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Data –Driven Analysis of Psychiatric Disorders in Type 2 Diabetic Patients and Associations with Demographic Factors

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Abstract

This research examines the incidence of stress, anxiety, and depression in individuals with type 2 diabetes as well as how these conditions relate to demographic characteristics. A convenience sample technique was used to choose 364 individuals from the diabetic clinic at Taleghani Hospital in Tehran, Iran. The Depression, Anxiety, and Stress Scale (DASS-21) was used for psychological testing, and SPSS was used to analyze the data at a significance level of 0.05. The study population had a mean age of 51 years and was composed of 60% females and 40% men. Significantly high rates of stress, anxiety, and depression were observed (92.2%, 79.8%, and 83.7%, respectively). All three psychiatric problems and educational attainment were significantly correlated, although stress and age did not correlate. Furthermore, there were no discernible correlations found between age, marital status, or the length of diabetes and stress, anxiety, or depression. However, there was a definite correlation found between anxiety and problems associated to diabetes. The results highlight how crucial it is to screen patients with type 2 diabetes for mental health disorders in order to guarantee prompt treatment and management of these psychosocial problems.

Introduction

Diabetes is among the most common endocrine illnesses. The International Federation of Diabetes (IFD) research predicts that diabetes will become a worldwide pandemic. In 2013, 382 million individuals have diabetes. By 2035, there are expected to be 592 million persons with diabetes (PWD) [1,2], representing a 220 million increase in the number of afflicted individuals in only 22 years. Additionally, according to WHO predictions, 10.1% of Iranians will have diabetes by 2035 [2]. Increased blood glucose levels brought on by diabetes eventually result in a number of problems. One of the most important things that may help diabetic people live better lives is psychological support because of the chronic nature of the disease. Diabetes raises the risk of depression, while depression raises the chance of diabetes. The Clinically significant depressive disorders affect at least 33% of people with disabilities. Depression in diabetes patients may make treatment and management more difficult since it lowers medication compliance. Studies conducted abroad show that diabetes individuals experience greater levels of stress and anxiety than the general population [3]. Prior research conducted in Iran solely looked at the prevalence of anxiety. In contrast to studies conducted elsewhere, they showed similar frequency in the general population and among diabetes patients [4]. Stress and anxiety may contribute to poor diabetes management by affecting self-care practices including exercise and good behavior. Two studies show that a significant portion of people with

diabetes have psychological issues [5,6]. Furthermore, it is impossible to conduct a nationwide survey with a sizable population, so the purpose of this study was to ascertain the prevalence of anxiety, stress, and depression in diabetic patients who visited Taleghani's hospital's diabetes clinic as well as how these conditions related to their demographic characteristics [7–10].

Methods

Study design

All diabetic patients that attended Taleghani's Hospital's diabetes clinic in Tehran, Iran, between May 2017 and April 2018 comprise the statistical population of this cross-sectional hospital-based research. The large number of T2DM patients sent to this facility was the basis for its selection, which also represented the demographic, socioeconomic, ethnic, and religious diversity of Tehran. 305 unrelated adult patients with Type 2 Diabetes Mellitus (T2DM) who were diagnosed in accordance with the 1998 World Health Organization (WHO) diagnostic and grading standards were included in the research group. Patients with confirmed diabetes met the inclusion requirements for the research, whereas those with other forms of diabetes and other comorbidities were not allowed to participate.

Exposure

After a face-to-face interaction, patients were asked to complete a self-report survey that included the DASS-21 short form and personal data. It took cooperators an average of five minutes to complete. The 42-item DASS-42 self-report assessment was condensed into the DASS-21 [30], which includes seven items from the DASS-42 and 21 symptoms broken down into three subscales (stress, anxiety, and depression). The DASS-21 is linked to excellent reliability evaluations and comprises the three dimensions specified in the tripartite design [7]. [8] The degree to which each state was experienced over the previous week is measured using a 4-point severity scale that goes from 0 (does not apply to me) to 3 (applies to me most or all of the time). Based on information gathered from earlier testing of the scale, the symptom records for depression (0-9, 10-20, and >20), anxiety (0-7, 8-14, and >14), and stress (0-14, 15-25, and >25) were divided into three categories: average, mild-moderate, and severe-extremely severe [9].

Statistical analysis

The statistical population for this descriptive-analytic research consists of all diabetic patients that attended Taleghani's Hospital's diabetes clinic in Tehran, Iran, between May 2017 and April 2018. Following a research by Taheri et al., the formula was used for sampling, and d=0.05 and p=0.85 were taken into consideration. There were 305 diabetic individuals in the final sample pool. The evaluation instrument used for the interviews was the DASS-21. The 21 axes in the sequence correspond to symptoms of the negative emotions of stress, anxiety, and sadness, each of which within a single subscale. Six components make up each sub-scale, and the terminal score is the total of the components in that sub-scale. From zero (never—did not refer to me) to three (nearly always— referred to me rather lot), all the components are tallied. For this scale, the Cronbach's alpha value is
0.76 for stress, 0.66 for anxiety, and 0.77 for depression. The acquired data has been analyzed using

the Mann-Whitney, Kruskal-Wallis, ANOVA, and independent t-tests. Significant P values were defined as less than 0.05.

Results

Participantsofthisstudywere25%maleand75%female,withameanageof55yearsold.Patients in this investigation have six years of diabetes history, onaverage. In terms of education, 46% of individualshavepassedelementaryuptosecondaryschoolclasses,40%haveahighschooldegree, and only 14% have a university education. Our research demonstrates the prevalence of anxiety, depression, and stress calculated in these categories as the following, 83.1%, 78.1%, and 96%, respectively (Table 1). This research described the normal distribution of stress based on Kolmogorov-Smirnov's test; ANOVA and t-test were used for data study. Since the irregular distributionofanxietyanddepressionamongparticipants,Mann-WhitneyandKruskal-Wallistests wereperformed. Despite the similarity of stress distribution among the two genders, anxiety and depression were significantly more eminent in diabetic women based on the statistical calculation. In individuals with higher education stages, depression was considerably fewer than two other groups. In the category of diabetes associated-disorder, patients with ocular complications experiencedmoreanxietythanindividualswithotherdisorders.Nevertheless,stressanddepression did not have a significant correlation with diabetes-associated disorders. Anxiety, stress, and depression were not significantly related to the number of children, age, years of history with diabetes, and marital status.

Logisticregression analysis

Three logistic regression analysis models using anxiety, depression, and stress as the dependent variables were completed in order to identify predictors of these three variables. Continuous variables (age, number of children per family, duration of type 2 diabetes) and categorical factors (gender (females), chronic condition other than type 2 diabetes, and presence of type 2 diabetes) were included as independent confounding variables. Disease status for anxiety [odds ratio (OR)=8.77, 95% CI=3.07-25.05], depression (OR=5.19, 95% CI=1.40-19.27), stress (OR=4.98, 95% CI=1.73-14.38), and age for stress (OR=1.05, 95% CI=1.00-1.10) were the only factors selected using this technique. None of the psychiatric disorders evaluated were linked to any of the other factors that were chosen.

Discussion

In order to find predictors of the dependent variables—stress, depression, and anxiety—three logistic regression analysis models were done. As independent confounding variables, continuous variables (age, number of children per household, duration of type 2 diabetes) and categorical factors (gender (female), presence of type 2 diabetes, and chronic disease other than type 2 diabetes) were included. The only covariates chosen using this method were disease status for anxiety [odds ratio (OR)=8.77, 95% CI=3.07-25.05], depression (OR=5.19, 95% CI=1.40-19.27), stress (OR=4.98, 95% CI=1.73-14.38), and age for stress (OR=1.05, 95% CI=1.00-1.10). None of the other characteristics included were associated with any of the mental diseases assessed.

Table1.Anxiety,depression,andstressprevalencedistributionamongdiabeticpatients

Psychiatric disorder	Mean±SD	Healthyindividuals (%)	Mildto moderate disorder(%)	Severedisorder (%)
Anxiety	17.29± 8.6	12 (3.9%)	55 (18.0%)	238 (78.1%)
Stress	21.7± 8.4	67 (22.0%)	130 (42.6%)	108 (35.4%)
Depression	18.9± 9.6	51 (16.4%)	124 (40.6%)	129 (42.3%)

Table2.Prevalencedistributionofpsychiatricdisorderondiabeticpatientsbased on eachvariable

		Number (%)	Stress# (%)		Depression#(%)		Anxiety#(%)	
			Not Found	Presence	Not Found	Presence	Not Found	Presence
Gender	Female	229 (75.1%)	46 (20.1%)	183 (79.9%)	36 (15.7%)	193 (84.3%)	9(3.9%)	220 (96.1%)
	Male	76 (24.9%)	21 (27.6%)	55 (72.4%)	15 (19.7%)	61 (80.3%)	3(4.0%))	73 (97.0%
Age	39-49years	196 (64.3%)	42 (21.4%)	151 (78.6%)	35 (17.8%)	161 (82.2%)	8(4.1%)	188 (95.9%)
	50-69years	109 (35.7%)	25 (22.9%)	84 (77.1%)	16 (14.7%)	93 (85.3%)	4(3.7%)	106 (96.3%)
Education	Lessthanhigh school	141 (46.2%)	24 (17.0%)	117 (83.0%)	12(9.9%)	129 (90.1%)	3(2.2%)	138 (97.8%)
	Highschoolgraduate	121 (39.7%)	31 (25.6%)	90 (74.4%)	30 (24.8%)	91 (75.2%)	6(5.0%)	115 (95.0%)
	Universityeducation	43 (14.1%)	12 (27.9%)	31 (72.1%)	9(20.9%)	34(79.1%)	3(7.0%)	40 (93.0%)
	0-4	259 (84.9%)	55 (21.2%)	204 (78.8%)	42 (16.2%)	217 (83.8%)	8(3.1%)	251 (96.9%)

Numberof children	Morethan 5	46 (15.1%)	12 (26.1%)	34 (73.9%)	9(20.9%)	37 (79.1%)	4(8.7%)	42 (91.3%)

According to our study, the prevalence of stress, anxiety, and depression is greater than the general community, with the relevant percentages being 83.1%, 78.1%, and 96% [11–14]. 83% of diabetes patients had depression, according to our inquiry; a prior study by Mousavi et al. found that 78% of diabetics had depression [15,30,32]. The number of people with diabetes who suffer from depression varies according to other studies conducted in various nations; for example, the United States, Korea, Germany, Brazil, and Lithuania reported 8.3%, 28.8%, 10.4%, 35.2%, and 28.5%, respectively [16–20]. People with diabetes face a number of obstacles in their everyday life, including restrictive diets, frequent insulin injections, work, childbirth, and marriage. Additionally, these issues lead to mental health issues such anxiety, stress, and sadness [21–23]. Iranian studies provide a different picture since there are more insufficient health services and less follow-up patients, even if the frequency of psychological illnesses among diabetes patients is low in affluent nations. The greater prevalence of mental health issues in women compared to men was reported in this study and a few other types of research; this finding implies that women in the public need more psychiatric assistance than men do. According to this research, there is no relationship between the age of patients and the prevalence of stress, anxiety, or depression. However, diabetes management is much more difficult when anxiety and sadness are present [24,31,33]. Anxiety was linked to the accompanying disorders of diabetes, according to a study by Moayedi et al. Patients with higher educational attainment had a lower prevalence of anxiety problems, which may indicate that more educated people take better care of themselves. The relationship between depression and secondary and primary education levels has been estimated in two earlier research [22,26,34]. As the only research in Iran to show that education is not substantially correlated with education level, the other study, carried out by Mirzae et al., evaluated the relationship between education and mental health issues such stress, anxiety, and depression. We have discovered that there is no correlation between the length of diabetes and the mental health issue. Patients' perception that diabetes is a part of their life and that they must accept it may be the cause of this uncorrelated association. The second research reveals a substantial association between the duration of diabetes and the severity of depression [21,35,37], notwithstanding the conclusion of Bafrooni et al. that there is no statistically significant correlation between anxiety and depression [24,36]. Regarding the present study's limitations, our sample pool consists of patients who frequent Taleghani's hospital's endocrinology clinic and residents of a certain district of Tehran. Nonetheless, patients from all over the nation come to this clinic to evaluate their illness status since it is the leading referral endocrinology clinic. The study's second shortcoming is that it does not evaluate variables like a history of heart disease, psychological problems, drugs, or other related illnesses.

Conclusion

Patients with diabetes need psychological support since their condition has a significant impact on them. The most prevalent mental conditions among diabetic patients are stress, anxiety, and depression. Additionally, managing this condition is a personal responsibility, thus understanding the psychosocial perspective of the illness is crucial to its management.

References

[1] Sun, N., Lou, P., Shang, Y., Zhang, P., Wang, J., Chang, G., & Shi, C. (2016). Prevalence and determinants of depressiveandanxietysymptomsinadultswithtype2diabetesinChina:across-sectionalstudy.BMJOpen,6(8), e012540. doi:10.1136/bmjopen-2016-012540

[2] Globalestimatesofdiabetesprevalencefor2013andprojectionsfor2035.DiabetesResClinPract2014;103:137–49.doi:10.1016/j.diabres.2013.11.002CrossRefPubMedGoogleScholar

[3] Grigsby,A.B.,Anderson,R.J.,Freedland,K.E.,Clouse,R.E.,Lustman,P.J.(2002).Prevalenceofanxietyinadults with diabetes: a systematic review, J. Psychosom. Res. 53 (December (6)) 1053–1060. PubMed PMID: 12479986. Epub 2002/12/14.

[4] Mirzaei,M.,Daryafti,H.,Fallahzadeh,H.,Azizi,B.(2016).EvaluationofDepression,AnxietyandStressin Diabetic and Non-Diabetic Patients. JSSU, 24(5), 387-397.

[5] Egede,L.E.,&Dismuke,C.E.(2012).SeriousPsychologicalDistressandDiabetes:AReviewoftheLiterature. CurrPsychiatryRep14,15–22.https://doi.org/10.1007/s11920-011-0240-0

[6] Robinson,N.,Fuller,J.H.,Edmeades,S.P.(1988).Depressionanddiabetes.Diabeticmedicine,5(3),268-74.

[7] Brown,T.A.,Chorpita,B.F.,Korotitsch,W.,Barlow,D.H.(1997).PsychometricpropertiesoftheDepression Anxiety Stress Scales (DASS) in clinical samples. Behav Res Ther 35, 79-89.

[8] Clara,I.P.,Cox,B.J.,Enns,M.W.(2001).ConfirmatoryfactoranalysisoftheDepression-Anxiety-StressScalesin depressed and anxious patients. J Psychopathol Behav Assess 23, 61-7.

[9] Henry,J.D.,&Crawford,J.R.(2005).Theshort-formversionoftheDepressionAnxietyStressScales(DASS-21): Construct validity and normative data in a large non-clinical sample. Br J Clin Psychol 44, 227-39.

[10] Taheri, N., Hojjati, H., Mousavi, M., Afra, A., Dehghan, B. (2011). The Survey of Anxiety and Depression PrevalenceinDiabeticPatientReferredtoAbadanTaleghaniandKhorramshahrValiasrHospitals.JDN,1(2),21-31. [In Persian]

[11] Asad Abadi, A., Aziz Zadeh Foroozi, M., Fuladvandi,G.R., Fuladvandi, M., Lashkari, T., Malekian, L. (2014). Effectivenessofstressmanagementtrainingonimprovedqualityoflifeinpatientswithtype2diabetes.JHPM,2(3), 16-24. [In Persian]

[12] Esmaili,A.,Asadnia,S.,Easazadeh,A.,Amirsardari,L.,Issazadeghan,A.,Ansari,B.(2013).Evaluationofthe effectivenessofcognitivebehavioraltherapy on decreasingdepression levelsand improving thelifestyleofpatients with type 2 diabetes. Urmia Med J, 24(10), 822.

[13] Ranjbar,K.H.,Sharif,F.,Dzhbkhsh,T.(2006).Frequencyandseverityofdepressionindiabeticadultsusing tablet and insulin. HMJ, 10(4), 363-9. [In Persian]

[14] Moayedi,F.,Zare,S.,Nikbakht,A.(2012).Anxietyanddepressionindiabeticpatientsreferredto BandarAbbas diabetes clinic. HMJ, 18(1), 65-71. [In Persian]

[15] Mirzaei,M.,Daryafti,H.,Fallahzadeh,H.,Azizi,B.(2016).EvaluationofDepression,AnxietyandStressin Diabetic and Non-Diabetic Patients. JSSU, 24(5), 387-97. [In Persian]

[16] Attari, A., Mehrabi, A., DavazdahEmamy, M.H., Roshan, R. (2009). The Effectiveness of Cognitive-Behavioral StressManagementTrainingonGlycemicControlandDepressioninPatientswithType2Diabetes.IJEM,11(4),385-

92.[InPersian]

[17] Ansari,M.,ShamsSfandabad,H.,Hakami,M.(2011).Theeffectoftrainingangercontrolandstressmanagement on blood glucose levels in people with diabetes. HPJ, 1(3), 47-60. [In Persian]

[18] Zahrakar,K.(2012).AStudyofEffectivenessofGroup-basedRational,Emotive,BehaviorTherapy(REBT)on Decrease of Stress among Diabetic Patients. JKH, 7(4), 160-4. [In Persian]

[19] Amiri,M.,Aghaei,A.,Abedi,A.,Safari,Y.(2014).Effectivenessofstressinoculationtraining(SIT)on depression in diabetics. HPJ, 3(1), 16-28. [In Persian]

[20] Mahmoodi,G.H.,Abolghasemi,S.H.,Darvishi,H.(2012).Theeffectofstressinoculationtrainingonreducing psychological pressure in patients with type 2 diabetes. JHB, 2(2), 41-4.

[21] Alhani,F.,MohajeriTehrani,M.R.,Sharifirad,G.,Shojaeezadeh,D.,Tol,A.(2012).Effectofempowerment model on distress and diabetes control in patients with type 2 diabetes. JNE, 1(1), 38-47. [In Persian]

[22] Zare,S.,Nikbakht,A.,Moayedi,F.(2014).AnxietyanddepressionindiabeticpatientsreferredtoBandarAbbas diabetes clinic. HMJ, 18(1), 65-71. [In Persian]

[23] Mehrabi, A., Fata, L., Davazdah Emami, M.H., Rajab, A. (2008). Effect of stress management training based on Cognitive-behavioraltheoryonglycemiccontrolandreducestheemotionalproblemsofpatientswithtype1diabetes. IJEM, 8(2), 103-14.

[24] Khosravi,A.,Aghayan,S.,Mousavi,S.A.,Razavian–zade,N.,Norouzi,N.(2008).DepressionandGeneral Health Status in Type II Diabetic Patients. JKH, 3(1), 44-8. [In Persian]

[25] Sayehmiri,K.,Sheykhi,A.,RabieiFakhr,F.,Yadegarazadi,A.,Azami,M.(2016).Theprevalenceofdepression in patientswith type 2diabetesin Iran- systematic review and meta-analysisstudy. IJEM,15(4), 217-24. [In Persian]

[26] Park,C.Y.,Kim,S.Y.,Gil,J.W.,Park,M.H.,Park,J.H.,Kim,Y.(2015).DepressionamongKoreanadultswith type 2 diabetes mellitus: Ansan-community-based epidemiological study. PHRP, 6(4), 224-32.

[27] Kruse, J., Schmitz, N., Thefeld, W. (2003). On the association between diabetes and mental disorders in a communitysample.ResultsfromtheGermanNationalHealthInterviewandExaminationSurvey.JDC,26(6),1841-6.

[28] Ferreira, M.C., Piaia, C., Cadore, A.C., Antoniolli, M.A., Gamborgi, G.P., Oliveira, P.P. (2015). Clinical variablesassociatedwithdepressioninpatientswithtype2diabetes.RevistadaAssocMedBrasileira,61(4),336-40.

[29] Taherian,M.,Tajabadi,Z.,Azhideh,A.,Taherian,R.(2021).Methotrexate-inducedneurocognitivelateeffectsin treatment of pediatric acute lymphoblastic leukemia: a review. Human, Health and Halal Metrics, 2(1), 63-74.

[30] Ashrafi,F.,Rezaei,A.,Azhideh,A.,Tabeie,F.,Gachkar,L.,Ahmadi,M.A.,Yousefi-Asl,M.,Zali,A.,Khoshnoud, R.J.(2020).EffectivenessofExtremelyLowFrequencyElectromagneticFieldandPulsedLowLevelLaserTherapyin Acute Stroke Treatment. International Clinical Neuroscience Journal, 7(3), 127.

[31] Mikaliukstiene, A., Zagminas, K., Juozulynas, A., Narkauskaite, L., Salyga, J., Jankauskiene, K., et al. (2014). Prevalenceanddeterminantsofanxietyanddepressionsymptomsinpatientswithtype2diabetesinLithuania.Med Sci Monitor: Inter Med J Experiment Clinic Res, 20, 182-90.

[32] Taherian,M.,Tajabadi,Z.,Azhideh,A.,Taherian,R.(2021).Methotrexate-inducedneurocognitivelateeffectsin treatment of pediatric acute lymphoblastic leukemia: a review. Human, Health and Halal Metrics, 2(1), 63-74.

[33] Mirzaei,A.,Mohammadi,S.,Mazloomy,S.S.(2008).StudyofDepressionPrevalenceinthePatientswithType II Diabetes Referring to Yazd Diabetes Research Centers in 2008. TBJ, 7(1-2), 30-5. [In Persian]