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Original Article

The Stressful Link: Diabetes and Its Impact on Mental Health

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Abstract: *Diabetes is a chronic disease and also poses risk for mental health other than physical health. This paper addresses the influence of diabetes in mental health condition such as depression, anxiety, diabetes distress and back. The purpose of this study was to search for the frequency and clinical implications (regarding the treatment of the diseases) of these enfermedades, in subjects with Diabetes Mellitus, and also regarding the relationships that exist between and among the disorders by using the literature already published. The data suggest that diabetes is a risk factor for mental disorder and the reverse, with the risk on diabetes management and its complications and possibly finally leading to an impact on glycaemic control and complications. There are also common physiologic pathways (e.g., chronic inflammation, neuroendocrine dysregulation, and alteration of neurotransmitters) that contribute to this association.*

Psychological distress has been associated with nonadherence to diabetes selfcare regimens9-13 increased use of health care13 and worse quality of life.14 The post advocates for person-centered diabetes and mental health treatment. Nevertheless, therapeutic approaches (e.g., psychosocial treatments that include CBT and mindfulness-based stress reduction, pharmacological treatments, and lifestyle therapy should be eased of on the patient. Lastly, the authors emphasize the necessity of not only identifying but also treating the mental health problems of a person living with diabetes in order to enhance their overall health and QoL. There is a requirement for multidisciplinary care, education and support to address the challenge of managing two burdens, diabetes and mental illness, together.

Keywords: *Diabetes Mellitus, Mental Health, Depression, Anxiety, Diabetes Distress, Glycemic Control, Inflammation, Integrated Care, Psychosocial Interventions, Quality of Life.*

I. INTRODUCTION

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due either to decreased insulin secretion or decreased insulin action or both. Diabetes has become a key global health challenge affecting an estimated 463 million adults worldwide. 'More recently - and with diabetes becoming more widespread - we have become aware of its influence on a broad range of health problems. Another stage of diabetes care that is more subtle but nevertheless huge is the impact the disease and its treatment have on mental health. The more complex parts of diabetes management, such as the emotional weight of living with a chronic illness and the persistent physiological and psychological stress of the disease, can leave a person more vulnerable to a gamut of mental health problems, depression, anxiety and stress-related disorders.

This paper discusses the relationship between diabetes and mental health, including a two-way relationship, where diabetes can exacerbate, and be exacerbated by, mental health. By factoring in the psychological burden of diabetes and its relationship to the mental health of the patient, doctors could develop a more holistic approach to treatment, addressing all facets of a patient's health.

II. DIABETES AND MENTAL HEALTH: A TWO-WAY STREET

A. The Emotional Effects of Diabetes

But when you have diabetes, you can't let it get away from you. They have to monitor their blood glucose and adhere to a diet and exercise regimen, and in many cases take oral drugs or insulin injections. The endless demands associated with the management of diabetes can lead to "diabetes distress," which takes the form of frustration, burnout and a sense of failure in coping with the illness.

a) Diabetes Distress

It's distinct from clinical depression, but you can have some overlap in the symptoms: feelings of guilt, fears about complications and emotional exhaustion. Studies show that up to 40 percent of people with diabetes have high levels of diabetes distress, which can interfere with managing the disease effectively.

b) Depression

One of the most common mental health concerns in diabetes is depression. People with diabetes are about twice as likely to become depressed as those without the condition. Comorbid depression in diabetics can result in poor control of blood glucose, decreased treatment adherence, and diabetes related complications.

c) Anxiety

Anxiety is another commonly reported mental health issue in diabetes. The fear of hypoglycemia and of long-term complications as well as the burden of daily disease management, may contribute to the pathogenesis of anxiety disorders. It can also make managing diabetes more difficult, for, among other reasons, people may be reluctant to check their blood sugar (who wants even more bad news right now?) or even visit their doctor or medical care facility.

B. Effect of Mental Health on Diabetes Control

Not only do mental disorders result from diabetes but mental disorders can also have an adverse influence on diabetes course and outcome. The absence of a cognitive approach increases the likelihood of psychiatric comorbidities such that patients' ability to manage their diabetes is reduced as significantly as is necessary, so that a “vicious cycle” is established, leading to an inadequate care of the health.

a) Depression and Diabetes Management

Even the self-care that is needed for managing diabetes itself may be severely compromised when you have depression. No energy, no motivation and an inability to concentrate can make it fracturing to follow a treatment plan. Patients are therefore at increased risk for complications, such as cardiovascular disease, neuropathy, and retinopathy, secondary to combined depressive symptoms and elevated HbA1C (a marker of long-term blood glucose control).

b) Anxiety and Diabetes Self-Care

Anxiety may also interfere with diabetes self-care. High-anxiety individuals may fixate on a blood glucose level (checking) or withdraw entirely from the check (avoidance). This can result in erratic blood sugar management and increased likelihood of complications. Moreover, other health behaviors, like diet and exercise, also get placed on the back burner when someone has anxiety disorders, further exacerbating diabetes control.

C. Natural Connections Between Mental Health and Diabetes

In addition to the psychological burden of diabetes, there is a physical reason why diabetes and mental health problems are related.

a) Inflammation

Chronic systemic inflammation is a common feature in diabetes itself, as well as depression and other mental health diseases. Elevated markers of inflammation have also been reported in individuals with CA and/or OA, including C-reactive protein (CRP) and interleukin-6 (IL-6). Inflammatory pathways may play parts in the aetiology of insulin metabolism disturbances and hyperglycaemia in diabetes, and in the neurobiology of depression.

b) Neuroendocrine Dysfunction

The HPA axis, as the brain's major stress response system, plays a central role in the regulation of pathways that have been implicated in the etiology of both diabetes and psychological disease. Increased HPA axis activity is also related to elevations in cortisol, which in turn are related to increased circulating glucose and depressive symptoms. This abnormal interaction could also 'contribute to the pathogenesis of anxiety disorders in diabetics'.

c) Serotonin Dysregulation

A neurotransmitter controlling mood and glucose metabolism, serotonin, has also been involved. Low serotonin function in depression and insufficient insulin. This bidirectionality suggests to us that a serotonergic dysfunction might be an underlying bridging mechanism in the co-morbidity of diabetes and psychological dysfunctions.

III. ABOUT SOCIAL DETERMINANTS IN DIABETES AND MENTAL HEALTH

Socioeconomic factors, including SES, educational level, access to medical care, social support, and others can significantly contribute to confounding in the relationship of diabetes with psychological mental condition.

A. Socioeconomic Status

People of lower socioeconomic groups are reported to have both diabetes and mental health problem. The lack of access to healthcare, healthy foods and safe locations for physical activity can make it challenging for people to prevent and manage diabetes.

It may possibly also be correct that monetary struggle plus no resources adds to mental wellness troubles and this will become a cycle of ill wellness.

B. Education and Health Literacy

Health literacy is a key aspect of diabetes care. Individuals with limited health literacy have difficulty understanding complex medical directions, less successful managing chronic disease, and more frequent complications as the result. Persons with low levels of health literacy also have a higher likelihood of experiencing anxiety and depressive symptoms, due to having insufficient confidence to manage their condition.

C. Access to Healthcare

Access to health care is crucial for diabetes care and mental health care. People without access to primary care may struggle to obtain the right screening, medication and treatment to manage their diabetes — and, for that matter, their mental health issues. This lack of access can lead to delayed diagnosis, suboptimal disease management, and a high risk of complications.

D. Social Support

psychological and social support is crucial in diabetes. Those with robust social connection engage in more healthy behaviors, follow-up on treatment more, and have reduced stress and depression. Conversely, when a person has little social support, that can also result in social isolation and stress and increase the likelihood of poor health.

IV. EXPERIENCES OF HAVING CO-MORBID DIABETES AND MENTAL HEALTH

Given how closely entwined diabetes and mental health are, comprehensive care is imperative. Multi-casual models of integrated care targeting comorbid physical and psychological health might improve the prognosis for people with diabetes.

A. Integrated Care Models

Multidisciplinary care models Coordinated care through the collaboration of the health care team (e.g., primary care physicians, and endocrinologists, psychologists, and diabetes educators). Policies generated from these monitoring and screening models will demonstrate the demand of screening for mental health disorders in diabetics, and the required treatment and care for persons that return a positive result.

a) Collaborative Care

Coordinated care is a model in which mental health specialists deliver care (including mental health and substance use treatments) to individuals with mental health disorders, in close collaboration with primary health care workers. This approach has been shown to improve mental health and diabetes outcomes, as it allows for early identification and treatment of mental health challenges that might interfere in diabetes treatment.

b) Stepped Care

“Stepped care” is a method of delivery of care where interventions are delivered sequentially, ranging from less-to-more intensive, depending on need of the patient. Self-management support and behavioural interventions may prove sufficient for people with diabetes and mild mental health problems. Psychotherapy or medication may be necessary for those with more severe symptoms.

B. Psychosocial Interventions

The psychosocial interventions which have gained some success in the treatment of the psychological self-management of diabetes are the cognitive–behavioral therapy (CBT), the mindfulness-based stress reduction (MBSR), and the diabetes self-management education (DSME).

a) Cognitive-Behavioral Therapy (CBT)

There would be CBT (which is often offered for depression, anyway) as an alternative. It helps people identify and change thoughts and actions that contribute to symptoms. Individuals with diabetes may benefit from an adapted form of CBT that specifically addresses diabetes-related stressors, including fear of complications or difficulty with blood glucose management.

b) Mindfulness-Based Stress Reduction (MBSR)

MBSR is a course that uses the practice of mindfulness meditation to teach participants to cope with pain, illness, stress, anxiety and depression. In a few studies, MBSR has also been found to reduce diabetes distress and to enhance glycosylated haemoglobin in diabetes patients.

c) Diabetes Self-Management Education (DSME)

DSME programmes aim to provide participants with the skills and knowledge needed to manage themselves in daily life with diabetes. These interventions could contribute to the decrease in diabetes related distress and the enhancement of psychological wellbeing by empowering individuals to take more control of their condition.

C. Pharmacological Interventions

Psychiatric disorders in diabetics may also necessitate pharmacological intervention.

a) Antidepressants

Antidepressants including SSRI and serotonin and norepinephrine re-uptake inhibitors (SNRIs) are commonly utilized for treatment for individuals with diabetes who are experiencing depression. These medications may relieve depressive symptoms and improve overall quality of life. Some antidepressants may affect blood glucose levels, though, and people who have diabetes will need to be monitored closely.

b) Anxiolytics

Anxiolytics, benzodiazepines n some antidepressants can be prescribed in comorbidity cases of diabetes and anxiety disorders. As with the antidepressants, the response of blood sugar levels must be carefully watched.

D. Lifestyle Interventions

Lifestyle interventions (for example, physical activity, healthy eating and stress reduction) can improve diabetes outcomes and mental health.

a) Physical Activity

Physical activity has also been shown to improve glucose metabolism and to reduce symptoms of depression and anxiety. Physical activity may also reduce diabetes-related stress and improve overall quality of life.

b) Healthy Eating

Benefits may be seen to mental health also if blood glucose levels are promoted by good nutrition. Eating fruits, vegetables, whole grains and lean proteins can as well help to balance your mood and give you the energy you need to face the day.

c) Stress Management

Relaxation methods, such as deep breathing, meditation, and yoga, can also help you deal with the natural stressors of everyday diabetes care. And those mindset habits are associated with lower stress, better mood and, over time, greater overall health.

V. OBJECTIVE

The objectives of this article are to:

- Investigate the bi-directional relationship of diabetes with mental disorders e.g., depression, anxiety, diabetes distress.
- Learn the biochemical and psychological highways between diabetes and mental health.
- Understand how mental illnesses impact diabetes care and outcomes.
- Establish and disseminate appropriate models of integrated care for people with concurrent diabetes and mental health problems.

VI. METHODOLOGY

A comprehensive literature review was undertaken to explore the relationship between diabetes and mental wellbeing. Outcome: The role of mental disturbances in diabetes patients, their impact on disease management, and the effectiveness of various intervention concepts were reviewed in this analysis of peer reviewed articles - comprising clinical trials and reviews. The following methodology was employed:

- Literature Search: Studies were identified through PubMed, Google Scholar and the Cochrane Library database. Search words were “diabetes and mental health”, “diabetes distress”, “depression and diabetes” and “anxiety in diabetes”.
- Inclusion Criteria: All the studies that were selected should have relevance, methodological robustness and evidence quality. In this review, inclusion criteria were limited to English articles published in 2000 only.
- Synthesis Among the reviewed studies, we summarized the description of diabetes and psychiatric comorbidity (including its effect on disease management and patient outcomes).
- Intervention Review: Any record of evidence of interventions to control mental health disease in people with diabetes - clarity should be given on evidence of efficacy, feasibility and integration with diabetes care.

VII. FINDINGS

A. The Self-Perpetuating Relationship of Mental Health and Diabetes

a) Diabetes and Depression:

- There is much evidence that diabetes increases the risk of depression, roughly twice as high if compared with the general population. While the prevalence of depression among the general population is approximately 6%, up to 30% of individuals with diabetes have comorbid depression and depression is viewed as a contributing factor to suboptimal diabetes care (Golden et al., 2008).
- Depression is associated with poor glycemic control, complications of diabetes, and more diabetes distress (Gonzalez et al., 2008).
- Depression symptoms of low energy, lack of motivation, and difficulty concentrating may disrupt diabetes self-management behaviors, including nonadherence to medication, poor dietary choices, and lacking regular physical activity.

b) Diabetes and Anxiety:

- Anxiety disorders are prevalent among people with diabetes, and some 40% of type 1 or type 2 persons may report elevated levels of anxiety (Grigsby et al.
- The fear of hypoglycemia, the concern about long-term complications for their offspring and the burdens of diabetes that are linked to daily care foster the anxiety of those parents.
- Anxiety over the uncertainty about the future can lead to avoidance behaviors, including neglecting to check blood glucose levels or missing medical appointments that would help you manage your diabetes.

c) Diabetes Distress:

- Diabetes distress refers to a form of emotional distress that is characterized by negative emotions specific to the burden of diabetes (stress, frustration, fear of complications, feeling overwhelmed by type of daily management activities).
- Studies suggest that 15–40% of people living with diabetes, suffer from diabetes distress, which is separate to depression and anxiety (Polonsky et al., 2005).
- Diabetes-related distress is a negative phenomenon and is related to poor glycemic control and diabetes complications.

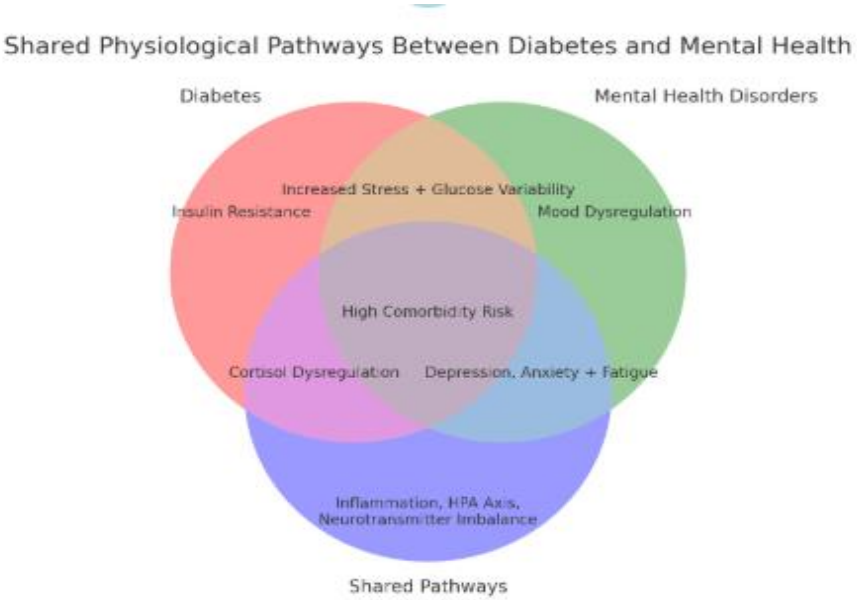

Figure 1 : Shared Physiological Pathways Between Diabetes and Mental Health

B. Biological Mechanisms Underlying this Connection Between Diabetes and Mental Health are Relevant to Both Body and Soul.

a) Inflammation:

- Low graste inflammation is a known isue with diabetes as well dispair. Correlations between inflammatory markers (C-reactive protein (CRP) and interleukin-6 (IL-6)) have also been observed in patients with one or other disorder (Dowlati et al., 2010).

- The inflammatory process could lead up to insulin resistance (in case of diabetes) and changes in neurotransmitters/functions through which depressive symptom could have developed.

b) Neuroendocrine Dysregulation:

- Disordered HPA axis, a central stress response system of the CNS, are linked to T2DM and mental health disorders (Elenkov, 2008).
- Elevated circulating cortisol levels in HPA axis dysregulation promote insulin resistance and hyperglycemia, as well as depressive and anxiety symptoms.

c) Neurotransmitter Imbalances:

- Serotonin and Dopamine, as 'mood-regulating' neurotransmitters, influence insulin secretion and glucose metabolism (Golden et al., 2009).
- Dysregulation of these neurotransmitters may be associated with mood disturbances and insulin intolerance.

C. Effect of Psychiatric Conditions on Blood Glucose Management in Diabetic Patients.

a) Adherence to Treatment:

- Impairment in cognitive function, motivation and energy levels as a result of mental health problems may indirectly result in poor adherence to diabetes management plans (Gonzalez et al., 2016).
- Non adherence is when the patient failed to take their medication, restrictive diets and fail to do regular exercises will result in poor glycemic control as well as the higher incidence of complications.

b) Quality of Life:

- Psychosocial health issues are responsible for a significant reduction in QoL among diabetics (Snoek et al., 2015).
- Psychic disturbances can then even lead to a social retreat, with withdrawal from everyday life and frustration in life.

c) Healthcare Utilization:

- Individuals with diabetes and psychiatric comorbidities show greater health care utilization, including hospitalizations and emergency room visits (de Groot et al., 2001).
- This increased uptake is often due to the complications of diabetes due to poor control of diabetes and unmet mental health needs.

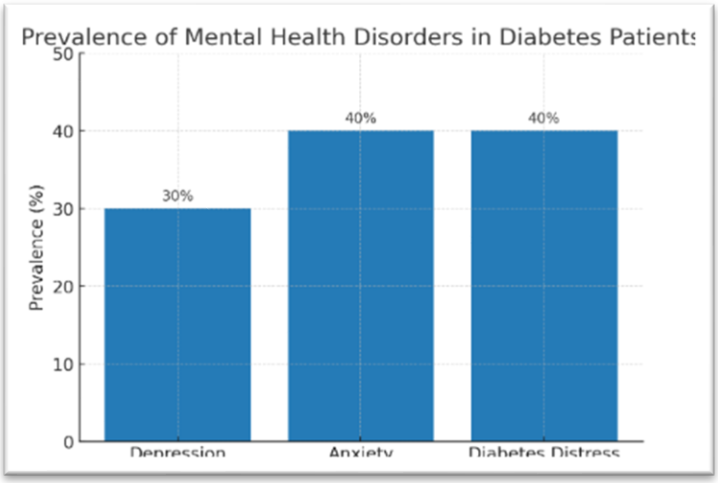

Figure 2 : Prevalence of Mental Health Disorders in Diabetes Patients

VIII. RECOMMENDATIONS

A. Integrated Care Models:

- Use of composite models that incorporate fosters care for both diabetes and mental health is an essential aspect of patient care.
- Collaborative care provided by an endocrinologist, general practitioner, psychiatrist and diabetes educator provides comprehensive education (Katon et al., 2010).

B. Psychosocial Interventions:

- Interventions like CBT and MBSR have been demonstrated to reduce diabetes distress and HbA1c levels (van Bastelaar et al., 2011).
- DSME can also include goals for managing stress and coping strategies" (Powers et al., 2016).

C. Pharmacological Interventions:

- Anti-depressants (e.g. SSRIs) can be beneficial in treating depression in diabetics (Lustman et al., 2006).
- Fluctuations should be closely observed with respect to potential interactions of antidiabetic agents with antidepressants.

D. Lifestyle Modifications:

- Both physical activity and healthy eating are also important contributors to mental health and glycemic control (Colberg, 2010).
- Stress-busting techniques such as yoga, meditation and deep breathing should be included in a diabetic's regimen.

E. Patient Education and Support:

- Improved patient knowledge of the diabetes–mental health relationship could facilitate people seeking help and taking their treatment (Young-Hyman et al., 2016).
- Emotional support, as well as reducing alienation, can be provided by support groups and peer counseling.

IX. CONCLUSIONS

Bidirectional association between diabetes and mental health The relationship between diabetes and mental health is complex and multidimensional, with psychological and physiological pathways involved. Depression, anxiety, diabetes distress and other mental health issues are highly prevalent among diabetic patients, and can negatively impact on diabetes management and patient outcomes. An integrated care model of care that addresses diabetes and mental health is needed to optimize the health and well-being of this population.

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