Market assessment of Diabetes in India

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by

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2023

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **"Market assessment of diabetes in india"** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Name of Student: Prince Sherbahadur Singh

Date:

CERTIFICATE

This is to certify that dissertation titled **"Market assessment of diabetes in india"** is a record of the research work undertaken by **Prince Singh** in partial fulfilment of the requirements for the award of the degree of **MBA (Pharmaceutical Management)** from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

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LIST OF ABBREVIATION

Sr No	Abbreviation	Meaning
1	CAGR	Compounded Annual Growth Rate
2	CV	Cardiovascular
3	DKA	Diabetic Ketoacidosis
4	DM	Diabetes Mellitus
5	GAD65	Glutamic Acid Decarboxylase
6	GDM	Gestational Diabetic Mellitus
7	HB1Ac	Glycated Haemoglobin
8	HIP	Hyperglycemia in pregnancy
9	IAA	Insulin Auto Antibodies
10	AIC	Antibodies to Islet Cell
11	IDF	International Diabetes Federation
12	IFG	Impaired Fasting Glucose
13	IGT	Impaired Glucose Tolerance
14	T2DM	Type 2 Diabetes Mellitus

LIST OF FIGURE

ABSTRACT

Consumers face numerous issues as a result of the oral antidiabetic market's intense competition and fragmentation. As a result, research is required to gain a more comprehensive understanding of the market. An important known risk factor for kidney and ocular issues is diabetes. As a result of regularly published new knowledge, diabetes therapy is always evolving, and an excessive number of new medications are being added quickly. Due to their effectiveness in reducing underlying comorbid diseases, there has been a change in the medications that are prescribed. Older, less efficient treatments with more side effects are gradually replacing outmoded ones. This study, therefore, concentrates on the market estimation and development of oral antidiabetics, as well as an evaluation of new rivals in the same market. The dispensing chemists were the intended audience for the survey that was created as part of the study project. They were asked to answer the questions, and their comments were digitally recorded. The responses were subjected to a graphical analysis before the result was formulated.

Keywords: Oral and insulin-based diabetes medications, cost-effectiveness, market, competitive environment, brands.

INTRODUCTION

Diabetes Mellitus (DM) is a general term used to describe a variety of metabolic diseases characterized by chronic hyperglycemia leads to insufficient or impaired insulin action, insulin synthesis, or both (Awad.M. Ahmed, 2002). Because insulin is an anabolic hormone, it changes the metabolism of proteins, lipids, and glucose (Awad.M. Ahmed, 2002).

Diabetes, a prevalent chronic condition affecting millions of people worldwide, has emerged as a major public health concern in recent years. The increased blood glucose poses significant challenges to individuals, healthcare systems, and societies at large. Understanding the intricacies of diabetes, its types, causes, risk factors, and management strategies is crucial in addressing its impact on individuals and implementing effective preventive measures.

Diabetes prevalence has risen to epidemic levels, with the WHO predicting that 422 million people worldwide had diabetes as of 2019. Due to variables like population expansion, ageing, urbanization, unhealthy lifestyles, and genetic susceptibility, this figure is expected to increase significantly over the next few decades. Diabetes has no age, gender, socioeconomic, or geographic restrictions and affects people of all ages, genders, and regions.

Diabetes is primarily caused by the body's inability to properly use or manufacture insulin, a hormone vital for controlling blood sugar levels. A key that unlocks cells, insulin is released by the pancreatic beta cells, allowing glucose to enter and be metabolized for energy. This complex process is hampered in people with diabetes, resulting in blood glucose levels that remain abnormally high.

Often diagnosed in childhood or adolescence, type 1 diabetes is also known as insulin-dependent diabetes or juvenile-onset diabetes. This autoimmune disorder develops when the immune system unintentionally targets and kills the pancreatic cells that make insulin. Because of this, people with type 1 diabetes must have lifelong insulin therapy in order to survive. The precise causes of this autoimmune reaction are yet unknown, but genetic and environmental factors are thought to be major contributors.

Contrarily, type 2 diabetes, which makes up the majority of cases of the disease, is caused by a confluence of inadequate insulin production and insulin resistance. Insulin resistance is the term for the body's impaired capacity to react to the effects of insulin, necessitating greater insulin dosages to maintain normal blood glucose levels. Once the beta cells in the pancreas might exhaust itself, which would lead to less insulin being produced. Obesity, sedentary lifestyles, bad eating habits, and genetic predisposition are all strongly linked to type 2 diabetes.

Other types of diabetes, Pregnant women who have gestational diabetes, a transitory illness, are significantly more likely to experience it. Pregnancy-related hormonal changes may hinder insulin's ability to work properly, raising blood glucose levels. Although postpartum gestational diabetes usually goes away, both the mother and the baby are more likely to develop type 2 diabetes in the future.

Additionally, recent research has provided information on more uncommon types of diabetes as LADA and MODY. LADA shares autoimmune traits with type 1 diabetes but manifests later in life. It is frequently initially misdiagnosed as type 2 diabetes. MODY, a monogenic form of diabetes that typically affects younger people and is sometimes confused with type 1 or type 2 diabetes, is brought on by genetic alterations.

The consequences go far beyond high blood sugar levels. Uncontrolled diabetes can have a significant negative impact on the body's systems and organs, which can result in catastrophic consequences. Blood arteries can get harmed lead to CAD, raising the risk of cardiovascular diseases. Furthermore, long-term high blood sugar levels can have severe consequences on the eyes, kidneys, and nerves, which could lead to visual impairment, kidney disease, and diabetic neuropathy.

A thorough and all-encompassing strategy is needed to address the many issues surrounding diabetes. In order to slow the rise in diabetes prevalence, prevention is crucial. Public health programmed that encourage active living, emphasize the value of a balanced diet, and promote healthy lifestyles are crucial. Effective diabetes management and avoiding complications depend on early detection and prompt intervention. Access to cheap healthcare services, education, and routine screening programmed are important in this regard.

Additionally, a variety of interventions are used in diabetes care regimens. The foundation of diabetes care is lifestyle adjustments, which include a healthy diet, frequent exercise, managing weight, and quitting smoking. Exogenous insulin injection is required to keep blood sugar under control in type 1 diabetes. When managing type 2 diabetes, a step-by-step strategy is frequently used, beginning with lifestyle modifications and ending, if necessary, with oral medicines or insulin therapy. Essential elements of diabetes management include careful blood glucose monitoring, regular checkups, and adherence to medication schedules.

In conclusion, diabetes is a serious metabolic illness that has repercussions for people all over the world. Because of its rising prevalence and links to several complications, diabetes necessitates a thorough understanding, strong preventative measures, and focused management techniques. It is possible to lessen the pressure of diabetes and enhance the quality of life for those who have this chronic condition by encouraging healthy lifestyles, raising awareness, and guaranteeing access to high-quality healthcare services.

CLASSIFICATION

There are 2 type of diabetes

1. Type-1 Diabetes Mellitus- Only 5-10% of diabetes, also known as type 1 diabetes, insulin-dependent diabetes, and juvenile-onset diabetes, is this type, which is brought on by the autoimmune cell-mediated destruction of pancreatic beta cells. Diagnosis and Classification of Diabetes Mellitus, 2010. Antibodies against the islet cell (ICAs), glutamic acid decarboxylase (GAD65), tyrosine phosphatases IA-2 and IA-2b, ZnT8, and insulin autoantibodies (IAAs) are examples of markers of immune cell breakdown. When fasting hyperglycemia was originally described, 80-85% of the population had one or more of these autoantibodies. Solid-Herrera, Triplett, and Reasner (2000). The rate of ß-cell degeneration in this form of diabetes is extremely varied in some people (mostly babies and children) and slow in others (mostly adults). In certain people, especially ketoacidosis may be the first indication of the illness in both newborns and adults. Others have mild fasting hyperglycemia, which can quickly progress to significant hyperglycemia if they are exposed to an infection or other triggers. Type 1 idiopathic diabetes Idiopathic DM variations frequently originate mostly in Africa or Asia. Based on their varying low blood levels of insulin, there is a variable risk of developing diabetic ketoacidosis (DKA)

2. Type-2 Diabetes Mellitus- Insulin resistance and relative insulin insufficiency are the distinguishing features of this type of diabetes, which affects 90–95% of adults with diabetes and was formerly known as non–insulin–dependent diabetes, type 2 diabetes, or adult-onset diabetes. (RA,1997) Despite the fact that fasting and meal-stimulated plasma insulin levels are usually above average in absolute terms, they are insufficient to maintain optimal glucose regulation "relative" to the level of insulin resistance. (M & RA, 2008) This kind of diabetes affects a large proportion of obese people, and obesity worsens insulin resistance. Patients who don't match the usual definition of obesity may have a larger percentage of 3 body fat, which is typically seen in the abdomen. Ketoacidosis is unlikely to happen when used with this type of multivitamin. When it does, stress frequently contributes to an infection or another ailment. This type of diabetes may go untreated for years due to the gradual onset of hyperglycemia and the fact that it frequently does not become severe enough for the patient to detect any of the normal symptoms of diabetes in its early stages. The International Diabetes Federation (IDF) published data in 2013 that suggested 382 million people worldwide have diabetes. With a 10% global frequency, there will probably be 590 million of

them by 2030. The majority of them are aged between 40 and 60. (Aguiree,2013). Genetics and lifestyle decisions are the primary causes of type 2 diabetes.

Gestational Diabetes: Gestational diabetes can develop in women who have never had the condition before. Hormonal changes associated with pregnancy may make insulin less effective, which would result in higher blood sugar levels. Gestational diabetes often disappears after childbirth, but women may get diabetes in future. Monitoring blood sugar levels, making dietary and lifestyle modifications, exercising, and, in certain cases, receiving insulin therapy are necessary to manage gestational diabetes and prevent complications for both the mother and the unborn child.

Other Types of Diabetes:

LADA (Latent Autoimmune Diabetes of Adulthood): LADA is an autoimmune disease that appears in maturity and is similar to type 1 diabetes. Due to its similar presentation to type 2 diabetes, people may first be misdiagnosed with it since it advances slowly.

MODY - The full form MODY is Maturity-Onset Diabetes of the Young**.** A rare kind of diabetes called MODY is brought on by genetic abnormalities. Usually affecting younger people, it's frequently misinterpreted as one of type of diabetes. Depending on the particular genetic mutation present, different MODY treatments are available.

Secondary Diabetes: Secondary diabetes can be brought on by specific medical conditions or drugs. As an illustration, some hormonal conditions, pancreatic conditions, and the usage of specific drugs like corticosteroids can cause increased blood sugar levels.

Finally, it should be mentioned that there are several types of diabetes, and each one needs a different care strategy. Type 1 diabetes is an autoimmune disorder in contrast to type 2 diabetes, which is characterized by insulin resistance or insufficient insulin production. Gestational diabetes caused by pregnancy typically disappears after delivery. Other, less common types of diabetes include LADA, MODY, and secondary diabetes brought on by underlying conditions or medications. People with diabetes must work closely with medical professionals to maintain healthy blood sugar levels and lower the risk of complication.

INDIAN DIABETES REPORT

In 2020, it is anticipated that the Indian diabetes market will be valued near to USD 1,957 million. Between 2021 and 2026, the market is projected to expand at a16.5% CAGR, reaching a value of around USD 4,892.7 million. increasing understanding and knowledge Consumer knowledge of the signs and symptoms of diabetes and its negative health implications has significantly increased the rates of diagnosis and medication use, driving the Indian diabetes industry. The development of the healthcare infrastructure and the growth of the diabetes industry in India are both being aided by increased urbanization. In addition, the development of low-cost medication production, the introduction of new technologies, and the growth of pharmaceutical contract manufacturing have all accelerated the development of the country's diabetes sector. Though, in Costly R&D expenses, stringent pricing regulations, price control, technology improvements that make prescription pharmaceuticals obsolete, and intellectual property rights (IPR) regulatory clearances for quality control and protection could impede the future market progress this year. specialized market research

BACKGROUND & RATIONALE

The market for oral antidiabetic medications is highly competitive and fragmented, which poses several issues for consumers. As a result, studies are required to gain a better understanding and evaluation of the market. An important known risk factor for kidney and ocular issues is diabetes. In reaction to newly published material daily, diabetes treatment continues to advance, and an abundance of new medications are being added quickly. There has been a change in the medications given out as a result of their beneficial effects on reducing underlying co-morbid conditions. Older, less efficient treatments with more side effects are gradually replacing outmoded ones. This study therefore concentrates on the market estimation and development of oral antidiabetics, and an ex, as well as an evaluation of fresh rivals in the same market.

LITERATURE REVIEW

Type 2 diabetes mellitus (T2DM) is a worldwide epidemic, as can be seen from the International Diabetic Federation's world map representation of diabetes (http://www.diabetesatlas.org/). Diabetes mellitus is a serious metabolic disorder that progresses and is largely characterized by hyperglycemia. It is believed that improper insulin secretion, tissue resilience, or a combination of the two are the most common causes of the physiopathology of T2DM, a spectrum of diseases that started with tissue-insulin resistance and eventually progressed to the state characterized by completely no secretory activity in pancreatic beta cells .T2DM makes a major contribution to the rapid rise in non-communicable diseases in developed and developing nations. This succinct review aims to describe the current management strategies for lowering T2DM high blood glucose, which includes the range of medications currently used for pharmacological control. (Chaudhury,2017)

A number of classifications of diabetes mellitus and related types are contrasted in terms of diagnostic criteria, pathophysiology, and genomics. The molecular genomics of diabetes has received significant attention recently from a number of eminent scholars and research organizations in the field of biomedicine. Numerous mutations and single nucleotide polymorphisms (SNP) in genes as well as in the development, control, and operation of pancreatic cells at various levels are studied. The key developments in the molecular knowledge of diabetes in relation to various types of diabetes are briefly discussed below in comparison to the prior understanding in this field. Despite the accumulation of significant information at both the molecular and cellular levels, the mechanism underlying the evolution of diabetes and its consequences is still not entirely understood. There needs to be further research necessary in this field, which will concentrate on reducing the likelihood of chronic disorders arising and enhancing diagnostics and therapy. (2015) Kharroubi & Darwish. The main causes of DM type 2 are genetic and dietary variables. This study examined 84,941 women nurses who were free of cardiovascular disease, diabetes, and cancer based on diagnosis at baseline in order to analyses the influence of lifestyle behaviors on diabetes. Information on diet and lifestyle was updated frequently. A low-risk group was defined in conjunction with the following five factors: Low body mass index (BMI), high grain fibre, unsaturated fat, little or no trans-fat, and glycemic load diet all have an impact on the blood sugar result due to diets, sufficient to high-intensity daily activity, quitting smoking, and daily average alcohol consumption with a minimum alcohol level of.50%. Obesity or overweight was the most important risk factor for diabetes. Even after correcting for body mass index, not exercising, eating poorly, and continuing to smoke all significantly increased the risk of developing diabetes. There was a 0.09 proportionate risk of diabetes in the low-risk group (3.4% of women), compared to the rest of the cohort. In this group, routines and behaviors that do not conform to a low-risk pattern may be responsible for 91 percent of diabetes cases.

Hu, Manson, and Stampfer (2002). Researchers evaluated the cluster implications and outcomes of Type 2 diabetes among Asian Indians in a different study.

With the help of dependent indicators such as age at the time of the diagnostic test, waist circumference, glycated hemoglobin, serum triglycerides, serum high-density lipoprotein, and serum high-density lipoprotein, and we carried out k-means clustering on almost 19,000 patients with T2DM (aged 10-95 years) who had the condition for less than five years. prior to their first doctor visit. This was subsequently validated in a data collection from a national epidemiologic study that included representative people from 15 Indian states. Researchers discovered four patient clusters, varying in both the phenotypic characteristics and the prognosis of the illness Cluster 1 Cluster 2 and Cluster 4 (IRDD Insulin-Resistant Diabetes) We identified four patient clusters that varied in both the phenotypic characteristics and the course of the illness, even if SIDD and MARD match clusters documented in other demographic groups. According to proportional hazards, SIDD is most at risk from retinopathy, followed by CIRDD, whereas CIRDD is more at risk from renal illness. 2020 (Anjana, Baskar, & Nair). Another article aims to analyses the self-management education (DSME) features for women from Africa and Latin America who have Type 2 diabetes mellitus in an effort to maximize their diabetes education. We conducted literature searches in several health databases for randomized controlled trials and comparative analyses. The abrogation of the major anti-diabetic brands and the ensuing introduction of generic drugs to the market are the main factors driving the rise of consumer interest in these brands. 2010's Claudia Morgan This study sought to provide information on post-market research conducted by the pharmaceutical industry and the impact of label changes on studies of oral diabetic medications. Metformin, glipizide, and pioglitazone post-market trials were identified in a literature review. The FDA has highlighted labeling changes in MedWatch® as response indicators for the post-market safety of pharmaceuticals. By contrasting studies financed by industries and those funded by non-industries, the data for post market studies, sponsored studies, changes to drug labels, and results after a medicine's usage has become widespread all underwent analysis. Studies covering the entire industry were funded, and the findings revealed that for 21 (19.8%) pioglitazone, for metformin, and for glipizide, the differences in the favorable results between industry and non-industry trials were comparable at 85 (80.2%) compared to 149 (49%) and 155 (51%) for metformin, 33 (44%), and 42 (56%) for glipizide. The introduction of generic versions of metformin and glipizide did not considerably boost the quantity of research financed by the industry. Studies supported by Glipizide manufacturers are preferred to those supported by competitors in the sector.

OBJECTIVE

Gaining a thorough grasp of the diabetes market in India is the goal of this study. Analyzing current market trends, diabetes prevalence and incidence in India, socioeconomic and demographic characteristics associated with diabetes, current diabetes treatment options, and key participants in the diabetes market are all necessary for this. The regulatory environment, patient access to care, and evolving technology are a few of the market's problems and possibilities that will be examined in the study. This study's main objective is to offer information that will enable decision-makers to confront the expanding diabetes epidemic in India in the most effective way possible.

- To examine the Market Growth and future opportunities in diabetes in India?
- To examine the competitor landscape of the Anti-Diabetes Market.

MATERIAL AND METHODS:

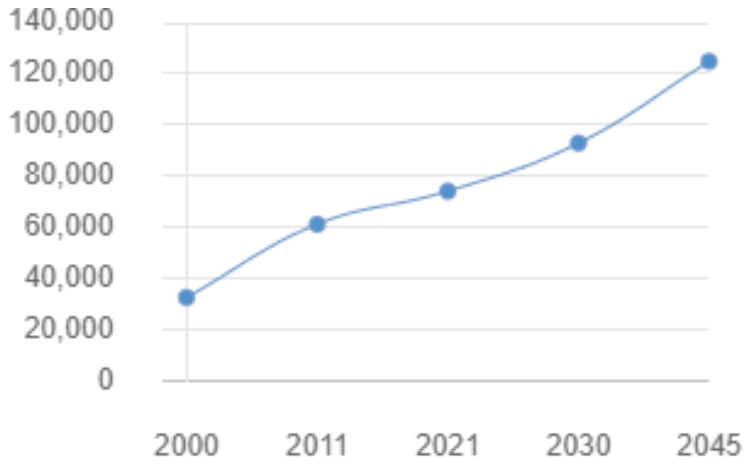
- **Study Design**: Descriptive Type
- **Research Population** – Diabetologist, Cardiologist
- **Data collection tool-** Questionnaire
- **Sample source:** Primary and Secondary research
- **Method**
    - **Primary Data collection** – A Structured series of questionnaires were used for data collection.
    - **Secondary data collection** – Articles and Journals
- **Duration of Research** – 3 months (27 February to 27 May)

SAMPLE DESIGN

- **Target population –** Dispensing Pharmacists.
- **Sample size**- 100 pharmacists
- **Sampling Techniques –** Non-Probability- convenience sampling
- **Study Area- Mumbai**
- **Data collection and analysis** - Using programs like Microsoft Excel and R-studio, the responses were gathered, filtered, and statistically analyzed.
- **A measure of Ethics -** Respondents received guarantees of confidentiality and privacy.
- **Data Analysis and Interpretation -** Using appropriate statistical methods, the conclusions were drawn through data analysis and interpretation**.**
-

RESULT

- The below figure shows the market of diabetes growth in future



Market growth of Diabetes

1) **According to the prescriptions you receive, what type of anti-diabetic medications are administered to patients more frequently?**

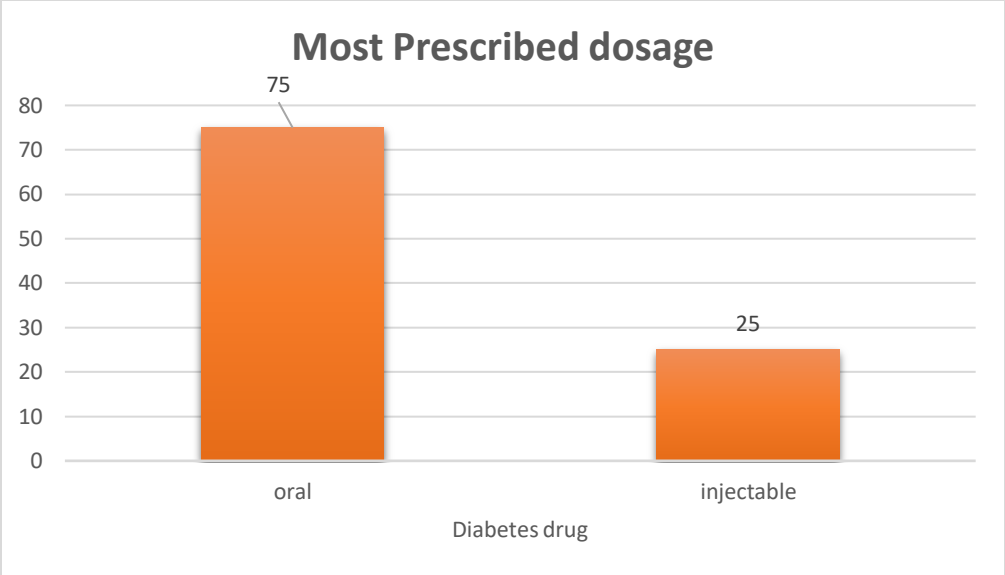


Fig- 1

Interpretation - The sort of anti-diabetic medication that is typically prescribed is shown in the graph above. According to a survey, 75% of oral anti-diabetic and 25% of injectable anti-diabetic medications are prescribed in Mumbai

2) What is the most popular oral anti-diabetic medication?

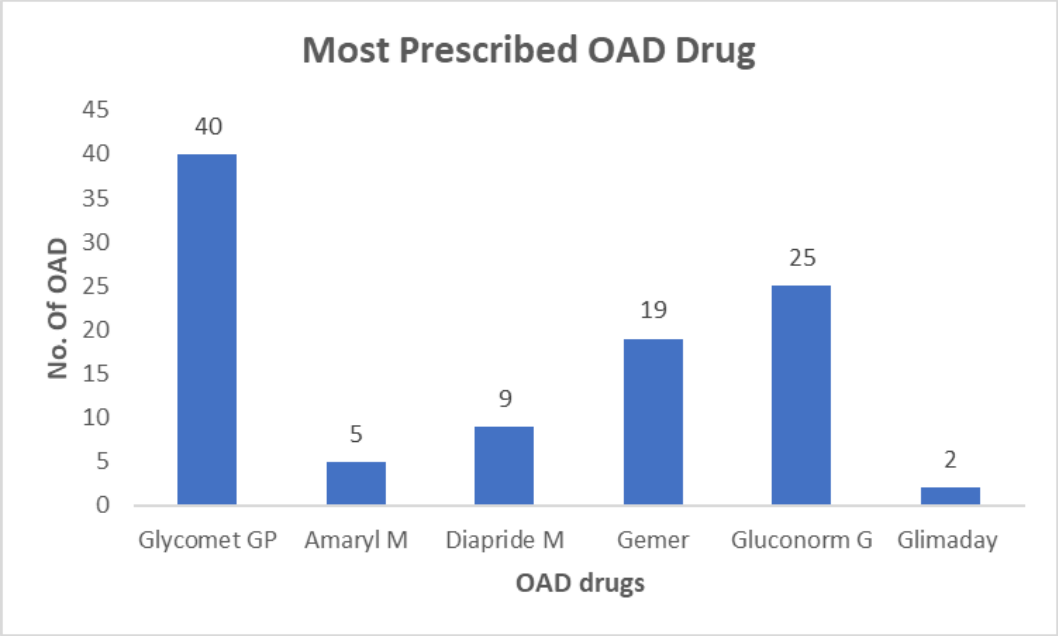


Fig-2

Interpretation The medicine that is typically prescribed for oral diabetes is shown in the graphical analysis. Glycomet is one of the oral diabetes medications.

The most frequently prescribed drug is GP (40%), which is followed by Gluconorm G (25%), Gemer (19%), Diapiride M (9%) , Amaryl (5%)and Glimaday (2%).

3) Which company, in your opinion, dominates the oral anti-diabetic market?

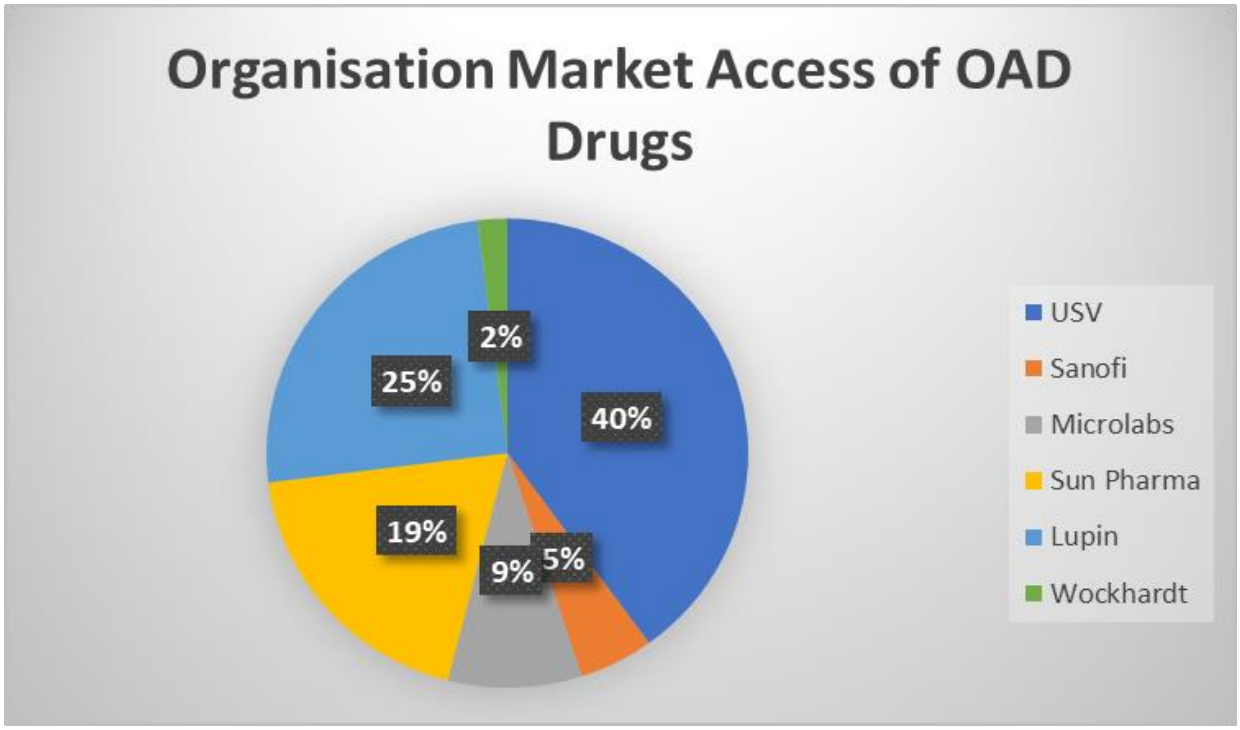


Fig-3

Interpretation - The market leader in the oral antidiabetic market is shown in this graphical study. USV (40%) holds the top spot in the market for oral antidiabetics, while the second Sun Pharma is in second place (25%) behind Lupin. At last place were Sanofi (5%), Microlabs (9%) Wockhardt(2%)

4) Which injectable anti-diabetic medication is most frequently prescribed?

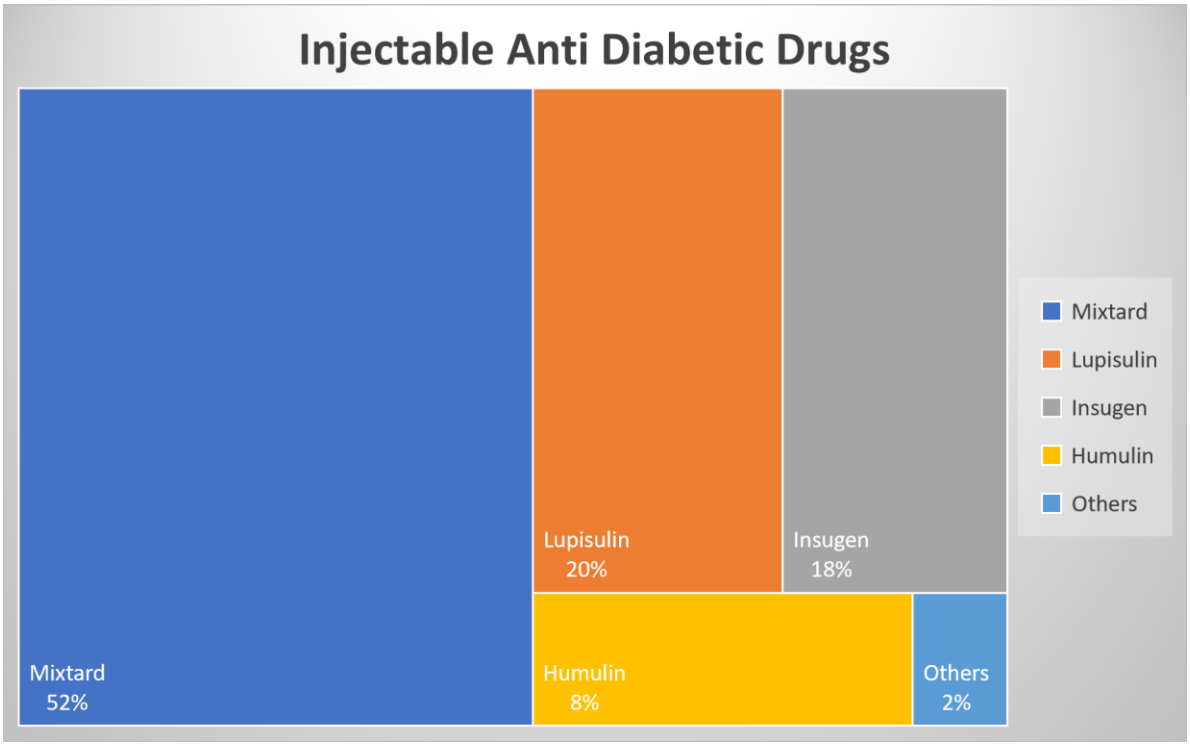


Fig-4

Interpretation- The most popular injectable anti-diabetics are shown in this graphical study. Mixtard is the most commonly prescribed injectable antidiabetic (52%), and it accounts for more than 50% of the market share. The second-most frequently prescribed injectable diabetes medication is lupisulin (20%), which is followed by insugen (18%), humulin (8%) and Others(2%).

5) Which injectable anti-diabetic product, in your opinion, commands the market?

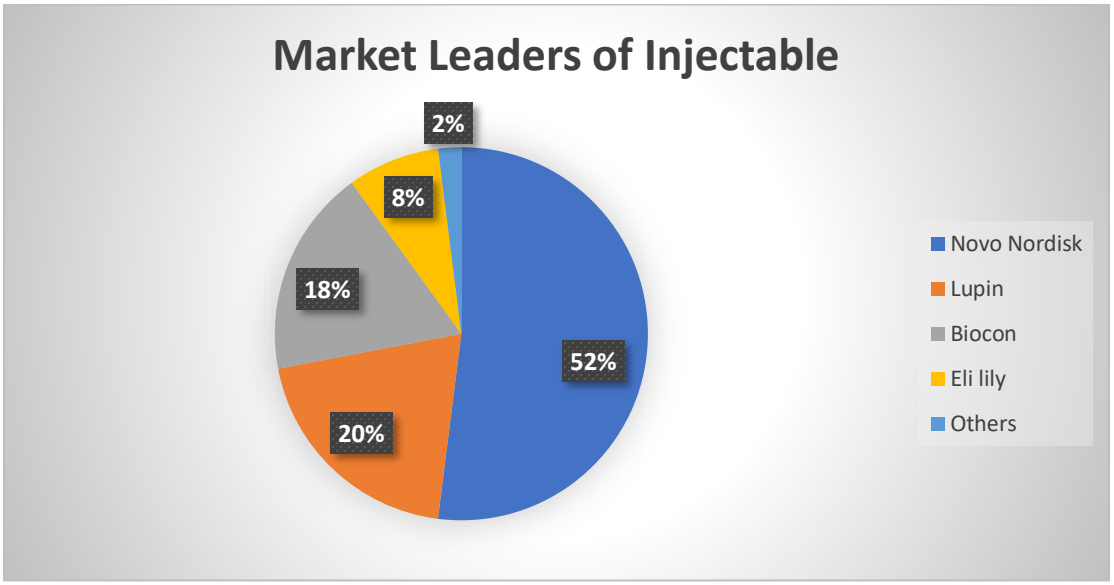


Fig-5

Interpretation- The market leader for injectable anti-diabetics is shown in the graphical analysis. Novo Nordisk (52%) is the market leader for injectable antidiabetics, whereas the second-place Lupin (20%) is the market leader among these, followed by Biocon (18%), Eli Lilly (8%) and Others (2%).

6) Which treatment do you believe doctors like most?

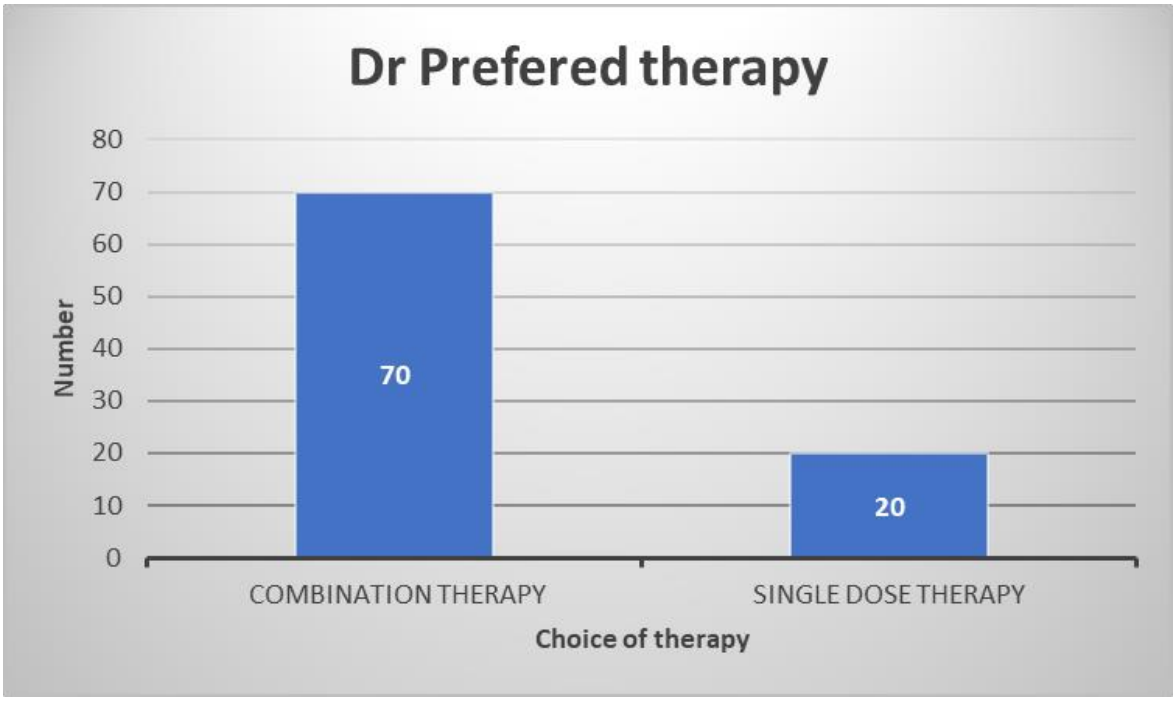


Fig-6

Interpretation- The preferred form of therapy suggested by the doctors is depicted in the graphical analysis. According to the findings, combination therapy (70%) is the treatment that doctors most frequently choose and suggest to patients. The patients might not forget to take their medication, and the reason is cost effectiveness. Rest (30%) additionally suggests single-dose treatment

7) What could be the rationale for favoring oral antidiabetic medications?

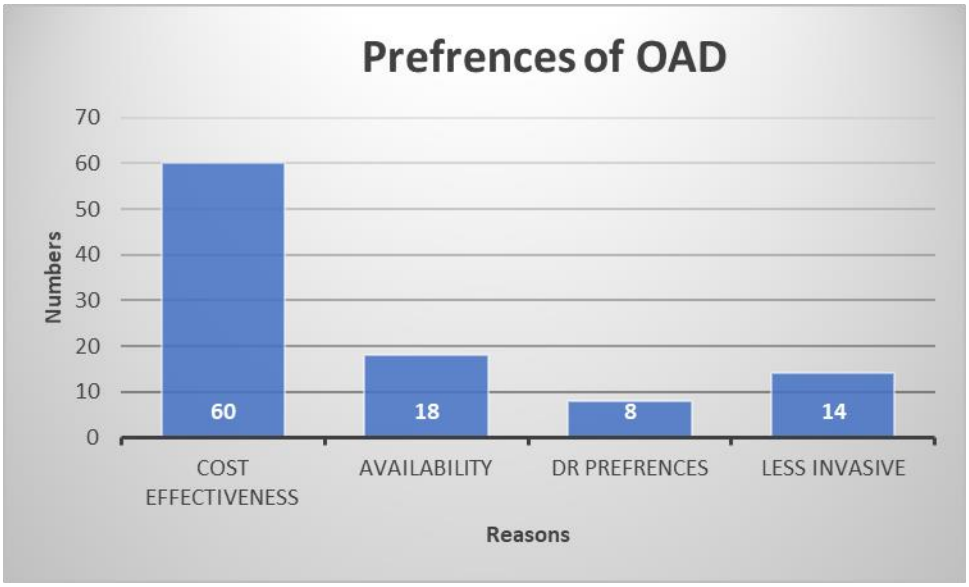


Fig-7

Interpretation- The graphical analysis shows the probable justification for choosing oral diabetes medications over injectable ones. Cost-effectiveness is the key justification for choosing oral diabetes medications over injectable ones (60%). Additionally, oral diabetes medications are extensively used and accessible (18%), followed by less invasiveness (14%) and, finally, by doctors' dependence on them oral diabetes medicines (8%)

8) Which oral antidiabetic medication is most frequently prescribed?

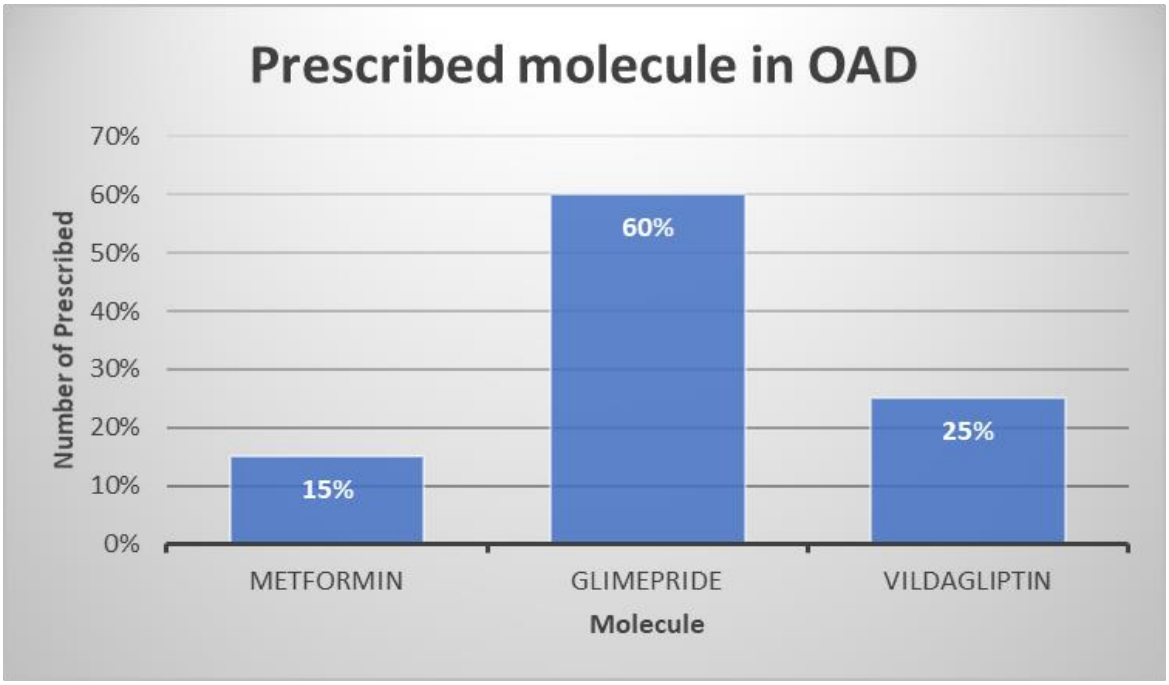


Fig-8

Interpretation- The oral antidiabetics segment's most often prescribed molecule is depicted in the graphical analysis. The most frequently given oral antidiabetic drug is glimepiride (60%) with Vidagliptin (25%) and Metformin (15%) following.

CONCLUSION

The survey was carried out in the Mumbai area between February 2023 and May 2023. The dispensing pharmacists from several pharmacies in the intended location where the research is to be conducted were the target audience. 100 dispensing chemists was included in the sample size. In comparison to injectable antidiabetics, oral antidiabetics are prescribed more frequently, according to statistical and graphical analyses of the data. Out of 100 participants, 75% indicated that oral diabetes medications are favored, while only 25% indicated that injectable diabetes medications are given. The most frequently prescribed oral diabetes medication is Glycomet GP (40%), followed by Gluconorm G (25%), Gemer, Diapiride, and Amaryl. Mixtard (52%) is the most frequently prescribed injectable diabetes medication, followed by Lupisulin (20%), Insugen, Humulin, and HumanInsulink.

The Competitor Landscape of Antidiabetic market is very big and it is driven by **Novo Nordisk (52%) is the market leader in the injectable anti-diabetic's category, whereas USV (30%) is the market leader in the oral anti-diabetic's segment**. Resting below Novo Nordisk in the market for injectables are Lupin, Biocon, Eli Lily, and Glenmark. The oral market has Lupin, Sun Pharma, Glenmark, Microlabs, and Sanofi below USV. Additionally, due to cost-effectiveness and the possibility that patients won't forget their medication, doctors suggest combination therapy (70%) over single-dose therapy. Oral diabetes medications are favored over injectable ones primarily because they are more affordable (60%) and less intrusive. There are several compounds linked to anti-diabetic medications, with glimepiride (60%) being the one that is most commonly administered. Vidagliptin (25%) and metformin (15%) are next in line.

RECOMMENDATION

The description that follows makes it obvious that injectable therapies are less common than oral diabetes drugs. Novo Nordisk dominates the market for injectable medications, while USV leads the market for oral anti-diabetic medications. Glimepiride is one of the oral anti-diabetic drugs that are most frequently prescribed, albeit combination therapy is favored over single-dose therapy. Combination therapy is recommended since it is less expensive.

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ANNEXURE

Ethical Consideration:

The research study was carried out in accordance with the established research procedures. The study participant was provided time to express their real feelings about the research topics. The participants' consent was obtained, and proper permission was granted for the use of their data.

The respondent's identity was revealed with their permission, and if they were unwilling to do so, their identity was kept confidential.