Original Article

The Relationship Between Obsessive-Compulsive Symptoms and Glycemic Control in Patients with Diabetes

Narges Shams Alizadeh [1], Azad Maroufi [1, *], Shima Rostami [2] and Ebrahim Ghaderi [3]

[1]Neurosciences Research Center, Department of Psychiatry, Kurdistan University of Medical Sciences, Sanandaj, IR Iran
[2]Department of Psychiatry, Kurdistan University of Medical Sciences, Sanandaj, IR Iran
[3]Social Determinants of Health, Research Center, Kurdistan University of Medical Sciences, Sanandaj, IR Iran

*Corresponding author: Azad Maroufi, Department of Psychiatry, Kurdistan University of Medical Sciences, Sanandaj, Pasdaran Avenue, IR Iran. Tel: +98-9183711193, Fax: +98-8733661340, E-mail: maroufimd@gmail.com

Abstract

Background: Concomitant mental disorders may worsen the clinical conditions of patients with diabetes by affecting the quality of self-care regimens and treatment compliance.

Objectives: The aim of this study was to assess the relationship between obsessive-compulsive symptoms and glycemic control in patients under diabetes treatment.

Methods: In this cross-sectional study, 390 adult patients with type I and II diabetes were recruited. The patients were interviewed using the Yale-Brown obsessive-compulsive scale to evaluate the existence of obsessive-compulsive symptoms and their type and severity. In order to measure the quality of glycemic control, patients were evaluated for average glucose levels over the past two to three months, using HbA1c. HbA1c of more than seven was considered as poor glycemic control.

Results: Overall, 50.8% of the participants had considerable obsessive-compulsive symptoms. No significant difference was seen between obsessive-compulsive symptoms and age (P = 0.443) or type of diabetes (P = 0.1.7). Obsessive-compulsive symptoms were significantly higher in patients, who had HbA1C levels of more than 7% (P < 0.001). Familial history of diabetes was more frequent in patients with more obsessive-compulsive symptoms (P = 0.016). Regression analysis showed that the chance of being afflicted with obsessive-compulsive symptoms was 2.9 times more in females compared with males, and 5.5 higher in those with HbA1C > 7% than less than 7%.

Conclusions: As a preliminary study, this study shows that remarkable obsessive-compulsive symptoms in patients with diabetes may be associated with poor glycemic control and there is a relationship between glycemic control and obsessive-compulsive symptoms, which may be more complex than a simple mental reaction to a chronic stressful disease.

Keywords: Blood Glucose, Diabetes Mellitus, Obsessive-Compulsive Disorder

1. Background

The prevalence of diabetes has nearly doubled over the past 20 years. This disease is accompanied by physical and mental complications associated with increased morbidity and mortality rates of afflicted patients (1-3). During the recent years, the concomitant existence of psychiatric disorders and chronic diseases has gained increasing attention among researchers. In this regard, diabetes and its comorbid mental disorders have become increasingly important because of the need for daily and accurate care and control (4). Concomitant psychiatric disorders could worsen the clinical condition of patients by affecting the quality of self-care regimens and treatment compliance (5).

A meta-analysis showed that patients with diabetes are afflicted with depression twice the rate of healthy individuals (6). Unsuitable diabetes control could increase depression by directly affecting brain function, or by increasing its complications, indirectly, leading to impairment of function or reduced quality of life (7). Some studies have shown that depression is accompanied by hyperglycemia in patients with type I and II diabetes (8), while other studies have not confirmed this finding (9). Moreover, some studies have shown that suitable treatment of psychiatric disorders associated with diabetes could lead to better glycemic control (10, 11).

In contrast to depression, a few studies have been done on the relationship between diabetes and anxiety (12). This is while anxiety is highly prevalent in the normal population (13-16). A number of studies show that anxiety is a

common disorder that accompanies diabetes and requires more clinical attention (12). Moreover, concomitant anxiety disorders or severe anxiety symptoms in patients with diabetes is directly related to worsening of diabetes symptoms (17), increased complications (18-20), increased pain (21), reduced quality of life (22), increased depression (23), and increased body mass index (BMI) (24).

On the other hand, studies have shown controversial results with respect to glycemic control and anxiety. Some have shown a positive relationship between anxiety and worsening of blood glucose levels (24-26), while others show that anxiety is associated with better glycemic control (27). Despite various studies, results did not provide adequate evidence for a clear positive relationship between diabetes and anxiety, due to differences in anxiety assessment, diabetes assessment, and confounder control (12).

2. Objectives

To the best of the author's knowledge, there is only one study on the relationship between obsessive-compulsive symptoms and glycemic control in patients with type II diabetes, showing a significant relationship between these two variables (25). Therefore, considering the high prevalence of mental disorders in patients with diabetes and the possible impacts of such problems on treatment compliance, prognosis and the course of diabetes on one side and lack of studies in this area on the other side, the current researchers aimed at assessing the relationship between obsessive-compulsive symptoms and glycemic control.

3. Materials and Methods

In this cross-sectional study, adult patients aged 18 to 65 years old with type I and II diabetes referring to a diabetes clinic in Sanandaj, Iran, during years 2014 to 2015 were recruited. Patients with fasting plasma glucose level at or above 126 mg/dl or Plasma glucose at or above 200 mg/dl, two hours after drinking a high glucose drink, were considered to be diabetic and included in the study. The diagnosis of diabetes was confirmed by an expert endocrinologist. Patients, who were unable to answer the questions, due to any interfering condition such as cultural factors leading to misinterpretation of questions and lack of adequate abstract thinking to realize the meaning of the questions, were excluded from the study. Written informed consent was obtained from the participants and the collected data were totally anonymous. The protocol of the study was approved by the Ethics Committee of Kurdistan University of Medical Sciences.

The sample size was calculated as 400 people due to estimating the prevalence according to type I error of 5%, prevalence of OCD of 10%, and precision of 3%. The data regarding the type of diabetes, last HbA1C test result, duration of diabetes, used medications, and familial history of diabetes were extracted from the patients' records. The patients were then interviewed using the Yale-Brown Obsessive-Compulsive Scale to evaluate and confirm the existence of obsessive-compulsive symptoms and their severity by an experienced clinician. This scale was devised by Goodman et al. in 1986 and can measure obsessive and compulsive symptoms separately (28). This scale is completed by the researcher and consists of 10 items rated from zero to four, yielding a maximum score of 40. The severity of the disorder is categorized as subclinical (scores 0 to 7), mild (scores 8 to 15), moderate (scores 16 to 23), severe (scores 24 to 31), and extreme (scores 32 to 40). In the current study, patients with scores higher than 15 were considered as having obsessive-compulsive symptoms. The Persian version of this scale was validated by Esfahani et al. (29).

Data were analyzed using SPSS software, version 16. Frequency and percentages as well as means and standard deviations were calculated. To compare qualitative data between the two groups (with and without obsessive-compulsive symptoms), the Chi-square test was used. To evaluate quantitative data, t and Mann-Whitney U tests were used as appropriate. Logistic regression was also used to assess factors related to obsession. Statistical significance was considered as less than 0.05.

4. Results

Four hundred patients with diabetes were enrolled in this study and 10 were excluded because of incomplete records. Furthermore, 78.5% of the participants were females. Most of the participants were illiterate (54.4%), had type II diabetes (96.4%), and used oral medications during the study period (70%) (Table 1).

We found that 50.8% of the participants had considerable obsessive-compulsive symptoms. Among the obsessive-compulsive symptoms, checking (53.3%) and hoarding (0.3%) were the most and least common behaviors (Table 1).

Also, the researchers found that obsessive-compulsive symptoms were significantly more common in females (P < 0.001). However, no significant difference was seen between these symptoms and age (P = 0.443) or type of diabetes (P = 0.17) (Table 2).

Obsessive-compulsive symptoms were significantly higher in patients, whose blood glucose levels were less controlled and had HbA1C levels of more than 7% (P <

Table 1. Socio-Demographic Characteristics of the Studied Patients with Diabetes

Variables	Frequency	Percentage
Presence of Obsessive-Compulsive Symptoms		
Yes	198	50.8
No	192	49.2
Type of Obsessive Symptom		
Aggression	2	0.5
Contamination	3	0.8
Hoarding	1	0.3
Symmetry	25	6.4
Other	13	3.3
Type of Compulsive Symptoms		
Cleaning	79	20.3
Checking	208	53.3
Repetitive Procedures	3	0.8
Hoarding	106	27.2

0.001). Also, by assessing the correlation between quantitative variables, the researchers found a significant negative relationship between the severity of obsessive-compulsive symptoms (higher scores) and quality of glycemic control (P < 0.001). Moreover, familial history of diabetes was more frequent in patients with more obsessive-compulsive symptoms (P = 0.016) (Table 2).

Regression analysis showed that the chance of being afflicted with obsessive-compulsive symptoms was 2.9 times more in females compared with males, and 5.5 higher in those with HbA1C > 7% than less than 7% (Table 3).

5. Discussion

This study found that the quality of glycemic control was lower in patients with obsessive-compulsive symptoms. The results of this study showed that obsessive-compulsive symptoms had a considerably high prevalence in patients with diabetes compared with the prevalence of obsessive-compulsive disorder in Iran, which was about 5.1% (30). However, this comparison might not reflect the true result due to the difference in assessing obsessive-compulsive symptoms in the current study instead of obsessive compulsive disorder and difference in assessment measures.

More than half the patients in this study (50.8%) had obsessive-compulsive symptoms. There are a few studies on comorbidity of diabetes and obsessive-compulsive disorder in the literature (25). In a review by Kettle and Marks, obsessive-compulsive disorder accompanied by diabetes

was considered as a rare phenomenon (31); this is while most studies report the high prevalence of psychiatric disorders, especially anxiety disorder, in patients with diabetes (12, 32). This difference in the obtained results could be attributed to the use of different methods for measuring and evaluating obsessive-compulsive symptoms, such as clinical interview or questionnaires. One study showed that community surveys have considerably over-estimated the prevalence of obsession. In community surveys, the severity criteria are neglected. In patient seeking studies, underestimation occurs because of disregarding obsession in medical referrals. Therefore, it seems that estimations in patient seeking studies are three times less than community surveys (33). This research did not find any study related to the prevalence of obsessive-compulsive symptoms in diabetes. Therefore, further studies may be needed to confirm this issue.

This research found that the prevalence of obsessive-compulsive symptoms was higher in females, which is consistent with some other studies (25, 33), and inconsistent with others (34). This difference in the results could be attributed to the difference in help seeking behavior among males and females, family tolerance of obsessive-compulsive symptoms, and the congruence between these symptoms and the patient's career (35).

Familial history of diabetes was more frequent in patients with more obsessive-compulsive symptoms and seen in half the patients with obsessive-compulsive symptoms. A genetic background could be assumed for such a relationship. Although studies on chromosomes related to these two disorders yielded contradictory results, a relationship between chromosome 1q and both disorders was hypothesized (36, 37), which should be further studied.

This research did not find any significant relationship between obsessive-compulsive symptoms and age, type of diabetes, and duration of diabetes. Moreover, the researchers found no similar studies in this regard to compare findings. However, it seems that obsessive-compulsive symptoms have a primary nature and are unrelated to these factors, although chronic disorders, such as diabetes, could increase anxiety symptoms over time due to symptom-related worries and illness-progression concerns (12). On the other hand, evidence shows that anxiety could increase the risk of diabetes. In a longitudinal study, the risk of type II diabetes increased by two folds in patients with high levels of anxiety (38) and post-traumatic stress disorder (39, 40).

Obsessive-compulsive symptoms were significantly higher in patients, whose blood glucose levels were less controlled. Moreover, a direct significant relationship was seen between HbA1C levels and prevalence of obsessive-compulsive symptoms in patients with such symptoms.

Table 2. The Relationship Between Obsessive-Compulsive Symptoms and Characteristics of the Participants

Characteristics	Without Symptoms Frequency (%)	With Symptoms Frequency (%)	Total Frequency (%)	P-Value
Sex				
Men	58 (69)	26 (31)	84 (100)	< 0.001
Women	134 (43.8)	172 (56.2)	306 (100)	
Age				
< 50	44 (45.8)	52 (54.2)	96 (100)	0.443
> 50	148 (50.3)	146 (49.7)	294 (100)	
Type of Diabetes				
I	10 (71.4)	4 (28.6)	14 (100)	0.107
II	182 (48.4)	194 (51.6)	376 (100)	
HBA₁C				
≤ 7	130 (69.5)	57 (30.5)	187 (100)	< 0.001
> 7	62 (30.5)	141 (69.5)	203 (100)	
Duration of Diabetes				
≤ 7 years	120 (51.3)	97 (48.7)	199 (100)	0.414
> 7 years	90 (47.1)	101 (52.9)	191 (100)	
Type of treatment				
Oral drugs	131 (48)	142 (52)	273 (100)	0.614
Intravenous	37 (53.6)	32 (46.4)	69 (100)	
Oral Drugs + Intravenous	21 (47.7)	23 (52.3)	44 (100)	
Diet	3 (75)	1 (25)	4 (100)	
Familial History of Diabetes	91 (43.5)	118 (56.5)	209 (100)	0.016

Table 3. The Relationship Between Obsessive-Compulsive Symptoms with the Patients' Characteristics Using Logistic Regression

Variable	Beta	Standard Error	TestWald	DOF	Sig	Odds Ratio	CI = 95% Min	CI = 95% Max
Female sex	1.074	0.287	13.997	1	< 0.001	2.926	1.667	5.136
HbA₁C > 7	1.717	0.231	55.407	1	< 0.001	5.569	3.543	8.753
Familial history of diabetes	0.409	0.228	3.211	1	0.073	1.505	0.962	2.355
Age	-0.023	0.012	3.805	1	0.051	0.977	0.955	1.000

Regression analysis showed that the chance of being afflicted with obsessive-compulsive symptoms was 5.5 higher in those with HbA1C > 7%. However, considering the type of study, no causal relationship could be confirmed in this regard. This finding is consistent with a previous related study showing that depression and obsessive-compulsive symptoms have a direct relationship with metabolic profile and quality of glycemic control in patients with diabetes (25).

In another study, an inverse relationship was found between obsessive-compulsive symptoms and serum oxytocin levels in patients with diabetes, who control their glucose levels. Therefore, glycemic control is associated with increased oxytocin levels and increased oxytocin levels and in turn reduces obsessive-compulsive symptoms (26).

Moreover, Kontaoangelos et al. found a direct relationship between homocysteine and the psychopathology of patients with type II diabetes. Patients, who controlled their blood glucose significantly had lower levels of serum homocysteine (41). On the other hand, Atmaca et al. showed that homocysteine levels were positively correlated with severity of obsessive compulsive symptoms in patients with OCD (42). Furthermore, some patients with diabetes become obsessed and preoccupied with controlling their glucose levels after being diagnosed. Such obsessive behaviors do not lead to better glycemic control and rather worsen their metabolic profile (25).

One of the limitations of the current study was inaccessibility to a suitable population of males and females with diabetes, because most of the patients referring to the clinic were females, for unknown reasons. Also, most of the patients had type II diabetes. Moreover, due to socioeconomical and educational condition of the participants, the researchers had to provide extensive explanations in order for them to comprehend the meaning of related questions.

5.1. Conclusion

As a preliminary study, this study showed that remarkable obsessive-compulsive symptoms in patients with diabetes may be associated with poor glycemic control and there is a relationship between glycemic control and obsessive-compulsive symptoms, which may be more complex than a simple mental reaction to a chronic stressful disease.

Footnotes

Authors' Contribution: Narges Shams Alizadeh made a substantial contribution in concept and design, drafted the writing and approved the final copy. Azad Maroufi made a substantial contribution in concept and design, drafted the writing, critical revision, supervised the project and approved the final copy. Shima Rostami participated in data collection, drafted the article, and approved the final copy. Ebrahim Ghaderi, performed the analytic calculations and the interpretation of the results, critical revision, and approved the final copy.

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