

# Prevalence of Depression in Diabetes Mellitus and Its Determinants

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## Abstract

**Introduction:** The prevalence of diabetes mellitus is increasing world wide. Diabetes mellitus is a chronic disease which affect many organ system leading to reduced life expectancy. The association of diabetes mellitus and depression has been observed since long.

**Purpose:** To find out prevalence of depression in diabetes mellitus.

**Method:** Total 300 diabetic patients included in this study and they were screened for depression by patient health questionnaire-9

**Results:** the result from the study showed the prevalence rate of depression in diabetic is 43.33%. Among these depressed group 30.76% were mildly depressed, 40.76% were moderately depressed and 28.46% had severe depression.

**Conclusion:** High prevalence of depression was found in diabetic patients. Hence psychiatrist assessment should be part of diabetic patients evaluation.

**Key words:** Depression, Diabetes mellitus, Glycemic control, Psychiatric assessment, PHQ-9

## INTRODUCTION

Diabetes mellitus and depression both are common disease. The World Health Organization projected that 300 million people will suffer from diabetes mellitus by 2025.<sup>1</sup> 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.<sup>1</sup>

Diabetes mellitus is chronic disease which virtually affects every organ of human system leading reduced life expectancy and quality of life as a result of complication.

Depression is the most common psychiatric disorder in the general practice.<sup>2,3</sup> It is estimated that 340 million people are affected globally,<sup>4</sup> and it is associated with significant morbidity and health-care cost.

Depression is common among people with diabetes.<sup>5</sup> The frequent association of diabetes and depression has been observed since long. More than 300 years ago Dr. Thomas willis, a british physician, made the observation that there was a relationship between diabetes and depression when he suggested that diabetes was the result of sadness or long sorrow.<sup>6</sup> Latter on many studies showed high prevalence of depression in diabetic as compared to general population and confirmed the link between diabetes and depression.

Compared with patients with diabetes alone, diabetic patients with depression have been shown to have poorer self-management and poor drug compliance and associated with worst diabetic outcome.<sup>7</sup> Patients with depression and diabetes are more likely to have

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higher micro-vascular and macro-vascular complication<sup>8</sup> and higher mortality rate.<sup>9</sup> They are more likely to have higher cardiovascular risk factors such as smoking, obesity, sedentary lifestyle, and uncontrolled hyperglycemia.<sup>10</sup>

Depression is associated with physiological abnormalities, including activation of the hypothalamic–pituitary–adrenal axis, sympathoadrenal system, and proinflammatory cytokines, which can induce insulin resistance.<sup>11</sup>

While depression may contribute to poor diabetic-related outcome, diabetes and its complication may also contribute to poor depression outcome. Hence, one disease fuelling the other.

### Aim and Objective of the Study

To find out the prevalence rate of depression in diabetic patients, its major determinants and its severity grading.

## MATERIALS AND METHODS

This study was an observational prospective study conducted after approval from Institutional Ethic Committee at the department of General Medicine, IGIMS, Patna, Bihar from June 2016 to May 2017. Number of participants included was 300.

### Inclusion Criteria

1. All patients suffering from diabetes mellitus above the age of 15 years
2. Willing to participate in study.

### Exclusion Criteria

1. Not willing to participate in study
2. Diabetic patients of age <15 years.

The study included all diabetic patients from OPD and IPD of general medicine department IGIMS. Both newly diagnosed diabetic patients and patient having history of diabetes were included in the study. The study included all type of diabetes, i.e., Type 1, Type 2, and other specific type. The diagnosis of diabetes was made according to criteria proposed by American Diabetes Association. Clinical history including age, sex, and religion was taken, HbA1c was done.

Then, all diabetic patients was screened for depression by patient health questionnaire (PHQ-9).

By this scoring system following questions was asked over the past 2 weeks, how often have you been bothered by any of the following problems?

Questionnaire	Not at all	Several days	More than half days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed or the opposite being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself	0	1	2	3
Total score	0	9	18	27

Total score	Depression severity
0-4	No depression
5-9	Mild depression
10-14	Moderate depression
15-19	Moderately severe depression
20-27	Severe depression

After collection of data prevalence of depression in diabetic patient was derived, and statistical analysis has been done regarding its correlation with demographical, social and clinical variables such as age, sex, religion, and glycemic control (HbA1c).

## RESULTS

Among 300 diabetic patients, 130 patients had depression whereas 170 patients did not have depression. Of these 130 diabetic patients with depression 55 were male and 75 were female. The mean age of depressed diabetic patient was 50.19 years. Among depressed group 110 patients were Hindu and 20 were Muslim (Table 1).

According to PHQ-9 score, among these depressed group 40 (30.76%) were mildly depressed (PHQ score 5-9), 53 (40.76%) were moderately depressed (PHQ score 10-14), and 37 (28.46%) patients had severe depression (PHQ score - 15-27) (Table 2).

The mean HbA1c level of depressed patients with diabetes were 8.5.

**Table 1: The sociodemographic data of the depressed and non-depressed group**

Group	Depressed	Non-depressed
Number of patients	130	170
Mean age (in years)	50.19	51.70
Gender		
Male	55	98
Female	75	72
Religion		
Hindu	110	140
Muslim	20	30

**Table 2: Severity of depression in diabetic patients**

Severity	Number of patients (%)	Gender
Mild	40 (30.76)	Male - 15 Female - 25
Moderate	53 (40.76)	Male - 24 Female - 29
Severe	37 (28.46)	Male - 16 Female - 21

## DISCUSSION

The aim of study was to assess the prevalence of major depression among diabetic population. The result from the present study showed the prevalence rate of depression in diabetic patients is 43.33%. This study indicates that the prevalence of depression in diabetes is high as compared to non-diabetic population. World mental health surveys indicate that major depression is experienced by 10-15% people in their lifetime.<sup>12</sup> This study also showed that the prevalence of depression in diabetics is higher compared to that reported in most of the previous similar study.

Asghar *et al.*, found that depressive was present in 29% of males and 30.5% of females with newly diagnosed diabetes in rural Bangladesh.<sup>13</sup> Similarly, Sotiropoulos *et al.*, found depression in 33.4% of a cohort of Greek adults with Type 2 diabetes.<sup>14</sup> In another study, Zahid *et al.* found a lower depression prevalence (14.7%) among patients with diabetes in a rural area in Pakistan.<sup>15</sup>

However, there are many studies which indicated higher prevalence rate as compared to our study. Das *et al.* found that rate depression in Type 2 diabetes mellitus was 46.15%.<sup>16</sup> In another study, Khamseh *et al.* found major depression in 71.8% of a sample of 206 Iranian patients with Type 1 and Type 2 diabetes.<sup>17</sup> Result of this study is much higher than our study. Our findings are comparable with that of Mier *et al.*, who found that the rate of depression among hispanic patients was 40.5% in northeastern Mexico.<sup>18</sup> Taken together; these studies and

our finding provide evidence that depression is associated with diabetes mellitus.

Diabetic female showed increased prevalence of depressive symptoms compared with male participants; in our study 57.69% of depressive patient was female. The predominance of depression among females is consistent with other studies. Anderson *et al.* found that diabetes doubles the risk of depression and it is especially more among females 28.2% compared to 18% among males.<sup>19</sup>

In our study, mild and moderate depression was more common 71.52% than severe depression which was only 28.46%.

Independent risk factors of depressive symptoms were glycemic control. In our study, Mean level of HbA1c was 8.5, which indicates that most of the depressed patients with diabetes are poorly controlled.

## CONCLUSIONS

An unexpectedly high prevalence of unrecognized depression was found in diabetic patients. Depression is common in diabetes patients' particularly poorly controlled diabetic female. Hence, Psychiatric assessment should be part of initial and ongoing evaluation of these patients, and psychiatric intervention may be necessary to achieve improved overall health in diabetic population.

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