A Narrative Review of Effects of Poor Glycemic Control among Type 2 Diabetes Mellitus Patients

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ABSTRACT

Cardiovascular complications were the main consequence of poor glycemic control. The hospital management system needs to make sure that there are opportunities and times set aside for patients to learn how to manage their conditions, including working on some of the things that would prevent them from having proper glycemic control in addition to taking their medications. encouraging early detection of non-communicable diseases through initiatives like community outreach programs and DM screenings for all patients with hypertension, among other things.

Keywords: Diabetes Mellitus, Glucose, Glycemic Control.

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Introduction

Diabetes mellitus is a long-term metabolic disorder of blood sugar regulation that develops when the pancreas either produces insufficient insulin or when the body's cells do not react to insulin that is circulated.[1-3] The majority of people in the world have type 2 diabetes.[5–6]

The prevalence of diabetes and risk factors have been rising steadily, reaching 2.7% and 3.0% for males and females, respectively, according to the 2016 World Health Organization (WHO) Global Report on Diabetes. 3.9 % of adults and 18.6 % of adults, respectively, are obese.[6]

According to statistics, the prevalence of diabetes increased significantly between the years 2000 and 2014 on a global scale. 421 million people worldwide had diabetes in 2017, and by 2045, it was predicted that 693 million people would have the disease.[7]

Patients with type-2 diabetes in sub-Saharan Africa frequently have sub-optimal glycemic control, which is a serious public health issue. While quick action is necessary to improve glycemic control in this area,[8–10] these interventions should take sociodemographic, lifestyle, clinical, and treatment-related factors into account. In 2017, there were 150.5 million adults in Africa aged 20 to 79 who had diabetes, corresponding to a 6 percent regional prevalence. It is predicted that 40.7% of adults will have diabetes by the year 205. Africa also has a high rate of diabetes cases that go undiagnosed. According to the global estimates of diabetes prevalence[11–13], the majority of people are unaware that they have diabetes, which increases the risk of chronic complications that can cause increased morbidity and mortality. The majority of people were unaware of their hyperglycemia, which suggests a likelihood of complications showing up later.[14]

In contrast to studies conducted in previous years, a study conducted in the Kanungu district revealed a high prevalence of type 2 diabetes, raising public health concerns. According to this study, type 2 diabetes primarily affects women and people between the ages of 61 and 65. Last but not least, type 2 diabetes risk factors include

having a family history of the disease, being overweight, and being obese.[15]

Sociodemographic Elements

Age, sex, educational attainment, marital status, and employment status are just a few of the social demographic factors that affect glycemic control.[16–18]

Age

According to a study by Abera et al., age of the patient has a significant impact on glycemic control in the majority of cases.[19-20] demonstrated that poor glycemic control was linked to older age and a longer length of stay with the condition.

Saghir et al.'s cross-sectional research in Yemen.[21] demonstrated that young patients presented with poorer glycemic control than the elderly due to the older individuals' greater level of diabetes experience. Male and female genders had the same rates of poor glycemic control.

According to a descriptive study conducted in Kenya, type 2 DM patients over the age of 56 had better blood glucose control than those between the ages of 41 and 55.[22] This was explained by the high level of disease awareness among elderly patients.

Education

The effects of education and literacy levels on glycemic control have been studied differently. Poor coping strategies and depressive symptoms significantly contributed to poor glycemic control, according to a study that used poverty and education levels as indicators of socioeconomic status.[23] The results of another cross-sectional study that examined the effect of type 2 DM patients' education levels on treatment outcomes showed that more educated patients used better self-management techniques, which decreased the incidence of complications.[24] Higher literacy levels resulted in better diabetes management and favorable glycemic outcomes.[25]

However, a lack of knowledge and skills plays a significant role in poor glycemic control. In an Ethiopian study on the prevalence of poor glycemic control, this shortcoming is caused by a lack of time, human resources, and adequate diabetes education guidelines.[26]

Status of Marriages

Better disease management outcomes are related to social relationships such as social networks and support. They may come from family, friends, or another healthcare provider. Positive support encourages better self-care, which leads to an improvement in quality of life, which results in successful treatment outcomes. Cross-sectional studies on partner relationships and diabetes outcomes have revealed that having a partner is related to greater support, which improves diabetes-related outcomes.[27]

According to a study on type 2 DM, partners who offered support improved regimen adherence and lifestyle satisfaction.

In contrast, partner criticism, hostility, and overprotection were discovered to be a negative form of social support which was associated with poor glycemic control, in a qualitative study done to ascertain how married people manage diabetes.[29]

Occupation

A few studies that specifically examined the relationship between occupation and glycemic control have been conducted. Poor glycemic control was significantly correlated with having a job, thinking of diabetes as a disease that interferes with daily activities, and having better social support. Glycemic control is impacted by employment, possibly as a result of patients having less time to manage their own diabetes care. These self-care practices include taking prescription medications, adhering to a diet plan, engaging in enough physical activity, and self-monitoring blood sugar levels.[30]

Due to the lack of free time to manage the disease, those with occupations had poor self-care practices in a qualitative sectional study on type 2 DM in Brazil.[31]

Poor glycemic control is related to certain clinical factors

Obesity, dyslipidemia and BMI

It has been established that patients with type 2 DM who have a high body mass index are at risk for having poor glycemic control.[32] Obesity or being overweight was positively associated with poor glycemic control in studies on risk factors for poor glycemic control in the USA.[33] This was attributed to poor glycemic control caused by high BMI-related insulin resistance.[34]

History of diabetes in the family

According to a study by Lubaki et al., it is anticipated that patients may experience diabetes earlier than expected, predisposing them to hyperglycemia over time.[35]

According to numerous exploratory studies on type 2 DM, patients with a family history of diabetes have an earlier onset of the disease and poorer glycemic control than those without a history of the disease.[36]

Hypertension

It was found to be a common co-morbidity in type 2 DM and hypertension in a cross-sectional study.[37] Depending on age, ethnicity, and obesity, 20–60% of diabetic patients also have hypertension.[38] Haile et al.'s systemic review and meta-analysis research project in Ethiopia. According to[39], there was a higher pooled prevalence of hypertension among type 2 DM patients in urban than rural areas of Ethiopia, with prevalence rates of 60 and 52 percent in urban and rural areas, respectively. Aljabri and colleagues' latest research. According to[40], people with type 2 DM in Saudi Arabia were most frequently affected by hypertension and various types of diabetes.

Consequences of poor glucose management

Cardiovascular disease

In people with diabetes compared to those without diabetes, the risk of coronary heart disease is 2-4 times higher. The primary cause of death in people with type 2 diabetes mellitus is cardiovascular disease.[41] In a study by Chen et al.[42] demonstrated that in type 2 DM, poor glycemic control has a negative impact on endothelial function and exacerbates coronary atherosclerosis. Dyslipidemia, hypertension, overweight or obesity, and insufficient fruit and vegetable intake were the most prevalent additional CVD risk factors.[43]

Diabetes-related retinopathy

A research project by Naserrudin et al.[44] revealed that the prevalence of DR was 13.5 percent and discovered that age is one of the significant risk factors of DR. As people get older, they are at an increased risk of developing DR, and they are also more likely to have T2DM. In addition, the management of glycemic levels affects the development of DR. Fenwick et al.'s latest study.[45] found that less than one in five patients receiving tertiary eye care were able to achieve optimal lipid and glucose control together. In contrast, nearly one in ten participants had poor glycemic control for all three indicators of diabetic control, and nearly two thirds had poor glycemic control, suggesting that, in line with other studies, diabetes control in adults with type 2 DM in Australia is still incredibly poor.

Diabetic neuropathies

Vibha et al. conducted yet another study.[46] examined the prevalence of diabetic foot syndrome and related risk factors in people with diabetes mellitus and discovered a 51.8% overall prevalence of the condition. study carried out by Rossboth et al. Smoking was identified as one of the major risk factors and an acceptable risk factor by[47] when assessing the risk factors connected to diabetic foot.

In a study by Jasmine et al. In patients with type 2 diabetes,[48] discovered a 44.9% prevalence of

peripheral neuropathy, which is nearly identical to Kamabrathnam's findings.

Diabetic kidney disease

Ahmed et al. conducted a study in Ethiopia in 2022 which examined the prevalence of chronic kidney disease in people with type II diabetes mellitus and discovered that the average time it took for CKD to develop was five years, with a cumulative incidence rate of 10.8%. Since cardiovascular disease and hypercholesterolemia have increased the risk of developing CKD, health promotion and education of diabetes patients are encouraged in order to maintain healthy cholesterol levels and prevent cardiovascular disease in order to reduce the severity of life-threatening disease. The incidence of CKD among patients with type 2 diabetes was found to be 14.25% in a subsequent study to determine its incidence and predictors.[49]

Infections

Infections occur more frequently and are more severe in diabetics, especially those with poor glycemic control. This is brought on by diminished[50] and abnormalities in phagocyte and cell-mediated immunity linked to hyperglycemia.

Tegegne et al.'s retroactive investigation in China. Gender, age, random blood glucose, insulin autoantibody, and albumin excretion rate in 24 hours were the risk factors for urinary tract infections.[51] and the prevalence of UTI was estimated at 11.2% in patients with T2DM.[52,53] An investigation by Akirov et al.[54], patients with diabetes have a higher risk of mortality, longer hospital stays, and infections and complications during their hospital stays. Additionally, Carrondo and Moita[55] reported that additional risk factors, such as severe hypoglycemic episodes, advanced age, and the presence of comorbidities, may raise the incidence of infections in diabetes.

Conclusion

The analysis of the effects of poor glycemic control revealed that cardiovascular, neuropathy, and nephropathy were much more closely related to the clinical and social demographic factors associated with poor glycemic control, demonstrating that the effects of poor glycemic control are influenced by various factors, which results in a poor patient quality of life.

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