

## ORIGINAL ARTICLE

**Prevalence of Depression in Type 2 Diabetic Patients Using PHQ-9 Scale: A Clinic Based Cross Sectional Study**

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**Abstract:**

**Background:** The prevalence of depression is higher in patients with chronic illnesses such as diabetes and hypertension. The PHQ-9 (Patient Health Questionnaire) is an instrument designed to diagnose depression by the criteria identified by 4th Diagnostics and Statistical Manual of Mental Disorders. **Aim and Objective:** To assess the depression in diabetic population using PHQ-9 scoring system and its association with some sociodemographic correlates. **Material and Methods:** It is a cross-sectional study involving 46 consecutive patients presenting at a tertiary care centre, aged >18yrs and diagnosed with Type 2 diabetes mellitus. The PHQ-9 questionnaires were given to patients who were included in the study. Data was entered in MS excel sheet and analysed by using SPSS 24.0 version, IBM USA. **Results:** Prevalence of major depression in our study was 41.3%. Out of 19 patients with major depression, Majority was from 51-60 and above 60 years age group i.e., 7 (36.8%) each. There is statistically significant difference in the proportion of males and females between two categories of depression. ( $p < 0.05$ ). Females were more prone to major depression as compared to males. **Conclusion:** The prevalence of major depression in our study was 41.3%. Females were more prone to depression in our study being having more PHQ-9 score. PHQ-9 seems to be acceptable in our study being easy to administer and for quick assessment of depression in busy clinical schedule.

**Key words:** Diabetes, depression, PHQ-9

**Introduction:**

Depression is the most common in present day clinical practice. The prevalence of depression has been increased due to increase in chronic illnesses such as

diabetes and hypertension [1,2]. Current epidemiological evidence shows that at least one third of diabetic patients suffer from depression [3,4,5]. In the modern world, prevalence of diabetes is increasing due to increase in risk factors such as lack of exercise, sedentary lifestyle, obesity due to westernization of food habits and also an aging population. It is expected that the prevalence of diabetes is going to double globally from 171 million in 2000 to 366 million in 2030 with a maximum increase in India [6]. Depression can lead to less-than-optimal diabetes management, lower levels of physical activity with subsequent increased risk of microvascular and macrovascular outcome and overall increase in health care costs [7,8]. Although depression can be managed successfully with psychological and pharmacological treatments, the under recognition of mental disorders is a major barrier to successful treatment [9,10,11]. In addition, depression may also overlap with the emotional distress associated with having and managing diabetes and there by interfere with the provision of appropriate care [12].

According to WHO world mental health survey consortium 2004, "depression is one of the most prevalent mental disorders" [13]. It is described by the DSM-IV-TR as a "loss of interest or pleasure in daily activities resulting in impaired functioning"[13]. According to the American psychiatric association, 2000, there are about nine specific symptoms of depression: depressed mood and interest, change in

appetite, sleep, activity, fatigue, feelings of worthlessness, decrease in concentration, and suicidal thoughts. The PHQ-9 (Patient Health Questionnaire) is an instrument designed to diagnose depression by the criteria identified by 4<sup>th</sup> Diagnostics and Statistical Manual of Mental Disorders. It consists of nine multiple choice items. Each criterion is scored between 0 and 3 denoting “Not at all”, “some days” and “Nearly every day” respectively. The PHQ-9 is specifically designed in a simplest way to be used in primary care settings. It is short and simple to use and also effective in variety of patient groups [13].

The U.S. Preventive Services Task Force (USPSTF) published a recent recommendation about depression screening, and it concluded that treatment with psychotherapy and drug therapy or both decrease the clinical morbidity and improves outcomes in adults with depression identified through screening in family medicine settings [14]. American Diabetes Association, American Association of Clinical Endocrinologists [15], and Canadian Diabetes Association [16], recommend screening for psychosocial status at diagnosis, during regular follow ups, in case of hospitalizations whenever complications are found or when fluctuations in glucose control and quality of life are found. Patients are likely to exhibit psychological vulnerability at diagnosis and when their medical status changes. There are different methods to assess the depression but we want to find out the prevalence by using PHQ-9 scale in our clinic setting hence the present study was carried out. The present study was taken to assess the depression in diabetic population using PHQ-9 scoring system and its association with some sociodemographic correlates.

#### **Material and Methods:**

It is a cross-sectional clinic-based study involving 46 consecutive patients presenting at the Department of General Medicine of Navodaya Medical College and Hospital, Raichur, Karnataka which is a tertiary care centre. We planned to include all the patients visiting approaching to our OPD during the month of June and July 2020. We had total 46 patients fulfilling the

eligibility criteria of our study. Patients aged above 18 years and diagnosed with Type 2 diabetes mellitus were included in the study. Institutional ethics committee approval was obtained. Written informed consent was obtained from the study participants. The PHQ-9 questionnaires were given to patients who were included in the study. An interpreter assisted those patients who were illiterate in filling the questionnaires. The PHQ scores 0-9 (none, minimal and mild depression categories) was considered as “no major depression” and a scores of 10-27 (moderate, moderately severe and severe categories) as “major depression” [17,18].

The following variables were considered such as age, gender and duration of diabetes, glycemic index and presence of hypertension. Age was measured in completed years. Duration of diabetes and glycemic control was taken from the patient’s case records. Hypertension was defined in the study as systolic BP levels of >140mmHg and diastolic BP of >90mmHg, or current treatment for hypertension with prescription medication [19,20]. Individuals who had been diagnosed with Type 2 DM for at least one year, spoke either Kannada or Hindi and were attending the outpatient department of our selected sites for consultation were approached by the research team and invited to participate in the study.

The patients having age group 18-65 years, capable of independent communication and capable of giving informed verbal consent were included in the study. The patients with complications from diabetes (retinopathy, neuropathy, nephropathy), Previous history of mental illness, previous illness known to increase a risk for depression (CAD, CVA) and patients already on antidepressants for other symptoms were excluded from the study.

Data was collected by using a structured proforma. Data thus was entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of percentages and proportions. Quantitative data was expressed in terms of Mean and Standard deviation. There was association between two qualitative variables seen by using Chi square/Fischer’s exact test.

Comparison of mean and SD between two groups was done by using unpaired t test to assess whether the mean difference between groups is significant or not. Descriptive statistics of each variable was presented in terms of mean, standard deviation and standard error of mean. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

**Results:**

We included total 46 diabetics in our study. Majority of them were from 51-60 years age group i.e., 15 (32.6%), followed by 13 (28.3%) patients from 41-50 years, 10 (21.7%) from above 60 years and 8(17.4%) from 30-40 years age group. Mean age of the study population was 52.54 ± 11.35 years. In our study, majority was males 27 (58.7%) and 19(41.3%) were females. Male to female ratio was 1.42:1. PHQ-9 score was minimum in 9 patients and mild in 18 subjects. The score was moderate in 11(23.9%), moderately severe in 7 (15.2%) and severe in 1 patient i.e., 2.2%. So, the prevalence of major depression in our study was 41.3%.

Out of 27 patients with no major depression, majority was from 41-50 years age group i.e. 9 (33.3%) followed by 8 (29.6%) from 51-60 years and 7 (25.9%) from 30-40 years. Out of 19 patients with major depression, majority was from 51-60 and above 60 years age group i.e., 7(36.8%) each. There is no

significant difference in the proportion of two groups with respect to each age group (p>0.05).

Proportion of males with no major depression was 74.1% compared to 36.8% with major depression. Proportion of females with no major depression was 25.9% compared to 63.2% with major depression. There is statistically significant (p<0.05) difference in the proportion of males and females between two categories of depression. It also means that females were more prone to major depression compared to males with major depression.

Out of 27 patients with no major depression, majority was having diabetes duration of 1-5 years i.e. 44.4% as compared to 36.8% of major depression group. This is followed by 37% patients from no major depression group having duration of diabetes between 6-10 years as against 10.5% from major depression group. This is followed by 14.8% patients from no major depression group having duration of diabetes one year as against 31.6% from major depression group. There is no significant difference in the proportion of patients between two groups with respect to duration of diabetes is concerned (p>0.05).

Mean PHQ-9 score in males was 7.48 ± 3.85 and in females it was 11.95 ± 5.29. When we compared the mean difference of PHQ-9 between males and females, the difference was found to be statistically significant (p<0.05). It means that females were more prone to depression in our study being having more PHQ-9 score.

Table No.1: Distribution according to age and gender

		Frequency	Percent
Age group in years	30-40	8	17.4
	41-50	13	28.3
	51-60	15	32.6
	>60	10	21.7
	Total	46	100.0
		Frequency	Percent
Gender	Male	27	58.7
	Female	19	41.3
	Total	46	100.0

Table No.2: Prevalence of depression

			Frequency	Percent
PHQ grade	No major depression	Minimum (1-4)	9	19.6
		Mild (5-9)	18	39.1
	Major depression	Moderate (10-14)	11	23.9
		Moderately severe (15-19)	7	15.2
		Severe (20-27)	1	2.2
	Total			46

Table No.3: Prevalence of depression according to age group

		PHQ-9 grading of depression				Total
		No major depression		Major depression		
		No	%	No	%	
Age group in years	30-40	7	25.9	1	5.3	8
	41-50	9	33.3	4	21.1	13
	51-60	8	29.6	7	36.8	15
	>60	3	11.1	7	36.8	10
	Total	27	100.0	19	100.0	46

Chi square test-6.09, p-0.075 (>0.05), Not significant

Table No.4: Gender difference in the prevalence of depression

		PHQ-9 grading of depression				Total
		No major depression		Major depression		
		No	%	No	%	
Gender	Male	20	74.1	7	36.8	27
	Female	7	25.9	12	63.2	19
	Total	27	100.0	19	100.0	46

Chi square test-6.37, p-0.012 (<0.05), significant

Table No.5: Prevalence of depression according to diabetes duration

		PHQ-9 grading of depression				Total
		No major depression		Major depression		
		No	%	No	%	
Duration of diabetes	<1 year	4	14.8	6	31.6	10
	1-5 year	12	44.4	7	36.8	19
	6-10 years	10	37.0	2	10.5	12
	>10 years	1	3.7	4	21.1	4
	Total	27	100.0	19	100.0	45

Chi square test-6.5, p-0.089 (>0.05), Not significant

Table No.6: Comparison of PHQ-9 score between male and female

Sex	N	Mean ± SD	t	p	Inference	
Total score	Male	27	7.48 ± 3.85	-3.320	0.002	Significant
	Female	19	11.95 ± 5.29		<0.05	

**Discussion:**

Few screening tools to detect common mental disorders (CMDs) have been specifically developed in low and middle-income countries [21] as such many researchers rely on tools from developed countries. It is important that instruments for screening patients have to be evaluated for their reliability and validity prior to their use in a country to ensure that the instruments are measuring what they supposed to measure [22].

PHQ-9 measures demonstrated acceptable reliability since the questionnaires can be self-administered and completed within a few minutes and seem to be a better tool for self-administered screening.

PHQ-9 score was minimum in 9 patients and mild in 18 subjects. The score was moderate in 11(23.9%), moderately severe in 7(15.2%) and severe in 1 patient i.e., 2.2%. So, the prevalence of major depression in our study was 41.3%. Out of 27 patients with no major depression, majority was from 41-50 years age group i.e., 9(33.3%) followed by 8(29.6%) from 51-60 years and 7(25.9%) from 30-40 years. Out of 19 patients with major depression, majority was from 51-60 and above 60 years age group i.e., 7(36.8%) each. There is no significant difference in the proportion of two groups with respect to each age group (p>0.05).

Das R et al [23] in their study reported that among the study participants, 90 patients (males: 41, females: 49) fulfilled the DSM-IV diagnostic criteria for major depressive episodes, whereas 105 patients (males: 40, females: 65) did not have a major depressive episode in recent time. Prevalence of mild depression was

32.2%, moderate depression as 36.7% and 14.4% had severe depression.

However, worldwide estimates of depression prevalence among individuals with diabetes appear to vary by diabetes type and among developed and developing nations. Li et al., found that among the U.S. adults aged  $\pm 18$  years, the age adjusted rate of depression was 8.3% (95% CI 7.3-9.3), ranging from 2.0% to 28.8% among the 50 states [24].

Asghar et al., found evidence of depressive symptoms in 29% of males and 30.5% of females with newly diagnosed diabetes in rural Bangladesh [25]. Similarly, Sotiropoulos et al., found 33.4% of a cohort of Greek adults with type 2 diabetes [26]. Zahid et al., found a more modest depression prevalence (14.7%) among patients with diabetes in a rural area in Pakistan [27]. However, Khamseh et al., found major depression in 71.8% of a sample of 206 Iranian patients with type I and type II diabetes [28], which is higher than in this study.

Our findings are almost consistent with the above findings.

Risk factors associated with the presence of depression in patients with diabetes include female sex, younger age, not having a spouse, poor social support, lower education, low socioeconomic status, poor glycemic control, presence of diabetic complications, presence of medical comorbidity, physical impairment and previous history of depression [29,30].

#### Conclusion:

The prevalence of major depression in our study was 41.3%. Major depression was prevalent commonly in 51-60 and above 60 years age group. Females were more prone to depression in our study being having more PHQ 9 score. PHQ-9 seems to be acceptable in our study being easy to administer and for quick assessment of depression in busy clinical schedule.

**Conflict of Interest** - Nil

**Sources of Support** - Nil

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