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Depression and Its Associated Factors among Diabetes Mellitus Patients Attending the primary health care centers in United Arab Emirates:
A Cross-Sectional Study

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Abstract
Diabetes mellitus (DM) and depression are major global public health problems. Depression negatively affects the course of DM through hormonal, neuronal, or immune system changes that directly affect the body's ability to produce or use insulin. The coexistence of depression with DM also results in poor glycemic control by causing poor self-care behaviors such as lack of physical activity. The coexistence of depression with DM also results in poor glycemic control. The study aimed to assessing depression and Its associated Factors among diabetes mellitus patients attending the primary health care centers in United Arab Emirates. This study was conducted on 463 diabetic patients attended the primary health care centers during 8th may to 26th may, 2021. Nine primary health care centers were selected according to the accessibility. The Patient Health Questionnaire-9 (PHQ-9) was selected of the actual 9 criteria upon which the diagnosis of DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition) depressive disorders is based. Our study showed that there was non-significant difference in depression Levels between non-smokers and smokers, there was non-significant difference in depression Levels and education levels, there was significant difference in depression Levels and marital status, non-significant difference in depression Levels and nationality, non-significant difference in depression Levels and type of diabetes. Conclusion based on this study the prevalence of depression among female diabetes mellitus was high. From this study we concluded that depression levels: non-depressed, mild depression, moderate depression, moderately and severe depression are high in married participants comparing with single, divorced and widow participants

Keywords: Diabetes Mellitus, Depression, Immune System, Glycemic Control

1. Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder caused by the body's inability to utilize insulin.DM Type 1 and DM type 2 diabetes mellitus often start in childhood and adulthood, respectively Beck et al. (2018). Although genetics is thought to be the source of DM type 1, environmental factors such as viruses may have a role in the disease's onset. DM Type 2 is caused by a variety of variables, including lifestyle choices and genetics. Patients who have recently been diagnosed with diabetes face a significant amount of stress in their lives. Many of them go through the grieving process, which includes denial, anger, despair, and acceptance Sridhar and Madhu (2002). Depressive disorder is one of the most common and debilitating psychological disorders in diabetics Waitzfelder et al. (2010) . Depression is a prevalent comorbid illness in diabetic patients, according to studies Ahmad et al. (2018). The prevalence of depression in diabetic patients ranges from 8 to 15%, compared to just 3 to 4% in the general population Marcus at al. (2012). Depression is linked to the burden of complications, financial stress, poor overall health status, diabetes knowledge, and poor glucose control in people with diabetes mellitus. It also affects diabetes prognosis, increases noncompliance with medical therapy, lowers quality of life, delays diabetes recovery, and increases mortality Birhanu et al. (2016). Hospitalizations and diabetes-related comorbidities are both linked to depression Dejene at al. (2014). The study's findings will aid in the development of more effective strategies for the management of comorbid diabetes and depression. The survey's findings will also be utilized as a starting point for other academics who want to perform a large-scale study in United Arab Emirates. This study will also assist anyone who is interested in learning more about the link between depression and diabetes. This study's findings may aid healthcare providers in detecting, diagnosing, and treating depression in diabetic patients at an early stage.

2. Method

This study was conducted on 463 diabetic patients attended the primary health care centers during in Dubai, United Arab Emirates. the primary health care centers are fully organized and launched to give service for Patients with DM, the primary health care centers have also given the psychiatric service at the outpatient level.

2.1 Study design and period

This was a cross-sectional study conducted from 8th may to 26th may, 2021.

2.2 Inclusion and exclusion criteria

All diabetic patients aged≥15 years and communicating independently were included. Those who were taking antidepressant drugs for their depressive symptoms were excluded because antidepressant drugs can mask depression signs and symptoms. DM patients who were newly diagnosed at the time of data collection were not part of the study. Finally, DM patients who were seriously ill were excluded from this study.

2.3 Study variables

The dependent variable was depression. Independent variables included sociodemographic factors (age, sex, marital status, ethnicity, educational and occupational status), clinical factors (type of DM, FBG level, duration of DM, type of treatment), and psychosocial factors (social support).

2.4 Ethical considerations

Ethical approval was obtained from the Research Committee, of the research department in Dubai Medical College in Dubai, United Arab Emirates. Consent form was obtained from each study participant, where they were informed about the aim of the study and its nature and their right to interrupt the interview at any time. Patients' confidentiality and privacy were preserved at all levels of the study.

2.5 Method of data collection and tools

Data were collected by face-to-face interviews using patient health questionnaire-9 (PHQ-9). The questionnaire of socio-demographic and clinical related information was assessed by using questionnaires adapted from reviewing similar related articles and the patients' medical record. Gelaye et al, (2013)

2.6 Data Collection

Before the data collection, the students were trained on how to interview the patients, how to fill the questionnaire and also the translation of English to Arabic was standardized and agreed among the whole group members. A role play was practiced for a whole day duration. A pilot study was done on 30 patients before the actual data collection. The pilot study data collected was revised by the research members and considered to be valuable. The data was collected over a period of 3 weeks (8th May - 26th May) by 19 students from DMC. Each student conducted 25 interview questionnaires which resulted in a sample size of 475. Questionnaire was filled by a one-to-one interview with the patient and some of the information was taken from the patient medical records and the SAM system (such as HbA1c, medications and the BMI).

Table 1: Nine symptoms depression check list

Over the last two weeks, how often have you been bothered by any of the following?	Not at all	Several days (6/14)	More than half the days (8/14)	Nearly everyday
Little interest of pleasure in doing things	0	1	2	3
Feeling down, depressed, or hopeless	0	1	2	3
Trouble falling or staying asleep or sleeping too much	0	1	2	3
Feeling tired or having little energy	0	1	2	3
Poor appetite or overeating	0	1	2	3
Feeling bad about your self – or that you are a failure or have let yourself or your family down	0	1	2	3
Trouble concentration on things, such as reading the newspaper or watching television	0	1	2	3
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	0	1	2	3
Thoughts that you be better off dead or of hurting yourself in some way	0	1	2	3
1-4 Minimal depression, 5-9 Mild depression, 10-14 Moderate depression, 15-19 Moderately severe depression, 20-27 Severe depression				

3. Statistics and Data Analysis

Data was analyzed using statistical package for social sciences (SPSS) version 20. Descriptive statistics were computed to explain the socio-demographic characteristics. Qualitative data was presented as frequencies and percentages. A chi-square test for independence was used to detect relations between depression and its risk factors. P value ≤0.05 was considered statistically significant.

4. Results

Table 2: Socio-Demographic Characteristics of the Participants

Age	Number	%
15-29 years	17	3.7 %
30-39 years	33	7.1 %
40-49 years	82	17.7 %
50-59 years	165	35.6 %
60-69 years	113	24.4 %
70-79 years	45	9.7 %
80-89 years	8	1.7 %
Gender		
Male	195	42.1 %
Female	268	57.9 %
Nationality		
Local	393	84.9 %
Nonlocal	70	15.1 %
Marital Status		
Single	27	5.8 %
Married	370	79.9 %
Divorced	19	4.1 %
Widow	45	9.7 %
Education		
Illiterate	130	28.1 %
Read and write	38	8.2 %
Primary	59	12.7 %
Preparatory	48	10.4 %
Secondary	79	17.1 %
University and above	109	23.5 %
Occupation		
Not Working	284	61.3 %
Working	179	38.7 %

Table 3: Relationship between Depression in Diabetics and Gender

Depression Levels	Gender		Total
	Male	Female	
Non-Depressed	172 (88.7%)	196 (73.1%)	368
Mild Depression	12 (6.2%)	32 (12%)	44
Moderate Depression	7 (3.6%)	20 (7.5%)	27
Moderately Severe Depression	3 (1.5%)	11 (4.1%)	14
Severe Depression	0	9 (3.4%)	9
Total	194	268	462
X^2=19.125, P-value = 0.001			

Table 4: Relationship between Depression in Diabetics and Type of Diabetes

Depression	Types of Diabetes		Total
	Type 1	Type 2	
Non-Depressed	30 (68.1%)	338 (80.9%)	368
Mild Depression	7 (15.9%)	37 (8.9%)	44

Moderate Depression	3 (6.8%)	24 (5.7%)	27
Moderately Severe Depression	4 (9.0%)	10 (2.4%)	14
Severe Depression	0	9 (2.2%)	9
Total	44	418	462
X^2=9.806, P-value = 0.044			

Table 5: Relationship between Depression in Diabetics and Level of Education

Depression	Level of Education						Total
	Illiterate	read and write	Primary	Prep	Secondary	university and above	
Non-Depressed	98 (75.4%)	29 (78.4%)	46 (78%)	38 (79.2%)	62 (78.5%)	95 87.1%	368
Mild Depression	17 (13.1%)	5 (13.5%)	3 (5.1%)	4 (8.3%)	7 (8.9%)	8 7.3%	44
Moderate Depression	4 (3.1%)	2 (5.4%)	7 (11.9%)	5 (10.4%)	6 (7.6%)	3 2.8%	27
Moderately Severe Depression	5 (3.8%)	1 (2.7%)	2 (3.4%)	0	3 (3.8%)	3 2.8%	14
Severe Depression	6 (4.6%)	0	1 (1.7%)	1 (2.0%)	1 (1.3%)	0	9
Total	130	37	59	48	79	109	462
X^2: 24.381, P-value = 0.226							

Table 6: Relationship between Depression in Diabetics and Smoking

Depression	Smoking			Total
	Non-Smoker	Ex-Smoker	Smoker	
Non-Depressed	295 (78.6%)	42 (87.5%)	30 (78%)	367
Mild Depression	42 (11.2%)	1 (2%)	1 (2.6%)	44
Moderate Depression	21 (5.6%)	2 (4.1%)	4 (10%)	27
Moderately Severe Depression	10 (2.6%)	2 (4.1%)	2 (5%)	14
Severe Depression	7 (1.8%)	1 (2%)	1 (2.6%)	9
Total	375	48	38	461
X^2: 8.989, P-value =0.343				

Table 7: Relationship between Depression in Diabetics and Marital Status

Depression	Marital Status				Total
	Single	Married	Divorced	Widow	
Non-Depressed	21 (77.8%)	306 (82.9%)	12 (63.1%)	28 (7.6%)	368
Mild Depression	3 (11.1%)	30 (8.1%)	2 (10.5%)	9 (20.5%)	44
Moderate Depression	2 (7.4%)	19 (5.1%)	3 (15.8%)	3 (11.1%)	27
Moderately Severe Depression	1 (3.7%)	8 (2.2%)	1 (5.3%)	3 (21.4%)	14
Severe Depression	0	6 (1.6%)	1 (5.3%)	2 (22.2%)	9
Total	27	369	19	45	460
x^2: 34.173, P value = .005					

Table 8: Relationship between Depression in Diabetics and Nationality

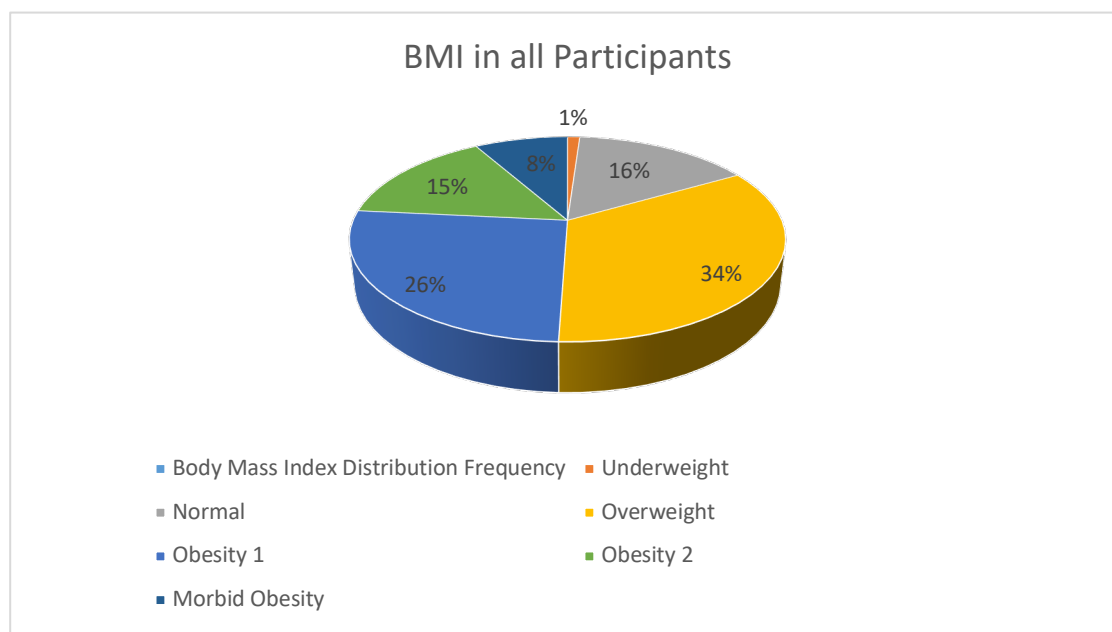| Depression	Nationality		Total
	UAE Citizens	Non- UAE Citizens	
Non-Depressed	303 (77.2%)	65 (92.9%)	368
Mild Depression	40 (10.2%)	4 (5.7%)	44
Moderate Depression	27 (6.9%)	0	27
Moderately Severe Depression	13 (3.3%)	1 (1.4%)	14
Severe Depression	9 (2.3%)	0	9
Total	392	70	462
X^2=10.190, P-value = 0.037			

Figure 1: Body Mass Index Distribution

5. Discussion

Diabetes mellitus (DM) is a chronic, multifaceted, and progressive disease. According to the International Diabetes Federation (IDF), more than 35.4 million of people in the Middle East and North Africa region have diabetes and it is predicted that the number will rise to 72.1 million by 2040 Ogurtsova et al. (2017). Depression is a common comorbidity in individuals with diabetes, compared to those without diabetes affecting approximately 20% of all patients Ellouze et al. (2017). The study aimed to assessing depression and Its associated Factors among diabetes mellitus patients attending the primary health care centers in United Arab Emirates.

This study was conducted on 463 patients, males 95 (42.1 %) and females 268 (57.9 %), with different ages ranging from 15 to 89 years. 15- 29 years 17 (3.7 %), 30-39 years 33 (7.1), 40-49 years 82 (17.7 %), 50-59 years 165 (35.6 %), 60-69 years 113 (24.4 %), 70-79 years 45 (9.7%) and 80-89 years 8 (1.7%). Table (2). In the present study relationship between depression in diabetics and gender in males' depression Levels: non-depressed, mild depression, moderate depression, moderately and Severe depression values were 172 (88.7%), 12 (6.2%), 7 (3.6%) and 3 (1.5%); respectively. On the other hand, females' depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 196 (73.1%), 32 (12%), 20 (7.5%), 11 (4.1%), 9 (3.4%); respectively with significant p value< 0.005 Table (3). In the current study, female gender was associated with developing depression. Our results agree with other study showed that female patients with Type 2 DM had a higher incidence of depression Sweileh et al. (2020). Another cross-sectional study in Austria also found that women with Type 2 diabetes were twice as likely to be diagnosed with depression compared with men Deischinger et al. (2020). However, a recent review by Lloyd et al. (2012) concluded that studies from around the world confirm that the prevalence of depression is increased in people with diabetes mellitus although the levels of depression vary between countries, between populations within the same country and between the sexes. Consequently, healthcare providers should manage mental health disorders in patients with diabetes in a culture-centered approach.

In the present study relationship between depression in diabetics and nationality for locals (UAE nationality) depression Levels: non-depressed, mild depression, moderate depression, moderately and Severe depression values were 303 (77.2%), 40 (10.2%), 27 (6.9%), 13 (3.3%), 9 (2.3%); respectively. where Non-UAE depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 65 (92.9%), 4 (5.7%), 0, 1 (1.4%), 0; respectively with non-significant P value = 0.037 Table (8).

In the present study relationship between depression in diabetics and relationship between depression in diabetics and marital status for single depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 21 (77.8%), 3 (11.1%), 2 (7.4%), 1 (3.7%), 0; respectively. where married depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 306 (82.9%), 30 (8.1%), 19 (5.1%), 8 (2.2%), 6 (1.6%); respectively, divorced depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 12 (63.1%), 2 (10.5%), 3 (15.8%), 1 (5.3%), 1 (5.3%); respectively, widow depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 28 (7.6%), 9 (20.5%), 3 (11.1%), 3 (21.4%), 2 (22.2%); respectively there was significant difference with P value = 0.005. table (7). Although the current study showed a statistically significant correlation between being married and depression, Previous studies in Sir Lanka and Ethiopia suggested that the marital status of patients with DM plays a role with those being married having less rates of depression in contrast to those who were single/divorced or widowed Asefa et al. (2020).

In the present study relationship between depression in diabetics and level of education for Illiterate depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 98 (75.4%), 17 (13.1%), 4 (3.1%), 5 (3.8%), 6 (4.6%); respectively, for read and write depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 29 (78.4%), 5 (13.5%), 2 (5.4%), 1 (2.7%), 0; respectively, for Primary level education depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 46 (78%), 3 (5.1%), 7 (11.9%), 2 (3.4%), 1 (1.7%); respectively, for Prep level education depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 38 (79.2%), 4 (8.3%), 5 (10.4%), 0, 1 (2.0%); respectively, for secondary level education depression Levels: non-depressed, mild depression, moderate

depression, moderately and severe depression values were 62 (78.5%), 7 (8.9%), 6 (7.6%), 3 (3.8%), 1 (1.3%); respectively, for secondary level education depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression values were 95 (87.1%), 8 (7.3%), 3 (2.8%), 3 (2.8%), 0; respectively with non-significant difference p value =0.226. Table (5). Association between depression and low education may be explained by the fact that educated people have better jobs and less likely to be depressed. Our study showed that there was non-significant difference in depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression between Non-Smoker, Ex-Smoker and Smokers, P-value = 0.343. Our study showed that there was non-significant difference in depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression between alcohol consumption and non-alcohol consumption, P-value = 0.765. Our study showed that there was non-significant difference in depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression between not working and working, P-value = 0.087. Our study showed that there was non-significant difference in depression Levels: non-depressed, mild depression, moderate depression, moderately and severe depression between Inadequate, adequate, and adequate and saving socio-economic status, P-value = 0.035. Table (6). The use of a relatively high sample size with a high response rate and using validated tools were the strength of this study. This study was conducted in health facilities; hence the findings might not adequately reflect the depression of the entire diabetic patient in the community.

5. Conclusion

The prevalence of depression levels: non-depressed, mild depression, moderate depression, moderately and severe depression are high in UAE-patients comparing to Non-UAE participants, based on this study the prevalence of depression levels: non-depressed, mild depression, moderate depression, moderately and severe depression are high in DM patients type 2 comparing to DM patients type 1. From this study we concluded that depression levels: non-depressed, mild depression, moderate depression, moderately and severe depression are high in married participants comparing with single, divorced and widow participants. Data from our study highlighted those patients with diabetes mellitus are at considerable risk of developing depression. We recommend that public health policymakers in the UAE should utilize more educational tools, in order to increase the awareness of the community on the risk of depression in diabetes patients.

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Disclosure

The authors have no conflict of interest to declare.

References

Beck J., Greenwood D.A., Blanton L., Bollinger S.T., Butcher M.K., Condon J.E., Cypress M., Faulkner P., Fischl A.H, Francis T., (2018): National standards for diabetes self-management education and support. Diabetes Educ, 44(1):35–50.
Sridhar G., Madhu K., (2002): Psychosocial and cultural issues in diabetes mellitus. Current Science, 83(12):1556–1564.
Waitzfelder B., Gerzoff R.B., Karter A.J., Crystal S., Bair M.J., Ettner S.L., Brown A.F., Subramanian U., Lu S-E., Marrero D., (2010): Correlates of depression among people with diabetes: the translating research into action for diabetes (TRIAD) study. Prim Care Diabetes, 4(4):215–22.
Ahmad A., Abujbara M., Jaddou H., Younes N.A., Ajlouni K., (2018): Anxiety and depression among adult patients with diabetic foot: prevalence and associated factors. J Clin Med Res, 10(5):411.
Marcus M., Yasamy M.T., van Ommeren M., Chisholm D., Saxena S., (2012): Depression: a global public health concern

Birhanu A.M., Alemu F.M., Ashenafie T.D., Balcha S.A., Dachew B.A., (2016): Depression in diabetic patients attending university of gondar hospital diabetic clinic, Northwest Ethiopia. Diabetes Metab Syndr Obes, 9:155.

Dejene S., Negash A., Tesfay K., Jobset A., Abera M, (2014): Depression and diabetes in Jimma university specialized hospital, Southwest Ethiopia. J Psychiatry, 17(126):2.

Ogurtsova K., da Rocha Fernandes J.D., Huang Y., Linnenkamp U., Guariguata L., Cho N.H., (2017): IDF Diabetes Atlas: Global Estimates for the Prevalence of Diabetes for 2015 and 2040. Ireland: Elsevier B.V.

Sweileh W.M., Abu-Hadeed H.M., Al-Jabi S.W., Sa'ed H.Z., (2014): Prevalence of depression among people with type 2 diabetes mellitus: a cross sectional study in Palestine BMC public health, 14 (1) p. 1

Deischinger C., Dervic E., Leutner M., (2020): Diabetes mellitus is associated with a higher risk for major depressive disorder in women than in men BMJ Open Diabetes Research and Care, 8 (1) Article e001430

Lloyd C.E., Roy T., Nouwen A., (2012): Chauhan Epidemiology of depression in diabetes: international and cross-cultural issues Journal of Affective Disorders, 142, pp. S22-S29

Asefa A., Zewudie A., Henok A., Mamo Y., Nigussie T., (2020): Depression and its associated factors among diabetes mellitus patients attending selected hospitals in Southwest Ethiopia: a cross-sectional study Psychiatry journal, p. 2020

Gelaye B., Williams M., Lemma S., Deyessa N., Bahretibeb Y., Shibre T., (2013): Validity of the patient health questionnaire-9 for depression screening and diagnosis in east africa. J Psychiatry, 210(2):653–6