Health Education and Health Promotion (HEHP) (2016) Vol. 4 (3)

The Prevalence of Stress, Anxiety and Depression in Patients with Type 2 Diabetes and Their Association with Demographic Factors

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Abstract

Aim: Psychosocial problems override in patients with type 2 diabetes than healthy individuals. The aim of this study was to determine the prevalence of depression, stress and anxiety in patients with type 2 diabetes as well as their association with demographic factors.

Methods: In this cross-sectional study, 201 patients with type 2 diabetes were incorporated using convenience sampling method from the Tehran-based Dornian Care Clinic. The instrument consisted of the Depression, Anxiety and Stress Scales (DASS). The collected data were analyzed in the SPSS software (ver. 16) at the significance level of 0.05.

Findings: In this study, there were 25% male and 75% female participants, with a mean age of 47 years. In terms of education level, they had high school diploma. The prevalence rate of depression, stress and anxiety was 83.1%, 78.1% and 96%, respectively. There was no significant association between stress and age. Depression, anxiety and stress correlated significantly with education level. There was also a significant relationship between anxiety and diabetes complications. Nevertheless, there were no significant relationships between anxiety, stress and depression and the demographic factors of age, duration of diabetes and marital status.

Conclusion: Given the high prevalence of depression, stress and anxiety in patients with type 2 diabetes, it seems necessary to administer a screening program for mental disorders. Provision of psychiatric consultation also appears beneficial.

Keywords: Type 2 diabetes, Depression, Stress, Anxiety

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Introduction

Diabetes is a chronic disease and the most common endocrine disorder, characterized by abnormalities in the carbohydrate, protein and fat metabolism [1]. The International Federation of Diabetes (IFD) reports that the prevalence of diabetes has turned into a global epidemic [2]. The number of people with diabetes has increased from 118 million in 1995 to 220 million in 2010, and is expected to reach 300 million in 2025. The World Health Organization (WHO) has predicted that diabetes in Iran will affect 6.8% of the population by 2025 [3].

In this disease, the insulin hormone is disrupted such that the blood glucose levels increase, leading to various disorders in the metabolism of the body. In the long run, diabetic patients are more susceptible than non-diabetic subjects to vascular complications, ischemic heart disease, neuropathic complications, retinopathy and glomerulosclerosis, lower limb complications, blindness, cardiac and cerebral infarctions, and renal failure [4]. Despite the significant advances in the treatment of diabetes, interventions to treat the disease have not proved as effective as expected. In the meantime, psychological factor is among the factors widely considered to impact the quality of life in diabetic patients [5]. One of the mental disorders associated with diabetes is depression. Depression is a main cause of disability in most countries and is one of the most common mental disorders known as a health problem. It is predicted to be the second leading cause of disability worldwide until the year 2020. Generally, 10 to 25 % of women and 5 to 10 % of men develop depression throughout their lives [6]. In diabetic patients, the prevalence is 8 to 20 % greater than the general population [6]. Depression in diabetic patients can be accompanied by anorexia, anomalies in the diet, or the inability to receive insulin on the part of the patient, making it difficult to treat and control diabetes. In a defective cycle, this can exacerbate emotional problems including stress, depression and anxiety [7].

On the other hand, according to the research findings, people with diabetes experience more stress and anxiety comparing to healthy individuals [8]. Anxiety is one of the common symptoms of depression that can be affected by diet and natural disorders such as diabetes. The prevalence of anxiety in the Iranian context is similar to that of depression, whereas the prevalence of anxiety in diabetic patients is reported to override the general population [1]. Anxiety is an obscure and unpleasant psychological emotion associated with one or more physical symptoms such as shortness of breath, palpitation, and high blood pressure [6]. Stress can be considered both a

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cause and complication of diabetes [9], which can interact with the endocrine system to impact the nutritional behaviors, physical activity and other self-care related functions, thereby resulting in increased blood glucose levels and improper control of the blood glucose [10]. A study on the prevalence of psychological symptoms among type 1 and type 2 diabetic patients found symptoms of depression and anxiety in the diabetic patients [11]. Also the results of a study in 13 countries showed that mental problems such as diabetes-related stress are very common among diabetic patients [12]. According to numerous findings in this regard, a high percentage of diabetic patients suffer from these psychological problems. For example, a study found that the prevalence rates of anxiety and depression in diabetic patients were 67% and 50%, respectively [13]. On the other hand, studies on the impact of demographic factors on depression, stress and anxiety in diabetic patients report differing results [1, 2, 6]. Therefore, this study aimed to determine the prevalence of depression, stress and anxiety in diabetic patients and their relationship with demographic factors.

Methods

This is a descriptive-analytic study with the statistical population being all diabetic patients who visited the Tehran-based Dornian Care Clinic. Sampling was based on

$$n = \frac{z^2 \times p(1-p)}{d^2}$$

formula, where d=0.05 and p=0.85 were considered following Taheri et al.'s study [1]. The final sample size was 200 persons who were selected via convenience sampling method. Depression, Anxiety and Stress Scale (DASS-21) was completed through interviews conducted by a health professional for each of the patients visiting the care center from September 2016 to March 2017. Inclusion criteria consisted of informed consent and a minimum of elementary literacy.

The scale consists of 21 items related to symptoms of negative emotions (the depression, anxiety and stress sub-scales). Each sub-scale contains seven items, the final score of which equals the sum of the items in that sub-scale. The items are scored from zero (*Did not apply to me at all - never*) to 3 (*Applied to me very much, or most of the time - almost always*). The Cronbach's alpha coefficient for this scale was 0.77 for depression, 0.66 for anxiety, and 0.76 for stress [14].

The data were analyzed in the SPSS software (ver. 16) using independent *t*-test, ANOVA, Mann-Whitney, and Kruskal-Wallis tests. P values less than 0.05 were considered significant.

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Results

In the present study, 25% of the participants were male and 75% were female. The mean age of the participants was 47 years, and the mean history of diabetes was 6 years. Moreover, 46% of the participants had elementary or secondary school degrees, 40% had high school diplomas, and 14% had tertiary degrees. The results showed that the percentage of depression, stress and anxiety in the studied patients was 83.1%, 78.1% and 96%, respectively (Table 1).

Table 1: Frequency distribution of stress, depression and anxiety in diabetic patients

Mental health parameters	Mean ± SD	Healthy percentage (Number)	Mild to moderate Percentage (Number)	Severe percentage (Number)
Stress	21.7 ± 8.4	21.9% (44)	42.8% (86)	35.3% (71)
Anxiety	17.29 ± 8.6	4% (8)	17.9% (36)	78.1% (157)
Depression	18.9 ± 9.6	16.9% (34)	40.8% (82)	42.3% (85)

The frequency distribution of stress, depression, and anxiety in diabetic patients in terms of individualistic variables is given in Table 2.

Table 2: Frequency distribution of stress, depression, and anxiety in diabetic patients in terms of individualistic variables

		Number (Percentage)	Depression number (Percentage)		Depression number (Percentage)		Depression number (Percentage)	
			Positive	Negative	Positive	Negative	Positive	Negative
Gender	Female	151 (75.1%)	30 (19.9%)	121 (80.1%)	24 (15.9%)	127 (84.1%)	6 (4%)	145 (96%)
	Male	50 (24.9%)	14 (28%)	36 (72%)	10 (20%)	40 (80%)	2 (4%)	48 (96%)
Age	39-49 yrs	129 (64.2%)	27 (20.9%)	102 (79.1%)	23 (17.8%)	106 (82.2%)	6 (40.7%)	123 (95.3%)
	49-59 yrs	72 (35.8%)	17 (23.6%)	55 (16.4%)	11 (15.3%)	61 (84.7%)	2 (2.8%)	70 (97.2%)
Education	Elementary /Secondary	93 (46.2)	16 (17.2%)	77 (82.8%)	8 (8.6%)	85 (91.4%)	2 (2.2%)	91 (97.8%)
	High school diploma	80 (39.8%)	20 (25%)	60 (75%)	20 (25%)	60 (75%)	4 (5%)	76 (95%)
	Tertiary	28 (14%)	8 (29%)	20 (71%)	6 (21.4%)	22 (78.6%)	2 (7.1%)	26 (92.9%)
Hepatitis history	1-6 yrs	118 (58.7%)	26 (22%)	92 (78%)	24 (20.3%)	94 (79.7%)	4 (3.4%)	114 (96.6%)
	6-11 yrs	83 (41.3%)	18 (21.7%)	65 (78.3%)	10 (12%)	73 (88%)	4 (4.8%)	79 (95.2%)
Number of children	0-4	171 (85.1%)	26 (20.3%)	102 (79.7%)	18 (24.7%)	110 (85.9%)	4 (3.1%)	124 (96.9%)
	4-8	30 (14.9%)	18 (24.7%)	55 (75.3%)	16 (21.9%)	57 (78.1%)	4 (5.5%)	69 (94.5%)

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In this study, stress scores were normally distributed according to the Kolmogorov-Smirnov's test; thereby, t-test and ANOVA were used for data analysis. On the other hand, there was an abnormal distribution of depression and anxiety data; hence, Mann-Whitney and Kruskal-Wallis tests were employed. According to the findings, depression and anxiety were significantly higher in diabetic women (P<0.05), whereas stress did not differ significantly between the two genders (P>0.05). Diabetic patients with higher education levels experienced significantly lesser degrees of depression (P=0.003), anxiety (P=0.011), and stress (P=0.004). Also patients with diabetes-associated ocular complications had significantly greater anxiety than those with other complications of diabetes (P=0.043). Nonetheless, there was no significant relationship between depression and stress variables and diabetes complications (P>0.05) (Table 3).

Also depression, anxiety and depression were not significantly correlated with age, duration of diabetes, number of children, and marital status (P>0.05).

Table 3: Mean scores of stress, depression, and anxiety in terms of demographic factors

		Stress Mean ± standard deviation	**Depression Mean ± standard deviation**	**Anxiety Mean ± standard deviation**
Gender	Female	22.21 ± 8.5	19.79 ± 9.4	18.12 ± 8.4
	Male	20.20 ± 8.2	16.40 ± 9.6	14.80 ± 8.6
	Statistical test result	t-test P = 0.147	Mann-Whitney P = 0.037	Mann-Whitney P = 0.024
Education	Elementary/Secondary n =93	23.74 ± 8.5	21.51 ± 8.8	19.44 ± 9.1
	High school diploma n = 80	19.48 ± 7.7	16.80 ± 9.8	15.75 ± 7.3
	Tertiary n = 28	21.36 ± 8.8	16.57 ± 10.2	14.57 ± 8.8
	Statistical test result	ANOVA P = 0.004	Kruskal-Wallis P = 0.003	Kruskal-Wallis P = 0.011
Diabetes complications	No complications n = 148	21.49 ± 8.8	19.26 ± 9.9	17.27 ± 8.3
	Ocular n = 25	22.16 ± 7.5	18.96 ± 8.3	20.16 ± 7.1
	Renal n = 8	21.50 ± 10.5	13.00 ± 9.8	14.50 ± 6.1
	Physical weakness n = 16	22.88 ± 6.1	19.5 ± 8.5	15.25 ± 9
	Foot ulcer n = 4	23.00 ± 5.7	17.00 ± 12.7	14.00 ± 9.2
	Statistical test result	ANOVA P = 0.967	Kruskal-Wallis P = 0.467	Kruskal-Wallis P = 0.043

Discussion

Diabetes and its complications as well as the

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patients' knowledge about the malignant complications of the disease have a significant impact on the mind of the patients [1]. The aim of this study was to determine the prevalence of stress, anxiety, and depression among type 2 diabetic patients and their association with demographic factors.

The results of this study showed that the percentage rate of depression, stress and anxiety was 83.1%, 78.1%, and 96%, respectively, all are higher than normal average in the general population. Taheri et al. [1] estimated the prevalence of depression and anxiety in diabetic patients as 85% and 95%, respectively. Mousavi et al. [15] also reported the prevalence of depression in these patients as 78%, which is consistent with the results of the present study. Some studies, however, have reported a lower prevalence for these disorders. Mirzae et al. [6], for example, reported the prevalence of depression, anxiety and depression in diabetic individuals as 42.4%, 48.4% and 45.4%, respectively. Lower prevalence rates have been estimated in other countries, with 8.3% in the United States, 28.8% in Korea, 10.4% in Germany, 35.2% in Brazil, and 28.5% in Lithuania [16-20].

Diabetic patients have a lot of limitations including an imposed diet, frequent infections, frequent hospitalization due to complications of the disease, repeated injections of insulin, costs, as well as restrictions on childbirth, marriage, and employment. These lead to a relatively higher prevalence of psychiatric disorders like stress, depression and anxiety in these patients compared to the general population. Obviously, the prevalence of depression in diabetic patients in Iran is by far higher than the rate in other countries. The difference can be justified in terms of the provision of health services, lower treatment and follow-up of these patients in Iran than advanced countries, the difference in the measurement tool, and the sociocultural differences of the studied communities.

In this study and most other studies [5, 15, 21, 22], higher prevalence rates of depression, anxiety and stress have been reported in diabetic women more than in diabetic men. However, in the study of Islami et al. [23], there was no significant difference between the two genders in terms of depression. Since women are physically and mentally more subtle than men, they are more susceptible against chronic illnesses both psychologically and psychologically, leading to a greater prevalence of mood disorders in them, including depression, stress and anxiety. Many factors such as socio-cultural, biological and hormonal factors are also involved in this gender difference.

The results of this study showed that age has no significant relationship with stress, anxiety and depression in diabetic patients. The

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findings of Heydari et al. [21] confirm this though the studies by Moayedi et al. [5] and Bafrooi and colleagues [24] showed that as age increases, depression and anxiety also increase in diabetic patients. According to the results of this study, it can be concluded that the extent to which mental disorders happen in a diabetic person is not related to his/her age. The psychological state might, however, change according to the academic or non-academic education or experience the patient may receive over time.

In this study, anxiety was significantly higher in diabetic patients with ocular complications. Ocular complications in diabetic patients can lead to stress and anxiety concerning one's future life, leading to disrupted lifestyle and communication. In line with this finding, there was a significant relationship between anxiety and complications of diabetes in Moayedi et al.'s study [5].

The findings of this study suggest that people with higher education have lower levels of stress, depression and anxiety. This may be due to the positive impact of higher education on the knowledge and successful management of self-care as well as prevention and care programs. In Mirzaei [22] and Kasiri Dolat Abadi's studies [25], the highest prevalence of depression was also related to the primary and secondary levels of education, which is consistent with the results of this study. However, in the study of Mirzae et al. [6], there was no significant relationship between stress, depression and anxiety, and education.

In the present study, there was no relationship between history of diabetes and depression, anxiety and stress. The lack of correlation between psychiatric problems and the duration of the disease in this study may be attributed to the fact that people adapt and establish a proper relationship with their illness over time, and come to an insight that diabetes is not a disease but a compulsory aspect of life for them.

Bafrooni and colleagues [24] found that the history of diabetes had no statistically significant relationship with depression and anxiety. However, there was a significant relationship between the duration of diabetes and the severity of depression in Heydari et al.'s study [21].

Studies can have limitations. Sampling in the current study was limited to the diabetic patients in the Tehran-based Dornian Care Clinic. Moreover, due to the limited knowledge on the role of factors such as history of heart disease, psychiatric history of the patients, associated diseases, drug doses and use, and their role in the incidence of anxiety and depression symptoms, the findings of this study can be concluded with caution. Therefore, we suggest for future studies to investigate the prevalence of anxiety and

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depression symptoms, different dimensions of coping strategies, and their role in these patients based on more precise research methods, control of the role of these variables, and complete information of patients on an electronic database.

Conclusion

The findings of this study indicate a higher prevalence of stress and anxiety and depression among the diabetic patients than the general population. Diabetic patients are often in a constant challenge to maintain their quality of life and well-being. In this process, the psychological functioning of patients seems to be largely influenced by the disease and their coping strategies. Therefore, the medical team needs to pay particular attention to the psychological aspects of diabetes and seek collaboration from psychiatrists and psychologists. Sense of control on the disease and self-efficacy in these patients are probably among the main contributors to the coping process, which play an important role in the positive adaptation with the disease and can be studied in future studies.

Conflict of interest

There are no conflicting interests among the authors.

Authors' contributions

The principal author was Mrs. Ahangari, Ms. Moasheri was Supervisor, and Dr. Dr Norozi and. Dr. Shayesteh were consultants.

Funding/Support

The data of this article were derived from a student research project with code No. 4315. This project was sponsored by Birjand University of Medical Sciences.

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