



DEPRESSION AMONG SAUDI TYPE 2 DIABETIC PATIENTS ATTENDING SAMTAH PRIMARY HEALTH CARE CENTERS, JAZAN REGION, SAUDI ARABIA

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ABSTRACT

A cross-sectional descriptive study, health facility based was implemented included a representative sample of diabetic type 2 adult patients of both genders attending Samtah primary health care centers throughout the study period. The objective was to investigate the prevalence and determinants of depression in type 2 diabetic patients. Data were collected using a questionnaire composed of three main sections: personal characteristics, diabetes-related variables and the Arabic version of the Patient Health Questionnaire (PHQ-9) to screen, diagnose, and measure the severity of depression. Depression was

reported among almost two-thirds of type 2 diabetic patients (62.4%). It was mild among 36% of them, moderate among 17.6%, whereas it was moderately severe and severe among 8.8% of them. Multivariate logistic regression analysis revealed that female patients were at almost 9-folds risk for depression compared to male patients (AOR=8.95; 95% CI=2.94-27.18, $p<0.001$). Diabetic patients who had family history of depression were more prone to develop depression compared to those without such history (AOR=27.46; 95% CI=3.82- 558.42, $p<0.001$).

INDEX: Diabetic complications, type 2 diabetic patients, depression severity.

I. INTRODUCTION

WHO defines depression as "a mental disorder that presents commonly with depressed mood, decreased energy, feelings of guilt or low self-worth, loss of interest or pleasure, poor concentration and disturbed sleep or appetite".^[1] Depression can be categorized as mild, moderate or severe based on the number and severity of symptoms.^[2]

The relationship between diabetes and depression was studied by.^[3] Both diabetes and depression are debilitating conditions that are associated with significant morbidity, mortality and healthcare costs. Other studies also showed a high prevalence of depression in patients with diabetes mellitus.^[4]

The prevalence and determinants of depression in patients with established type 2 diabetes (T2DM) attending a tertiary care hospital in north India was investigated by Raval *et al.*^[5] They found that about one quarter (23%) of patients met the criteria for major depression, 18% for moderate depression and the remaining 59% had no clinically significant depression. Anderson *et al.*^[6] showed that the prevalence of co-morbid depression in the United States was significantly higher in diabetic women (28%) than in diabetic men (18%).^[7] examined the association of depression, anxiety and stress with Type 2 diabetes (T2DM) in Bahrain. The study found higher proportion of T2DM patients in the mild- moderate and severe-extremely severe depression ($p=0.002$), anxiety ($p<0.001$) and stress ($p<0.001$) groups.^[8] reported a prevalence of 41.9% for depression in Makkah, Saudi Arabia. Approximately 13.2% and 26.5% of patients had mild and moderate depression, respectively. Only 2.2% of them had severe depression. The prevalence of depression was significantly more reported among older, low-income, chronically diseased, complicated and uncontrolled diabetic patients. AL-Baik *et al.*^[9] found that depression was associated with female gender ($p=0.049$), long standing diabetes ($p=0.035$), insulin use ($p=0.024$) and with other medical co-morbidities ($p=0.006$).^[9] The objective of this study was to explore the possible association between depression and type 2 diabetes and its determinants in Samtah Governorate, Jizan Region, Saudi Arabia.

II. METHODOLOGY

Study area, design and target population: A cross-sectional descriptive study, health facility based was conducted in Samtah Governorate, Jizan Region, Saudi Arabia. All diabetic type 2 patients attended Samtah PHCCs throughout the study period (22 February to 21 March, 2015) constituted the target population for the study.

Data collection process

Sample size

It was assumed that the prevalence of major depressive disorder among type 2 diabetic patients was 6.2%.^[9] The sample size was calculated according to the following formula:

$$N = \frac{Z^2 \times P(1-P)}{M^2}$$

Where:

N = required sample size

Z = confidence level at 95% (standard value of 1.96)

P = estimated prevalence of disease in the project area

M = margin of error at 5% (standard value of 0.05).

The sample size would be a minimum of 362 patients. This sample was increased to 400 in order to compensate for drop-out.

Sampling technique

The sample size (400 patients) was equally distributed over the four PHCCs in Samtah city (i.e. 100 patients were invited to participate from each center). An average of one week was spent in each center to randomly select 100 patients. All eligible patients attended the PHCCs were recruited in the study until the required sample size was obtained from each center.

Data collection tools

Study tools included the following:

Data collection questionnaire developed by the researcher composed of two parts: Personal characteristics e.g. age, sex, education etc. and diabetes-related variables e.g. duration of disease, insulin treatment, compliance with therapy etc.

Scoring of PHQ-9 responses

The PHQ-9 has 9 questions with a score ranging from 0 to 3 for each setting to consider initiating treatment with antidepressants.^[10] Table (1) describes the provisional diagnoses for scoring classes.

Table 1: Provisional diagnoses for scoring classes.

PHQ-9 score	Provisional diagnosis
• 0-4	None
• 5-9	Mild depression
• 10-14	Moderate depression
• 15-19	Moderately severe depression
• 20-27	Severe depression

Pilot study

A pilot study was conducted at one of the selected PHCCs on 20 patients to test wording of the questionnaire in order to avoid inter-observer variation or bias. Data collection was totally performed by the researcher.

Data entry and statistical analysis

Statistical Package for Social Sciences (SPSS) software version 22.0 was used for computerized data entry and analysis. Descriptive statistics and analytical statistics using Chi Square tests (χ^2) to test for the association and/or the difference between two categorical variables were applied. P-value less than 0.05 was considered statistically significant.

Administrative and ethical considerations

All the necessary official permissions were obtained before data collection. Prior to data collection, the investigator informed all potential participants regarding the objectives of the study. They were assured about the anonymity and full confidentiality of their responses.

III. RESULTS**Response rate**

Out of 400 Type 2 diabetic patients recruited for the study, only 364 responded. Thus, a response rate of 91% had been achieved.

Socio-demographic characteristics

The participants' age ranged between 23 and 89 years with a mean \pm SD of 52.1 \pm 13.1 years. Table 2 summarizes their socio-demographic characteristics.

Table 2: Socio-demographic characteristics of the participants.

Demographic and socio-cultural explanatory variables	Frequency N=364	Percentage
Age in years		
≤30	17	4.7
31-45	95	26.1
46-60	165	45.3
>60	87	23.9
Gender		
Male	220	60.4
Female	144	39.6
Marital status		
Single	28	7.7
Married	316	86.8
Divorced/widowed	20	5.5
Number of children (n=338)		
One	28	8.3
Two	68	20.1
Three	242	71.6
Four or more	102	28.0
Job		
Governmental employee	16	4.4
Private sector employee	29	8.0
Business	140	38.4
House wife/not working	61	16.8
Retired	16	4.4
Others		
Income in Saudi Riyals/month		
≤5000	137	37.8
5001-10000	177	48.9
>10000	48	13.3

Depression was reported among almost two-thirds of type 2 diabetic patients (62.4%). It was mild among 36% of them, moderate among 17.6%, whereas it was moderately severe and severe among 7.7% and 1.1% of them, respectively (Fig. 1).

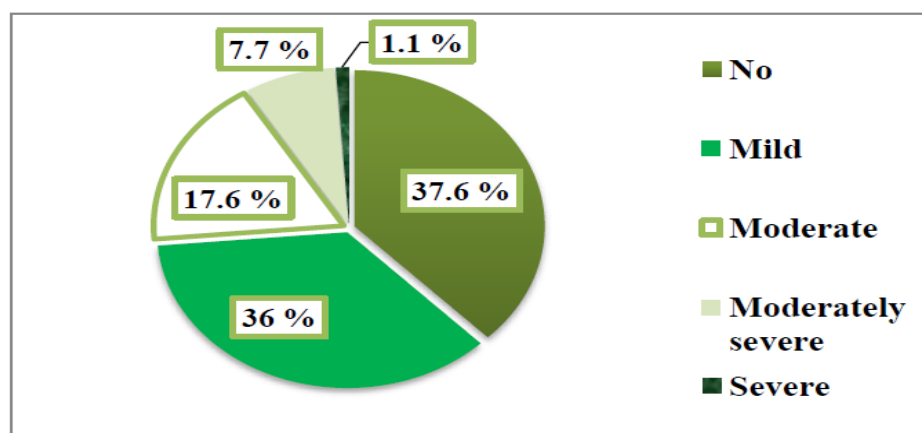


Figure 1: Distribution of depression levels among type 2 diabetic patients, Samtah Governorate.

Factors associated with depression

- **Patient's gender:** More than half of males (54.1%) compared to 75% of females were depressed. Moderately severe and severe depressions were reported among 10% of male patients compared to 6.9% of females. The difference was statistically significant ($p < 0.001$) (Table 3).

Table 3: Association between diabetic patient's gender and depression severity.

Gender	Depression				χ^2 (p-value)
	No N=137 N (%)	Mild N=131 N (%)	Moderate N=64 N (%)	Moderately severe/Severe N=32 N (%)	
Males (n=220)	101 (45.9)	71 (32.3)	26 (11.8)	22 (10.0)	23.68 (< 0.001)
Females (n=144)	36 (25.0)	60 (41.7)	38 (26.4)	10 (6.9)	

- **History of insulin therapy:** More than two-thirds of diabetic patients on insulin therapy (68.5%) compared to 60.3% of those without insulin therapy were depressed. Moderately severe or severe depression was reported among 15.2% of patients on insulin therapy compared to 6.6% of those without insulin therapy. However, the difference was not statistically significant (Table 4).

Table 4: Association between history of insulin therapy and depression severity among diabetic patients.

Insulin	Depression				χ^2 (p-value)
	No N=137; (%)	Mild N=131; (%)	Moderate N=64; (%)	Moderately severe/Severe N=32; (%)	
Yes (n=92)	29 (31.5)	32 (34.8)	17 (18.5)	14 (15.2)	7.11 (0.068)
No (n=272)	108 (39.7)	99 (36.4)	47 (17.3)	18 (6.6)	

- **Diabetic complications:** Table 5 shows that majority of patients with diabetic complications (82.6%) compared to 59.4% of those without complications were depressed. In addition, moderately severe or severe depression was reported among 21.7% of complicated patients compared to only 6.9% of not complicated. The difference was statistically significant ($p = 0.001$).

Table 5: Association between history of complications and depression severity among diabetic patients.

Diabetic complications	Depression				χ^2 (p- value)
	No N=137; (%)	Mild N=131; (%)	Moderate N=64; (%)	Moderately severe/Severe N=32; (%)	
Yes (n=46)	8 (17.4)	20 (43.5)	8 (17.4)	10 (21.7)	16.60 (0.001)
No (n=318)	129 (40.6)	111 (34.9)	56 (17.6)	22 (6.9)	

Multivariate logistic regression analysis revealed that female patients were at almost 9-folds risk for depression compared to male patients (AOR=8.95; 95% CI=2.94- 27.18, $p<0.001$). Diabetic patients who had family history of depression were more prone to develop depression compared to those without such history (AOR=27.46; 95% CI=3.82-558.42, $p<0.001$). Patients who reported partial compliance with therapy were at almost double-risk for depression compared to those with perfect compliance (AOR=2.28; 95% CI=1.24-4.18, $p=0.008$), while those who reported no compliance with therapy were at almost 26-fold risk for depression compared to those with perfect compliance (AOR=26.38; 95% CI=4.01-589.1, $p<0.001$). Patients with diabetic complications were at 4-fold risk for depression as opposed to those without complications (AOR=4.33; 95% CI=1.53-12.25, $p=0.006$) (Table 6).

Table 6: Predictors of depression among type 2 diabetic patients: Results of multivariate logistic regression analysis.

	B	SE	OR	95% CI	p-value
Gender					
Males (n=220) ^a					
Females (n=144)	2.191	0.567	8.95	2.94-27.18	<0.001
Family history of depression					
No (n=346) ^a	20.996	8497.3	27.46	3.82	<0.001
Yes (n=18)				558.42	
Compliance with therapy					
Yes, perfect (n=238) ^a					
Yes, to some extent (n=120)	0.824	0.309	2.28	1.24-4.18	0.008
No (n=6)	20.01	15223.9	26.38	4.01-589.1	<0.001
Diabetic complications					
No (n=318) ^a					
Yes (n=46)	1.465	0.531	4.33	1.53-12.25	0.006

a:Reference category; B: slop SE: standard error; OR: Adjusted odds ratio; CI: Confidence interval.

IV. DISCUSSION

It is evident that co-morbid depression among patients with diabetes is associated with adverse diabetes outcomes.^[11] This study revealed a moderately severe prevalence of depression among type 2 diabetic patients. Similar findings (71.8%) were reported by^[12] in Iran among patients with diabetes (both types; type 1 and type 2).

Somehow, lower prevalence rates (41.9%) were reported by^[8] in Makkah, 48%, Jeddah^[13] and 45.8% in Riyadh.^[9] A prevalence of 41% of clinically significant depression was reported in North India by.^[5] Very lower prevalence rates for depression were recorded in Qatif area (14.5%).^[14] Lower prevalence rates for depression in patients with Type II diabetes (15%) were also reported by.^[15] This difference in prevalence rates of depression among diabetic patients between different studies could be explained by the fact that some studies included only major depression according to Diagnostic and Statistical Manual of Mental Disorders, IV (DSM VI) criteria, while others such as the present study included depression as one category. This in addition to the different tools used for diagnosis of depression and different patients` background criteria.

A higher prevalence of depression among older patients (>60 years) was observed in this study and in similar native^[8,13] and international studies^[5,16,17] although the significance disappeared after controlling for confounding effect in multivariate regression analysis. This might be due to the fact that aging is accompanied by longer duration and complications of diabetes.^[18]

Contrary to the current finding, higher prevalence of depression was reported by^[19] among younger population as a result of stress, conflicts and irritability. This statement was also supported by the findings of^[20] who stated that major depression appears to be less frequent among older adults than at earlier ages.

Female patients were at almost 9-folds risk for developing depression compared to male patients in the present study. Similar results have been reported elsewhere by.^[21,6,16,22,23] However, the study carried out by^[24] contradicted this finding where the estimated risk of getting depression in the general population is 10–25% in females compared to 5–12% in males. However, other studies^[25] did not find an association between gender and depression among diabetics.

In the current survey, presence of diabetic complications was a significant predictor for depression. Earlier studies confirmed this finding.^[8,12,18,26,27] Moreover, it has been reported that having more than two diabetic complications increased odds ratio of having depression by almost three times.^[27] Additionally,^[28] reported that longer depression period increased the risk of developing diabetic retinopathy as a result of long periods of poor glycaemic control. Also, in a meta-analysis published by^[29] a significant association between diabetic complications (retinopathy, neuropathy, nephropathy, sexual dysfunction and macrovascular complications) and depression was confirmed.

V. CONCLUSION AND RECOMMENDATIONS

It could be concluded that almost two-thirds of type 2 diabetic patients attended Samtah PHCCs were depressed, mostly of mild and moderate grades. It is recommended to implement screening program for diabetic patients regarding depression through trained family physicians especially for high risk groups.

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