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PREVALENCE OF DEPRESSION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND ITS IMPACT ON GLYCEMIC CONTROL: A CROSS SECTIONAL, UNICENTRIC, OBSERVATIONAL STUDY

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ABSTRACT

Background: Diabetes Mellitus is a chronic metabolic disease with many complications, which can cause disability and restriction in an individual's life. Clinical studies have suggested patients with type 2 Diabetes Mellitus have 1.6-2.0 times higher rate of major depression compared to general population. However the adequate and exact data regarding prevalence of depression and its impact on glycemic control is limited. **Objective:** To assess the prevalence of co-morbid depression among type 2 diabetic patients and its impact on glycemic control. **Methods and Materials:** A cross sectional, unicentric, observational study was carried out over 24 weeks at an internal medicine outpatient department of a tertiary care hospital in India. Patients aged 30-60 years with established type 2 Diabetes Mellitus for one year and more were screened for depression. Beck's depression inventory was used to detect the depressive disorder and its severity. **Result:** The study population (n=40) was predominantly male (30) and had a mean age of 54.975 years. Majority of the patients had poor glycemic control. Among study subjects 17 (42.5%) were suffering from clinical depression of which 10 persons had moderate depression. None of them were having severe to extreme depression according to Beck's Depression Inventory. Although more patients with higher HbA1c values found to be suffering from depressive illness, there was no significant correlation between glycemic control and level of depression. **Conclusion:** Depression was found to be highly prevalent among the patients of type 2 Diabetes Mellitus but we failed to show association between depression and hyperglycemia.

KEYWORDS: Depression, Diabetes, glycemic control.

INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder all over the world and the prevalence of this has been increasing in last few years.[1] Type 2 DM is characterized by relative insulin deficiency caused by pancreatic β-cell dysfunction and insulin resistance in different target organs.[2] According to a report in 2015 type 2 DM was the 6th most leading cause of disability worldwide. Cardiovascular complications are the greatest cause of morbidity and mortality associated with type 2 diabetes. This requires intensive management of glucose concentration in blood as well as the meticulous control of blood pressure and lipid concentration to minimize risk of complications and progression of the disease.[2]

Depression on the other hand is an important public-health issue, having a relatively high lifetime prevalence which is around 2 to 15%. The co-morbidity of depression with chronic diseases such as diabetes is well recognized in some countries. Some studies have suggested that there is an increased risk of having major depression in people with one or more chronic diseases.[3] There are evidences that depressed patients are twice as likely to develop diabetes compared to those who are not depressed. Whereas major depression can be found in one in four patients with Diabetes and its often associated with poor glycemic control.[4] The association between these two conditions is even more complex when cognitive dysfunction complicates the care of both diabetes and depression. There are evidences that the relationship between diabetes and depression is bidirectional, and that each condition may increase both the risk of and severity of each of the other conditions.[5] The pathogenesis of this relationship is not well understood and requires further study. It is believed that behavioral, physiological and genetic factors have some effect on neuroendocrine as well as neurotransmitter function. It is also known that when these conditions co-exist, there is more risk for adverse clinical outcomes and increased mortality.[4][5] Moreover depression causes poor self-care and adherence to medical treatment, diminished quality of life and can increase health-care

costs.[6] This study aims to find out the prevalence of depression among patients with type 2 DM so that we can manage it more intensely to improve the outcome. The exact data regarding the prevalence of depression among patients with type 2 DM is limited in this part of India. We tried to find out the prevalence of depressive disorder in diabetic patients attending a tertiary care hospital in eastern India and its association with glycemic control.

MATERIALS AND METHODS

It was a cross sectional study spanning over 24 weeks involving patients with established type 2 Diabetes for more than 1 year, aged between 30 to 60 years and presented to general medicine outpatient department of a tertiary care hospital. Patients have been on adequate anti-diabetic therapy prescribed by an Endocrinologist have been considered for this purpose. Patients with HbA1C <7% were considered as the controlled group and the uncontrolled group was taken as the one with HbA1c ≥ 7%. Both the groups were on optimum anti diabetic medication which was prescribed according to the guideline of American Diabetes Association, taking the severity, duration of illness and other factors like renal profile, cardiac profile etc into consideration. Patients with gestational Diabetes, advanced stage of diabetic kidney disease, history of stroke and major cardiac illness like myocardial infarction or heart failure and known psychiatric disorder were excluded.

A standard questionnaire for depression, 'The Beck's Depression Inventory' questionnaire was given to each patient. The questionnaire was given to the patients to assess their severity of depression. The glycemic control was measured by the HbA1c results of the patients.

Ethical clearance was obtained from the institutional Human Ethics Committee and Informed consent was obtained from the participants before administering the questionnaire.

STATISTICAL ANALYSIS

Descriptive statistics like mean and percentages were used for the analysis for the interpretation of results. Comparison of groups was done by chi square test. Spearman test was used to find out the correlation between groups. Statistical analysis was performed using SPSS version 21.

RESULTS

The study was conducted to find out the prevalence of depression among patients with type 2 DM, and its relation with glycemic status of the patients. Among the patients attending general medicine outpatient department of Midnapore Medical College 40 met the inclusion criteria and got enrolled in our study, among them majority was male (30), vide fig 2. Study subjects had a mean age of 54.9±9.61 years, most of them were aged above 60 years (32.5%), followed by the age group of 51-60 years (30%) as depicted in fig 1.

The severity of depression as obtained using the Beck's depression inventory score was categorized into five categories, with category one representing the least or minimum depressive symptoms, while category six representing the extreme form of the illness, as depicted in table no 1. A total 16 number of subjects found to have a score (Beck's depression inventory score) between 21 to 30, thus falling into category 4, which indicates they had moderate form of depression, whereas 9 subjects found to be suffering from borderline clinical depression, as shown in fig 2. None of the participants had extreme depressive illness.

The mean duration of diabetes in the study population was 9.55 ± 5.5 years and the mean HbA1c level was 8.6 ±1.8. There was moderate positive correlation (Spearman correlation value 0.302) between glycemic control (HbA1c) and the level of depression as shown in table 2. It has been found that patients with poor glycemic control (HbA1c ≥ 7) tend to have higher BDI score (table no). Though the results were statistically insignificant (p value 0.58), but it was clearly evident that more number of patients with depressive illness have higher HbA1c level. Patients with moderate depression had a mean age of 54.5 ±8.7years, most of them were aged above 50.

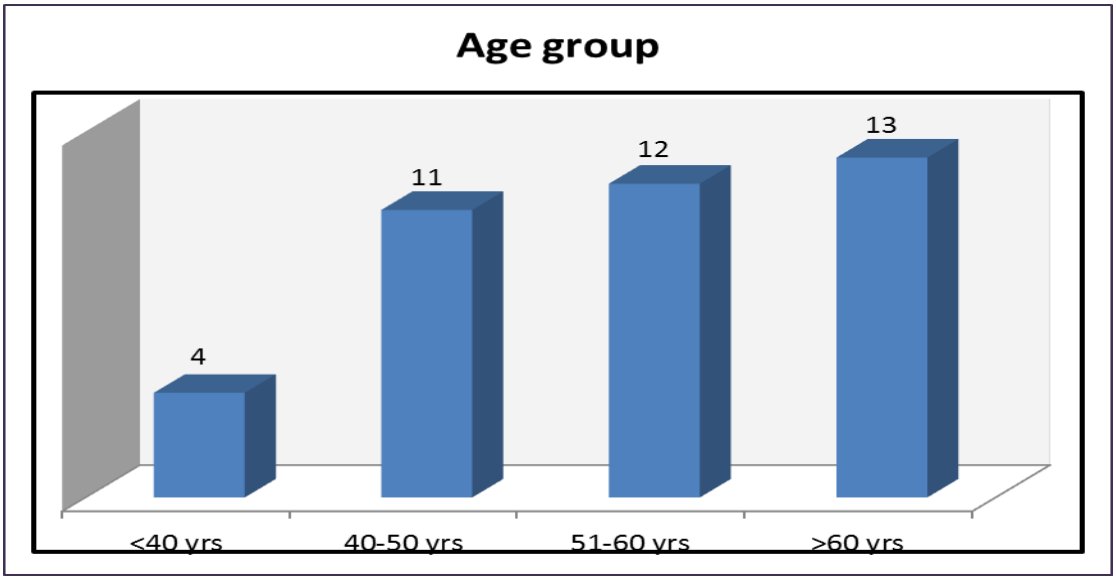

Fig 1: Age group wise distribution.

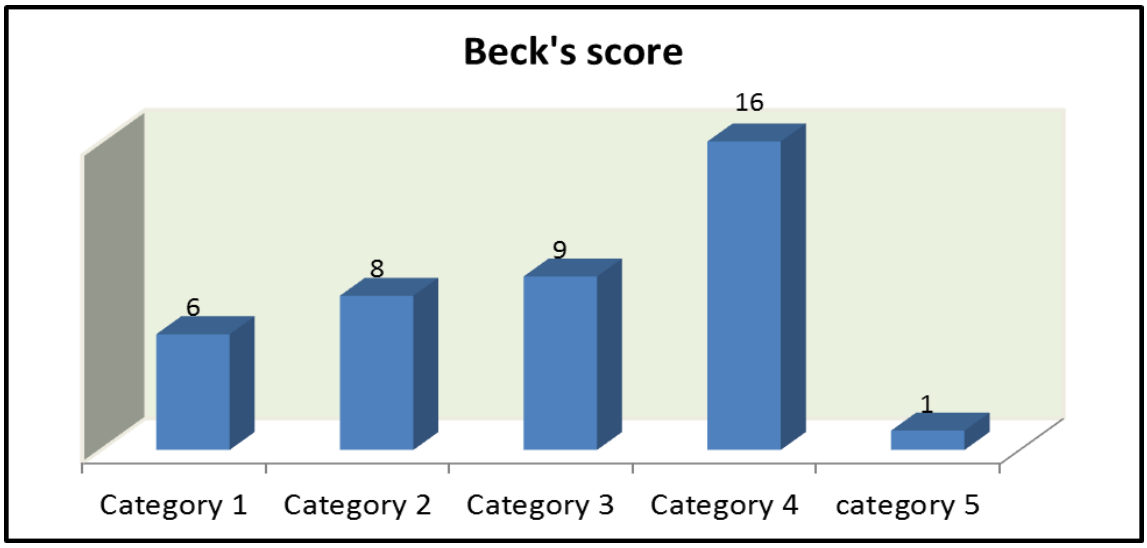

Fig 2: categorization of Beck's score among study subjects.

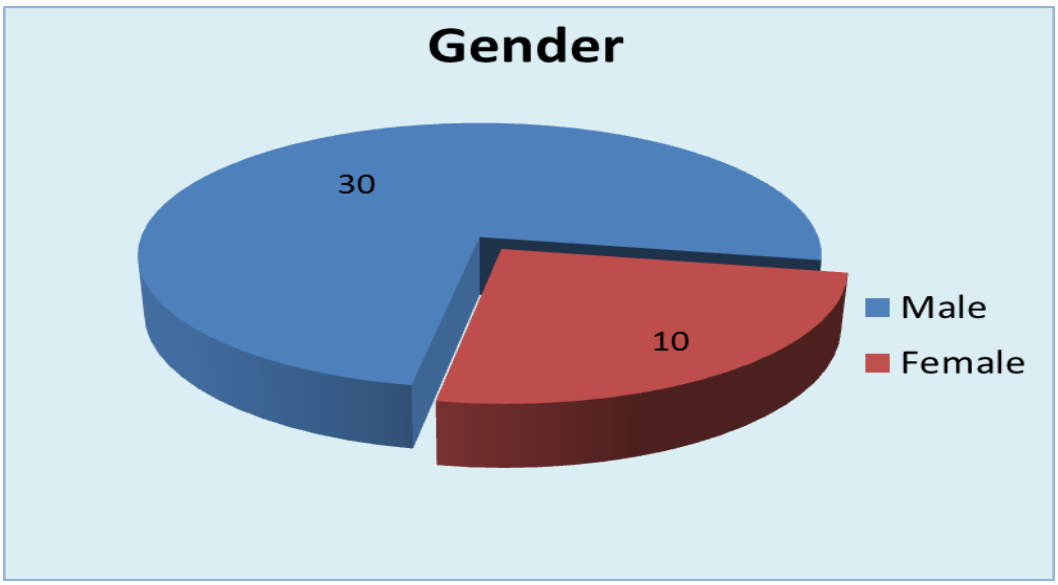

Fig 3: Gender wise distribution.

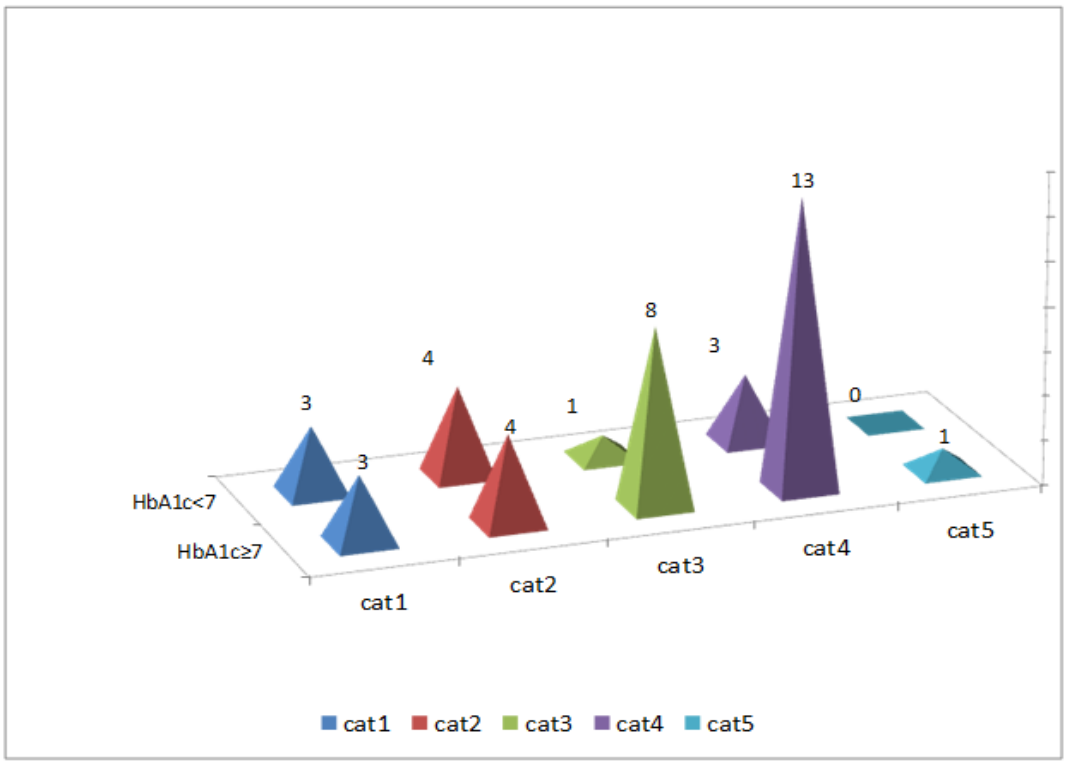

Fig 4: Distribution of Beck's score category among different HbA1c level.

Table 1: Interpretation of the Beck's depression inventory scores.

BDI score	Level of depression	Category
1-10	Normal	1
11-16	Mild mood disturbance	2
17-20	Borderline clinical depression	3
21-30	Moderate depression	4
31-40	Severe depression	5
>40	Extreme depression	6

Table 2: Comparison and correlation between glycemic control and level of depression.

Hba1c	Becks score category					P value (Chi square)
	1-10	11-16	17-20	21-30	31-40	
<7	3	4	1	3	0	0.218
≥7	3	4	8	13	1	
Spearman correlation value 0.302, (p value 0.58)						

DISCUSSION

Diabetes is about to become a potential epidemic in India with around 62 million individuals currently diagnosed with the disease. Poor glycemic control, a factor that has been observed in the Indian diabetic population, is responsible for micro- and macro vascular complications of the disease.[7] On the other hand all over the world, an estimated 300 million people suffer from depressive disorder.[8] The correlation between depression and DM is a well - known fact which is investigated by many researchers. In-fact some studies have shown major depression is highly prevalent among diabetic population and the rate of prevalence can vary depending upon the demographic characteristics and the type of diabetes.[9]

Our study clearly indicates that diabetic person with poor glycemic control are more prone to develop co-morbid depression and are more likely to suffer from depressive disorder when compared to the patients with good glycemic control. There are evidences that depression itself is an independent risk factor for the onset of type 2 DM, and a predictive factor for the severity of its complications.[10] Result of our study is similar to the studies conducted earlier in this regard. Similar cross sectional study conducted by Rajangam et al showed that the uncontrolled diabetics have twice the risk of confronting with depression when compared to the patients with good glycemic control.[11] Study conducted by Rajesh Rajput et al indicates that both the anxiety and

depressive disorders were 2 times more prevalent in patients with type 2 Diabetes Mellitus than in healthy controls.[12] A study conducted at a tertiary care center in north India showed strong correlation between uncontrolled diabetes and major depressive disorder. They found that almost one third of the participants with T2DM had major depressive illness, and overall the prevalence of depression tends to increase with age of the subjects.[13] A cross sectional study among 203 diabetic patients using the Beck Depression Inventory was carried out in a Diabetes clinic situated in Kathmandu, Nepal in the year 2018, which showed strong association between the two, as the prevalence of depression was high among the study population, : The prevalence of depression among diabetic patients was 34% (Mild - 17.7%, Moderate - 13.8% and Severe - 2.5%).[14] Where as in our study most of the subjects (40%) found to be suffering from moderate depressive illness, followed by borderline clinical depression (22.5%). According to a study conducted in Pakistan[15] elderly people are more prone to psychiatric illness like depression, where they found the prevalence of depression among elderly population to be around 28%. Our study showed that most of the subjects with moderate degree of depression had a age of 50 years and above as well.

CONCLUSSION

In our study we found that the diabetic people with poor glycemic control are more likely to develop co-morbid depression as compared to the ones with tight control. As the relation between these two diseases is bidirectional in nature treating depression or the diabetes adequately would bring some effects on each other. Patient with diabetes may require routine screening for such psychiatric disorder at the earliest as treating depression along with diabetes could be beneficial for controlling the disease progression and its complications.

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