Original Article

Anxiety among Adults with Diabetes in Fasa Diabetes Registry System: Risk Factors and Relationship to Blood Sugar Control

Modaresi Farzaneh[1], Eslamzadeh Mahboube[2], Rezaimotlagh Mohammad Ali[3], Pezeshki Babk[4], Karimi Aliasghar[4,5], Ansari Amir[6*]

1. Department of Psychiatry, Fasa University of Medical Sciences, Fasa, Iran
2. Psychiatry and Behavioral Sciences Research Center, Mashhad University of Medical Sciences, Mashhad, Iran
3. Student Research Committee, Fasa University of Medical Sciences, Fasa, Iran
4. Non Communicable Diseases Research Center (NCDRC), Fasa University of Medical Sciences, Fasa, Iran
5. Research Center for Neuromodulation and Pain, Shiraz University of Medical Sciences, Shiraz, Iran
6. Department of Internal Medicine, Fasa University of Medical Sciences, Fasa, Iran

Received: 14 Apr 2022 Accepted: 31 May 2022

Abstract

Background & Objective: Diabetes mellitus (DM) became a critical worldwide issue in last few decades. One of the progressive concerns is mental health in diabetic patients. Anxiety is one of mental health disorders that is comprehensively prevalent in diabetic patients. The investigation of anxiety in diabetes and poor glycemic control and other factors is related to comorbid anxiety with diabetes.

Materials & Methods: 220 diabetic patients who were registered on Fasa diabetes registry system. We interviewed them on telephone and collected Persian version of Beck anxiety inventory (BAI).

Result: Our study showed that prevalence of anxiety in diabetic patients was 29.5%. Among this the majority of them were females, i.e. 148 patients (67.3 %) and 72 (32.7%) were males and mean age was 57.16 years. Among all factors, glycemic control (glycosylated hemoglobin type A1C (HbA1C) and FBS) were not significantly related to anxiety in diabetes subjects. However significant relation between demographic factors (sex, having child and job) was detected.

Conclusion: Our study revealed a high prevalence of anxiety among diabetic patients and shows a significant relation with factors like sex, occupation, and job satisfaction. On the other hand, no significant relation between glycemic control and anxiety was observed. However, longitudinal study needs to identify detailed risk factors.

Keywords: diabetes, anxiety, diabetes mellitus, glycosylated hemoglobin type A1C

Introduction

Diabetes mellitus (DM) became a critical worldwide issue in last few decades (1, 2). More than 300 million individuals have been affected with diabetes mellitus and this number may increase to 438 million by 2030 (3, 4) and approximately 9.3% of the American population (1). In Iran the prevalence of diabetes was reported 11.9% in adult (2) and is rising dramatically in developing countries (5). DM is one of chronic diseases that includes lifelong comorbidity (6).

It became one of crucial issues in public health and costs an approximately 245 billion dollars in direct and indirect diabetes medical care. One of the progressive concerns is mental health in diabetic patients. Anxiety is one of mental health disorders

***Corresponding Author: Ansari Amir,** Department of Internal Medicine, Fasa University of Medical Sciences, Fasa, Iran
Email: Dr.amiransari84@yahoo.com
https://orcid.org/0000-0002-2540-7910

Modaresi Farzaneh: https://orcid.org/0000-0003-4619-1052
Eslamzadeh Mahboube: https://orcid.org/0000-0002-6230-9455
Rezaimotlagh Mohammad Ali: https://orcid.org/0000-0003-1478-5286
Pezeshki Babk: https://orcid.org/0000-0003-4839-8428
Karimi Aliasghar: https://orcid.org/0000-0002-8580-1186

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

that is comprehensively prevalent in diabetic patients (7). In the general population, the prevalence of anxiety was nearly 10%. Studies revealed that the prevalence of anxiety in diabetic patient was relatively 60 % higher than normal population and a review article that was conducted in 2019 shows that the prevalence of anxiety in diabetic patients in Iran was 64.5% (8). Anxiety is basically related to poor metabolic function and outcome in diabetic patients (1).

It's crucial to recognize the factors may influence the prevalence of anxiety in diabetes (9, 10). Glycemic control and relation with anxiety has recently been noticed in studies carried out and the relationship with anxiety is under investigation (11-14). Also, socio-demographic factors have attracted little attention. Our study aim to identify the factors (i.e.: glycemic control and demographic factors, etc.) relating to anxiety in diabetic patients.

Materials & Methodes

We conducted a cross-sectional study on diabetic patients who were registered on fasa diabetes registry system.

We registered all patients on the day of their visit to the clinic, and choose 220 patients randomly, each patients is subjected to routine measures of blood pressure, and blood chemistry (cell blood count, fasting blood sugar, HbA1c, lipid profile,renal functions) .and registered their demographic data (age, sex, marriage status, occupation, and smoking)

In our study, age range was 35 to 70 years old and in demographic factors, housewives were not included in the job group.

We interviewed patients on telephone and collected Persian version of Beck anxiety inventory BAI information. Pregnant and lactating woman and patients with mental retardation were excluded from the study. Moreover, we excluded the patients who were unable to communicate.

A structured self-administered questionnaire and medical files were the sources of our data collection.

We used a Persian translation version of Beck anxiety inventory questionnaire (BAI). The Beck Anxiety Inventory (BAI) is a valid and reliable instrument which contains 21 items (15).

Scores 0 to 7 present cut point for minimal anxiety, 8 to 15 for mild anxiety, 16 to 25 and 30 to 63 are moderate and severe anxiety (16). Also, we used medical files to collect data on weight, height, coronary artery disease (CAD), hypertension, hyperthyroidism, hypothyroidism, and history of substance use.

Statistical analysis was performed using last version of package for social science (spss). To examine the two categorical variables, we used chi-square test. A P-value (P) ≤ 0.05 was considered statistically significant.

Result

Socio-demographic and economic

A total of 220 patients with diabetes were interviewed and socio-demographic and economic information was assembled. Among this, the majority of them were females 148 patients (67.3 %) and 72 (32.7) were males and mean age was 57.16 years old. However, 180 patients were married (81.3 %), 24 were divorced (10.9 %), 14 were single and only 2 patients were widow. Majority of patients had no experience of dead fetus. 163 (74.1 %) patients had no abortion and others had experience of abortion 25.9 %.

Despite less than half of them had job 40.9 % our descriptive analysis shows that 9 (4.1%) had very much job satisfaction, and nearly half of them 45.5% had 10-30 million Rials salary (Table 1).

Glycemic control

Fasting blood sugar in our study was higher than normal range (mean=184.94 mg/dL), also we detected a 2-hour post prandial analyzed blood glucose, the mean was 259.51 that is higher than normal range. We assessed HbA1C as a useful biomarker to detect a poor glycemic control among 6% past months. Mean was 8.57% that also higher than normal range (Table 1).

Table1. This table describe frequency of demographic information

variable	category	frequency	Percent %
sex	Male	72	32.7
	Female	148	67.3
Marital status	Married	180	81.8
	Single	14	6.4
	Divorced	24	10.9
	widow	2	0.9
job	Yes	130	59.1
	no	90	49.9
Job satisfaction	Very much	9	4.1
	Much	11	5
	Moderate	50	22.7
	Little	9	4.1
	Very little	2	0.9
salary	<1m	35	15.9
	1-3m	100	45.5
	3-6m	22	10
	>6m	25	11.4
blood chemistry in diabetic patients (mean±SD)			
FBS		184.94	(76.28)
2HPP		259.51	(104.23)
HbA1C		8.57	(1.91)

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

History of drugs admission

Majority of them had no history of admission 90.5 %. The most common symptoms were polyuria and polydipsia 46.8%, 46.6%. Other symptoms such as fatigue 16.4%, weakness 26.8%, weight loss 29.5%, blurred vision 5.9%, are less frequent.

79 patients reported history of insulin use 35.9% and 68 patients take oral medications 30.9% and majority of them was metformin 43.2 % (Chart 1).

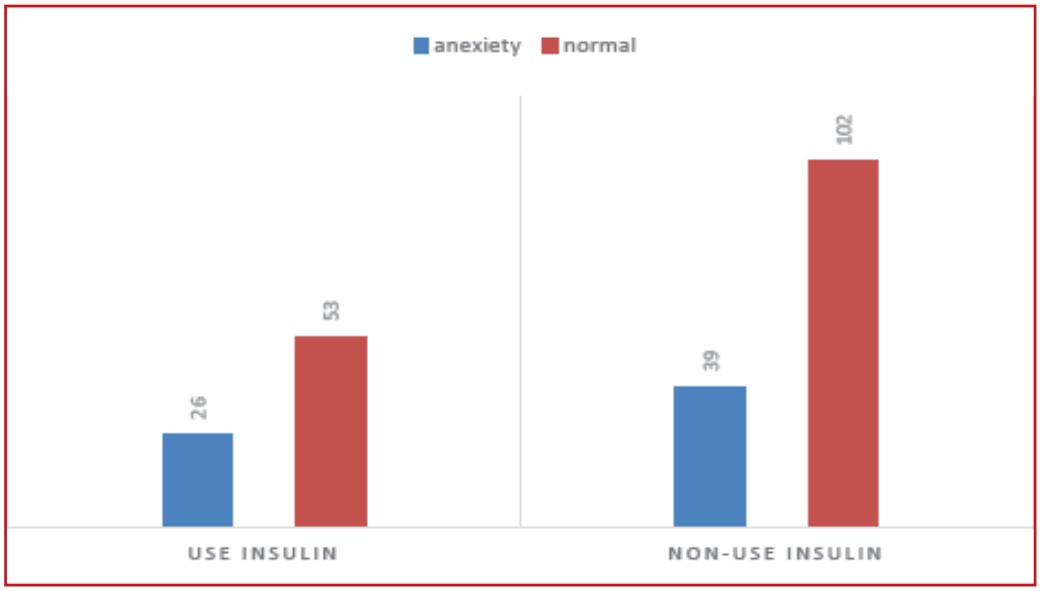

Chart 1. Anxiety and insulin use in diabetic patients

Comorbidities

18 patients were reported history of hypothyroidism 8.2% and 3 of them reported history of hyperthyroidism. 33 patients had history of hypertension (15%) although 2 patients had history of myocardial infarction (MI).

In our study no one reported history of amputation. In this investigation 99 (44.1%) subjects had hypertension and 83 (37.7%) had dyslipidemia.

Frequency of anxiety

Among the total study patients 65 (29.5%) had anxiety, that was categorized to mild, moderate and severe. That presented in Chart 2.

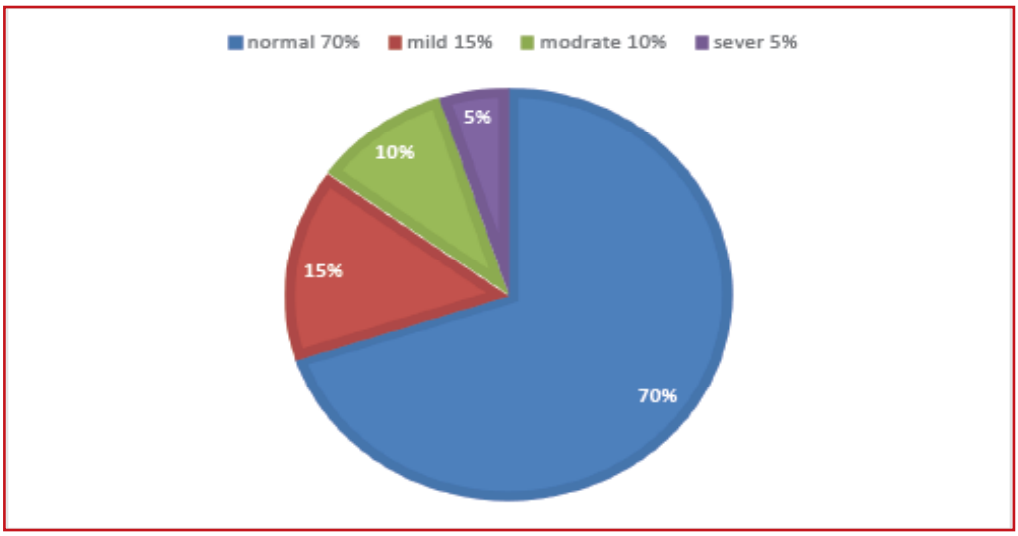

Chart 2. saldescribe frequency of intensity of anxietyes

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

Factors are associated to anxiety

In this study, we analyzed 14 demographic variables, including age, sex, marital status, having child and familial marriage. Our study revealed the correlation between sex and anxiety, female had more anxiety 35.1% and patients who had a child were less affected with anxiety. Nevertheless, in socio-demographic factors, having job, job satisfaction and salary, our study expressed significant correlation between job status and anxiety, patients who had no job reported high percent of anxiety. In drinking habits including alcohol and tea and coffee, our study shows no significant relation with anxiety. Our statistical analysis shows that there is no significant correlation in substance use (cigarette, water pipe) and likewise there is no significant correlation between insulin injection and oral medications and anxiety.

Our study demonstrated that among 20 blood chemistry dates, there is asignificant correlation between GFR status (p.value: 0.011) and anxiety but on the other hand FBS in diabetic patients suffering from anxiety and other diabetic patients had no significant difference (p.value:0.85). Likewise, there was no significant relation in 2HPP and HbA1C (Table 2).

Table 2. Blood chemistry analysis and anxiety in diabetic patients

	Anexity1	N	Mean	Std. Deviation	P-value
FBS	No	144	183.28	77.656	0.854
	Yes	63	188.73	73.511	
2hpp	No	124	259.40	110.027	0.326
	Yes	54	259.78	90.513	
HbAc	No	107	8.48	1.89	0.561
	Yes	40	8.82	1.98	

FBS:Fasting blood sugar, 2HPP:2hour post prandial, HbA1C:Glycosylated hemoglobin type A1C,GFR: Glomeural filtration rate

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

Discussion

Anxiety is frequent in chronic diseases like diabetes. It may result in many factors. Our study showed that prevalence of anxiety in diabetic patients were 29.5%. that is comparable with study conducted in Saudi Arabia (17) and Edmalem et al in Ethiopia (6) 32%. However, it was lower than Mukrim et al in Saudi Arabia (18) 45 %, and Sharma et al in Nepal (19) 49.7%. On the other hand, a systematic review that combined 18 studies reported 14% anxiety among diabetic patients (20) in contrast with meta-analysis study that was conducted in Iran that reveled a 64.5 % anxiety in diabetic patients (8) the difference between these findings may result in socioeconomic contrast, patiants included in studies and during that data collection or can be the difference in scale and tools. Our study revealed mild (14.5%), moderate (10%) and sever (5%) anxiety. Our finding in mild and moderate anxiety are lower than study conducted by Sharma et al (19) 24.7% ,20.3% and in sever anxiety, it is comparable with this study (19) 4.7%. Results in Pakistan (21) shows that mild, moderate and severe anxiety were 48.6%, 26.3% and 25% which were higher than our findings.The variation in studies may result in different population and culture and variety in measurements.

Our study revealed no significant association between glycemic control and anxiety, including FBS, 2HPP and HbA1C. Likewise, a study conducted in Italy (13) reported that there was no correlation between glycemic control and anxiety in diabetic patients. Also, a study carried out by Kendzo et al (14) reported no significant correlation between fasting blood glucose and anxiety in diabetic patients but a significant relationship was observed between HbA1C and anxiety among diabetic patients. In this line, a study conducted by Mazze et al (22) reported a significant relationship between glycemic controllevel of HbA1C, and anxiety in diabetic patients.

In this study, no significant relationship was observed between age and anxiety, which is in line with a study by Sharma et al which reported no significant association between age and anxiety (19). On the other hand, several studies express that younger patients are more prone to anxiety (23-25). However, a study by Ahmad et al (7) reported that elderly diabetic patients had an increased risk of anxiety.

Our study revealed that females are more prone to anxiety and there is a significant correlation between anxiety and female gender (Table 3). This finding was supported in studies conducted in Amman (7)and in Pakistan (21) and in Ethiopia (6) and in Saudi Arabia (25). The studies found that women are more sensitive to their body and health status.

In this study there is no significant association between marital status and prevalence of anxiety in diabetic subjects. In contrast, studies conducted in Spain (26), Saudi Arabia (18) and Adis Ababa (27) reported a significant association.

Moreover, there is no significant correlation in familial marriage and prevalence of anxiety among diabetic subjects. But there is a significant correlation between having a child and the prevalence of anxiety in diabetic patients. It may result in social support in elderly who had children.

This study showed significant correlations between occupational status and job satisfaction and anxiety in diabetic subjects (Table 3). This finding is in line with a to study conducted in Germany that shows significant relationship between low job satisfaction and the prevalence of anxiety in patients (28). On the hand, a study conducted in Lithuania (9) reported no significant relation between job and the prevalence of anxiety. Our results show no significant relation between substance use and anxiety, that is in line with a study carried out by Najafipour et al (29) but it is in contrast with Edmealem et al (6). This variation may influence tools and measurements

Table 3. This table describe relation between demographic information and anxiety in diabetic patients

Sex	No	Yes	Total	P value
male	59 (81.9 %)	13 (18.1)	72	0.009
female	96 (64.9)	52 (35.5%)	148	
Job				
Yes	99 (76.2%)	31 (23.8%)	130	0.026
No	56 (62.2%)	34 (37.8%)	90	
Job satisfaction				
very much	6 (66.7%)	3 (33.3%)	9	0.032
Much	8 (72.7%)	3 (27.3%)	11	
Moderate	44 (88%)	6 (12%)	50	
Little	4 (44.4%)	5 (55.6%)	9	
Very little	2 (100%)	0	2	

The association between complication and comorbidity of diabetes and anxiety

Our study revealed no significant correlation between vascular comorbidity (hypertension, nephropathy, myocardial infarction) and anxiety, this finding is in contrast with a study done by Rajput et al (5) who reported comorbidity as a considerable factor in the prevalence of anxiety in diabetes patients. Also, according to Khauwaja et al (30) it may result in different sample size.

Limitation

Having cross-sectional design and lack of control group are regarded as limitations of this study and low number of Iranian studies in prevalence of anxiety in diabetic patients.

Conclusion

Our study revealed a high prevalence of anxiety among diabetic patients and showed a significant relationship with factors like sex.

Acknowlegements

We wish to thank the office of research at Fasa university of medical sciences for supporting this study. The ethics code of the study is IR.FUMS.REC 1399.091.

Conflict of interest

There are no conflicts of interest.

Refrences

1.Bickett A, Tapp H. Anxiety and diabetes: Innovative approaches to management in primary care.

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]

Experimental biology and medicine (Maywood, NJ). 2016;241(15):1724-31.

2.Mirzaei M, Rahmaninan M, Mirzaei M, Nadjarzadeh A. Epidemiology of diabetes mellitus, pre-diabetes, undiagnosed and uncontrolled diabetes in Central Iran: results from Yazd health study. BMC public health. 2020;20(1):1-9.

3.Dehesh T, Dehesh P, Shojaei S. Prevalence and associated factors of anxiety and depression among patients with Type 2 diabetes in Kerman, Southern Iran. Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy. 2020;13:1509.

4.Che T, Teng X, Huang Q, Mu Y, Tang X, Mu X, et al. Agomelatine versus fluoxetine in glycemic control and treating depressive and anxiety symptoms in type 2 diabetes mellitus subjects: a single-blind randomized controlled trial. Neuropsychiatric disease and treatment. 2018;14:1527-33.

5.Rajput R, Gehlawat P, Gehlan D, Gupta R, Rajput M. Prevalence and predictors of depression and anxiety in patients of diabetes mellitus in a tertiary care center. Indian journal of endocrinology and metabolism. 2016;20(6):746-51.

6.Edmealem A, Olis CS. Factors Associated with Anxiety and Depression among Diabetes, Hypertension, and Heart Failure Patients at Dessie Referral Hospital, Northeast Ethiopia. Behavioural neurology. 2020;2020:3609873.

7.Ahmad A, Abujbara M, Jaddou H, Younes NA, Ajlouni K. Anxiety and Depression Among Adult Patients With Diabetic Foot: Prevalence and Associated Factors. Journal of clinical medicine research. 2018;10(5):411-8.

8.Khalighi Z, Badfar G, Mahmoudi L, Soleymani A, Azami M, Shohani M. The prevalence of depression and anxiety in Iranian patients with diabetes mellitus: a systematic review and meta-analysis. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2019;13(4):2785-94.

9.Mikaliūkštienė A, Žagminas K, Juozulynas A, Narkauskaitė L, Sąlyga J, Jankauskienė K, et al. Prevalence and determinants of anxiety and depression symptoms in patients with type 2 diabetes in Lithuania. Medical science monitor : international medical journal of experimental and clinical research. 2014;20:182-90.

10.Shuhaida MHN, Suhaila MYS, Azidah KA, Norhayati NM, Nani D, Juliawati M. Depression, anxiety, stress and socio-demographic factors for poor glycaemic control in patients with type II diabetes. Journal of Taibah University Medical Sciences. 2019;14(3):268-76.[In Persian]

11.Al Hayek AA, Robert AA, Al Dawish MA, Zamzami MM, Sam AE, Alzaid AA. Impact of an education program on patient anxiety, depression, glycemic control, and adherence to self-care and medication in Type 2 diabetes. Journal of family & community medicine. 2013;20(2):77-82.

12.Dedefo MG, Abate SK, Ejeta BM, Korsa AT. Predictors of poor glycemic control and level of glycemic control among diabetic patients in west Ethiopia. Annals of Medicine and Surgery. 2020;55:238-43.

13.Indelicato L, Dauriz M, Santi L, Bonora F, Negri C, Cacciatori V, et al. Psychological distress, self-efficacy and glycemic control in type 2 diabetes. Nutrition, Metabolism and Cardiovascular Diseases. 2017;27(4):300-6.

14.Kendzor DE, Chen M, Reininger BM, Businelle MS, Stewart DW, Fisher-Hoch SP, et al. The association of depression and anxiety with glycemic control among Mexican Americans with diabetes living near the U.S.-Mexico border. BMC public health. 2014;14:176.

15.Fydrich T, Dowdall D, Chambless DL. Reliability and validity of the Beck Anxiety Inventory. Journal of anxiety disorders. 1992;6(1):55-61.

16.Villamil-Salcedo V, Vargas-Terrez BE, Caraveo-Anduaga J, González-Olvera J, Díaz-Anzaldúa A, Cortés-Sotres J, et al. Glucose and cholesterol stabilization in patients with type 2 diabetes mellitus with depressive and anxiety symptoms by problem-solving therapy in primary care centers in Mexico City. Primary health care research & development. 2018;19(1):33-41.

17.Mirghani HO, Elbadawi AS. Depression, anxiety, and daytime sleepiness among type 2 diabetic patients and their correlation with the diabetes control: A case-control study. Journal of Taibah University Medical Sciences. 2016;11(4):374-9. [In Persian]

18.Mukrim ME, Alshammari NMD, Alshammari WMD, Alshammari MST, Alshammari YNR, Alshammari ASM, et al. Prevalence of depression, anxiety, and stress among diabetes mellitus patients in Arar, Northern Saudi Arabia. Age. 2019;62:22.3.

19.Sharma K, Dhungana G, Adhikari S, Bista Pandey A, Sharma M. Depression and Anxiety among Patients with Type II Diabetes Mellitus in Chitwan Medical College Teaching Hospital, Nepal. Nursing research and practice. 2021;2021:8846915.

20.Grigsby AB, Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. Prevalence of anxiety in adults with diabetes: a systematic review. Journal of psychosomatic research. 2002;53(6):1053-60.

21.Khan P, Qayyum N, Malik F, Khan T, Khan M, Tahir A. Incidence of Anxiety and Depression Among Patients with Type 2 Diabetes and the Predicting Factors. Cureus. 2019;11(3):e4254.

22.Mazze RS, Lucido D, Shamoon H. Psychological and Social Correlates of Glycemic Control. Diabetes Care. 1984;7(4):360-6.

23.Katon W, Fan MY, Unützer J, Taylor J, Pincus H, Schoenbaum M. Depression and diabetes: a potentially lethal combination. Journal of general internal medicine. 2008;23(10):1571-5.

24.Collins M, Corcoran P, Perry I. Anxiety and depression symptoms in patients with diabetes. Diabetic medicine. 2009;26(2):153-61.

25.Alzahrani A, Alghamdi A, Alqarni T, Alshareef R, Alzahrani A. Prevalence and predictors of depression, anxiety, and stress symptoms among patients with type and stress symptoms among patients with type II diabetes attending primary healthcare centers in the western region of Saudi Arabia: a cross-sectional study. International journal of mental health systems. 2019;13:48.

26.Jimenez-Fonseca P, Calderón C, Hernández R, y Cajal TR, Mut M, Ramchandani A, et al. Factors associated with anxiety and depression in cancer patients prior to initiating adjuvant therapy. Clinical and Translational Oncology. 2018;20(11):1408-15.

27.Woledesenbet MA, Shumet Mekonen S, Sori LM, Abegaz TM. Epidemiology of depression and associated factors among asthma patients in Addis Ababa, Ethiopia. Psychiatry j. 2018:5934872

28.Cook AS, Zill A. Working With Type 1 Diabetes: Investigating the Associations Between Diabetes-Related Distress, Burnout, and Job Satisfaction. Frontiers in psychology. 2021;12:697833.

29.Najafipour H, Farjami M, Sanjari M, Amirzadeh R, Shadkam Farokhi M, Mirzazadeh A. Prevalence and Incidence Rate of Diabetes, Pre-diabetes, Uncontrolled Diabetes, and Their Predictors in the Adult Population in Southeastern Iran: Findings From KERCADR Study. Frontiers in public health. 2021;9:611652.

30.Khuwaja AK, Lalani S, Dhanani R, Azam IS, Rafique G, White F. Anxiety and depression among outpatients with type 2 diabetes: A multi-centre study of prevalence and associated factors. Diabetology & metabolic syndrome. 2010;2(1):1-7.

[Downloaded from journal.fums.ac.ir on 2025-09-07]

[DOR: 20.1001.1.22285105.2022.12.3.9.7]

[DOI: 10.18502/jabs.v12i3.10715]