

The Broader Biopsychosocial Implications of Diabetes Mellitus

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Abstract

Diabetes is chronic illness characterized by the body's inability to produce sufficient quantities of insulin or an inability to use insulin effectively. The illness poses a major threat to public health. Biomedical advances have significantly helped to improve the quality of life of afflicted individuals, reducing morbidity and mortality rates. Diabetes is a multifaceted problem, characterized by wide-ranging biopsychosocial implications. It can cause considerable health complications if it remains untreated. The process of adjustment may be too overwhelming for some, resulting in anxiety and depression. A diabetes diagnosis may also affect family members who may be worried about potential health problems of their loved ones. Some individuals who are diagnosed with diabetes seem to go through stages of grief as they come to terms with their illness. This article discusses the broader biopsychosocial implications of diabetes and the importance of addressing the illness from a holistic perspective.

Keywords: Diabetes, coping, biopsychosocial model, adjustment, family impact.

What is diabetes mellitus?

Diabetes mellitus is one of the most common groups of metabolic disorders worldwide. It is characterized by hyperglycemia and distinctive health complications [1]. The global prevalence of diabetes mellitus is estimated to rise to 578 million individuals by the year 2030, with most of the sufferers coming from urban and high-income countries. The early common warning signs and symptoms include increased thirst and appetite, frequent urination, fatigue, recurrent infections and weight loss. Alarmingly enough, most of the individuals who have diabetes mellitus are not aware they suffer from the condition, with many remaining undiagnosed, thereby failing to seek timely help. [2]

There are different categories of diabetes mellitus, each having a differential onset, and all requiring specific treatments regimes. These include Type 1 diabetes, Type 2 diabetes, other specific types and gestational diabetes mellitus. Type 1 diabetes mellitus is characterized by insufficient production of insulin [3]. Although this type of diabetes mellitus can occur at any age, it is more commonly diagnosed in children and young people, with symptoms often developing fairly quickly. Lifelong treatment comprises insulin injections to prevent health complications. *Immune mediated diabetes* is a form of type 1 diabetes and occurs from cellular-mediated autoimmune destruction of the β -cells in the pancreas. This process may occur rapidly in some individuals or be of a slower onset in others. The first signs are often manifested

as ketoacidosis in some. Nonetheless, other individuals are often able to retain residual β -cell function that prevents ketoacidosis from happening [4]. On the other hand, *idiopathic diabetes* has no known etiology, with no evidence of autoimmunity [5].

Type 2 diabetes accounts for about 90% of individuals diagnosed with the condition. It is more common in individuals who are obese or those having a high percentage of abdominal body fat. This type of diabetes is more difficult to identify since individuals are often asymptomatic and insulin levels may appear normal. Type 2 diabetes occurs when the body is unable to use insulin, resulting in a dysregulation in blood sugar levels. Although some individuals can manage their blood glucose level by following special diets, medication is often needed to prevent hyperglycemia or an excess of glucose in the bloodstream.

Gestational diabetes mellitus tends to occur in 7% of pregnancies and can increase the risk of fetal and maternal morbidities if left untreated. This form of diabetes mellitus is more common in Asian, African-Caribbean and Middle Eastern women who have a high body mass index, those who have a family history of diabetes mellitus, and women who are over 35 years of age [6-7]. Gestational diabetes mellitus often resolves upon delivery. Nonetheless, it increases the mother's risk of developing Type 2 diabetes mellitus in the future. Although diabetes mellitus cannot be cured, it can be treated and controlled. Early management will increase the individual's chances of leading a relatively good and

normal life.

Finally, other specific types of diabetes are the rest of genetic defects of the β -cell, defects in insulin action, diseases of the exocrine pancreas, endocrinopathies, drug or chemical-induced diabetes, the result of infections, uncommon forms of immune-mediated diabetes and other genetic syndromes associated with diabetes. Each of these may require differential treatment regimes.

The role of biological factors

The biomedical model is very useful in explaining how biological, chemical, cellular or genetic factors contribute to our understanding of health and disease. Nonetheless, this model fails to provide a holistic explanation of the broader implications of chronic illness. The model has been criticized as being too reductionist and simplistic, assuming that disease is an affliction of the body that is separate from social and psychological processes of the mind. Engel's [8] interdisciplinary Biopsychosocial Model of Illness (1977) provides a holistic explanation of the complex interaction between biological, social and psychological factors and how these in turn affect health and disease. Biological factors include genetic materials and information inherited from parents which may predispose an individual to certain diseases. For instance, research reveals that family history is a strong predictor for developing Type 2 diabetes mellitus [9].

Biological factors are useful in explaining the health complications that can arise if the disease is not managed. Unfortunately, untreated diabetes mellitus can result in disabling health problems including nerve damage, increased risk of stroke and heart disease, retinopathy and amputations, just to mention a few [10]. It is estimated that 12% of the global health expenditure is spent in treating diabetes mellitus-related complications. Diabetes mellitus can also be fatal, with 5 million individuals reported to have succumbed to the disease in 2015 [11]. Unfortunately, this number is expected to rise, with obesity being a main contributor. Sedentary lifestyles, urbanization, consumption of energy dense diets and poor education are other factors that contribute to this increase in prevalence.

Social and environmental factors

Fortunately, some factors that can help reduce potential health complications following a diabetes mellitus diagnosis are modifiable and within the individual's control. These include eating healthy, adhering to medical treatment regimes, weight loss in the case of individuals who are overweight or obese, smoking cessation, cutting down on alcohol and increasing physical activity. Nonetheless, other factors are beyond the individual's control. *Social Determinants of Health* significantly affect the health outcomes of individuals with diabetes mellitus. *Social Determinants of Health* comprise conditions in the environment where an individual resides that will in turn affect health and health outcomes. These include one's economic situation, quality of health care and access to services, education access and quality, the social and community

context, the neighborhood and built environment [12]. Together, these factors have wide-ranging implications on health and health risks, quality of life and longevity of individuals with diabetes mellitus. Poverty, limited access to healthy food, poor education and low income has been found to affect the prevalence and outcome of diabetes mellitus [13-14]. Individuals with poor health literacy are less likely to take the necessary precautions to safeguard their health, making them at increased risk of developing diabetes mellitus-related complications. Individuals with lower socio-economic status may have less accessibility to healthy food options and are at an increased risk of developing high blood sugar. Low socio-economic status has also been associated with poorer physical and mental health outcomes [14].

Diabetes mellitus and the family

The majority of individuals who are diagnosed with diabetes mellitus seem to adjust quite well. Nonetheless, this is not true for everyone. An individual's perception of one's diagnosis can affect the adjustment process. Individuals with poor coping skills and limited social support networks tend to experience reduced general and psychological well-being [15-16]. A diabetes mellitus diagnosis often requires major lifestyle changes that do not only affect the diabetic, but the whole family. Some health complications such as blindness or amputations can result in dependency on others for basic needs, making the individual feel a burden on one's family. The long-term implications of the disease can also cause psychological problems. The family may find it hard to understand what the individual is going through, while the patient may feel misunderstood. Food differentiation and restriction, additional time and energy spent in preparing meals and help in the daily monitoring of blood sugar levels are just some of the few adjustments the family may be required to make. Anxiety about long-term health implications and hypos may also be overwhelming for some family members. On the other hand, having a supportive family environment has been found to improve treatment adherence and metabolic control as well as enhance self-management of the disease [17].

Psychological implications

As highlighted earlier, diabetes mellitus requires lifelong treatment. Some individuals may have problems coming to terms with the fact they need to take medication for the rest of their lives. This can create in resistance in adhering to treatment regimens, resulting in psychological distress and an exacerbation of health problems [18-19]. Research suggests that at the time of diagnosis, individuals seem to go through a roller-coaster of emotions that are very much similar to those proposed by Kubler-Ross' (1969) *Stages of Grief Model* [20]. Individuals who are diagnosed with a chronic disease often experience a loss of self-representation. The latter is often characterized by health, strength and vitality, which upon diagnosis, may be replaced by guilt, self-blame and narcissistic injuries [21]. This is particularly true for young people who may feel that life has been stolen from them. In a similar way,

Beeney and colleagues hold that at the diagnostic stage, individuals experience an initial shock reaction, followed by anxiety, anger and denial, prior to accepting the situation and learning to manage their disease [22].

Being diagnosed with a chronic disease may be stressful for the individual. A prolonged stress response can cause aberrant regulation of stress hormones, compromising insulin levels [23]. Stress has also been linked to poor glycemic control and lack of self-care in the same population [24]. About 20% of diabetics have been found to suffer from anxiety and depressive symptoms [25]. These often interfere with self-care regimes since the individual may be too upset to practice self-care strategies or too overwhelmed with the numerous and sudden lifestyle changes. Individuals who are anxious and depressed are also more likely to make use of healthcare services. This is likely to create an additional financial burden on the national health system.

Addressing the psychological needs of individuals diagnosed with diabetes mellitus remains a priority in reducing distress. Diabetes-related distress refers to the accompanying emotional and behavioral changes that the individual is required to make following a diabetes diagnosis [26]. The latter often results in lifelong restrictions and changes, including careful and frequent monitoring of blood sugar levels, watching one's food intake, mostly carbohydrates, learning to manage portion size, scheduling of meals while ensuring timely intake of medication and starting an exercise regime, just to mention a few. The sudden change in lifestyle as well as the realization that the illness cannot be cured but managed may be overwhelming for some.

The Diabetes Attitudes Wishes and Needs (DAWN) study conducted in 13 countries across the globe revealed poor regime adherence, low patient self-care and high diabetes-related worries among individuals diagnosed with diabetes [27]. The second Diabetes Attitudes Wishes and Needs (DAWN 2) study assessing diabetes-related psychosocial outcomes for people with diabetes across 17 countries revealed that 13.8% of individuals diagnosed with the condition were likely to suffer from depression, 44% were suffering from diabetes-related distress and 12% had a poor quality of life compared to individuals who do not suffer from the disease [28]. Both studies shed light on significant physical and psychological burdens brought about by diabetes and on the unmet needs of this population. Results point to the need for a person-centered approach to treatment, the importance of family involvement, the fostering of active self-management strategies as well as a comprehensive assessment of the quality of care being provided to sufferers.

Disordered eating behavior and diabetes mellitus

Research reveals that individuals who are diagnosed with diabetes mellitus are at an increased risk of disordered eating behaviors. These latter include self-induced vomiting, laxative use, extreme and unhealthy weight loss tactics, binge eating, insulin

restriction, and excessive exercise, resulting in poor health outcomes such as neuropathy, retinopathy, poor short-term metabolic control and eating disorders [29-30]. These behaviors are often coupled with negative emotions including feelings of worthlessness, poor self-image, low mood, guilt, shame and anxiety [31]. Giving the diverse physical and psychological implications, health care providers need to pay close attention to warning signs and symptoms of disordered eating and refer as necessary.

Assessing the implications of a diabetes diagnosis

A comprehensive assessment is indispensable in identifying the impact the disease has on the individual. As highlighted in a section above, diabetes distress is a term used to encompass the several changes brought about by the disease including frustration with self-care, fears about the future and health-related complications, concerns about the quality of care and medication costs and perceived lack of support from significant others [32]. Diabetes Distress has been linked to poor glycemic control, reduced self-efficacy and self-management of the disease as well as increased health complications [33].

Depression has been found to be common in individuals with diabetes. Research reveals that 41% of patients tend to suffer from mood disturbance and anxiety [34]. Anxiety may stem from the fear of health complications to problems adjusting to the new lifestyle. Anxiety has been linked to unhealthy coping strategies such as smoking, risky behaviors, substance use, abuse of medication and increased health complications [35].

The *Diabetes Distress Scale* is a useful tool that can assess the emotional burden, physician distress, regimen distress and interpersonal distress in relation to diabetes management in both clients and significant others and can shed light on how the individual is coping in view of the diagnosis [36]. Another useful measure of diabetes distress is the *Problem Areas in Diabetes Scale PAID* that can screen for negative emotional problems specific to diabetes [37]. The *World Health Organization-Five Well-Being Index (WHO-5)* is another useful tool that measures subjective quality of life including symptoms of distress as well as positive psychological well-being [38]. Finally, the *Patient Health Questionnaire (PHQ-9)* can be used to monitor the severity of depressive symptoms [39]. Taken together, these measures can provide a holistic assessment of the client's level of distress and functioning. They can be useful in the planning and delivery of tailored interventions targeting the client presenting problem.

Psychological interventions for diabetes

Psychological interventions can be useful in helping individuals cope with the diagnosis. They can help improve the uptake of health behaviors such as self-management and self-care, with the aim of fostering psychological well-being and positive affect. Education and skills-based interventions, cognitive behavior therapy and mindfulness seem promising in reducing depressive and anxiety symptoms [40-41]. Family sessions incorporating cognitive behavior

therapy and problem-solving techniques have been found to reduce primary symptomatology in children suffering from chronic disease [42]. These interventions have also proved to be beneficial in improving parental mental health, thereby enabling primary caregivers to be in a better position to support their children. A high sense of self-efficacy, an internal locus of control, and a healthy self-esteem have also been found to improve the health outcomes in diabetes mellitus care [43].

Conclusion

A diabetes mellitus diagnosis often touches every aspect of the individual's life and that of significant others. It may shatter assumptions one may have about the self and the future, resulting in a feeling of alienation from the world one inhabits. Psychosocial interventions, when used in conjunction with biological treatments, can help address the diverse adjustment problems faced by individuals with a chronic disease. They have the potential to improve the quality of life of individuals, equipping them with tools they need to deal with the life-changing problems brought about by a diabetes mellitus diagnosis.

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