Depression among Type 2 Diabetics Attending the National Diabetes Center

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ABSTRACT

Background: Diabetes mellitus is a common health, medical and economic problem. There were 1.2 million cases of diabetes in Iraq in 2015. Depression is known as a concurrent condition associated with diabetes.

Objectives: To find the prevalence of depression in type 2 diabetes patients; and, observe the socio-demographic and disease-related factors.

Methods: A case-control study was conducted in the National Diabetes Center, Al-Mustansiriya University, Al-Yarmook Teaching Hospital Campus, Baghdad/Iraq; on 100 type 2 diabetes patients and 100 apparently healthy participants as the control group. The Arabic version of the Patient Health Questionnaire-9 (PHQ-9) was used to assess depression in patients and controls.

Results: The overall depression (mild, moderate, moderately-severe and severe) among patients in the current study was 91%. Absences of depression and mild depressions were more prevalent among control group compared to diabetic patients. In contrast, moderate, moderately severe, and severe depression were more among diabetic patients compared to control group. The mean PHQ-9-score of diabetic patients (12.89 ± 5.82) was significantly higher than that of the control group (8.47 ± 5.27).

Conclusions: The study shows high prevalence of depression in type 2 diabetes mellitus patients attending the National Diabetes. Very high significant association between depression and personal charecteristics. The overall prevalence of depression much higher than what reported by other similar studies.

Keywords: Type 2 diabetes mellitus, Depression, Patient Health Questionnaire-9 (PHQ-9).

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Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defects in insulin secretion and/ or insulin action[1]. The worldwide prevalence of diabetes in 2010 was about 280 million, predicted to increase by the year 2030 to about 440 million;[2] about 90 to 95% of the overall diabetes prevalence was type 2 diabetes mellitus (T2DM)[3]. Also, depression is a worldwide high prevalence condition; about 340 million people complaining of depression globally[4]. Depression is a leading cause of disability and the fourth leading cause of the global burden of disease by the World Health Organization (WHO)[5].

Depression is commonly associated with a number of chronic diseases, mostly associated with diabetes mellitus[6]. Diabetic adults are more experienced depression than nondiabetic adults. The prevalence of depression among T1DM and T2DM adults is higher than the general population[7]. The meta-analytic review of the literature, Lustman *et al* observed that depression was significantly associated with hyperglycemia in patients with T1DM and T2DM, and poor metabolic control of T2DM[8]. Also, diabetes-related complications were also associated with depression[9].

The aim of this study was to explore the prevalence of depression, the effects of socio-demographic and disease-related factors in T2DM patients.

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Methods

A case-control study was carried out in the National Diabetes Center (NDC), Al-Mustansiriya University, Baghdad, Iraq; from May to August-2016, on 100 type 2 diabetes mellitus (T2DM) patients (51 males and 49 females, mean age 55.8±10.525 years) and 100 healthy control participants (50 males and 50 females, mean age 49.93± 8.863 years).

Inclusion criteria: Adult patients with established T2DM. Accept and permit the enrollment to the study.

Exclusion criteria: Participants excluded if they did not accept the enrollment to the study. Participants were type 1 diabetes mellitus (T1DM) patients. Patients on treatment with anti-depressant drugs or any neurological or psychological disorders.

The data were collected using a data collection sheet designed for the purpose of the study; the following information was recorded for each participant:

1. Personal data: Age, sex, residency, education, employment, marital status, any chronic disease, smoking, medications and physical exercise.

2. Diabetes-related data: Type of diabetes, duration of disease, and the use of insulin.

3. Questionnaire: The Arabic version of the 9–statement Patient Health Questionnaire (PHQ-9) was used for screening of depressive symptoms; The PHQ-9 is a multipurpose instrument for screening, monitoring and measuring the severity of depression; it is brief and useful in clinical practice. A score (ranging from 0 to 3) is given for each of the 9 statements; the sum of the total scores gives the provisional diagnosis for depression, (Figure 1)[10]. A pilot study was conducted on 10 diabetic patients to test the questionnaire; data obtained from the pilot study were not included in the main study.

The Statistical Packages for Social Sciences- version 20 (SPSS-20) was used to carry out the statistical analysis of data. Data and results were presented as frequency, percentage, mean, standard deviation. Student t-test was used to assess the statistical significance of difference between mean of two parametric quantitative variables, and one way ANOVA for more than two parametric quantitative variables; while the statistical significance of difference between the mean of two non-parametric, qualitative, variables were tested using chi-square test (χ2-test) with the application of Yet's correction or Fisher Exact test whenever recommended. The level of statistically significant difference between men was considered as the P value ≤ 0.05.

Results

The personal characteristics of the participants enrolled in the study showns the prevalence of depression among the study groups. Apparently, depression was more common in females than in males, but without statistical significance; the prevalence of depression is more in women than men, both in the general population and in diabetes. Very high significant associations were found between the prevalence of depression and marital state, occupation, smoking status, physical exercise, residence and age of participants, (Table 1).

The obtained results of control group show no depression and mild depression were more prevalent when compared to the diabetic group; while, the moderate, moderately severe and severe depression were more prevalent among diabetic patients compared to control group. The mean PHQ-9-score of diabetics and control groups (12.89 ± 5.82) and (8.47 ± 5.27), respectively, with a highly statistically significant difference (p = 0.0003), (Table 2).

Patient Health Questionnaire—PHQ-9

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Nearly Every day	More than half the days	Several Days	Not at all
1-Little interest or pleasure in doing things.				
2-Feeling down, depressed, or hopeless.				
3-Trouble falling/staying asleep, sleeping too much				
4. Feeling tired or having little energy				
5-Poor appetite or overeating				
6-Feeling bad about yourself – or that you are a failure or have let yourself or your family down				
7-Trouble concentrating on things, such as reading the newspaper or watching television				
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.				
9-Thoughts that you would be better off dead or of hurting yourself in some way.				

Provisional diagnosis	PHQ-9 score
No depression	0-4
Mild depression	5-9
Moderate depression	10-14
Moderately severe depression	15-19
Severe depression	20-27

Figure 1: The Patient Health Questionnaire (PHQ-9) and scoring of provisional diagnosis of depression.

Table 1: Personal characteristics of the participants.

		Diabetes group		Control group n = 100 (100%)	P value
		No depression n = 9 (100%)	Depression n = 91 (100%)		
Gender No. (%)	Male	5 (55.5 %)	44 (48.3 %)	50 (50%)	< 0.001 *
	Female	4 (44.5 %)	47 (51.7 %)	50 (50%)	
Marital state No. (%)	Single	0	0	26 (26%)	< 0.001 *
	Married	9 (100%)	85(93.4%)	70 (70%)	
	Widowed	0	6 (6.6%)	4 (4%)	
Occupation No. (%)	Retired	3(33.3%)	26 (28.5%)	14 (14%)	< 0.001 *
	Housewife	2 (22.2%)	38 (41.7%)	36 (36%)	
	Working	4 (44.4%)	27 (29.7%)	50 (50 %)	
Smoking status No. (%)	Smokers	6 (66.7 %)	12 (13.2%)	23 (23%)	< 0.001 *
	Nonsmokers	3 (33.3%)	79 (86.2%)	76 (76%)	
Physical exercise No. (%)	Regularly	0	3 (3.3%)	15 (15%)	< 0.001 *
	Irregularly	4 (44.4%)	27 (29.7%)	45 (45 %)	
	Not at all	5 (55.6%)	61(67.0%)	40 (40%)	
Residence No. (%)	Urban	4 (44.4%)	56 (61.5%)	72 (72%)	< 0.001 *
	Rural	5 (55.6 %)	35 (38.5 %)	28 (28%)	
Age (mean ±SD) (years)		59.44±8.002	55.44±10.71	49.93± 8.863	< 0.0001 **

*** Chi square test,** very high significance. **** One way ANOVA,** very high significance.

Table 2: The prevalence of different degrees of depression and mean PHQ-9-score.

Provisional diagnosis	Patients n=100 (100%)	Control n=100 (100%)	
No depression	9 (9)	39 (16.7)	< 0.001 *
Mild depression	16 (16)	36 (46.7)	
Moderate depression	33 (33)	19 (30)	
Moderately severe depression	33 (33)	2 (2)	
Severe depression	9 (9)	4 (4)	
PHQ-9 score (mean ±SD) *	12.89± 5.82	8.47± 5.27	0.0003**

*** Chi square test,** very high significance. **** Student t-test**, very high significance.

Discussion

Diabetes mellitus is a common metabolic disorder with medical and economic consequences. The Arab world will have the second highest percentage of people with DM in 2030 compared to other parts of the world[11]. Diabetes was an emerging epidemic in Iraq; the prevalence was about 1.2 million cases of diabetes in 2015[12]. Depression is a common medical problem;[10] it is commonly associated co-morbidity with diabetes[13]. The current study findings showed that the no depression and mild depression categories were higher prevalence among control group than the diabetic patient group; in contrast, moderate, moderately severe and severe depression categories were more prevalent among diabetic patients than the control group.

Surprisingly noticed, the high prevalence of mild depression (46.7%) and moderate depression (30%) among the control group; in contrast to what Al-Hamzawi *et al* found in their study about prevalence of major depressive episode in Iraqi general population, close to half (46%) of the 12-month major depressive episode cases where severe/very severe[14]; exposure of Iraqis to wars, sanction, and violence during previous decades were claimed as the cause of the association with a range of mental disorders such as depression and post-traumatic stress disorder[15].

The mean PHQ-9 score of diabetic patients was significantly higher than in the control group; depression was more prevalent among diabetes patients than non-diabetic persons as documented by Anderson *et al* meta-analysis study[16].

Moreover, the extent of synchronization between diabetes and depression reported by the current study may be different for instance; the overall prevalence of depression (all categories) among diabetes patients in the current study (91%) was much higher than what reported by other studies. Studies reported prevalence of depression in T2DM patients were varied from 30% to 83% in the USA and UK, respectively[17,18]. Khamseh *et al*, found a 55% prevalence of depression in Iranian patients with T2DM[19]. In the Saudi Arabia, Ali Alshahrani *et al* found a 58% prevalence of depression among diabetics[10]; and the Anderson *et al* meta-analysis study, indicated that the prevalence of depression among diabetics ranges from 8% to 61%[16]. The higher prevalence of depression among Iraqi diabetic patients may be related to the additional burden of the disease and the overall unstable security and economic situations in Iraq.

The prevalence of depression, according to different categories based on PHQ 9 score the mild, moderate, moderately severe and severe depression, 16%, 33%, 33% and 9%, respectively were much higher (except mild depression) than what reported among T2DM patients in Addis Ababa, Ethiopia 28.4%, 12.1%, 2.7%, and 1.5%, respectively[20].

The prevalence of depression among diabetics shows very high significant associations between the prevalence of depression and marital state, occupation, smoking status , physical exercise,

residence and age of participants. Apparently, depression was more common in females than in males, but without statistical significance; the prevalence of depression is more in women than men, both in the general population and in diabetes[21]; Ali Alshahrani et al, found that depression was more statistical significant among diabetes females than males, as well as for the cigarette smokers than nonsmokers, less among diabetic patients who practiced physical exercise regularly than those who irregularly or did not physically practice at all, also, more among widowed and divorced diabetic patients than married ones[10]. However, in the current study, there was ver high statistical significant association of patient's occupation, age, duration of diabetes, and smoking with the depression; the findings were in contrast with Norouzi *et al*, among T2DM patients in Khorramabad, Iran[22]. Also, Ali Alshahrani *et al* found differences in the prevalence of depressive symptoms among diabetics were statistically significant according to their age[10].

However, there are conflicting reports regarding the association between glycemic control and depression; poor glycemic control may result in depression and *vice versa* depression may result in poor glycemic control[23].

In conclusion; The study shows high prevalence of depression in type 2 diabetes mellitus patients attending the National Diabetes center. Very high significant association between depression and personal charecteristics. The overall prevalence of depression much higher than what reported by other similar studies.

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