MANAGEMENT AND TREATMENT OF TYPE-2 DIABETES

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ABSTRACT.

Diabetes is a diseas caused by insufficient insulin production by the pancreas. Diabetic people aged 18 and older accounted for 8.5% of the total adult population in 2014. From 2000 to 2010, the early death rate from diabetes was reduced in high-income nations, but then grew again from 2010 to 2016. Premature mortality from diabetes rose in low- and middle-income nations across both time periods. Noncommunicable illnesses (cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes) between the ages of 30 and 70 have declined by 18 percent worldwide since 2020. Cardiovascular events are markedly increased in people with diabetes. Diabetes treatment must be based on a thorough understanding of the disease's pathophysiology. To treat type 1 diabetics, insulin is necessary since insulin production is impaired. When insulin secretion and action are both impaired in people with type 2 diabetes, treatment becomes more difficult. As a result, the patient's stage of the disease and personal characteristics will influence the type of treatment he or she receives. Type 2 diabetes management and treatment objectives are discussed in this research.

Keywords: Type-2 Diabetes, UN organizations, Descriptive statistics.

INTRODUCTION.

When it comes to healthcare expenses, diabetes mellitus is a chronic condition that has a three to four-fold increase in cardiovascular morbidity and death. When it comes to diabetic people, ischemic heart disease is the leading cause of mortality. 1,2 Type 2 diabetes is the most common and, as a result, the one most likely to result in cardiovascular morbidity and death, which is why this article focuses on its treatment [1].

Diabetic therapy must be founded on a thorough knowledge of the disease's underlying mechanisms. Because of this, the only therapy for type 1 diabetes mellitus is the injection of insulin or insulin analogues. Insulin resistance predominates in the early stages of type 2 diabetes mellitus; nevertheless, this illness is much more complicated [2,3,4,5]. While insulin sensitivity remains,

the shortfall in insulin secretion becomes increasingly apparent in later phases. Consequently, the treatment strategy will be determined by the illness stage and the features of the patient.

In a single document, the WHO module on diagnosis and treatment of type 2 diabetes provides information on diagnosis, categorization, and management of the disease. Those who plan diabetes care service delivery [7], who educate and supervise service providers, and who work in facilities and primary care settings would all benefit from this module, which is aimed for policymakers, programmed managers, and clinicians.

It was announced in April 2021 that WHO will begin the Global Diabetes Compact, an international project that aims to help countries in low- and moderate-income levels make significant advancements in their diabetes prevention and treatment programmers. International donors and people with diabetes come together in the Compact to work on a shared vision of reducing the risk of diabetes and ensuring that everyone who is diagnosed has equitable, comprehensive, affordable, and high-quality treatment and care. The Compact also brings together national governments, [8] UN organizations and nongovernmental organizations. There will be a resolution on diabetes prevention and management passed by the World Health Assembly in May 2021. Access to insulin and other diabetes medicines and health products should be improved, regulatory requirements for these products should be harmonized to ensure they are all treated the same, and a web-based tool to share market transparency information should be evaluated for its feasibility and potential value [9,10,11].

Problem Definition.

Acute decompensation is avoided, late disease consequences are delayed or avoided, mortality is decreased, and a high standard of living is maintained as a general objective of diabetes management. Controlling blood sugar levels may help prevent microvascular complications (retinopathy, kidney disease, and neuropathy), but it doesn't seem to be as important in the prevention of macrovascular complications (e.g., cardiovascular disease) (ischemic heart disease, cerebrovascular disease, peripheral arteriopathy) [12,13,14]. 4 When treating these individuals' risk factors, the management of hyperglycemia should be seen as a component of a comprehensive strategy (arterial hypertension [AHT], dyslipidemia, smoking). In other words, a strategy for controlling blood sugar that ignores other cardiovascular risk factors is irrational. Even if all of the diabetic patient's objectives aren't met, it's in their best interest to focus on reducing cardiovascular risk factors as a whole. Table 1 lists the goals of therapy [15,16,17]. 5-7 It is ideal to use HbA1c as a measure of diabetes management since it offers information on the past two to three months of glycemic control and should stay below 7%. Even in elderly or terminally ill patients, it is not required to achieve this therapeutic aim due to the danger of severe hypoglycemia. A diabetic patient's risk of developing ischemic heart disease is comparable to a nondiabetic patient who already has ischemic heart disease, thus the target values for the lipid profile and blood pressure should be based on these considerations. 8 Patients with known coronary artery disease, such as those with diabetes, should have stricter target values than diabetics do.

Research Objectives.

Descriptive statistics (frequency, mean, and standard deviation) were used to characterize patient socio-demographic variables, and the Chi-square test was employed to analyses the association between predictors and knowledge and practice levels while collecting data. In order to have a clearer picture of the relationship between various aspects of knowledge and practice, we need to merge these two elements [18]. The multi-variate models comprised variables with a P-value of less than 0.1. It was decided that a P-value of less than 0.05 was the threshold for statistical significance. SPSS version 18 was used for all analyses.

1.3 million individuals died because of diabetes in the United States in 2010. (2.4 percent of all death). The Eastern Mediterranean Region's diabetes prevalence varies from nation to country (EMR) [19,20].

- Neuropathy puts 20 percent of diabetics at risk for developing foot ulcers.
- With a frequency of 0–4 percent, diabetic foot ulcers (DFUs) are one of the most prominent diabetes complications.
- Diabetic foot issues and, finally, amputation may be prevented with adequate knowledge and practice of DFU.

Solution Suggested.

It has been shown that certain demographic factors of individuals with diabetes have a substantial association with knowledge and practice scores when it comes to the prevention and management of DFUs. As a consequence, a specific educational campaign to enhance diabetes understanding is necessary. Diabetic patients' attitudes toward foot care are connected to a decreased probability of acquiring ulcers. Regular shoe inspections, shoe selection, nail clipping, and daily foot management are just a few of the foot care behaviors that should be performed [21,22]. Furthermore, although education is vital for proper foot care, a lack of understanding might contribute to diabetic foot ulcers. Over the past two decades, researchers have focused on diabetes patients' foot care knowledge, attitudes, and behaviors in order to identify obstacles to receiving medical treatment, enhance self-care, and make lifestyle changes.

METHODOLOGY.

The feet are the most sensitive organs to injury, trauma, and infection in both healthy and diabetic persons. There's a link between a higher risk of developing peripheral vascular disease, dryness, and cracks on the feet due to a lack of sweating, as well as less protective feeling in the feet. The risk of foot damage and ulceration increases in diabetic patients if they do not obtain adequate foot care training. Foot care should include everything from cleaning to creaming to nail care to shoe management. When it comes to other behaviors, there is no discernible difference between those who are well-educated and those who are not. These findings could be explained

by the limited substance of the education program offered to patients who had previously been educated [23,24].

Planning Claims

Knowledge and application have a clear and undeniable link. Predictors of practice score included levels of knowledge, location, marital status, and previous hospitalizations owing to diabetic foot problems. Studies have indicated that having a better degree of information and a favorable attitude toward diabetic foot care improves diabetic foot care practice. As a result of these results, the goal of this research is to assess patients' knowledge and attitudes about foot care among those with diabetic foot ulcers and to contribute to the literature.

Principles General to Treatment

In the management of diabetes, a healthy diet and regular exercise are essential. To meet the treatment's overall goals, diet suggestions must be tailored to each patient's specific needs. Type 2 diabetics are prone to obesity, thus losing weight should be a primary goal for them. Each person's caloric intake should be tailored to his or her specific BMI and level of regular exercise. Proteins should make up 10% to 20% of calories consumed, while fats should make up less than 30% of calories consumed, with less than 10% of those calories coming from saturated fats. However, fast-absorbing carbs should be avoided, the focus should be on overall consumption rather than source when it comes to carbohydrates.

Other than helping diabetic people manage their condition, regular physical activity may help prevent the disease from developing in the first place.

It is very useful for individuals with type 2 diabetes to engage in 30 minutes of moderate intensity exercise each day, which decreases glycemia, improves cholesterol, lowers blood pressure, and aids in weight reduction (decreased heart rate at rest, increased systolic volume, and decreased cardiac work). The patient feels better and has a higher quality of life because of it. Hypoglycemia, which may develop hours after exercise and need alterations to the treatment regimen, is the primary drawback for diabetics. Hyperglycemic decompensation or even ketosis may occur in people with type 1 diabetes and poor metabolic control, particularly after anaerobic activity. Table 2 outlines the various dangers of physical activity, which include disrupting glucose metabolism. As a result, each patient's exercise regimen must be tailored to their physical capabilities and possible hazards.

Diabetic education provided by skilled healthcare professionals is critical to reaching treatment goals. Patients may learn more about their glycemic control by self-testing their capillary blood glucose, for example, which can assist them recognize hypoglycemia that might otherwise go unnoticed. For this reason, self-assessments are essential for making timely adjustments to treatment. A patient who has been taught how to use capillary blood glucose readings to adjust therapy and has been given guidance about dealing with different conditions like hypoglycemia or

hyperglycemic-kenotic decompensation would need fewer hospital admissions and have a higher quality of life.

DIABETES MELLITUS TYPE 2 TREATMENT.

Principles and methods of therapy in general

To manage type 2 diabetes, patients must follow a low-calorie diet and engage in regular physical activity on a regular basis. The use of pharmaceutical therapy must begin when appropriate metabolic control is not established, either because the patient does not adjust to changes in their lifestyle or because, despite adhering to the diet and exercising frequently, therapeutic goals are not accomplished, Type 2 diabetes treatment is shown graphically.

The planned treatment plan for type 2 diabetes. Repaglinide and Nate glinide are two of the fastest acting secretagogues. There are currently no TZDs that can be used as a single treatment for type 2 diabetes. It is based on the patient's specific needs. For example, if the patient is already on sulfonylureas (SU) and has a history of hyperglycemia, metformin might be added. A secretagogue or alpha-glycosidase inhibitor should be administered if inadequate control is achieved by postprandial hyperglycemic peaks after therapy with MET. Insulin therapy should begin with a single nocturnal dosage, according to current recommendations.

The use of medication

Sulfonylureas

Sus was originally commercialized in the mid-1950s, when the first sulfonylureas were created (carbetamide and tolbutamide). Tolbutamide, acetohexamide, tolazamide, and chlorpropamide were the first-generation Sus when they hit the market in the mid-1960s. Second-generation Sus were launched around the end of the 1960s (glipalamide, glipizide, gliquidone, and gliclazide). There were findings published in 1970 that suggested that tolbutamide, which was used to treat diabetes, was inefficient and increased cardiovascular mortality. This research had a significant influence not just in the United States, but also in other European nations, leading to a significant decline in the use of Sus. Despite this, the American Diabetes Society voted to lift limits on SU usage in 1979 and they have been available in the US since 1984.17 Another SU that has just been launched is glimepiride [48,49,50].

Action-reaction mechanism [44,45,46,47]. To put it another way, the Sus induce the release of produced insulin from pancreatic beta cells. 19 In order for the Sus to function, there must be a sufficient number of beta cells with insulin-secretory capability. As a result, Sus won't work for people with pancreatectomized or type 1 diabetes. Sus work by interacting with pancreatic beta cells, which have receptors with high affinity for their ligands. 20 Binding to these receptors blocks ATP-sensitive potassium channels from opening and prevents potassium outflow across the cell membrane, causing the cell membrane to depolarize. When the calcium channels open,

intracellular calcium levels rise and calmodulin binds to calcium, causing micro filament contraction and the exocytosis of insulin granules (Figure 2) [25,26,27,28].

Other cardio protective mechanisms [41,42,43] found in the heart and throughout the circulatory system include SU receptors and ATP-sensitive potassium channels. Sus may cause ischemia by blocking these channels. Despite this, the UKDPS trial showed that this potential adverse impact does not seem to be clinically meaningful, even when large dosages of Sus are provided abruptly [52,53,54,56,57,58].

DISCUSSION

Pharmacology in the clinic. Aside from potency, each SU has unique pharmacological qualities like as duration of action, metabolism, side effects, and more. Summarize some of the Sus most important pharmacological properties. More powerful and less poisonous are the second-generation Sus, which are more potent and less toxic than their predecessors. In the gastrointestinal system, all of the Sus are promptly absorbed and reach their peak plasma levels within two to four hours. Other medications may dislodge them from albumin, where they mostly adhere. The liver is responsible for the majority of metabolism, and the waste products that result from it are excreted in the urine and, to a lesser degree, the bile. For patients with mild to severe renal failure (creatinine levels less than or equal to 2 mg/dL) [32], Gliquidone may be an option [29,30,31].

Effects that aren't ideal. They're typically well-received by the public. The most common side effect is hypoglycemia, which is directly tied to the effectiveness and duration of the drug's action. 24 In contrast to tolbutamide [33,34,35,36,37,38], it occurs more often with chlorpropamide or glipalamide. Sufferers with SU are less likely to have hypoglycemia, but it might last longer and need IV glucose infusion therapy for many days. SU-induced hypoglycemia might be exacerbated by kidney or liver disease. Sus effects may be amplified by reducing drug consumption and use (e.g., aspirin, MAO inhibitors, pyrazolines, fibrates). All these variables are often present in diabetics who have reached an advanced [39,40] stage of their disease. Hypoglycemia symptoms may also be missing in some people, and they may instead be indicated by mental or neurological problems. Reversible side effects are rare (less than 5%) and readily tolerated.25 There are four tables in this section [59,60,61,62,63].

Precautions, indications, and medication selection

So is regarded first-line treatments for type 2 diabetes mellitus in patients who are not overweight and whose therapeutic goals cannot be met with a tailored diet and activity regimen [64,65,66,67]. Because the second-generation Sus are the most regularly used, the physician should prescribe the preparation she is most familiar with, as there is no evident superiority to the others. The decreased risk of life-threatening hypoglycemia with tolbutamide and glimepiride has led to their recommendation for the elderly population in general. In order to prevent hypoglycemia, treatment should begin with a modest dosage (usually half a tablet) and be

increased monthly until excellent metabolic control has been obtained or the suggested maximum dose has been reached, whichever comes first. Reducing dosages may be an option if a satisfactory response is achieved. Diet alone may be enough to keep symptoms under control if a lesser dosage is used. If the highest dosage of SU fails to produce satisfactory glycemic control, metformin may be taken in combination with SU, or the patient can be converted to insulin [32,33,34,35,36].

Because Sus is only effective if the patient has some insulin-secreting capability, they should not be used in individuals with type 1 diabetes or pancreas-deficient diabetes (e.g., after pancreatitis or pancreatectomy). Because they may penetrate the placental barrier and are secreted in mother's milk, they cannot be recommended during pregnancy and nursing. Under stressful conditions, it's not suggested to use Sus because they won't be able to provide enough insulin to keep the patient alive [65,66,67,68,69]. As a result, in critical cases like an AMI, a severe trauma, or a potentially life-threatening infection, it is better to begin insulin therapy first and then reevaluate SU treatment after the stress has passed. Because of the stress and the requirement for fasting, they should not be employed in the event of severe surgical operations. Because of this, insulin therapy and intravenous glucose infusion should be implemented in individuals with diabetes [70,71,73,74,75].

CONCLUSION

Rising focus has been paid to Preventing or delaying the onset of later-stage disease complications, lowering mortality, and preserving a high standard of living are the primary aims of diabetes management. Controlling blood sugar levels may help prevent microvascular complications (retinopathy, kidney disease, and neuropathy), but it doesn't seem to be as important in the prevention of macrovascular complications (e.g., cardiovascular disease) (ischemic heart disease, cerebrovascular disease, peripheral arteriopathy) [76,77,78]. As a result, treating hyperglycemia as part of a comprehensive strategy to address all of the patient's risk factors should be considered (arterial hypertension [AHT], dyslipidemia, smoking). An approach that prioritizes glucose management at the expense of other potential dangers to cardiovascular health is, therefore, counterproductive. Even if all of the diabetic patient's objectives aren't met, it's in their best interest to focus on reducing cardiovascular risk factors as a whole. Table provides a summary of the treatment goals [79,80,81,82]. 5-7 The greatest indicator of diabetes management is HbA1c (glycosylated hemoglobin), which measures how well blood glucose levels have been controlled over the previous two to three months and should be less than 7 percent. However, in elderly patients or those with a short life expectancy, this treatment aim is not essential since it has a significant risk of producing severe hypoglycemia. Remember that ischemic heart disease is the leading cause of death in diabetics1,2 and that diabetics' cardiovascular risk is comparable to that of nondiabetic patients who already have ischemic heart disease when setting goals for lipids and blood pressure. 8 As a result, diabetic individuals should be subjected to the same stringent standards as those with coronary artery disease.

Future work

Diabetes is a complex difficult metabolic disorder characterized by high blood glucose levels caused by insulin resistance, insufficient insulin production, or a combination of the two. Hyperglycemia is the most prevalent clinical sign of diabetes. Insulin deficiency and/or insulin resistance, on the other hand, are associated to alterations in lipid and protein metabolism, as well as mineral and electrolyte abnormalities. Treatment should begin with modest dosages of intermediate action insulin (0.3-0.5 U/kg/day) delivered in one or two injections each day. Depending on the patient's glycemic profile, the insulin dosage is either raised or adjusted. Type 1 diabetics should begin with a schedule of 3-4 insulin injections per day that includes both rapid and intermediate-acting insulin. In patients who are either unaware of their diabetes or who have poor glycemic control due to a variety of factors (e.g., AMI, surgery, infections, corticoid treatment), a good therapeutic strategy is to administer subcutaneous insulin in relation to blood glucose readings obtained every six hours, along with a meal containing 50 g of carbohydrates.

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