IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 13, Issue 9 Ver. VI (Sep. 2014), PP 63-68
www.iosrjournals.org

Prevalence of Depression among Patients Attending Babylon Diabetic Center

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Abstract
Background: *Diabetes mellitus(DM) is one of highly prevalent medical illnesses and it is a major cause of morbidity, mortality and economic expense worldwide.Many studies have shown a relationship between diabetes and psychiatric disorders especially depression.*
Objectives: *This study was designed to investigate the rate of depression among diabetic patients followed at the Babylon Diabetic Center in Marjan Teaching Hospital.*
Method: *This hospital-based cross-sectional study was carried out in a tertiary centre (in Marjan Teaching Hospital). 200 patients with DM seen at the Babylon Diabetic Center in Marjan Teaching Hospital from August 2013 to April 2014 were included in this study. Beck Depression Inventory Scale was used to diagnose and assess the severity of depression. Socio-Demographic characteristics, medical history and diabetic features were obtained from diabetic patients.Statistical analysis was carried out using SPSS version 18. Categorical variables were presented as frequencies and percentages. Continuous variables were presented as means with their 95% confidence interval (CI). The Pearson's chi-square test (x2) test was used to determine the associations between categorical variables. Analysis of Variance One Way (ANOVA) was used to compare means between more than two groups. A p-value of ≤ 0.05 was considered as statistically significant.*
Results: *Out of 200 diabetic patients, the overall mean age of patients was 49.44± 11.44 years old.(63.5%) of the patients were females. According to Beck Depression Index, 87 (43.53%) had mild depression, 61 (30.5%) had moderate depression, meanwhile, only 52 (26.0%) had severe depression. There were significant associations between depression and type of DM, type of treatment as well as duration of DM.*
Conclusion: *Diabetes mellitus is associated with increased risk of depression. Patients with long duration of DM and poor glycemic control are more susceptible of major depressive disorder which is in turn adversely affecting the physical health of diabetic patients; therefore, the treating physicians should be aware of the co-occurrence of depression and diabetes.*
Keywords: *DM, Depression, Merjan Teaching Hospital*

I. Introduction

Diabetes mellitus(DM) is one of highly prevalent medical illnesses and it is a major cause of morbidity, mortality and economic expense worldwide[1]. There are two common forms of DM, type I and type II. DM is related to the development of insulin resistance in the liver and peripheral tissues accompanied by a defect in insulin secretion by beta cells of pancreas leading to hyperglycemia. The high blood sugar results in frequent urination, polyuria and polydipsia [2 and 3].Persons with DM are at increased risk of several health problems, including cardiovascular diseases, renal failure, peripheral neuropathy, obesity and visual impairment. Many studies have also shown a relationship between diabetes and psychiatric disorders especially major depression[4].

DM is associated with increased risk of physical disability and cognitive impairment which are in turn lead to depression [5]. The diagnosis of DM itself can be a stressful life event to an individual and the failure to cope with the wide range physical and mental effects of DM make the vulnerable subject at risk of depression.Major depressive disorder is a well- known mood disorder, its prevalence in males 2.3 – 3.2% and 4.5 – 9.3% in females. According to DSM-IV (Diagnostic and Statistical Manual classification fourth version), major depressive disorder is characterized by a total of 5 or more symptoms lasting for a continuous two weeks period and an impairment of previous socio-occupational functioning. The main symptoms of depression are depressed mood and / or loss of interest or pleasure[6]. However, depression also has a significant physical effect and can present as a co-morbidity that would impair the illness outcome[7]. Several studies reported that there were significant associations between DM patients' socio-demographic characteristics with depression. Unmarried young female with low educational level DM patients were more liable to get depression [8 and 9].

The exact causal links between depression and DM are yet unknown, but there was bidirectional explanation regarded the most popular theory which stated that DM may predispose to depression and depression may induce DM. However other theory suggested that, neuroendocrine abnormalities associated with DM including altered activity of the hypothalamic-pituitary-adrenal axis (HPA axis) with increased level of cortisol may be involved in the development of depressive disorder[10]. On the other hand, depressed patients have increased cortisol level (hyperactivity of HPA axis) and increased catecholamine (activation of sympathetic nervous system) and both changes lead to Beta cell destruction in pancreas and hyperglycemia (type I DM) and insulin resistance (type II DM) [11 and 12].Maladaptive coping style, low social support, stigma and personal meaning attached to medical condition, physical effects of illness and treatment are all additional factors causing and influencing depression[13].

Depressive symptoms have additional negative impact on diabetic patients, it is negatively affect life quality and treatment compliance and increase health care expenditure. In addition, DM patients with depression are associated with poorer glycemic control, more complications of the disease and increased mortality[14]. Suicidal risk through insulin overdose may also increase due to easy access to insulin, consequently the above adverse effects accentuate the seriousness of management depression in DM.

II. Aim of the Study

This study was designed to investigate the rate of depression among diabetic patients followed at the Babylon Diabetic Center in Marjan Teaching Hospital.

III. Patients and Method

Study Design/Study Location:

This hospital-based cross-sectional study was carried out in a tertiary centre (in Marjan Teaching Hospital).

Study Population:

200 patients with DM type I and II seen at the Babylon Diabetic Center from the period from August 2013 to April 2014 were included in this study after taken informed consent. Patients with willingness and ability to participate were included in this study;meanwhile, refusal or inability to participate and presence of cognitive dysfunction were excluded.

Instruments and Procedures:

The outcome variable was grades of depression (Mild, Moderate and Severe) according to Beck Depression Index in diabetic patients (The Arabic version of Beck Depression Inventory Scale was tested and validated on Arabic patients). The independent variables were age, sex, marital status, occupational status, educational status, smoking, presence of hypertension and other chronic diseases(malignancy , cardiac disease and lung disease), type of DM, type of DM treatment, duration of DM, FBS, HBAIc and presence of DM complications(retinopathy , nephropathyand neuropathy).

Statistical Analysis:

Statistical analysis was carried out using SPSS version 18. Categorical variables were presented as frequencies and percentages. Continuous variables were presented as means with their 95% confidence interval (CI). The Pearson's chi-square test (x2) test was used to determine the associations between categorical variables. Analysis of Variance One Way (ANOVA) was used to compare means between more than two groups. A p-value of ≤ 0.05 was considered as statistically significant.

IV. Results

Out of 200 diabetic patients and according to Beck Depression Inventory, 87 (43.53%) had mild depression, 61 (30.5%) had moderate depression, meanwhile, only 52 (26.0%) had severe depression (Figure 1). The overall mean depression score was 10.41± 7.46. The overall mean age of patients was 49.44± 11.44 years. Majority (63.5%) of the patients were females (Figure 2). (96.0%), (73.5%) and (16.0%)of the patients were married, unemployed and illiterate, respectively.

Figure 1: Distribution of diabetic patients according to severity of depression

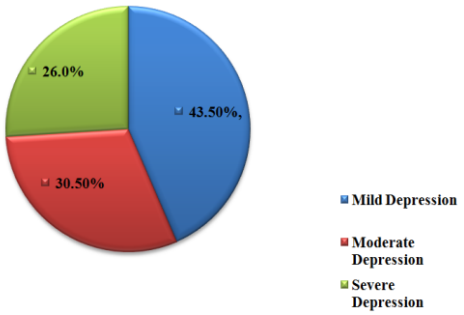

Figure 2: Distribution of diabetic patients according to gender.

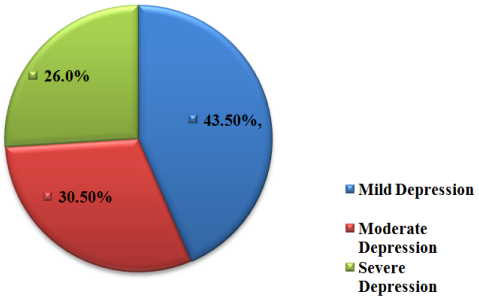

Table 1 shows the distribution of DM patients by medical history.(51.0%), (51.0%) and (86.0%) of the DM patients were hypertensive, had chronic diseases and non-smokers, respectively.

Table 1: Distribution of patients by medical history

Variable	Frequency (%)
Hypertension	
Yes	102 (51.0%)
No	98 (49.0%)
Chronicdiseases	
Yes	102 (51.0%)
No	98 (49.0%)
Smoking	
Smokers	28 (14.0%)
Non-Smokers	172 (86.0%)

The overall mean FBS for diabetic patients was (228.60± 92.34) mg/dl; meanwhile, the overall mean of HBA1c for DM patients was (8.73± 2.16).Table 2 shows the distribution of DM patients by type of DM, type of treatment, duration as well as presence of DM complication. Majority (63.5%) of DM patients were type II DM, only (45.0%) of the patients were on insulin alone. The duration of DM was more than 10 years in (44.0%) of the patients. Majority (65.0%) of the diabetic patients presented with DM complications.

Variable	Frequency (%)
Type of DM	
Type I DM	73 (36.5%)
Type II DM	127 (63.5%)
DM Treatment	
Diet	9 (4.5%)
Insulin alone	90 (45.0%)
OHA	77 (38.5%)
Insulin + OHA	24 (12.0%)
Duration of DM	
< 5 years	65 (32.5%)
5-10 years	47 (23.5%)
> 10 years	88 (44.0%)
DM Complications	
Presence	130 (65.0%)
Absence	70 (35.0%)

Table 2: Distribution of DM patients by diabetic features

Table 3 shows the association of depression with age, sex, marital status, occupational status andeducational level. There were significant associations between depression with occupational status and educational level.

Table 3: Association of depression with socio-demographic characteristics

*p value ≤ 0.05 is significant

Variable	Beck Depression Index			χ^2	*P* values
	Mild (%)	Moderate (%)	Severe (%)		
Age Groups (years)					
< 40 years	15 (17.2)	9 (14.8)	14 (26.9)		
40-50 years	25 (28.7)	23 (37.7)	12 (23.1)	10.071	0.122
50-60 years	32 (36.8)	26 (42.6)	17 (32.7)		
≥ 60 years	15 (17.2)	3 (4.9)	9 (17.3)		
Sex					
Male	33 (37.9)	24 (39.3)	16 (30.8)	1.027	0.599
Female	54 (62.1)	37 (60.7)	36 (69.2)		
Marital Status					
Married	82 (94.3)	61 (100.0)	49 (94.2)		
Single	2 (2.3)	0 (0.0)	0 (0.0)	5.961	0.202
Divorce	3 (3.4)	0 (0.0)	3 (5.8)		
Occupational Status					
Gov. Employee	19 (21.8)	8 (13.1)	6 (11.5)		
Self-Employed	6 (6.9)	3 (4.9)	11 (21.2)	**12.511**	**0.014***
Unemployed	62 (71.3)	50 (82.0)	35 (67.3)		
Educational Level					
Illiterate	9 (10.3)	17 (27.9)	6 (11.5)		
Primary school	36 (41.4)	16 (26.2)	20 (38.5)	**12.502**	**0.050***
Secondary school	22 (25.3)	19 (31.1)	17 (32.7)		
Diploma/ Bachelor	20 (23.0)	9 (14.8)	9 (17.3)		

Table 4 shows the association of depression with hypertension, chronic diseases and smoking. There was no significant association between depression with patient`s medical history.

Table 4: Association of depression with DM patient`s medical history

Variable	Beck Depression Index			χ^2	*P* values
	Mild (%)	Moderate (%)	Severe (%)		
Hypertension					
Yes	45 (51.7)	33 (54.1)	24 (46.2)	0.741	0.690
No	42 (48.3)	28 (45.9)	28 (53.8)		
Chronic Disease					
Yes	42 (48.3)	31 (50.8)	29 (55.8)	0.732	0.693
No	45 (51.7)	30 (49.2)	23 (44.2)		
Smoking					
Yes	16 (18.4)	5 (8.2)	7 (13.5)	3.112	0.211
No	71 (81.6)	56 (91.8)	45 (86.5)		

*p value ≤ 0.05 is significant

Table 5 shows the association of depression with type of DM, type of treatment, duration as well as presence of DM complications. There were significant associations between depression with type of DM, type of treatment as well as duration of DM.

Table 5: Association of depression with DM features

Variable	Beck Depression Index Mild (%)	Moderate (%)	Severe (%)	χ^2	*P* values
Type of DM					
Type I	33 (37.9)	14 (23.0)	26 (50.0)	**8.997**	**0.011***
Type II	54 (62.1)	47 (77.0)	26 (50.0)		
Type of Treatment					
diet	6 (6.9)	0 (0.0)	3 (5.8)		
insulin alone	36 (41.4)	25 (41.0)	29 (55.8)	**38.927**	**<0.001***
OHA	42 (48.3)	30 (49.2)	5 (9.6)		
Insulin +OHA	3 (3.4)	6 (9.8)	15 (28.8)		
Duration of DM					
< 5 years	20 (23.0)	28 (45.9)	17 (32.7)		
5-10 years	27 (31.0)	9 (14.8)	11 (21.2)	**10.435**	**0.034***
> 10 years	40 (46.0)	24 (39.3)	24 (46.2)		
Presence of Complications					
Presence					
Absence	54 (62.1)	42 (68.9)	34 (65.4)	0.730	0.694
	33 (37.9)	19 (31.1)	18 (34.6)		

*p value ≤ 0.05 is significant.

Table 6 shows the mean differences of depression grades (mild, moderate and severe) by FBS and HBA1c. There was significant mean difference of depression grades by HBA1c.

Table 6: Mean differences of depression grades by FBS and HBA1c

Variable	Depression Grades	N	Mean ±SD	ANOVA	P value
FBS	Mild	87	222.00 ± 83.95		
	Moderate	61	231.69± 88.88	0.423	0.656
	Severe	52	109.34± 15.16		
HBA1c	Mild	87	8.84± 2.29		
	Moderate	61	9.12± 1.89	**3.570**	**0.030***
	Severe	52	8.08± 2.13		

*p value ≤ 0.05 is significant.

V. Discussion

Depression is a serious global health issue affecting many people worldwide. The present study aimed to find the prevalence of major depressive disorder among 200 diabetic patients attending at Babylon Diabetic Center in Marjan Teaching Hospital. This study showed that 43.53% of patients with history of diabetes had mild mood disturbance (score 11 – 16) according to Beck Depression Inventory Scale, while only 30.5% and 26% of DM patients had moderate and severe depressive symptoms respectively and these patients were considered had clinically significant depression which should be identified and treated properly. The coexistence of DM and depression is a well know result of many researchers, and this study finding support the high prevalence of depression among diabetics which is similar to findings of other studies[15].

Depression was prevalent in 56.5% of the presenting and this result was higher than the finding of another study done in Saudi Arabia[16]. DM increases the risk of depression to the same extent as do other chronic disorders (e.g. malignancy, cardiac diseases, osteoarthritis and lung disease).The impact of diabetes and its different treatment regime on the patient, stigma and personal meaning attached to DM, maladaptive copying style and biological changes in brain resulting from chronic disease are the most important factors that make diabetic patients vulnerable to depression. The high rate of depression in this study may be attributed to other predisposing conditions like adverse life events (which are related to terrorist attacks in Iraq), low social support and sedentary life style associated with lack of physical exercise.

The overall mean age of patients was 49.44± 11.44 years and the females composed 63.5% of our patients which are similar to the findings of other researchers[16]. The prevalence of depression among DM patients is higher in younger age group has been supported by study conducted by Katon et al[8]. Depression in males is more likely to produce irritability, anger or violent behavior rather than depressed mood and thus depression might be missed on screening as anger and irritability are not the core features of depression. The majority of diabetic patients in the present work were married (96%) which could explain by the higher percentage of the females in the study group (most of females in our country marry at early age), while previous studies[17] reported a higher rate of depression in single patients compared to married. Never married and lower education level had also been reported to influence the status of depression in DM [8].51% of the studied sample were complaining from hypertension and presence of chronic disease (heart disease) and these are additional stressors predispose patients to depression. Interestingly, Clouse et al. [18] showed that in diabetic women,

major depression was an independent risk factor that accelerated the development of heart disease, so it would be important to diagnose and treat depression in patients with DM. According to Al-Ghamdi et al[16], Depression was significantly higher in diabetics with poor glycemic control, which is compared with this result. Diabetic patients with history of depression usually have pessimistic view of their life, and this leads to lack of their compliance with the necessary medications, diet and exercise and consequently the appearance of diabetic complications like retinopathy, neuropathy and nephropathy. The association between depression and the presence of diabetic complications was already observed by previous studies[16 and19].

There are few studies correlating depression with the duration of DM. In this study depression was higher among diabetic patients with longer duration of DM (> 10 years). The incidence of diabetic complications increases with increased duration of DM, so one could expect high prevalence of depression among diabetic patients with long duration of illness. Depression was higher among diabetic patients with longer duration of DM 10.8 ± 7.9 years compared to 8.6 ± 6.7 years among non-depressed[16]. Al-Amer et al.[20] found that the duration of DM was not significantly associated with depression among DM patients.DM patients who were on insulin have higher risk of having depression and this result is consistent with the result of another study [16 and 20]. Majority (63.5%) of DM patients was type II DM, and there was significant association between depression and the type of DM. Other study did not show an association between the type of DM and depression[20]. A meta-analytic review supported claim for raised rate of depression in type IIDM, which is also the most common type of DM [21].

In conclusion, this study is the first to be conducted in Babylon government to determine the prevalence of undiagnosed depression among diabetic patients and todetermine the factors that increase the likelihood of depression such as poor glycemic control, presence of diabetic complications and the long duration of illness.It necessary to provide diabetic patients the appropriate psychiatric assessment and introduce thepsychological aspect among the diabetic health care plan, this may lead to early recognition and treatment of mood disorder and consequently offer them a better quality of life.

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