REVIEW ARTICLE

A SHORT REVIEW ON THE ASSOCIATION BETWEEN DEPRESSION AND DIABETES

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ABSTRACT
Diabetes and depression are two major health issues that often co-exist in the general population. Though these two are isolated conditions, growing evidence suggest a strong association between the two chronic conditions. Studies show that individuals with diabetes have an increased risk for depression and vice versa. When diabetes and depression co-exist they increase the overall mortality of the patient. Identifying these conditions early and integrating treatment of depression and diabetes can tremendously improve health outcomes and quality of life.
Key-Words: Diabetes; Depression; Public Health; Glucocorticoids

Introduction

Diabetes and Depression are major public health concerns causing significant morbidity and mortality in the general population. According to the International Diabetes Federation there were 366 million people with diabetes in 2011, and this number is estimated to rise to 552 million by 2030.[1] A 2011 Centre for Disease Control and Prevention (CDC) report estimates that Diabetes Mellitus affects about 25.8 million people in the United States (7.8% of the population) in 2010 with 90% to 95% of them being type 2 diabetics.[2] The prevalence has been increasing steadily in every country with 80% of diabetics living in low and middle-income countries. In 2011, diabetes caused 4.6 million deaths.[3] In addition, the increasing prevalence of diabetes in Africa suggests a dramatic increase in its occurrence in both the rural and urban settings.[4]

Depression is a medical illness that is caused by an imbalance between hormones, neurotransmitters and other bioactive substances. Depressed patients visit their primary care physicians more often (3x) than patients who are not depressed. 20-50 % of patients with diabetes, CAD, Parkinson's, CVA, HIV/AIDS, asthma, and cancer are afflicted by major depressive disorder. 15-23% of patients with MI and 14-23% of patients with stroke develop major depressive disorder. Furthermore, approximately 11-15 % of patients with diabetes mellitus have major depression. There are more than 25 FDA approved anti-depressant medications available for the treatment of depression. According to AHRQ (Agency for Healthcare Research and Quality), in 2005 about 170 million prescriptions were filled for anti-depressants, 70% of which were prescribed by non-psychiatrists (family practitioners and internal medicine specialists). There are also other major challenges. About one-third of anti-depressant prescriptions are never filled and nearly half of the patients being treated discontinue pharmacotherapy during the first month of management. The 2004 NYC HANES study showed that 8 % of the New York population had a diagnosis of depression at the time of the survey but only 37 % were receiving clinically appropriate treatment.[5]

Link between Diabetes and Depression

Patients with diabetes are at twice the risk of developing depression than the general population.[6] In a systematic review designed to estimate the prevalence of clinically depressed patients with type 2 diabetes, the prevalence of depression was significantly higher among patients with type 2 diabetes (17.6%) than those without diabetes (9.8%).[6] It was also observed that the prevalence among females with diabetes (23.8%) was higher than their male counterparts with diabetes (12.8%). Overall, studies have demonstrated that individuals with diabetes are more likely to have depression than individuals who do not have diabetes. 9% of diabetics meet the criteria for major depression and 25% of diabetics suffer from a single or multiple depressive symptoms.[7] A bidirectional relationship exists between diabetes and depression. A meta-analysis of 42 published studies that included 21,351 adults found that the prevalence of major depression in people with diabetes was 11% and the prevalence of clinically relevant depressive symptoms was 31%.[7] However, worldwide estimates of depression amongst individuals with diabetes appear to vary by diabetes type and amongst developed and developing nations. Depression is a modifiable risk factor for diabetes mellitus

and diabetes as a chronic illness increases the risk of onset of depression. Data shows that diabetics with co-morbid depression report poor subjective quality of life. In this population, compliance with treatment is a major issue leading to complications, which adversely affects quality of life.[8,9] Patients with coexisting diabetes and depression have shown poor self-management by not sticking to a strict diet regimen, maintaining good physical activity, checking blood glucose levels on a regular basis and refilling medications.[10,11] These individuals are also more likely to have 3 or more cardiac risk factors (obesity, sedentary life style, smoking, impaired glucose tolerance) compared to patients with diabetes alone.[12] In ten studies done on patients with CAD, depression was associated with a 1.64-increased relative risk of mortality.[13] The meta-analysis also found an increased incidence of macro and micro vascular complications in diabetics with coexisting depression as opposed to individuals with diabetes alone.[14] Data from three longitudinal studies has shown an increased mortality in these groups of patients.[15-17] In fact patients with both diabetes and depression have a higher risk of death than patients with depression or diabetes alone. Behavioural and biological factors such as race, ethnicity and socioeconomic status are all identifiable risk factors for co-morbid depression in patients with diabetes mellitus. Depression not only often coexists with diabetes but also negatively effects treatment goals. A Nigerian study reported the prevalence of clinical depression as 30% amongst those who have diabetes mellitus compared to 9.5% in the apparently healthy control group. Socioeconomic status and having more children significantly correlated with higher depressive symptoms on the Beck depression inventory scale.[18] Studies that have examined the role of diabetes in suicidal ideation show that patients with diabetes scored higher on two subscales of the Beck's Hopelessness Scale and Suicide Score Scale.[19] Evidence shows that diabetics older than 50 years of age are at an increased risk of suicidal ideation and attempts.[19]

Although there is evidence that supports the bidirectional association between depression and diabetes, the causal relationship is still unclear. Several studies that examined the role of depression in predicting the onset of type 2 diabetes mellitus, confirmed an increase in the risk of type 2 diabetes in patients with depression. However, this increase is not uniform and ranges between 32% and 60%.[20-23] Similarly, several studies that assessed the role of diabetes in increasing the risk of depression showed a relationship between the two with an incidence estimated between 15% to 24%, thus concluding that patients with type 2 diabetes are associated with a higher risk of depression (Odds ratio of 1.41).[20,24,25] Two major hypotheses currently exist to explain the contributory pathway between the two. One hypothesis asserts that depression precedes type 2 diabetes (i.e. depression increases the risk of developing diabetes). Unfortunately, the mechanism underlying the association between the two is not clearly understood. In theory, the greater risk of type 2 diabetes in individuals with depression is believed to result from an increase in counter-regulatory hormone release and function, alterations in the glucose transport system, and increased immune-inflammatory activation.[26] These physiologic alterations are thought to contribute to insulin resistance and beta islet cell dysfunction, which ultimately leads to the development of type 2 diabetes. The second hypothesis claims that depression in individuals with both type 1 and type 2 diabetes is a result of chronic psychosocial stressors from having a chronic medical condition.[27] Studies have found that insulin resistance and resultant hyperglycemia often resolve when patients recover from depression.[28,29] Major depression is characterized by an increased release of counter-regulatory hormones such as glucocorticoids, growth hormone, catecholamines and glucagon, which can cause hyperglycemia and may lead to insulin resistance.[30] Altered cerebral glucose utilization is also reversed with successful anti-depressant treatment.[31] Evidence from three controlled trials suggests that the treatment of depression improves glycemic control.[32] Moreover, diabetics have higher levels of circulating pro inflammatory cytokines such as IL-6 released by adipose tissue, monocytes and macrophages. These cytokines can induce sickness behaviour including fatigue, loss of appetite, loss of concentration and decreased psychomotor activity all of which are important milestones in the diagnosis of major depression.

Conclusion

Depression and diabetes are emerging public health issues that have a major impact in terms of health outcomes and economic impact. Coexisting depression and diabetes translates into a 50% increase in health care expenditure compared to the cost of treating diabetes alone.[33] Despite numerous advancements in psychiatric research over the past two decades, depression still remains undiagnosed and untreated in certain cases. This translates into worse outcomes especially when the patient has a coexisting chronic illness like diabetes mellitus. It is important to diagnose and treat depression at an early stage in the diabetic population as this seems to have positive effects on both mood and glycemic control. Awareness concerning these often-coexisting conditions is important in providing

effective and holistic care to patients with these chronic medical conditions. Identifying these conditions early and integrating treatment of depression and diabetes can tremendously improve health outcomes and quality of life.

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