International Journal of Advanced Research and Development
www.multistudiesjournal.com
ISSN: 2455-4030
Received: 29-10-2024, Accepted: 28-11-2024, Published: 13-12-2024
Volume 9, Issue 6, 2024, Page No. 14-16

Different strategies for diabetes patients treatment

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Abstract
Type 2 diabetes is a chronic and progressive cardiometabolic disorder and a major cause of morbidity, mortality, disability, and high costs. This study focused on the first line treatment and the replaced medication to show the dependent treatment strategy. **C**ollection of 120 cases of both male and female diabetic patients was depended on certain information included: patient's gender, age, duration of diabetes, first line of treatment, the replaced medication. 58% of patients were females and 42% were males. Metformin as the first drug of choice. Replaced treatment after metformin was a combination of metformin and other antidiabetic drugs. Diabetes prevalence differences between males and females may be attributed to a variety of biological, behavioral, social, and genetic factors. Metformin is an effective medication as a monotherapy or in combination other glucose lowering medications with a minimal side effects.

Keywords: Diabetes, antihyperglycemic medications, first and alternative treatment

Introduction
Diabetes, a chronic and progressive cardiometabolic disorder, is a major cause of morbidity, disability, and mortality worldwide. Comprehensive person centred management of diabetes requires attention to glycaemic control and risk factors for cardiovascular disease (hyperlipidaemia, hypertension, and tobacco use), weight management, early detection and treatment of microvascular, macrovascular, and metabolic complications of diabetes and mental health concerns, mitigation of burden of treatment, addressing social determinants of health, and improving quality of life [1].
The diagnostic criteria for diabetes are based on fasting plasma glucose (FPG), 2-hour plasma glucose (2h-PG) during a 75g oral glucose tolerance test (OGTT), or glycosylated hemoglobin (A1C) value [2]. The A1C test should be performed using a method that is certified by the National Glycohemoglobin Standardization Program and should be standardized or traceable to the Diabetes Control and Complications Trial reference assay [3]. Since 2011, A1C has been included as a diagnostic criterion in the KDA clinical practice guidelines [4].
If someone can't maintain his target blood sugar level with diet and exercise, his health care provider may prescribe diabetes medications that help lower glucose levels. Many people with type2 diabetes need to take diabetes medications as well. These medications may include diabetes pills or medications he injects, such as insulin. Over time, he may need more than one diabetes medication to control his blood glucose level [2].

Biguanides
These pills works mainly by lowering glucose production in the liver and improving the body's sensitivity to insulin so it uses insulin more effectively [1]. Most works propose that biguanides inhibit the mitochondrial complex I, which causes ATP depletion and activation of compensatory response responsible for the therapeutic properties [5]. Monitoring serum creatinine levels is important because the medication is primarily excreted by the kidneys [2].

Insulin therapy
Some people who have type2 diabetes need insulin therapy. In the past, insulin therapy was used as a last resort, but today it may be prescribed sooner if blood sugar targets aren't met with lifestyle changes and other medicines. Different types of insulin vary on how quickly they begin to work and how long they have an effect. Long-acting insulin, for example, is designed to work overnight or throughout the day to keep blood sugar levels stable. Short-acting insulin generally is used at mealtime [6].

Meglitinides
These pills help the body to make more insulin around mealtime. Contraindications include liver or kidney problems, pregnancy or breastfeeding. The use of these pills may be associated with hypoglycemia [7].

DPP-4 Inhibitors
The clinically most relevant and important action of DPP- 4 inhibitors is the endogenous elevation of the incretin hormone concentration of GLP-1 that consecutively leads to a glucose-dependent stimulation of insulin secretion and an inhibition of glucagon secretion [8]. The insulinotropic effect of DPP-4 inhibitors explains the phenomenon that this class increasingly is replacing the use of sulfonylureas as insulin releasing agents; especially since the intrinsic hypoglycemia risk of DPP-4 inhibitors is very low [9, 10, 11]. A part from that, DPP- 4 inhibitors are body weight neutral, whereas sulfonylurea therapy is associated with body weight gain [12, 13].

GLP-1 receptor agonists
GLP-1 is a peptide hormone with a short plasma half-life of a few minutes, in type 2 diabetes glucagon secretion is excessively stimulated and glucagon stimulates hepatic

glucose production. GLP-1 inhibits glucagon secretion under hyperglycaemic conditions and thereby improves glycaemia [14, 15].

SGLT2 Inhibitors

These pills affect the kidney to increase the amount of sugar that goes out in the urine [7]. Avoid SGLT-2 inhibitor use in people with low intake of carbohydrates, such as a ketogenic dietary approach, as this may increase the risk for euglycemia ketoacidosis. SGLT-2 inhibitors are contraindicated in the context of heavy alcohol use. If aware of excess alcohol intake, stop the SGLT-2 inhibitor and reassess at a later date [2].

Sulfonylureas

These pills help your body make more insulin. Contraindications include heart, liver, or kidney problems. Older adults and people with kidney or liver problems may be more likely to have low blood sugar when taking these medicines. Common side effects include; hypoglycemia, weight gain, dizziness, and headache [7].

Bile acid sequestrants

It is not clear how this pill works for diabetes. But This medicine is also used to treat high cholesterol. Common side effects include constipation, dyspepsia, and nausea [16].

Dopamine receptor agonists

This pill affects a chemical called dopamine in your cells. It is not clear how this pill works for diabetes. Common side effects include Nausea, headache, vomiting, and tiredness [2].

Alpha-Glucosidase Inhibitors

These pills help your body digest sugar more slowly. Contraindications include heart, liver, or kidney problems, pregnancy or breastfeeding [16].

Thiazolidinediones

These pills help the cells in the body to use glucose, make the body's tissues more sensitive to insulin. Contraindications include heart problems or heart failure. Common side effects include fluid retention, weight gain, heart failure, and anemia [17].

Patient and methods

Collection of 120 cases of both male and female diabetic patients was started from 7/3/2024 to 10/7/2024 at Al Imam Alsadiq general hospital, Marjan general hospital, Al Qasim general hospital. Information of data were included: patient's gender, age, duration of diabetes, first line of treatment, the replaced medication. These information were then analyzed to explain the best medication of choice for the treatment of diabetes and the alternative treatment.

Results and Discussion

The results of this study showed that the rate of diabetes among males is greater than that of females, as the rate of diabetes in males is 58%, while the rate of diabetes in females is 42%. While the results of the other search showed that there is a weak association between male sex and high frequency of diabetes. More striking is the observation that all populations with an incidence higher than 23/100 000 had a male excess, whereas all those with a rate below 4.5/100 000 had a female excess [17].

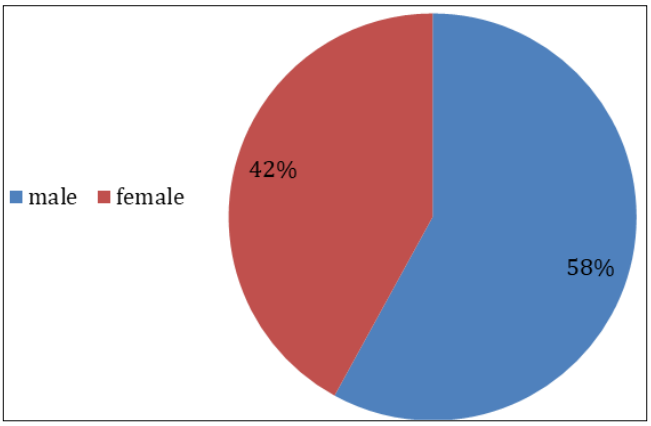

Fig 1: Distribution of diabetes according to gender

Through the results of the research, it was found that metformin is used as a first-line treatment for type 2 diabetes. It is effective as a monotherapy and in combination with other glucose-lowering medications, as it is generally well tolerated with minimal side effects compared to other medications and at reasonable prices, as the side effects are minor and can be tolerated. Dealing with it the most common side effects of metformin are nausea, diarrhea, and abdominal discomfort [18]. Gastrointestinal side effects will be less severe if metformin is taken with a meal and the dose is titrated gradually. Lactic acidosis affects 3-10 per 100,000 people per year in patients who take metformin are considered a small percentage compared to the benefits provided by metformin. Many studies have found low levels of vitamin B12 in patients who take metformin. As a precaution, regular testing of vitamin B12 levels in patients taking metformin has been suggested. In patients with low vitamin B12 levels, oral supplements may be recommended [19, 20].

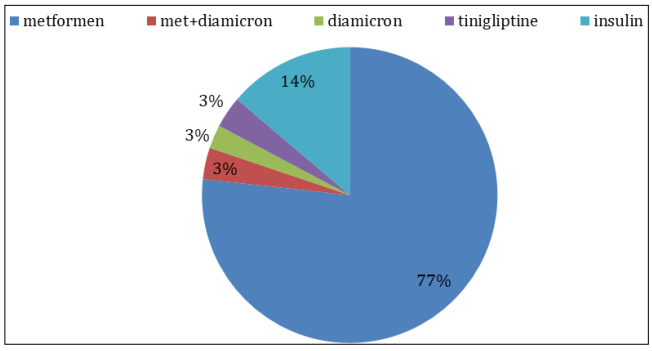

Fig 2: The first choice of treatment of diabetes

Regarding alternative treatment for patients, it was found that the percentage of patients who changed their treatment from metformin to insulin obtained a higher percentage compared to the rest, as the percentage reached 15%. While in second place are those who changed their treatment from metformin 500mg to metformin 1000 mg Their percentage is 10%, as shown in the figure 3. These differences may be due resistance to the first line of treatment, or the side effects may occur that the patient cannot tolerate, which prompts him to change the first treatment to a treatment that is appropriate for his health condition, such as a decrease in

B12 and weight loss for patients undergoing treatment with metformin. Also, control of metformin may be poor Finally, some chronic conditions or diseases may lead to changing treatment, such as pregnancy and heart and kidney patients.

Metformin is not suitable for pregnant women because it may cross the placenta, while insulin does not cross the placenta and thus is deemed safer for the fetus than oral antihyperglycemic agents; however, the evidence that oral agents are not safe is not convincingly found in the literature due to limited data [21]. Use of metformin in the first trimester of pregnancy did not find a significant increase in major congenital malformations [22].

Glinides are useful in patients with chronic kidney disease, as they are predominantly metabolized by the liver and therefore may be a useful alternative to metformin in this population [23].

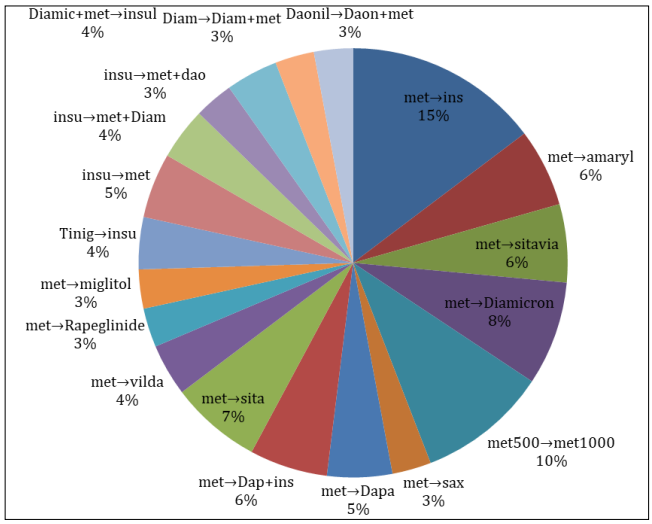

Fig 3: The first and the alternative drugs used for the treatment of diabetes

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