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

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Abstract

This study investigates the prevalence of anxiety, depression, and stress in patients with type 2 diabetes and explores their association with demographic factors. 364 patients were selected using a convenience sampling method from the diabetes clinic at Taleghani Hospital in Tehran, Iran. Psychological assessments were conducted using the Depression, Anxiety, and Stress Scale (DASS-21), and data analysis was performed using SPSS at a significance level of 0.05. The study population consisted of 40% males and 60% females, with a mean age of 51 years. The prevalence of anxiety, depression, and stress was notably high, at 92.2%, 79.8%, and 83.7%, respectively. A significant correlation was found between educational level and all three psychological disorders, while no association was observed between stress and age. Additionally, no significant relationships were identified between stress, anxiety, or depression with the duration of diabetes, marital status, or age. However, a clear association was noted between diabetes-related complications and anxiety. The findings underscore the importance of screening for mental health conditions in patients with type 2 diabetes to ensure timely intervention and management of these psychosocial issues.

Introduction

One of the most frequent endocrine disorders is diabetes. According to the report of the International Federation of Diabetes (IFD), the prevalence of diabetes will be a global epidemic. Diabetes affected 382 million people in 2013. It is predicted that the number of people with diabetes (PWD) will rise to 592 million by 2035 [1,2], which demonstrates about a 220 million increase in the number of affected people in just 22 years. Furthermore, WHO has predicted the prevalence of diabetes in Iran will be 10.1% of the population in 2035 [2]. Diabetes leads to increased blood glucose levels, which in the long run eventuate in various complications. Due to the chronic characteristics of diabetes, psychological support is one of the most critical factors that can improve the quality of life in diabetic patients. Depression increases the risk of diabetes, and diabetes increases the risk of depression. The

prevalence rate of clinically relevant depressive disorders in PWD is at least 33%. Depression in diabetic patients can trouble the treatment and control of it due to reducing patients' compliance with drugs. Foreign studies demonstrate that stress and anxiety are higher in diabetic patients than in the general population [3]. Previous Iranian studies only investigated the prevalence of anxiety. They demonstrated equal prevalence among the general population and among diabetic patients [4], which is not the same as foreign investigations. Improper control of diabetes can result from stress and anxiety by their influence on self-care-related functions such as physical activity or healthy behavior. Two studies demonstrate the high percentage of psychological problems in diabetic individuals [5,6]. Moreover, the lack of a domestic survey with a large population is inevitable; therefore, this study aimed to determine the prevalence of depression, stress, and anxiety in diabetic patients who visited the diabetes clinic of Taleghani's hospital and its correlation with their demographic factors [7-10].

Methods

Study design

This is a cross-sectional hospital-based study with the statistical population being all diabetic patients who visited the diabetic clinic of Taleghani's hospital, in Tehran, Iran, from May 2017 to April 2018. This center was chosen based on the high number of T2DM patients referred to and reflected Tehran's ethnic, socio-economic, denominational, and demographic heterogeneity. The study group included 305 unrelated adult Type 2 Diabetes Mellitus (T2DM) patients diagnosed according to the 1998 World Health Organization (WHO) diagnostic and grading guidelines. Patients with other types of diabetes and other comorbidities were excluded from the study; however, patients with confirmed diabetes were the inclusion criteria.

Exposure

Following the pattern of face-to-face conversation, patients were valued to fill a self-report survey that comprised personal data details and the short-form of the DASS-21; cooperators took on average 5 min to complete it. DASS-21 is a short version of the original 42-item DASS-42 self-report inventory [30] and consists of 21 symptoms divided into three subscales (depression, anxiety, and stress) of 7 items taken from DASS-42. DASS-21 includes the three dimensions defined in the tripartite pattern [7], and is associated with great reliability assessments [8] A 4-point severity scale ranging from 0 (does not apply to me), to 3 (applies to me most or all of the time) measures the extent to which each state was experienced over the past week.
Depressive (0-9, 10-20, and >20), anxiety (0-7, 8-14, and >14), and stress (0-14, 15-25, and >25) symptom records were categorized into average, mild-moderate and severe-extremely severe, based on data obtained from previous testing of the scale [9].

Statistical analysis

This is a descriptive-analytic study with the statistical population being all diabetic patients who visited the diabetes clinic of Taleghani's hospital, in Tehran, Iran, from May 2017 to April 2018. The sampling was conducted on the formula, where d=0.05 and p=0.85 were considered following a study conducted by Taheri et al. The ultimate sample pool was 305 diabetic patients. The DASS-21 was the assessment tool that was completed during interviews. The order consists of 21 axes correlated to symptoms associated with the adverse emotions of depression, anxiety, and stress, each

in one sub-scale. Each sub-scale consists of 6 elements with the terminal score, the sum of parts in one sub-scale. All the elements are counted from zero (never - did not refer to me) to 3 (almost always - referred to me quite much). The Cronbach's alpha coefficient for this scale is 0.77 for depression, 0.66 for anxiety, and 0.76 for stress. Independent t-tests, ANOVA, Mann-Whitney, and Kruskal-Wallis tests have been used to analyze collected data. Less than 0.05 for P values were considered significant.

Results

Participants of this study were 25% male and 75% female, with a mean age of 55 years old. Patients in this investigation have six years of diabetes history, on average. In terms of education, 46% of individuals have passed elementary up to secondary school classes, 40% have a high school degree, 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 distribution of anxiety and depression among participants, Mann-Whitney and Kruskal-Wallis tests were performed. 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 experienced more anxiety than individuals with other disorders. Nevertheless, stress and depression 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.

Logistic regression analysis

Predictors of anxiety, depression, and stress were defined by completing three logistic regression analysis models, with the dependent variable being anxiety, depression, and stress. Independent confounding variables were introduced as continuous variables (age, number of children per household, duration of T2DM), and categorical variables [gender (females), chronic disease other than T2DM, and T2DM presence]. The only variables chosen using this method were disease status for anxiety [odds ratio (OR)=8.77, 95% confidence interval (CI)=3.07-25.05], depression (OR=5.19, 95% CI=1.40-19.27), and stress (OR=4.98, 95% CI=1.73- 14.38), and in addition age for stress (OR=1.05, 95% CI=1.00-1.10). Other variables selected were not associated with any of the psychological disturbances assessed.

Discussion

Diabetes complications and the patient's consciousness of its disorder significantly influence their mental health [1,25]. This inquiry was conducted to determine the prevalence of depression, stress, and anxiety amid type 2 diabetes and demonstrate its association with demographic determinants.

Table 1. Anxiety, depression, and stress prevalence distribution among diabetic patients

Psychiatric disorder	Mean ± SD	Healthy individuals (%)	Mild to moderate disorder (%)	Severe disorder (%)
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%)

Table 2. Prevalence distribution of psychiatric disorder on diabetic patients based on each variable

		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	39-49 years	196 (64.3%)	42 (21.4%)	151 (78.6%)	35 (17.8%)	161 (82.2%)	8 (4.1%)	188 (95.9%)
	50- 69 years	109 (35.7%)	25 (22.9%)	84 (77.1%)	16 (14.7%)	93 (85.3%)	4 (3.7%)	106 (96.3%)
Education	Less than high school	141 (46.2%)	24 (17.0%)	117 (83.0%)	12 (9.9%)	129 (90.1%)	3 (2.2%)	138 (97.8%)
	High school graduate	121 (39.7%)	31 (25.6%)	90 (74.4%)	30 (24.8%)	91 (75.2%)	6 (5.0%)	115 (95.0%)
	University education	43 (14.1%)	12 (27.9%)	31 (72.1%)	9 (20.9%)	34(79.1%)	3 (7.0%)	40 (93.0%)
Number of children	0-4	259 (84.9%)	55 (21.2%)	204 (78.8%)	42 (16.2%)	217 (83.8%)	8 (3.1%)	251 (96.9%)
	More than 5	46 (15.1%)	12 (26.1%)	34 (73.9%)	9 (20.9%)	37 (79.1%)	4 (8.7%)	42 (91.3%)

Our research reveals the prevalence of anxiety, depression, and stress calculated in these categories as the following, 83.1%, 78.1%, and 96%, respectively; these findings are higher than the average community [11-14]. Our investigation calculated the prevalence of depression among diabetic patients is 83%; a previous study conducted by Mousavi et al. reported depression of 78% in diabetic individuals [15,30,32]. Several investigations in other countries show different percentages of depression among diabetic patients; for instance, the United States, Korea, Germany, Brazil, and Lithuania reported 8.3%, 28.8%, 10.4%, 35.2%, and 28.5%, respectively [16-20].

Individuals with diabetes have several barriers in their daily lives such as forced diet, repeated injection of different types of insulin, employment, childbirth, and marriage. Furthermore, these complications result in some mental problems like depression, stress, and anxiety [21-23]. Despite the low prevalence of psychiatric disorders among diabetic patients in developed countries, Iranian studies show different stories since there are more inadequate health services and fewer follow-up patients. This study and a few previous kinds of research described the higher prevalence of mental health problems in women than men; this fact suggests the increased need for psychiatric help in females than males in the population. This study reveals that the age of patients is not correlated with the prevalence of depression, anxiety, and stress. However, the presence of anxiety and depression hardens the control of diabetes [24,31,33]. An investigation by Moayedi et al. revealed the correlation between anxiety and diabetes's accompanying disorders. Regarding educational level, patients with higher education presented a lower prevalence of anxiety problems, which might suggest that more knowledgeable individuals have more self-care. Two previous studies have calculated the relevance of depression with secondary and elementary education levels [22,26,34]. The other study, conducted by Mirzae et al., assessed the correlation between education and psychiatric problems such as anxiety, depression, and stress; this is the only Iranian study that demonstrates education is not significantly related to education level. We have found the fact that the duration of diabetes is not associated with the psychiatric problem. This uncorrelated relationship might be the consequence of the belief in patients that diabetes is a part of their lives and that they have to get along with it. Despite the finding of Bafrooni et al., which demonstrates there is no statistically significant correlation between anxiety and depression [24,36], the other study shows a meaningful relationship between the span of diabetes and the hardness of depression [21,35,37]. In terms of the limitation of this current study, our sampling pool is from the specific area of Tehran and patients who visit the endocrinology clinic of Taleghani's hospital. However, since this clinic is the top referral endocrinology clinic, people from all parts of the country come to assess their disease situation. The other limitation of this study is the fact that factors such as the history of psychiatric disorders, heart disease, medications, and other associated diseases are not assessed in this investigation.

Conclusion

Diabetic patients are strongly influenced by their disease; therefore, psychological help is necessary. Stress, anxiety, and depression are the most common psychiatric disorders among patients with diabetes; besides, the control of this disease depends on the self-care of each individual; therefore, attention to the psychosocial viewpoint of the disease is the essence to control it.

Conflict of interest

The authors declared no conflict of interest.

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