

# Prevalence of Depression among type 2 Diabetic Patients attending at Primary Health Care Centres Buraidah, Qassim Province, Saudi Arabia

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## Abstract

**Background:** Chronic diseases such as type 2 diabetes can play a major role in mental health and its spectrum. Recent studies have been shown that the diabetes can increase the risk of depression which could lead to poor self-care and adverse outcomes among the patients.

**Methodology:** A cross sectional study was conducted among the patients attending primary health care centres and simple random technique was applied among the 250 participants for the sample recruitment through self administered questionnaire. Results: In the present study, about 43.2% were having depression based on self reported patient health questionnaire (PHQ-9) and majority people had mild depression (29.2%). Depression among the type 2 diabetes was significantly associated with female gender, primary education, unemployed and widow ( $P < 0.05$ ). Logistic regression analysis was done, diabetic neuropathy and family history of depression was significantly associated with depression among type 2 diabetes patients ( $P = 0.001$ ,  $P = 0.004$  consecutively). Conclusions: Based on the study results, there was increase prevalence of depression was noticed. This could be due to PHQ-9 tool, also self administered questionnaire and self reported participants. Health promotional measures to be strengthened.

**Keywords:** Type 2 Diabetes; Depression; Patient Health Questionnaire; Diabetic complications; Family history of depression.

## Introduction

Type 2 diabetes is considered as one of the most common causes of chronic disease that affect the global population.<sup>1</sup> Type 2 Diabetes mellitus accounts 90-95% of all diabetic patients diagnosed in the world and predominantly seen in above 40 years of age group. This could be resulted due to familial predisposition and change in lifestyle including

food habits change globally, resulted in early age occurrence of type 2 diabetes.

The predicted prevalence of diabetes will be projected as 35.37% in 2020; 40.37% in 2025 and it will reach to 45.36% in the year 2030.<sup>2</sup> Recent studies in Saudi Arabia showed that Depression was considered common among patients with T2DM. In Arar city in northern region showed that the

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prevalence of depression among diabetic patients was 37.4%<sup>3</sup>, other study was conducted in Qassim found 34.8% of diabetic patients had depression.<sup>4</sup> Depression can lead to poor compliance and self-care such as adherence to medication, diet, exercise and blood glucose monitoring which can lead to worse outcomes.<sup>5</sup>

A study conducted in Saudi Arabia by AlHadi AN et al about Patient health Questionnaire (PHQ-9) tool of Arabic translation to detect not only for depression and also stress, somatic and panic disorders detection. PHQ-9 as best screening tool even at the primary health care centres can be used and will be practiced in the world including Saudi Arabia.<sup>6</sup> Based on PHQ-9 score classified the normal and depression status. depression status further classified as mild, moderate, moderately severe and severe depression; based on score 0-4, 5-9, 10-14, 15-19 and more than 20 consecutively.<sup>7</sup> A study done in Eastern province among type 2 diabetes patients and mentioned the prevalence of depression was 49.6%.<sup>8</sup>

In this study also mentioned as patients with chronic diseases tend to develop psychological condition and scarce evidence was noticed and its relationship between depression and anxiety with chronic diseases.<sup>9-11</sup> In view of all those mortality, morbidity and disability associated with depression among type 2 Diabetes patients, present study was conducted.

### Objectives:

To find the prevalence of depression and risk factors association with patients of type 2 diabetes at primary health care centres.

## Materials and Methods

**Study design:** Cross sectional study was conducted and included type 2 diabetic patients visiting at primary health care centre (PHCC) during the period from January 2021 to February 2022 in Buraidah.

### Sampling:

The formula used for the calculation of the sample size in qualitative studies ( $N = 4PQ / L^2$ ) and sample estimate was 330. Simple random method

used, based on daily appointment given at primary health care centre.

### Inclusion Criteria:

Type 2 Diabetic patients aged 30 years and above.

### Exclusion Criteria:

Patient who are below 30, pregnant women and patient known to have major psychiatric illness (Schizophrenia) will be excluded.

### Questionnaire:

A self administered questionnaire distributed to all the type 2 diabetes patients selected from the appointment list by simple random method. We distributed the questionnaire to the 330 participants, but responded sample was 250.

Our questionnaire was consists of three parts. First part demographic variables, second part risk factors and third part PHQ-9. Each question graded as four domains and their scores labelled for each question as "0" as not at all, "1" as several days, "2" as more than half days, "3" as nearly every day. The range of the score in PHQ-9 was 0 to 27.

### Statistical analysis:

For categorical analysis, the Chi-square test was applied. For the prediction of risk factors, logistic regression analysis was done. The level of significance will be taken as  $P < \text{or} = 0.05$ .

**Ethical issues:** Institutional ethical committee permission was taken. Informed consent was attached to each questionnaire and consent was taken. Privacy and confidentiality of the participants completely protected.

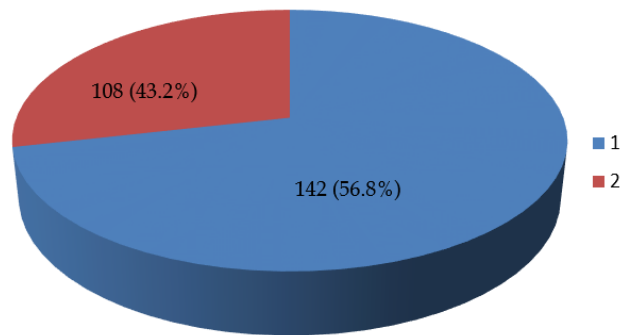
## Results

In the present study, about 250 type 2 Diabetes patients of aged 30 years and above were participated and females were 38%. Retired people in the study population was 18%. Out of 250 study participants, 43.2% were having depression based on self reported questionnaire administration to the participants. Of which, majority people were having mild depression (29.2%), moderate depression was 8.8%, moderately severe depression was 4.8% and lastly

severe depression was 0.4%. In the study population, about 62% were males and 10% of type 2 Diabetics were in the age group of 30-40 years. Majority of the study participants 49.2% (123/260) were completed University level education. About 10.8% were income was > 15000 SR per month.

In the study group, about 62% were reported as presence of family history and 4.8% were stated as more than 20 years of duration of Diabetes. About 89.4% were showing their HbA1C was > 7% in the current study group. 80% of the type 2 diabetics were using oral hypoglycaemic drugs and compliance of the medication was 86% in the present study. In the present study, about 26.4% were having diabetic retinopathy, diabetic neuropathy 27.2% and less proportion of diabetic nephropathy was reported as 6.8%. All these complications based self reported

status by the study participants.



**Figure 1: Prevalence of Depression status among type 2 Diabetes study population:**

Figure 1 stated that in the study group, about 43.2% were having depression among the type 2 diabetes patients.

**Table 1: Study population answers about Patient Health Questionnaire (PHQ-9).**

PHQ-9	Not at all	Several days	More than half of days	Everyday
Loss of Pleasure	96 (38.4%)	90 (36%)	61 (24.4%)	3 (1.2%)
Feeling down or hopeless	126 (50.4%)	86 (34.4%)	37 (14.8%)	1 (.4%)
Less or more sleep	113 (45.2%)	117 (46.8%)	19 (7.6%)	1 (.4%)
Tired or little energy	69 (27.6%)	70 (28%)	97 (38.8%)	14 (5.6%)
Change in appetite	164 (65.6%)	71 (28.4%)	14 (5.6%)	1 (.4%)
Feeling bad about yourself	161 (64.4%)	64 (25.6%)	24 (9.6%)	1 (.4%)
Trouble concentration	164 (65.6%)	68 (27.2%)	16 (6.4%)	2 (.8%)
Moving or speaking slowly	201 (80.4%)	35 (14%)	12 (4.8%)	2 (.8%)
Suicidal thoughts	223 (89.2%)	16 (6.4%)	9 (3.6%)	2 (.8%)

Table 4 revealed that for the PHQ -1 (Loss of pleasure), 38.4% were responded as not yet all and 1.2% were mentioned as nearly every day. Similarly for the PHQ 2nd question (Feeling down or

depressed), about 50.4% were responded as a not yet all and the same question mentioned about only 0.4% as nearly every day.

**Table 2: Associations of Depression with some demographic factors status among Type 2 Diabetes patients.**

Variables	Diabetics with no Depression	Diabetics with Depression	Total
Female	39 (41.1%)	56 (58.9%)	95 (100.0%)
Male	103 (66.5%)	52 (33.5%)	155 (100.0%)
X <sup>2</sup> -15.485, 1df, P-0.001; OR - .352, CI: 0.207-0.596.			
Age 30-39 yrs	16 (64%)	9 (36%)	25 (100.0%)
40-49 yrs	35 (64.8%)	19 (35.2%)	54 (100.0%)
50-59 yrs	38 (54.3%)	32 (45.7%)	70 (100.0%)
60-69 yrs	40 (54.1%)	34 (45.9%)	74 (100.0%)
>70 yrs	13 (48.1%)	14 (51.9%)	27 (100.0%)

Variables	Diabetics with no Depression	Diabetics with Depression	Total
$\chi^2$ -3.173, 4df, P-0.529.			
Occu: Employed	84 (65.1%)	45 (34.9%)	129 (100.0%)
Retired	32 (71.1%)	13 (28.9%)	45 (100.0%)
Unemployed	26 (34.2%)	50 (65.8%)	76 (100.0%)
$\chi^2$ -23.17, 2df, P-0.0001.			
Edu: Primary	8 (21.6%)	29 (78.4%)	37 (100.0%)
Secondary	50 (55.6%)	40 (44.4%)	90 (100.0%)
University	84 (68.3%)	39 (31.7%)	123 (100.0%)
$\chi^2$ -25.33, 2df, P-0.0001.			
Married	122 (64.9%)	66 (35.1%)	188 (100.0%)
Single	5 (50.0%)	5 (50.0%)	10 (100.0%)
Divorced	5 (35.7%)	9 (64.3%)	14 (100.0%)
Widow	10 (26.3%)	28 (73.7%)	38 (100.0%)
$\chi^2$ -22.13, 3df, P-0.001.			

Table 2 depicted that in the study population, among the females, 58.9% were suffering from depression and it was statistically significant. Low

depression was observed with retired people, University education participants and married people ( 28.9%, 31.7% and 35.1% respectively).

**Table 3: Risk factors associations with Depression status among the type 2 diabetes patients.**

Risk factors	Diabetics with no Depression	Diabetics with Depression	Total
Duration less than 5 years	56 (61.5%)	35 (38.5%)	91 (100.0%)
5 - 9 years	70 (63.6%)	40 (36.4%)	110 (100.0%)
10 -20 years	15 (40.5%)	22 (59.5%)	37 (100.0%)
>20 years	1 (8.3%)	11 (91.7%)	12 (100.0%)
$\chi^2$ -18.40, 3df, P-0.001			
No family history	47 (49.5%)	48 (50.5%)	95 (100.0%)
family history -yes	95 (61.3%)	60 (38.7%)	155 (100.0%)
$\chi^2$ -3.35, 1df, P-0.06			
Medication Compliance	132 (61.4%)	83 (38.6%)	215 (100%)
No medication Compliance	10 (28.6%)	25 (71.4%)	35 (100%)
$\chi^2$ -13.31, 1df, P-0.001; OR - 3.976, CI: 1.81 - 8.70.			
Compliance PA	97 (72.9%)	36 (27.1%)	133 (100.0%)
Non Compliance PA	45 (38.5%)	72 (61.5%)	117 (100.0%)
$\chi^2$ - 30.14, 1df, P-0.0001; OR - 4.311, CI: 2.52 - 7.35.			
Compliance to BSM	98 (61.6%)	61 (38.4%)	159 (100.0%)
No BSM	44 (48.4%)	47 (51.6%)	91 (100.0%)
$\chi^2$ - 4.16, 1df, P-0.01; OR - 1.716, CI: 1.01 - 2.88.			

Table 3 revealed that in the current study, duration of diabetes was significantly associated with depression condition (> 20 years diabetes duration, prevalence was 91.7%, P-0.0001). Among medication

compliance people, the depression was 38.6%, whereas is in non compliance medication people, the depression was 71.4% (P<0.05).

**Table 4: Logistic regression analysis of variables association with Depression status among Diabetes patients.**

Variables	Adjusted Odd's ratio	Confidence Interval	P value
Compliance to BSM	0.527	0. 298 to 0.933	0.028
Diabetic Retinopathy	0.694	0. 322 to 1.495	0.350
Diabetic Nephropathy	0.206	0. 041 to 1.040	0.056
Diabetic Neuropathy	0.291	0.137 to 0.615	0.001
Family History of Depression	0.278	0.117 to 0.661	0.004

After adjust of the above factors, there was significantly associated with diabetic neuropathy, family history of depression and compliance to blood sugar measurement with depression.

### Discussion

In our study, about 43.2% of type 2 diabetes patients were having depression, a similar study was done in the year of 2016 in Qassim, at Diabetic center in king Saud hospital among type 2 diabetic patients which showed a prevalence of depression of 34.8%.<sup>4</sup> Another study was conducted in diabetic center at Arar region found that 37.4% of diabetic patients have depression.<sup>3</sup> Other study was conducted by Turkey H almogbel et al. showed that the prevalence of depression among type 2 diabetes was 20.7%.<sup>12</sup> Little more prevalence of depression among diabetes patients observed in studies conducted at different places consecutively 40% in Palestine study<sup>13</sup>, 40.6% in Jazan city<sup>14</sup>, 47% in Ethiopia<sup>15</sup> study by Habtewold TD, about 48% in Mexican study<sup>16</sup>, 49.6% in study done in outpatients of Eastern province<sup>8</sup> and lastly 52.5% was reported by study conducted in Qatar.<sup>17</sup>

The depression prevalence depends upon multiple factors like type of the scale, opinions of participants on self administered questionnaire, number of chronic diseases and its duration of the diseases and also varies with geographical variations. Though PHQ-9 is widely used instrument for the depression, the gradient of depression (mild depression) will start from the participants score 5 and above onwards in PHQ-9. This is also one of the reason for high prevalence of depression in many studies. But, it has definitive role in the many screening programs of depression and gives the direction for early detection of the depression condition in the participants.

The prevalence of depression among females was 58.9%. A study conducted by Mukrim ME et

al shown the prevalence of depression among the female gender was 71.2%.<sup>3</sup> A study was conducted in Arar region by Norah Muqbil et al revealed that the prevalence of depression among longer duration of diabetes patients was 51.2%. In their study longer duration of diabetes considered as more than 10 years, this could be the reason for reporting less prevalence of depression.<sup>18</sup>

There was statistically significant association was observed between uncontrolled glycaemic control and type 2 diabetes (P-0.02, OR-2.78, CI-1.078 to 7.202). A study conducted in Spain among the primary health care centre participants of type 2 diabetes mellitus stated that HbA1C level was not significantly associated with depression among the diabetes patients.<sup>19</sup>

There was significant association observed between depression and non compliance physical activity (P-0.001). Similar studies conducted in Arar region, Saudi Arabia and Spain found same significant associations with physical activity among diabetes.<sup>18,19</sup> Little contrast finding observed with physical activity among diabetes patients in the study conducted in Sharjah.<sup>20</sup> In our study, compliance to medication and blood sugar management was significantly associated with depression among diabetes patients and same type of association was observed in Jordan<sup>21</sup> and also in Saudi Arabia.<sup>18</sup>

Whereas in study conducted in Sharjah among primary health care patients stated that diabetic retinopathy complication significantly associated with depression among type 2 Diabetes (P<0.05).<sup>20</sup> In the year 2001 study conducted by De Groot M et al. in their meta analysis revealed that all the long term complications of diabetic neuropathy, retinopathy and nephropathy were significantly associated with depression among diabetes patients.<sup>9,22</sup> A study conducted by Liu Q, Cai H et al. in China stated

that chronic diseases and social determinants like age, education and marital status were significantly associated with depression.<sup>23</sup>

### Conclusions

On the whole, chronic nature of the disease including diabetes complications (Neuropathy), non compliance of medication and physical activity, duration of the disease are triggers for the depression among the 2 diabetes patients. Similar studies are needed to substantiate the present study findings. Health promotional measures including information and education to patients are to be strengthened. Behavioural change is also required to adopt lifestyle and compliance to medication aspects from the patient.

**Source of Finding:** None

**Conflict of interest:** None

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