

To Study the Association of Depression with Complications of Type 2 Diabetes and to Find Out any Correlation Between Type of Complication and Depression.

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ABSTRACT

Background: Depression is common among people with diabetes and it is associated with poor outcomes. This study was carried out to investigate the association of depression with various complications of type 2 diabetes and to find out any correlation between type of complications and depression. **Methods:** 200 patients with established T2DM attending the Outpatient department and indoor wards of Medicine Department of Rajindra Hospital, Patiala were evaluated for depression by a previously validated depression questionnaire [PHQ-12 item]. **Results:** Patients with T2DM (n=200) were evaluated [94 (47%) male and 106 (53%) female]. Maximum number of patients i.e. 68(34%) were in 51-60 years age group. 57(28.5%) patients out of 200 had depression. Depression was commonly associated with retinopathy (68.57%), followed by neuropathy (61.2%), nephropathy (59.57%) & CAD (25.45%). It was most commonly associated with PDR (100 %) and least commonly with CAD. **Conclusion:** This study showed high prevalence of depression in patients with T2DM. The prevalence of depression is higher in T2DM subjects with retinopathy, neuropathy and nephropathy compared to those without the respective complications. The Chances of becoming depressed increased with increase in number of complications.

Keywords: Depression, diabetic complications.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disease, characterized by a disorder in the metabolism of carbohydrates, lipids, and amino acids, either as a result of decreased insulin secretion or due to a reduction to insulin sensitivity of the cells of the body cells. It is a disease that is acquiring epidemic form and constitutes one of the major threats to human health in the 21st century.^[1]

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The World Health Organization projected that 300 million people will suffer from diabetes by 2025. India has the largest number of diabetic population

in the world and it is expected that there will be 69.9 million diabetic populations in India by 2025.^[2]

Depression is common among people with diabetes^[3], and it is associated with worse diabetes outcomes.^[4,5] The prevalence of depression is higher in patients with diabetes who have long-term complications.^[5,6] Compared with patients with diabetes alone, patients with depression and diabetes have been shown to have poorer self-management and poor adherence to antidiabetic, lipid-lowering and antihypertensive treatment.^[7] They are more likely to have higher cardiovascular risk factors like smoking, obesity, sedentary lifestyle, and uncontrolled hyperglycemia.^[6]

Earlier studies have examined the association of depression with micro and macrovascular complications of diabetes and there is evidence to suggest that the long-term complications of diabetes are associated with depressive symptoms.^[8,9] A meta-analysis of 27 studies conducted by de Groot et al^[8] to determine whether an association existed between depression and diabetes complications

reported that depression was associated with retinopathy, neuropathy, nephropathy and macrovascular disease. The available data regarding the prevalence of depression in type 2 diabetes (T2DM) patients & its correlation with various complications in India are limited. We investigated the association of depression with complications of type 2 diabetes and to find out any correlation between type of complications and depression in 200 patients of established T2DM.

MATERIALS AND METHODS

This study was carried out at the Rajindra Hospital, Patiala. All patients with T2DM as defined by American Diabetes Association (ADA 2011) criteria attending the Outpatient department and indoor wards in Rajindra Hospital were evaluated. Informed and written consent was obtained from all the participants. The study protocol was approved by the Institute's Ethics Committee. Patients with established T2DM were examined consecutively for depression by PHQ-12 (Patients Health Questionnaire-12). Each yes answer was assigned one mark for the question in PHQ-12. Score >4 was considered as positive for depression.

Four types of chronic diabetes complications were included for study, out of which three were microvascular and one was macrovascular. Retinopathy was diagnosed by detailed fundus examination after full dilatation of pupils by an ophthalmologist. Retinopathy was classified as non-proliferative and proliferative and as macular edema. Nephropathy was diagnosed if urinary albumin excretion was >30 µg/mg creatinine (it was presumed to be present if any two readings out of three of urinary albumin to creatinine ratio were ranging from 30 to 300 µg/mg). Clinical nephropathy was evaluated by the estimation of 24 h urine protein and it was present if urine proteins were more than 500 mg/total volume of urine.^[10]

Neuropathy was evaluated by history and clinical examination using 10 g monofilament, vibration sense by biothesiometer (VPT at great toe >25MV was considered significant) and ankle reflex.^[11] Coronary artery disease (CAD) was diagnosed by history of angina or myocardial infarction or documented by previous treatment records or ECG evidence of significant Q wave and/or ST segment changes in standard 12 lead ECG or evidence of CAD by Echocardiography. Plasma glucose was measured using the glucose oxidase method.

Statistical analysis: Statistical analysis was done using the t-statistics, which is the ratio of the departure of an estimated parameter from its national value and its standard error and student t-test, SPSS-16 software was used for Statistical analysis.

RESULTS

A total of 200 T2DM patients including 94 (47%) males and 106 (53%) females were evaluated. The mean age ± SD of patients was 57.92 ± 10.88 yrs. Out of 200 patients studied, 81 (40.5%) had no complications while 119 (59.5%) had complications of T2DM. Retinopathy was present in 35 (17.5%), nephropathy in 47 (23.5%), neuropathy in 49 (24.5%) and CAD in 55 (27.5%) [Figure 1].

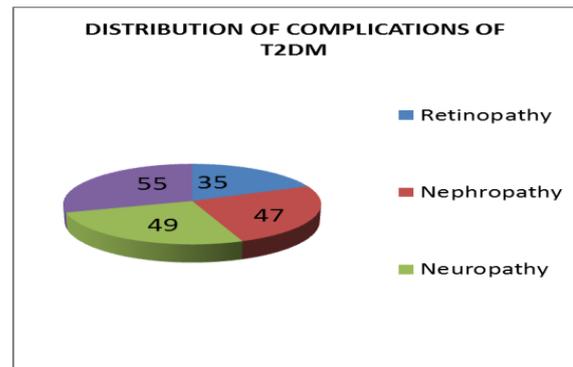


Figure 1: Distribution of Complications of T2DM.

72 (36%) patients had one complication, 28 (14%) had two complications, 18 (9%) had three complications and only one patient had all the four complications. In 35 patients with retinopathy, 28 (80%) had Non proliferative diabetic retinopathy (NPDR) and 7 (20%) had Proliferative diabetic retinopathy (PDR). Depression was present in 17 (48.57%) patients with NPDR and in all 7 (100%) with PDR. Depression was present in 19 (40.42%) patients with microalbuminuria and in 9 (19.1%) with macroalbuminuria out of 47 patients with nephropathy. Peripheral sensory neuropathy was present in 49 (24.5%) and depression was present in 30 (61.2%) patients. Out of 55 (27.5%) patients with CAD, statistically insignificant depression was present in 14 (25.45%).

HbA1c (Glycosylated Haemoglobin) levels in maximum number of patients (189) was in the range of 7-10% while mean HbA1c levels in patients with depression was 7.98 ± 1.21% [Figure 2].

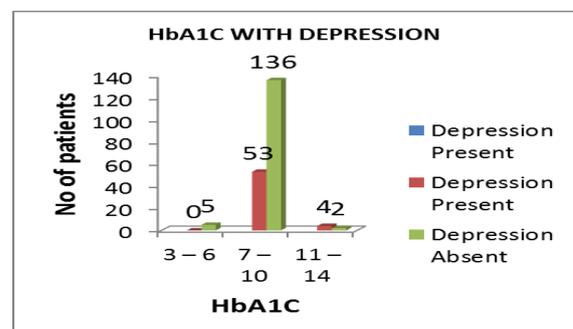


Figure 2: HbA1C with Depression.

Depression was present in 12(14.8%) out of 81(40.5%) patients of T2DM with no complications however it was present in 45(37.18%) patients of T2DM with complications and it was statistically significant (p value <0.0001) [Figure 3].

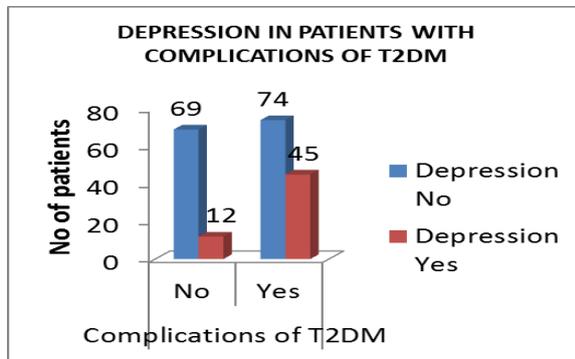


Figure 3: Depression in patients with Complication of T2DM.

Depression was most commonly associated with retinopathy (68.57%), followed by neuropathy (61.2%), nephropathy (59.57%) & CAD (25.45%). It was most commonly associated with PDR (100 %) and least commonly with CAD.

Depression was present in 10(13.88%), 20(71.42%), 14(77.77%) and 1(100%) in patients of T2DM with one, two, three and four complications respectively [Figure 4].

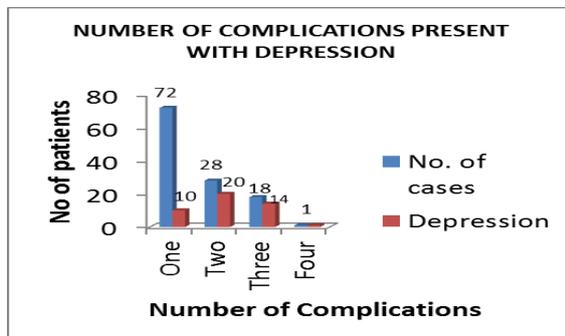


Figure 4: Number of Complications present with depression.

DISCUSSION

The presence of diabetes complications alone may not result in depression unless severe functional limitations such as blindness, impotence and cognitive impairment are present. The nature of depression in diabetes is complex and adverse life events, severity of medical illness, genetic and personality factors and psychiatric history are all likely contributors to its occurrence.^[12]

The prevalence of clinical depression and depressive symptoms are higher among diabetics and it has negative impact on various aspects of diabetic care e.g. depression was found to increase the incidence of both microvascular and macrovascular

complications, decrease compliance with medications and healthy lifestyle measures as diet and exercise, increase health care use and expenditures, decrease quality of life and more important increasing the risk of cardiovascular mortality, which is the leading cause of death in these patients.

Various Indian studies have reported prevalence rates of depression that vary from 9 – 83% in primary care practices.^[13-17] There are few population-based studies from India. The Chennai Urban Rural Epidemiology Study,^[18] which is the largest population-based study from India, to report on prevalence of the depression, showed that among urban south Indians, the prevalence of depression was 15.1%. The presence of depression in 13% of the healthy controls in the present study correlated with the above-mentioned studies. The prevalence of depression in 43% of the newly diagnosed diabetics correlated with the meta-analyses of several studies done by Anderson et al.^[19], who reported the prevalence of depression in diabetes ranging from 8 to 61%. Similarly all the above-mentioned studies concluded that depression was significantly associated with diabetes.

Various studies have also noted an association between diabetic complications and depression. Bajaj S et al^[20] also found that among patients of newly diagnosed T2DM, the majority of those having nephropathy (screened by microalbuminuria and serum creatinine) also had significantly associated depression (P = 0.0078 for microalbuminuria and P = 0.0068 for serum creatinine). However, the relation between dyslipidemia, retinopathy, or ECG abnormalities and depression was not significant. Yu et al. also found a significant association between microalbuminuria and depression in newly diagnosed diabetics, whereas, Raval et al^[21] found that significant risk factors associated with depression in type 2 diabetes included age, socioeconomic status, waist circumference, neuropathy, nephropathy, microvascular and macrovascular complications, diabetic foot, peripheral vascular disease (PVD), and a greater pill burden. Similar significant association between depression in diabetes and diabetic complications have also reported by Groot et al^[5], Poongothai et al^[18] and Joseph N et al^[21].

Depression is a common comorbidity associated with diabetes mellitus especially in those with complications and it has a huge implications on the management of diabetes. Health care personnel therefore should take the initiative to screen these patients especially those who present with multiple complications, to improve out come in patient's overall care and better quality of life will be achieved by managing both the depression and diabetes concurrently. However further studies are needed to be done to clarify the association between

the two and help those at primary care level to design an appropriate intervention programme.

CONCLUSION

This study showed high prevalence of depression in patients with T2DM. The prevalence of depression is higher in T2DM subjects with retinopathy, neuropathy and nephropathy compared to those without the respective complications. The Chances of becoming depressed increased with increase in number of complications.

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