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RELATION BETWEEN DIABETES AND DEPRESSION

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Abstract:

Introduction: *Comorbidity of physical as well as mental disorders is an important challenge for global health care. The rise in life expectancy and a number of other factors have led to an increase in its prevalence, which is predicted to continue. The relationship between depression and diabetes is a classic case of mental/physical comorbidity. Both disorders are becoming more common, and depression in persons with diabetes is twice as common as in those without diabetes. The majority of health facilities are ill-equipped to handle diabetes and depression together, and things will likely get worse as medicine becomes more specialized (and fragmented).*

Aim of the Study: *The epidemiology and risk factors for the co-occurrence of depression and diabetes are reviewed in this study, along with areas that need to be prioritized in order to lessen issues that may arise as a result of the co-occurrence of these two disorders.*

Methodology: *The review is a comprehensive research of PUBMED since the year 2007 to 2022.*

Conclusion: *Diabetes and depression place a major burden on the public health system. Diabetes has a significant association with depression. Though the precise processes by which these two chronic diseases interact and significantly impair one another's quality of life are still unknown. In this article, the common causes of the comorbidity of diabetes and depression were discussed. These causes included physiological (such as the hypothalamic-pituitary-adrenal (HPA) axis' dysregulation, the sympathetic nervous system's (SNS) overactivity, microvascular dysfunction, arterial stiffening, inflammation, and cytokines), behavioral (such as dietary and lifestyle changes), and environmental (such as childhood hardship, poverty, and neighborhood conditions).*

Keywords: *diabetes-related distress, the impact of diabetes and depression on life, diabetes and depression prevalence, depression, etc.*

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INTRODUCTION:

One of the chronic diseases with the greatest global prevalence is diabetes. Approximately 536.6 million people worldwide have diabetes, and the figure is expected to rise to 783.2 million in the year 2045, according to the International Diabetes Federation. As per the data from Centres for Disease Control and Prevention (CDC) in the United States (US), diabetes affected over 37 million people (11.3%) in 2021. Chronically high blood sugar levels are a hallmark of diabetes, which is caused by the body failing to produce sufficient insulin and insufficient insulin synthesis as a result of the autoimmune-mediated destruction of pancreatic beta-cells.[1-3]

Diabetes can be broadly classified as:[3]

Type	Pathophysiology
Type 1 diabetes mellitus (T1DM)	Autoimmune-mediated β-cell destruction
Type 2 diabetes mellitus (T2DM)	Insufficient insulin production or insulin resistance
Gestational diabetes mellitus (GDM)	Pregnancy-induced glucose intolerance
Others	Drugs, chemicals, and genetic and pancreatic disorders

Pathophysiological association between diabetes and depression

Metabolic dysfunction is due to: [4]

1. Behavioral factors (Diet, obesity, physical inactivity, etc.)
2. Biological factors/ physiological factors (Deregulation of HPA axis etc.)
3. Environmental factors (Intrauterine, such as fetal and maternal stress, and external factors, such as child obesity)
4. Genetic Factors

Behavioral factors

Poor eating habits, insufficient exercise, and irregular sleep patterns are examples of behavioral factors that might lead to depression. Individuals are predisposed to T2DM by these changed behavioral variables, which control glucose metabolism and independently affect diet and lifestyle [5,6].

Diet: Compared to non-depressed people, depressed patients are more likely to engage in poor dietary practices, including consuming refined sugar and saturated fat instead of a balanced diet consisting of fruits and vegetables, which further deteriorates their ability to regulate their diabetes. At the moment, the US government places a lot of importance on the quality of the food; as a result, they focus on the types or patterns of food, such as a healthy US-style eating pattern, a vegan diet, or the Mediterranean diet, rather than recommending limits on the amount of carbohydrate, protein, and fat in foods. [7]

Obesity: There is a strong association between obesity, diabetes, and depression, with the risk of depression being 55% greater in obese individuals and the risk of obesity being 58% higher in those who are depressed. According to Luppino et al.'s meta-analysis, there is a two-way relationship between depression and obesity that is stronger in Americans than in Europeans (p=0.05). The research found an association between obesity and an increased risk of developing depression (unadjusted OR: 1.55; 95% CI: 1.22-1.98; p0.001). [8]

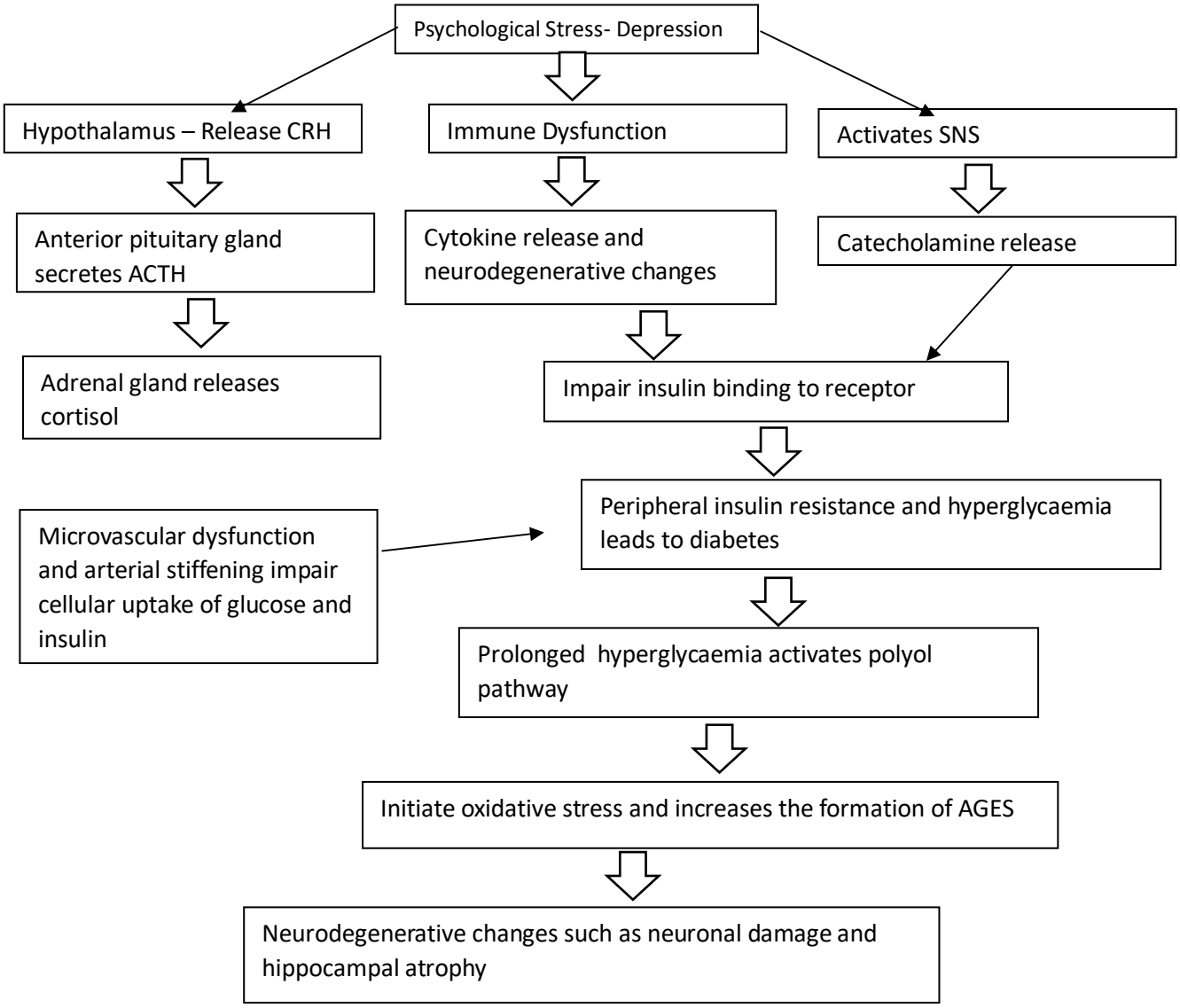
Physical activity: The risk of developing diabetes is inversely correlated with all forms of physical activity. An epidemiological study found that even with low levels of physical activity, such as 5-7 hours of leisure time and strenuous or low-intensity exercise each week, the relative risk of developing diabetes was lowered. [9]

Socioeconomic level: Compared to high socioeconomic groups, people with low socioeconomic levels have a 40%–60% higher chance of acquiring diabetes. Depression and diabetes are majorly affected by instability in social circles, such as poor social cohesion and social capital, greater aggression decreased home stability, and reduced walkability. [10]

Alterations to sleep and circadian rhythm have been linked to depression and type 2 diabetes. Shan et al. recently showed that diabetes risk was modest with 7-8 hours of sleep per day and increased by 9% for each hour of sleep loss in a meta-analysis of prospective trials. Similar to this, Rao et al.'s randomized crossover study in sleep labs revealed that after five days of sleep deprivation, insulin sensitivity fell by 29%. [11,12]

Biological factors/ physiological factors

Among these, Type 2 diabetes mellitus (T2DM) is frequently known to be associated with depression. The correlation between Depression and Type 2 Diabetes Mellitus (T2DM) physiologically is explained as :[4]



(CRH: corticotrophin-releasing hormone, ACTH: adrenocorticotropic hormone, SNS: sympathetic nervous system, AGEs: advanced glycation end products)

Environmental factors

Environmental elements may raise the incidence of co-occurring diabetes and depression from intrauterine life through neighborhood surroundings. According to various, a person's chance of getting diabetes in infancy, adolescence, and adulthood is increased by an intrauterine environment and low birth weight (LBW). The overexposure of cortisol in the fetus is caused by high cortisol levels secondary to maternal stress, which increases the risk of metabolic and stress-related diseases. However, there is conflicting evidence linking a poor intrauterine environment to an increased risk of adult depression. [4,13]

Comorbid diabetes and depression are more susceptible to other environmental factors, such as childhood adversity, poverty, neighborhood environment, traffic, and noise. The awareness of children and adolescents to engage in greater physical exercise, which could shift them into a healthy mood and ultimately enhance their quality of life, is increased by a good neighborhood and family support system with encouragement and praise. [14]

Genetic Factors

Numerous studies have shown that there is little to no genetic correlation between diabetes and depression. According to Scherrer et al.'s study of 1,237 middle-aged male twins in Vietnam, there is no genetic link between diabetes and depression (r=0.19; 95% CI: 0.00-0.46). In contrast, Samaan et al. conducted a cohort research on 17,404 individuals with a risk of T2DM from multiethnic backgrounds, 3,209 of whom had depressive cases and 14,195 of whom did not.[15]

The 50-K SNP array focused on cardiovascular genes allowed for the genotyping of a total of 20 SNPs linked to T2DM. Twelve of the 20 SNPs were linked to T2DM (p=0.048). The 20 SNPs were not linked to depression, though (p=0.09). The study found no genetic link between T2DM and depression.[16]

Treatment of comorbid depression and diabetes

Alonso et al.'s study found that whereas most people with diabetes (92%) receive regular therapy, up to 50% of people with mental illnesses do not obtain the proper care. Depression can be assessed by numerous circumstances, such as female patients suffering from panic attacks more often, etc. But not everyone who was given a diagnosis of depression received the care that the pertinent guidelines for their condition advised.[17]

In an array of studies that were compiled into a review and released in 2010, the effectiveness of treating depression in the presence of serious somatic illness was investigated. A moderate-to-large effect on depressed symptoms and a moderate-to-large effect on glycemic control were found for psychotherapy therapies (some of which included diabetes education). Selective serotonin reuptake inhibitor (SSRI) psychopharmacological therapy also had a moderate-to-large effect on depressive disorders with less of an impact on glycemic control. Despite the fact that the majority of the studies were limited in scope, the results tend to suggest that in order to attain diabetic self-care and glucose control, psychotherapy or medication for the treatment of depression should be combined with education.[18]

The idea is that better treatment of depression must go hand in hand with the treatment of diabetes and with changing unhealthy behaviors (such as smoking, living a sedentary lifestyle, and being overweight). In primary health care settings, these could include the management by mental health professionals in the primary health care teams, improved referral chains, education of both the general public and diabetics, regular screening of diabetics for depression, changes in the education of personnel working in services dealing with diabetes, and other actions.[18]

CONCLUSION:

Although there is debate regarding the reciprocal relationship between diabetes and depression, it is obvious that the two conditions can interact to worsen each other's management and increase the risk of long-term complications like mortality, stroke, and dementia. Diabetic depression presents a variety of symptoms, including subsyndromal symptoms and depression-like symptoms, which present significant obstacles to successful care. Given the overlap in the various relevant psychological symptoms, it will be crucial to look more closely at the characteristics of various psychometrics, especially those made to measure more particular subdomains.

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