

SUBMITTED 7 SEP 20

REVISION REQ. 15 OCT 20; REVISION RECD. 12 NOV 20

ACCEPTED 3 DEC 20

**ONLINE-FIRST: APRIL 2021**

**DOI: <https://doi.org/10.18295/squmj.4.2021.065>**

## **Depression in Urban Omani Adults with Type 2 Diabetes**

### *A cross-sectional study*

**\*Sanaa Harib Alsumry,<sup>1</sup> Tharaya Al Ghelani,<sup>2</sup> Sanjay Jaju<sup>3</sup>**

<sup>1</sup>Department of Family Medicine & Public Health, Sultan Qaboos University Hospital, Muscat, Oman; <sup>2</sup>Department of Family Medicine, Ministry of Health, Muscat, Oman; <sup>3</sup>Department of Family Medicine & Public Health, Sultan Qaboos University, Muscat, Oman.

\*Corresponding Author's e-mail: [drshs@squ.edu.om](mailto:drshs@squ.edu.om)

### **Abstract**

**Objectives:** This study aimed to identify the prevalence of clinically significant depression among adult Omani patients with type 2 diabetes mellitus (T2DM) and to explore potential associations with sociodemographic and clinical variables in this population. **Methods:** This descriptive cross-sectional study was conducted between August 2018 and September 2019 and included 427 Omani T2DM patients from 12 randomly selected governmental health centres in Muscat, Oman. An Arabic version of the validated Patient Health Questionnaire-9 was administered to the participants via face-to-face interviews to determine the prevalence of depression. **Results:** Overall, a total of 111 T2DM patients had depression (26%). The response rate was 100%. The presence of a personal history of depression was the only variable significantly associated with depression ( $P < 0.001$ ). Other sociodemographic and clinical factors were not associated with depression, including age, gender, duration of diabetes, glycated haemoglobin level, mode of diabetes treatment or the presence of diabetes-related complications such as cardiac complications, renal impairment, retinopathy, neuropathy and erectile dysfunction ( $P > 0.050$  each). **Conclusion:** This study revealed a high prevalence of depression

among urban Omani adults with T2DM, with a personal history of depression found to be significantly associated with depression. Therefore, early screening for depressive symptoms is necessary to improve the quality of life of diabetic patients in this region.

**Keywords:** Depression; Type 2 Diabetes Mellitus; Prevalence; Public Health; Primary Healthcare; Oman.

### **Advances in Knowledge:**

- Depression was found to be common among urban Omani adults with type 2 diabetes mellitus.
- Moreover, a personal history of depression was the only factor found to be significantly associated with depression in the studied cohort.

### **Application to Patient Care:**

- In light of these findings, early detection and intervention tools should be implemented in diabetic clinics in Oman in order to help counteract the high prevalence of depression among diabetics and improve their quality of life.

### **Introduction**

Depression is a mental health disorder which commonly presents with symptoms of low mood or sadness, loss of interest and pleasure in normal activities or surroundings, decreased energy, feelings of guilt or low self-esteem, sleep or appetite disturbances and difficulties focusing or concentrating.<sup>1</sup> This public health problem is a significant contributor to the global burden of disease; according to the World Health Organization (WHO), an estimated 264 million people worldwide are affected by depression.<sup>1,2</sup> In 2011, results from the World Mental Health Survey indicated that approximately one in 20 people had experienced a depressive episode in the previous year.<sup>3</sup> Indeed, depression has been identified as the third leading cause of disease burden and years lost due to disability worldwide.<sup>2</sup>

Diabetes mellitus is a chronic metabolic disorder which represents the fourth leading cause of disability globally.<sup>2</sup> Estimates from the WHO indicate that 422 million adults were affected by diabetes in 2014, with the global age-standardised prevalence of this disease rising from 4.7% in

1980 to 8.5% in 2016.<sup>4</sup> Moreover, both diabetes and diabetes-related complications have a tremendous financial impact, particularly in low- and middle-income countries, both in terms of direct and indirect medical costs and premature mortality as well as productivity loss and labour market effects.<sup>4,5</sup> While patients with type 2 diabetes mellitus (T2DM) have a 24% increased risk of depression compared to non-diabetics, the mechanisms underlying this relationship are still unclear.<sup>6,7</sup> In particular, depressive symptoms in diabetics have been associated with worsened glycaemic control, an increased prevalence of diabetes-related complications, increased functional disability, lower adherence to antidiabetic medications, higher health-related costs and increased mortality.<sup>8-13</sup> The overall prevalence of depression among people with T2DM has been reported to be 27%; moreover, in a meta-analysis of 42 studies comprising 21,351 adults, the prevalence of major depression in people with diabetes was 11.4%, while the prevalence of clinically significant depressive symptoms was 31%.<sup>14</sup>

Over the last few decades, the burden of diabetes has risen dramatically in Oman, from 8.3% in 1991 to 11.6% in 2000.<sup>15</sup> Alarming, the number of individuals living with diabetes in Oman is predicted to further increase by 174% from 128,769 in 2015 to 352,156 in 2050.<sup>16</sup> Depression among those with diabetes would most likely lead to poor adherence to medical treatment, thus further increasing the economic burden of this disease. A previous study showed the overall prevalence of depression to be 8.1% among urban Omani adults attending primary healthcare clinics in Muscat for various reasons; however, while the study highlighted the co-existence of depression with chronic physical illnesses, it failed to show a clear association due to the limited number of subjects with chronic diseases ( $P = 0.26$ ).<sup>17</sup> A meta-analysis revealed depression to be a significant comorbidity among a cohort of Arab women with T2DM, including Omanis.<sup>18</sup>

To the best of the authors' knowledge, no studies have yet been conducted in Oman to identify the prevalence of depression among Omani diabetic patients. Hence, the aim of this study was to determine the prevalence of depression among a population of Omani adults with T2DM attending randomly selected governmental diabetic clinics in an urban region. In addition, this study aimed to identify associations between depression and sociodemographic and clinical variables in order to inform the development and implementation of early detection and intervention tools so as to improve the quality of life of this group. As the Ministry of Health in

Oman provides free treatment to all citizens, the care of diabetes-related complications represents an increasing financial burden. It is therefore imperative to conduct local studies for the benefit of policy-planners to further strengthen measures to tackle the rising impact of non-communicable diseases.

## Methods

This descriptive cross-sectional study was conducted from August 2018 to September 2019 at a random selection of 12 out of 30 governmental primary healthcare centres in Muscat Governorate. All patients with T2DM attending the diabetes clinics of these health centres during this period were included. However, patients with major mental illnesses and those who were deaf and mute, currently taking antidepressants, pregnant or less than six months postpartum were excluded from the study. The necessary sample size was calculated to be 384 for a single proportion using nMaster software, Version 2.0 (Christian Medical College, Vellore, India), based on a documented depression prevalence rate of ~50% and at a confidence level of 95% and relative precision of 5%.<sup>19</sup> However, in order to account for a presumed non-response rate of 10%, the desired sample size was set at 422.

Data were collected from the patients at the selected health centres during face-to-face interviews performed by several trained research assistants. A previously translated Arabic version of the Patient Health Questionnaire (PHQ)-9 was used to assess the prevalence of depression.<sup>20</sup> The original PHQ-9 is a valid and reliable tool for depression screening which focuses on nine specific symptoms and signs of depression based on criteria proposed by the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, including loss of interest/pleasure, low mood/hopelessness, sleeping difficulty, loss of energy, changes in appetite, feelings of guilt/worthlessness, difficulty concentrating, feelings of being slow/restless and suicidal ideation.<sup>21</sup> In line with previous research, a cut-off score of  $\geq 10$  was considered to indicate the presence of a depressive disorder.<sup>22</sup> The information provided by the patients during the face-to-face interviews was subsequently verified with their medical records and medication lists using the standard electronic healthcare software used in Oman.

Data were analysed using the Statistical Package for the Social Sciences (SPSS), Version 23.0 (IBM Corp., Armonk, New York, USA). As appropriate, Chi-squared or Fisher's exact tests were used to compare differences in proportion between groups. A univariate analysis was performed to determine associations between depression and various sociodemographic and clinical variables. All statistical tests were two-sided. A *P* value of <0.05 was considered statistically significant.

Ethical approval for this study was obtained from the regional research committee of the Directorate General of Planning and Studies at the Ministry of Health in Muscat. The purpose of the study was explained beforehand to the patients, all of whom provided written informed consent prior to participation.

## Results

A total of 427 patients with T2DM were included in the study. The response rate was 100%. According to their total PHQ-9 scores, 111 patients (26%) were found to have depression, while 316 (74%) were not depressed. Among those who were depressed, 55 (49.5%) were male and 56 (50.4%) were female, whereas 152 (48.1%) were male and 164 (51.9%) were female in the non-depressed group [Figure 1].

Depression was most prevalent among those aged >60 years and was least prevalent in those aged 30–40 years (34.2% versus 15.3%). However, the presence of a personal history of depression was the only variable significantly associated with depression (*P* < 0.001). No significant associations were observed between other sociodemographic characteristics and depression, including gender (*P* = 0.79) or age (*P* = 0.056) [Table 1].

In terms of clinical characteristics, the rate of depression was highest among patients who had had diabetes for more than 10 years (38.7%). However, the difference between the two groups was not statistically significant (*P* = 0.54). Depression was also not significantly associated with diabetes control as measured by glycated haemoglobin (HbA1C) level (*P* = 0.057). Similarly, no significant associations were noted between depression and other clinical factors, such as the

presence of various diabetes-related complications, body mass index or mode of anti-hyperglycaemic treatment [Table 2].

## Discussion

Depression can be reliably diagnosed and treated in primary care settings, with standard treatment consisting of basic psychological support combined with antidepressant medications or psychotherapy, such as cognitive behavioural therapy, interpersonal psychotherapy or problem-solving treatment.<sup>23</sup> However, many primary care patients presenting with multiple disorders including depression often go undiagnosed; moreover, even if depression is recognised, treatment is usually prioritised for other diseases.<sup>24</sup> Results from the World Health Survey confirmed that depression had a stronger negative influence on health status compared to other chronic diseases; as such, the timely diagnosis and treatment of depressive disorders is imperative.<sup>25</sup>

The current study found the rate of depression to be 26% among adult Omani patients with T2DM attending urban primary health centres. Other studies conducted in the Gulf Cooperation Council (GCC) region have reported similar findings. For instance, Nasser *et al.* reported a comparable rate (33%) among primary care diabetic patients in Bahrain.<sup>26</sup> Alzahrani *et al.* observed the rate of depression to be 33.8% among 450 patients with T2DM attending primary health centres in western Saudi Arabia, with similar findings reported in central Saudi Arabia (34.8%).<sup>27,28</sup> Alarming, the prevalence of depression in the present study was more than twice that noted among other urban Omani adults attending primary health clinics (26% versus 8.1%).<sup>17</sup> A meta-analysis also revealed an increased prevalence of depression among diabetic patients compared to the general population (31% versus 11%).<sup>14</sup>

However, much higher prevalence rates of depression have been reported among other diabetic populations in GCC countries. For instance, in eastern Saudi Arabia, the prevalence of depression among individuals with T2DM was 49.6%, with depression significantly associated with gender, marital status and diabetes-related complications.<sup>19</sup> In addition, a study conducted in southern Saudi Arabia reported 37.6% of those with T2DM to be depressed, a finding which was also significantly associated with complications.<sup>29</sup> In contrast, in the United Arab Emirates

(UAE), Sulaiman *et al.* found the prevalence of depression or anxiety to be only 12.5% among T2DM patients attending diabetes clinics at primary care centres or hospitals in Sharjah; however, this study utilised the K6 scale rather than the PHQ-9 tool to assess mental health status.<sup>30</sup> Differing prevalence rates of depression could be explained by variations in study methods and sample characteristics.

In the current study, various sociodemographic factors—including age, gender, educational level, marital status, monthly income and a family history of major illness—were not found to have a significant influence on the rate of depression. Albasheer *et al.* reported similar findings in Saudi Arabia.<sup>29</sup> No significant associations between depression and clinical variables were observed in the present study, such as diabetes duration. This is consistent with results reported by studies from eastern and southern Saudi Arabia.<sup>19,29</sup> This could be attributed to cultural, religious and ethnic differences. The current study also showed no significant associations with diabetes control (as represented by HbA1C values) or with diabetic micro- and macro-vascular complications. Similar findings were noted by Albasheer *et al.* in southern Saudi Arabia.<sup>29</sup> In contrast, Sulaiman *et al.* found that the presence of ocular, vascular and neurological diabetes-related complications such as diabetic retinopathy, glaucoma and diabetic foot disease to be significantly associated with psychological symptoms of depression and anxiety among T2DM patients in the UAE.<sup>30</sup> Comparable findings were also reported by other researchers.<sup>29</sup> This could be explained by the difference in study setting, as primary care centres usually ensure continuity of care and provide specialised diabetes-related services. This level of medical support could help patients adapt more easily to disease complications, thereby potentially lessening the likelihood of depression.

Overall, the presence of a personal history of depression was the only variable significantly associated with depression in the current study. This could point to an effect of inherited genes on the development of depression. However, no significant associations were noted for other potential genetic factors, such as the presence or absence of consanguinity or a family history of depression. As such, further research is required to confirm these findings. In the meantime, early point-of-care screening is recommended to evaluate the occurrence of depressive

symptoms among diabetic individuals in Oman in order to improve the quality of life of this patient group.

In terms of limitations, the present study was conducted in a single governorate of Oman, thereby hindering generalisation of the results. Further studies involving additional patients attending primary health clinics in other parts of the country are necessary. Moreover, the PHQ-9 questionnaire used in the study was not the latest version of this tool; however, this version was used in order to compare findings with previous studies available in the existing literature. Additionally, as a multivariate regression analysis was not conducted, the study could only identify associations between variables and potential confounders could not be ruled out. In addition, while the information provided by the patients during the face-face interviews was corroborated with their medical records, it is possible that the findings were subject to self-report bias. Finally, all of the subjects consisted of diagnosed T2DM cases with health issues of sufficient severity to involve seeking treatment at a clinic. Additional studies may be necessary to determine whether depression is similarly high among undiagnosed diabetics in the general population or among those with less severe or overt symptoms. Despite these limitations, this study is the first in the country to identify the prevalence of depression among Omani diabetic patients. This information would be of use in the development and implementation of early detection and intervention tools to help counteract the high prevalence of depression in this group.

## **Conclusion**

In primary care settings, depression among patients with T2DM often goes unnoticed and therefore untreated. This study revealed a fairly high prevalence of depression among a cohort of urban Omani adults with T2DM, with a personal history of depression found to be the only variable significantly associated with depression in this group. Accordingly, early screening for depressive symptoms is highly recommended in order to improve the quality of life of these patients.

## **Conflict of Interest**

The authors declare no conflicts of interest.



## Funding

This study was funded by the Deanship of Research at Sultan Qaboos University (Budget ID: IH25051905).

## Acknowledgements

The authors extend their sincere gratitude to the patients who participated in this study as well as the research assistants for their help in conducting the interviews and collecting data.

## References

1. World Health Organization. Depression: A global public health concern. From: [www.who.int/mental\\_health/management/depression/who\\_paper\\_depression\\_wfmh\\_2012.pdf](http://www.who.int/mental_health/management/depression/who_paper_depression_wfmh_2012.pdf) Accessed: Aug 2020.
2. Global Burden of Disease Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: A systematic analysis for the Global Burden of Disease Study 2017. *Lancet* 2018; 392:1789–858. [https://doi.org/10.1016/S0140-6736\(18\)32279-7](https://doi.org/10.1016/S0140-6736(18)32279-7).
3. Morris J, Lora A, McBain R, Saxena S. Global mental health resources and services: A WHO survey of 184 countries. *Public Health Rev* 2012; 34:3. <https://doi.org/10.1007/BF03391671>.
4. World Health Organization. Global report on diabetes. From: [https://apps.who.int/iris/bitstream/handle/10665/204871/9789241565257\\_eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/204871/9789241565257_eng.pdf) Accessed: Oct 2020.
5. Seuring T, Archangelidi O, Suhrcke M. The economic costs of type 2 diabetes: A global systematic review. *Pharmacoeconomics* 2015; 33:811–31. <https://doi.org/10.1007/s40273-015-0268-9>.
6. Nouwen A, Winkley K, Twisk J, Lloyd CE, Peyrot M, Ismail K, et al. Type 2 diabetes mellitus as a risk factor for the onset of depression: A systematic review and meta-analysis. *Diabetologia* 2010; 53:2480–6. <https://doi.org/10.1007/s00125-010-1874-x>.
7. Al-Shookri A, Khor GL, Chan YM, Loke SC, Al-Maskari M. Effectiveness of medical nutrition treatment delivered by dietitians on glycaemic outcomes and lipid profiles of Arab,

Omani patients with type 2 diabetes. *Diabet Med* 2012; 29:236–44.

<https://doi.org/10.1111/j.1464-5491.2011.03405.x>.

8. Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE. Depression and poor glycemic control: A meta-analytic review of the literature. *Diabetes Care* 2000; 23:934–42. <https://doi.org/10.2337/diacare.23.7.934>.

9. de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ. Association of depression and diabetes complications: A meta-analysis. *Psychosom Med* 2001; 63:619–30. <https://doi.org/10.1097/00006842-200107000-00015>.

10. Egede LE, Zheng D, Simpson K. Comorbid depression is associated with increased health care use and expenditures in individuals with diabetes. *Diabetes Care* 2002; 25:464–70. <https://doi.org/10.2337/diacare.25.3.464>.

11. Zhang X, Norris SL, Gregg EW, Cheng YJ, Beckles G, Kahn HS. Depressive symptoms and mortality among persons with and without diabetes. *Am J Epidemiol* 2005; 161:652–60. <https://doi.org/10.1093/aje/kwi089>.

12. Egede LE. Diabetes, major depression, and functional disability among U.S. adults. *Diabetes Care* 2004; 27:421–8. <https://doi.org/10.2337/diacare.27.2.421>.

13. Ciechanowski PS, Katon WJ, Russo JE. Depression and diabetes: Impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med* 2000; 160:3278–85. <https://doi.org/10.1001/archinte.160.21.3278>.

14. Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: A meta-analysis. *Diabetes Care* 2001; 24:1069–78. <https://doi.org/10.2337/diacare.24.6.1069>.

15. Al-Shookri A, Khor GL, Chan YM, Loke SC, Al-Maskari M. Type 2 diabetes in the Sultanate of Oman. *Malays J Nutr* 2011; 17:129–41.

16. Al-Lawati JA, Panduranga P, Al-Shaikh HA, Morsi M, Mohsin N, Khandekar RB, et al. Epidemiology of diabetes mellitus in Oman: Results from two decades of research. *Sultan Qaboos Univ Med J* 2015; 15:e226–33.

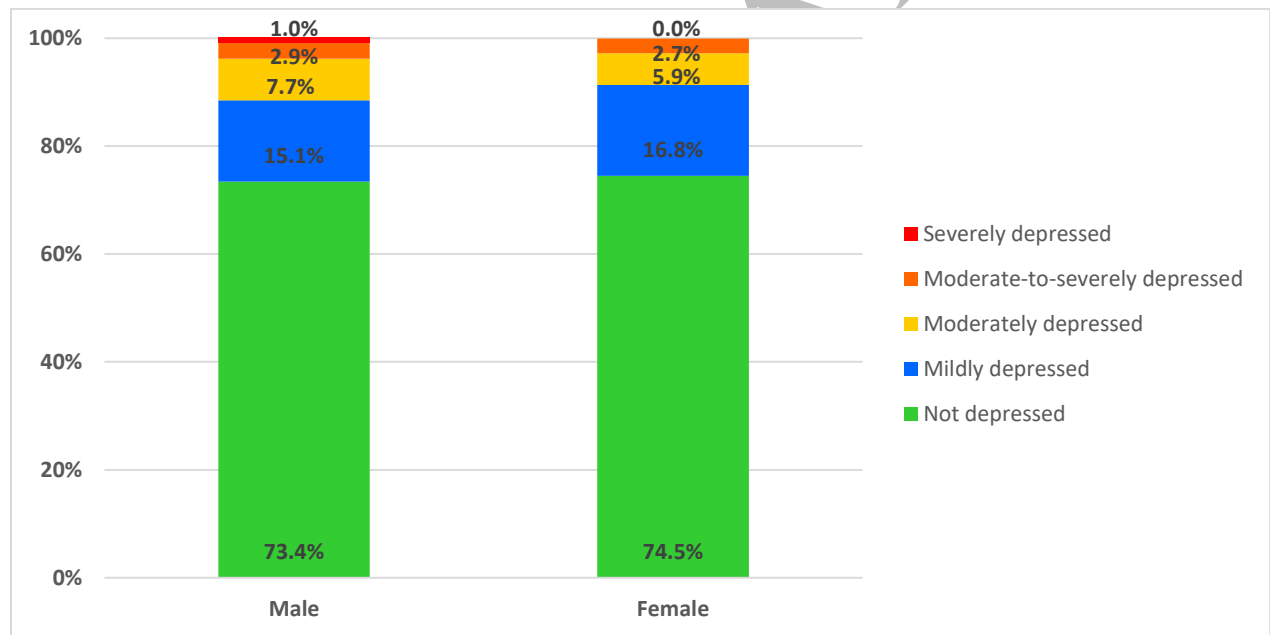
17. Al-Salmani A, Juma T, Al-Noobi A, Al-Farsi Y, Jaafar N, Al-Mamari K, et al. Characterization of depression among patients at urban primary healthcare centers in Oman. *Int J Psychiatry Med* 2015; 49:1–18. <https://doi.org/10.2190/PM.49.1.a>.

18. Hawamdeh S, Dator WL, Abunab HY. Prevalence of depression among Arab women with type 2 diabetes: A systematic review and meta-analysis. *Health* 2016; 8:650–7. <https://doi.org/10.4236/health.2016.87068>.
19. El Mahalli AA. Prevalence and predictors of depression among type 2 diabetes mellitus outpatients in Eastern Province, Saudi Arabia. *Int J Health Sci (Qassim)* 2015; 9:121–7. <https://doi.org/10.12816/0024105>.
20. Multicultural Mental Health Resources Centre. PHQ-9 Arabic for Israel. From: [www.multiculturalmentalhealth.ca/wp-content/uploads/2013/11/PHQ9\\_Arabic-for-Israel.pdf](http://www.multiculturalmentalhealth.ca/wp-content/uploads/2013/11/PHQ9_Arabic-for-Israel.pdf) Accessed: Oct 2020.
21. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med* 2001; 16:606–13. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>.
22. Hermanns N, Kulzer B, Krichbaum M, Kubiak T, Haak T. How to screen for depression and emotional problems in patients with diabetes: Comparison of screening characteristics of depression questionnaires, measurement of diabetes-specific emotional problems and standard clinical assessment. *Diabetologia* 2006; 49:469–77. <https://doi.org/10.1007/s00125-005-0094-2>.
23. World Health Organization, World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians. Integrating mental health into primary care: A global perspective. From: [www.who.int/mental\\_health/resources/mentalhealth\\_PHC\\_2008.pdf](http://www.who.int/mental_health/resources/mentalhealth_PHC_2008.pdf) Accessed: Apr 2020.
24. Cassano P, Fava M. Depression and public health: An overview. *J Psychosom Res* 2002; 53:849–57. [https://doi.org/10.1016/s0022-3999\(02\)00304-5](https://doi.org/10.1016/s0022-3999(02)00304-5).
25. Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. Depression, chronic diseases, and decrements in health: Results from the World Health Surveys. *Lancet* 2007; 370:851–8. [https://doi.org/10.1016/S0140-6736\(07\)61415-9](https://doi.org/10.1016/S0140-6736(07)61415-9).
26. Nasser J, Habib F, Hasan M, Khalil N. Prevalence of depression among people with diabetes attending diabetes clinics at primary health settings. *Bahrain Med Bull* 2009; 31.
27. Alzahrani A, Alghamdi A, Alqarni T, Alshareef R, Alzahrani A. Prevalence and predictors of depression, anxiety, and stress symptoms among patients with type II diabetes attending primary healthcare centers in the western region of Saudi Arabia: A cross-sectional study. *Int J Ment Health Syst* 2019; 13:48. <https://doi.org/10.1186/s13033-019-0307-6>.

28. Al-Mohaimed AA. Prevalence and factors associated with anxiety and depression among type 2 diabetes in Qassim: A descriptive cross-sectional study. *J Taibah Univ Med Sci* 2017; 12:430–6. <https://doi.org/10.1016/j.jtumed.2017.04.002>.

29. Albasheer OB, Mahfouz MS, Solan Y, Khan DA, Muqri MA, Almutairi HA, et al. Depression and related risk factors among patients with type 2 diabetes mellitus, Jazan area, KSA: A cross-sectional study. *Diabetes Metab Syndr* 2018; 12:117–21. <https://doi.org/10.1016/j.dsx.2017.09.014>.

30. Sulaiman N, Hamdan A, Tamim H, Mahmood DA, Young D. The prevalence and correlates of depression and anxiety in a sample of diabetic patients in Sharjah, United Arab Emirates. *BMC Fam Pract* 2010; 11:80. <https://doi.org/10.1186/1471-2296-11-80>.



**Figure 1:** Chart showing the prevalence and severity of depression according to gender among urban Omani adults with type 2 diabetes (N = 427).

**Table 1:** Prevalence of depression according to demographic characteristics among urban Omani adults with type 2 diabetes (N = 427)

Characteristic	n (%)		P value
	Depressed (n = 111)	Not depressed (n = 316)	
<b>Age in years</b>			0.056
30–40	17 (37.8)	30 (63.8)	
41–50	29 (32.6)	60 (67.4)	
51–60	27 (21.3)	100 (78.7)	
>60	38 (23.2)	126 (76.8)	
<b>Gender</b>			0.79
Male	55 (26.6)	152 (73.4)	
Female	56 (25.5)	164 (74.5)	
<b>Education level</b>			0.92
Illiterate	44 (24.3)	137 (75.7)	
Primary	26 (26.5)	72 (73.5)	
Secondary	26 (28)	67 (72)	
University and above	15 (27.3)	40 (72.7)	
<b>Marital status</b>			0.64
Single	9 (47.4)	10 (52.6)	
Married	75 (24.1)	236 (75.9)	
Divorced	9 (39.1)	14 (60.9)	
Widowed	18 (24.3)	56 (75.7)	
<b>Presence of parental consanguinity</b>			0.14
None	76 (29.1)	185 (70.9)	
First-degree	27 (22.7)	92 (77.3)	
Second-degree	8 (17)	39 (83)	
<b>Employment status</b>			0.72
Employed full-time	25 (26.6)	69 (73.4)	
Employed part-time	10 (37)	17 (63)	
Unemployed	3 (33.3)	6 (66.7)	
Business owner	4 (23.5)	13 (76.5)	
Housewife	40 (23.1)	133 (76.9)	
Retired	29 (27.1)	78 (72.9)	
<b>Personal history of depression</b>			0.00
Yes	33 (64.7)	18 (35.3)	
No	78 (20.7)	298 (79.3)	
<b>Family history of depression</b>			0.57
Yes	17 (43.6)	22 (56.4)	
No	94 (24.4)	294 (75.8)	
<b>Family history of</b>			0.05

<b>major disability or illness</b>			
Yes	29 (45.3)	35 (54.7)	
No	82 (22.6)	281 (88.9)	
<b>Regular physical activity</b>			0.098
Yes	42 (25.9)	120 (74.1)	
No	69 (26.0)	196 (73.9)	
<b>Smoking status</b>			0.11
Smoker	13 (37.1)	22 (62.9)	
Non-smoker	98 (25.0)	294 (75.0)	

**Table 2:** Prevalence of depression according to clinical characteristics among urban Omani adults with type 2 diabetes (N = 427)

Characteristic	n (%)		P value
	Depressed (n = 111)	Not depressed (n = 316)	
<b>Duration of DM in years</b>			0.54
<1	6 (19.4)	25 (80.6)	
1–5	35 (26.1)	99 (73.9)	
6–10	26 (25.5)	76 (74.5)	
>10	44 (27.5)	116 (72.5)	
<b>HbA1C in %</b>			0.06
≤7	43 (23.6)	139 (76.4)	
7.1–8.9	34 (22.8)	115 (77.2)	
≥9	34 (35.4)	62 (64.6)	
<b>BMI in kg/m<sup>2</sup></b>			0.35
≤25	25 (25.3)	74 (74.7)	
26–29	30 (22.1)	106 (77.9)	
≥30	56 (29.2)	136 (70.8)	
<b>Mode of DM treatment</b>			0.24
Oral	76 (24.2)	238 (75.8)	
Injection	10 (25.6)	29 (74.4)	
Oral plus injection	25 (33.8)	49 (66.2)	
<b>Complications</b>			
Diabetic foot	4 (28.6)	10 (71.4)	0.81
Cardiac or vascular	17 (27.9)	44 (72.1)	0.72
Renal impairment	21 (28.8)	52 (71.2)	0.61
Neuropathy	7 (31.8)	15 (68.2)	0.52
Retinopathy	28 (26.7)	77 (73.3)	0.86

DM = diabetes mellitus; HbA1c = glycated haemoglobin; BMI = body mass index.