

Prevalence and Predictors of Depression among Type 2 Diabetes Mellitus Outpatients in Eastern Province, Saudi Arabia

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Abstract

Background: Diabetes Mellitus is frequently accompanied by serious complications. Less known is the increased risk for depression. Undiagnosed depression prevents initiation of treatment, thereby contributing to poor clinical outcomes.

Objectives: Study aimed to determine prevalence and predictors of depression among type 2 diabetes mellitus patients.

Methodology: Study was cross-sectional. It was conducted in the outpatient clinics of diabetes mellitus in a governmental hospital in Eastern Province, Saudi Arabia in 2013. Patients with type 2 diabetes mellitus (260 participants) were selected using systematic random sampling technique. One interview questionnaire was designed to collect demographic and health factors. Two self-administered instruments were used to assess perceived social support and depression. Assessment of the relationship between depression and its predictors was done using Univariate analysis. Multivariable analysis was used to evaluate the combined effect of several factors associated with depression among type 2 diabetes mellitus patients after adjusting for confounding variables.

Results: Almost fifty percent of diabetics were depressed (49.6%). Patients with poor diabetes mellitus control (OR 3.221, *P*.000) and unmarried (OR 3.206, *P*.025) were more risky for developing depression and difference was significant.

Conclusion: Prevalence of depression among Type 2 diabetes mellitus patients was almost fifty percent. So, diabetics should be regularly examined for signs and symptoms of depression.

Key words: depression, diabetes mellitus, risk factors

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Introduction

The global prevalence of diabetes mellitus (DM) is continuously rising. The International Diabetes Federation suggests around 6.6% of the world's population is currently living with diabetes mellitus, a figure which is expected to rise to 7.8% by 2030; more than 70% of these people reside in developing countries. ⁽¹⁾ A nationwide, household, randomized, population based cohort of 18 034 participants aged ≥ 30 years found that prevalence of DM in Kingdom of Saudi Arabia (KSA) is 25.4 %.⁽²⁾

DM is frequently accompanied by serious short-term complications such as hypoglycemia, but also by disabling long-term complications like cardiovascular disease, neuropathy, nephropathy and retinopathy. Less known is the increased risk for depression. ⁽³⁻⁶⁾ It is also reported in general as well as in patient populations, that depression and other psychological problems are more prevalent in developing countries compared to developed countries. There are some possible explanations like higher level of gender inequities, social insecurity, lower level of education, greater level of poverty, financial difficulties and other forms of economic stressors.⁽⁷⁾

The presence of undiagnosed depression amongst people with DM is cause for concern as it prevents initiation of treatment for these concomitant conditions and allows frustration to build up in patients, thereby contributing to poor clinical outcomes. Depressed individuals are also less likely to comply with DM self-care recommendations and more likely to follow sedentary lifestyles, remain physically inactive, indulge in smoking and high fat diet, ⁽⁸⁾ eventually leading to poor diabetes control and clinical outcomes.⁽⁹⁻¹⁰⁾ However, it is evident that active case finding and management of depression can assist in alleviating patient suffering, and contribute to improved metabolic control and clinical outcomes, while reducing the costs of patient management.⁽¹¹⁾

Various studies to assess the prevalence of depression and its associated factors among diabetic patients have been reported from developed countries. ^(9, 10, 12) However, there is limited information regarding the prevalence of depression and its associated risk factors among diabetics in developing countries.

Gap of Knowledge

One study was conducted in Jeddah (September 2002-June 2003) to measure prevalence of depression among diabetic and non-diabetic patients and examined effect of demographic features and co-morbidities as {poor glycemic control, retinopathy, hyperlipidemia, and hypertension} as predictors of depression. As diabetes and depression are associated with morbidity and early mortality, ⁽¹³⁾ documentation of the presence of depression and its prevalence among type 2 DM patients in Eastern Province in KSA was substantial. In addition, researcher studied demographic variables, health factors, and perceived social support from family, friends, and significant other as risk factors of depression.

Methods

Study was cross-sectional. It was done in the OPC of DM in a governmental hospital in Eastern Province, KSA. Patients with type 2 DM attending scheduled clinic visits in 2013 were interviewed. Patients with type 2 DM for at least one year; aged ≥ 18 years; and willing to participate were approached. However, patients with gestational/ type 1 DM; had prior diagnosis of depression; and were deaf, mute, or illiterate were excluded.

The sample size was based on the calculation of prevalence of 19% (using the prevalence from Engum et al. in 2003 ⁽¹⁴⁾ with power of 80% and non-response rate of 10%. The sample size required was 260. Study participants were selected by the systematic random sampling method using the medical records # in the registration list at the OPC. The subjects were approached based on the ratio of 1: 2 until 260 participants were completed. Only five patients apologized to do the interview, as they were busy. However, other five patients were selected using the same "systematic random sampling technique" until sample reached 260 patients.

A pre-coded data collection interview questionnaire was designed to collect information on socio-demographic characteristics and health factors. Patients attending the OPC of DM for scheduled follow-up visits were interviewed after taking their informed consent. **Demographic variables** included gender; age; marital status; country of

origin; education level; household size; main source of household income, income per month, dwelling type and employment status. Socioeconomic status was assessed by asking participants if they were employed or not; employment is an indicator of socioeconomic position. ⁽¹⁵⁾ **Health factors** included the duration of diabetes; diabetes control. DM control was documented in patients' medical records as either good/ poor.

Multidimensional Perceived Social Support Scale (PSSS) was used to assess perceptions about support from family, friends and a significant other. It is a validated 12-item instrument designed by Zimet et al in 1988. ⁽¹⁶⁾ The items were divided into factor groups relating to the source of support, with scores ranging from 1 to 7. High scores indicate high levels of perceived support. Social support was believed to contribute a moderating influence between stressful life events and depression. It was a self-administered questionnaire.

The Center for Epidemiologic Studies Depression Scale (CES-S) ⁽¹⁷⁾ was used for assessing depressive symptoms. This scale is a 20-item self-report depression inventory with possible scores ranging from zero to 60. Reliability and validity of the scale have been tested in general and clinical populations, yielding very good internal consistency, with α of 0.85 for the general population and 0.90 for a patient population. Scale scores range from zero to 60. A cutoff point of 15 and above indicates clinically significant levels of depressive symptoms. ⁽¹⁸⁾ Although the scale does not provide a diagnosis of clinical depression, it has been shown to predict both current and future clinical depression. ⁽¹⁹⁾ The Arabic version of (CES-S) was used. ⁽²⁰⁾

Formal approval from the Ministry of Health in Eastern Province was taken before conducting the research. Informed consent was obtained from patients. Confidentiality of the data collected was considered.

Pilot study was conducted to measure the time taken for each patient to complete the interview questionnaire and the two self-administered instruments. It was also useful to revise the interview questionnaire.

All data were statistically analyzed using SPSS program version 20.0. Prevalence of

depression among type 2 DM patients was calculated. Depressed and not-depressed patients were compared for risk factors associated with depression; test of significance at 5% p value was used. Odds ratio (OR) and 95% confidence interval were calculated. Binary logistic regression analysis was used to model the predictors of depression. Diabetes mellitus control and perceived social support were candidate variables for entry into the multivariate logistic regression model. After reviewing the literature it was found that, other independent variables play an important role in depression e.g. marital status and duration of DM. ⁽²¹⁻²²⁾ Accordingly, they were included in the multivariate logistic regression model.

Results

Table 1 demonstrated that 260 patients were included in the study. Nearly half of them were depressed (49.6%). The mean age of depressed patients was 49.87 ± 13.2 and not depressed was 53.19 ± 10.7 . Fifty eight percent of women were depressed. Three-fourths of not married were depressed. All non-Saudi patients were depressed, and slightly more than half of those who had intermediate/secondary education were depressed (53%). Slightly more than fifty percent of not-employed patients were depressed (52%). Almost half of those who had less than average and average income/month were depressed (52.8% each). More than fifty percent of patients who had DM for > 20 years were depressed (52.5%). Almost two-thirds of patients with poor DM control were depressed (64%) and difference was statistically significant ($P=.002$). Almost two-thirds of patients with low social support were depressed (63.6%) and difference was statistically significant ($P=.037$).

Table 2 shows predictors of depression among diabetics using multivariate logistic regression. Results demonstrated that unmarried patients were three times more depressed than married (OR= 3.206) and difference was statistically significant ($P=.025$). Moreover, patients with poor DM control were more depressed than those with good DM control (OR=3.221) and difference was statistically significant ($P=.000$).

Table 1: Presence or absence of depression by demographics, medical variables, and social support in diabetics in Eastern Province, KSA (2013)

Variables	No depression		Depression		P	Odds Ratio		
	No	%	No	%		Calculated	95% CI	
No (260)	131	50.4	129	49.6				
Age in years								
Mean ± SD	53.19± 10.7		49.87± 13.2		P=.380			
18-	14	35.9	25	64.1	P=.169	2.632	.663	10.454
40-	80	51.3	76	48.7	P=.317	1.541	.661	3.595
60 and more	37	56.9	28	43.1		Reference		
Gender								
Men	72	60.5	47	39.5		Reference		
Women	59	41.8	82	58.2	P=.437	1.425	.583	3.479
Marital status								
Married	125	53	111	47		Reference		
Not- married	6	25	18	75	P=.243	2.156	.594	7.825
Country of residence								
Saudi	131	52	121	48	P=.999	.000	.000	
Non- Saudi	0	0	8	100		Reference		
Educational level P=.711								
Elementary	66	51.2	63	48.8	P=.856	1.111	.357	3.458
Intermediate/ Secondary	39	47	44	53	P=.487	1.420	.528	3.823
University and more	26	54.2	22	45.8		Reference		
Employment status								
Employed	48	55.2	39	44.8		Reference		
Not employed	83	48	90	52	P=.755	.866	.350	2.141
Income/ month P=.440								
Less than 3000 SR	17	47.2	19	52.8	P=.698	.804	.267	2.422
3000-6000 SR	68	47.2	76	52.8	P=.420	1.404	.615	3.201
Above 6000 SR	46	57.5	34	42.5		Reference		
Medical history								
Duration of DM in years								
Mean± SD	10.22± 7.6		9.95± 8.4		P=.840			
1-10	77	48.7	81	51.3		Reference		
>10 – 20	35	56.5	27	43.5	P=.661	.812	.319	2.064
>20	19	47.5	21	52.5	P=.554	.727	.253	2.089
DM control								
Good	90	61.6	56	38.4		Reference		
Poor	41	36	73	64	P=.002*	2.828	1.481	5.400
Perceived social support P=.037*								
High acuity (69- 84)	48	57.8	35	42.2		Reference		
Moderate acuity (49-68)	67	50.4	66	49.6	P=.016	3.421	1.259	9.301
Low acuity (12-48)	16	36.4	28	63.6	P=.051	2.032	.996	4.147

*P< .05

Table 2: Multivariate logistic regression analysis to determine the independent predictors of depression among diabetics in Eastern Province, KSA (2013)

Variables	P value	Odds Ratio (OR)	Confidence Interval (95% CI)
Low perceived social support	.153	2.290	.973 - 5.388
Not- married	.025*	3.206	1.157 – 8.881
Poor DM control	.000*	3.221	1.833 – 5.661
Duration of DM >20	.619	.681	.278 - 1.665

*P<.05

Discussion

This study demonstrated that high percent of type 2 DM patients had depression (49.6%). In addition risk factors to develop depression were poor DM control (OR= 3.221) and unmarried (OR= 3.206). Difference was statistically significant between depressed and non-depressed for these two independent variables (P<.05).

Individuals with DM have a two-fold increased risk for depression,^(4,5) Depression is affecting approximately 1 in every five diabetes patients,^(3,4) but this often remains unrecognized and thus untreated.⁽⁵⁾ Prevalence rates vary from 11% to 60%.⁽⁶⁾ The present study revealed that prevalence of depression among diabetics was 49.6%. and Karachi in Pakistan⁽²²⁾ as prevalence of depression among type 2 DM was 40.3% and 43.5% respectively.

Studying associated risk factors of depression among diabetics is important.^(9, 10, 12) This is to initiate early treatment, improve clinical outcomes and decrease the associated resource utilization and costs. Results demonstrated that patients with poor DM control were more risky to develop depression and difference was statistically significant. This was in line with a study conducted in America where depression was more prevalent among patients with poor DM control (OR = 1.98). In addition, depressed patients with type 2 DM evidenced higher levels of glycated hemoglobin (8.6 ± 2.0 vs. 7.5 ± 1.8; p = 0.05) when compared to those who did not exhibit a mood disorder in a Brazilian clinical sample.⁽²³⁾

When DM is controlled, the patient feels better and safe from complications. However when DM is uncontrolled, the patient is under stress and worried about complications. Therefore, the patient may fall depressed.⁽²⁴⁾ However, other study did not find this association and this was related to anorexia originated by depression.⁽¹³⁾

Findings revealed that unmarried diabetic patients were three times more depressed than married ones and the difference was statistically significant. This goes hand in hand with a study conducted in Johns Hopkins University in Baltimore. Results demonstrated that depression was more prevalent among unmarried diabetics (OR=1.55).⁽²¹⁾ In addition, this was parallel to the study done in Morocco where prevalence of depression was higher in type 2 DM unmarried patients compared to married patients.⁽¹³⁾ However, two studies contradicted this finding where majority of depressed diabetic patients was married.⁽²⁵⁾

In the Middle East, the social support is important because of Islamic culture. The present study found that diabetics with low perceived social support were more depressed. However, in the multivariate analysis, the difference was not significant. About 43.3% of patients in Morocco study were without social security, and this factor was indeed strongly associated with depression in type 2 DM patients, with a P value of 0.001.⁽¹³⁾

The estimated risk of getting depression in the general population is 10-25% in females, in comparison to 5- 12% in males. A possible explanation is that women play many gender

specific roles, which exposes them to increased work demands and responsibilities. Furthermore, the social role attributed to women (passivity, dependence and emotional expression), allows them to be more emotional and extroverted in nature, in comparison to men. ⁽⁷⁾ Findings of the present study demonstrated that women were more depressed in comparison to men. This was consistent with a study results in four out-patient clinics in Karachi, Pakistan. ⁽²²⁾

The present study showed that all non-Saudi diabetics were depressed. However, the difference was not significant. This finding was consistent with a study conducted in Emirate where non-Emiratis were more depressed. ⁽²⁶⁾ This could be attributed to lack of access to medical advice regularly, in addition to problems of emigration.

Slightly more than fifty percent of not-employed patients were depressed. However, difference was not significant. This was parallel to another study conducted in Nigeria where (24.4%) of unemployed patients were depressed. ⁽²⁷⁾

Duration of DM is an important predictor of depression. When duration of DM is long, the patient becomes more depressed. ^(13, 22) This contradicted the results of the present study where patients who had DM for more than 20 years were not at higher risk to have depression. However, difference was not significant. This could be attributed to adaptation of patients' life style with the disease and experiences gained in dealing with different complications. This adaptation is a result of their long- life experience (>20 years) with DM. In addition, this contradiction could be attributed to difference in culture or religious beliefs especially we are in a big Islamic country where the faith and contentment with the disease could be high.

Conducting this study in one governmental hospital is a limiting factor to generalize study results. In addition, family history of depression/ psychiatric illness was not considered. However, this study added one piece of information regarding high prevalence of depression among type 2 DM study sample and association of poor DM control and unmarried with depression.

Conclusion and Recommendations

Depression is one of the least mentioned complications associated with DM although it became prevalent. Results showed that nearly half of the sample was depressed. Patients with poor DM control and those unmarried were more risky to develop depression than others. So, the following is recommended:

1. Diabetics should be regularly examined for signs and symptoms of depression.
2. Diabetics should be referred to the social worker and psychologist regularly.
3. OPCs staff together with patients must cooperate and coordinate to control DM properly.
4. Decision and policy makers should involve unmarried and those with low social support in community services and social activities.
5. Multidisciplinary health care for the patients with diabetes is recommended.

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