Depression and Glycemic Control in Type II Diabetic Patients

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Abstract

Objective: Studies reported conflicting results' regarding the status of depression and glycemic control in patients with type II diabetes(T2DM), therefore, this study was performed to determine the relationship between depression and glycemic control in T2DM patients.

Materials and Methods: This cross-sectional study was performed on 150 T2DM patients referred to Yazd diabetes research center, 2014. Data were collected by using Beck Depression Inventory. Data collected were analyzed by SPSS-21 with using descriptive statistics and analytical testing at $\alpha=0.05$.

Results Mean and standard deviation (SD) of age, disease duration and HbA1c levels respectively were; 58.18±9.63 years, 10.83±6.01 years and 8.52±1.59 mg/dl. About 97 patients (64.7%) were women, 88 (58.7%) had hypertension, 57 (38%) hyperlipidemia, 28 (18.7%) good glycemic control. There was no significant relationship between depression status and HbA1c control, hypertension, hyperlipidemia, insulin type and disease duration. Patients with moderate depression status and women had significant relationship with macrovascular complications.

Conclusion: Despite the lack of significant relationship between depression status and HbA1c control and given the significant relationship between moderate depression status and HbA1c control with macrovascular complications, it seems are needed more extensive studies.

Keywords: Type II diabetes, Depression, Hypertension, Hyperlipidemia, HbA1c.

Introduction

Type II diabetes (T2DM) is a multifactorial metabolic disorder and identified with chronic hyperglycemia due to impairment of insulin secretion or insulin action, or both (1,2). Diabetes is considered as a major public health problem and responsible for 9% of all deaths worldwide (1-4). Diabetes is the most common metabolic and endocrine disorder (5).

Disabilities due to diabetes are prevalent and one of the main health care problems (6). According to World Health Organization (WHO)-2011 there were 346 million diabetic patients in worldwide, this number will be doubled in 2030 (7). Among people with diabetes 10 to 15% have type I and 85 to 90% have T2DM (8-10).

According to WHO in 2011 prevalence of diabetes in adult population of Iran was 10.35% (7,11). Prevalence of diabetes in people older than 30 years in Iran, have been reported over than 14% (12). The prevalence of T2DM in population older than 30 years of Yazd was 14.52% (13,14). Costs of diabetes estimated 99 billion dollars annually that including direct costs of health care and indirect costs associated with disability and early mortality (15). Depression is the most common mental disorder and impose too costs as a burden of diseases to health care system. About 10% of the people have experienced at least one period of depression, during their lives. Studies have pointed out 20 to 61% of prevalence depression among student population (17, 16). Prevalence of depression in diabetic patients has mentioned by Mahmodi et al (18) 37% and by Sajadi et al (19) 13.75%. Depression is a mood disorder (20) in depressed person feel; worthless, guilt, loneliness, sadness, hopelessness, inefficiency, dissatisfaction, loss of energy and interest, low self-esteem, changes in appetite and sleep patterns and is unable to feel joy and happiness. Regardless of race, class and social status, depression can occur in any individual (21). According to several studies that has been reported about depression among people with diabetes (24-22). Previous studies reported conflicting results about relationship between depression and glycemic control in T2DM patients (29-25), therefore, this study was performed to determine the relationship between depression and glycemic control in T2DM patients referred to Yazd diabetes research Center in 2014.

Materials and Methods

This cross-sectional study was performed on 150 patients with T2DM. The systematic random sampling was used. The sample size was determined according to the same study (22) and considered 150 T2DM patients. It should be noted the samples were selected in such a way that laboratory and clinical variables had done in maximum over a month ago and recorded in their files by physician. Also the complications due to diabetes were examined. The inclusion criteria were; T2DM, having file in diabetes research center, no history of diagnosed mental illness, no history of previous depression duo to other factors, no history of other disabling diseases (other than hypertension and hyperlipidemia), if existed one of the following conditions patients were were replaced; imperfect or confound file, dissatisfaction to do research, incomplete, imperfect or confound questionnaire, existed clinical examination and testing finding more than a month. Data were collected by using Beck Depression Inventory (30) ,also the following information was collected; gender (male, female), age (in years), disease duration (in years), type of insulin (oral, NOVO, NPH, LAN), hypertension (yes, no), hyperlipidemia (yes, no) and macrovascular complications (Cardiomyopathy, retinopathy, nephropathy). All laboratory tests were done in one laboratory by the way, kit and similar devices, and clinical examination were done by one specialists (ophthalmologist and endocrinologist in Yazd diabetes research center). Furthermore, with putting a text in the first part of the questionnaire and explaining the purpose of the study, received written consent.

Beck Depression Inventory-II

Beck Depression Inventory-II (31) is new version of Beck Depression Inventory-I (30), that developed after 35 years of experience and research on version I. This questionnaire is self-report. Each part of the questionnaire consists of four phrases that each shows one of the symptoms of depression, low (score was 0) to high (score was 3). Total score is between 0-63. The score zero to 13 considered as no depression, 14 to 19 mild depression, 20 to 28 moderate depression, 29 to 63 severe depression (30). The questionnaire has been used in several studies about examining depression among diabetic's patients (39-32). This questionnaire is valid and reliable for measuring depression (18,40-42).

After collecting the data and entering them in statistical software SPSS-21 were analyzed by descriptive statistics such as frequency, mean, standard deviation and analytical tests such as the chi-square, ANOVA, independent t-test and correlation at α=0.05.

Results

The mean (± SD) of age, disease duration, and HbA1c levels in patients respectively were; 58.18±9.63 years, 10.83±6.01 years and 8.52±1.59 mg/dl. About 53 patients (35.3%) were male and 97 (64.7%) were female. Table 1 showed type of insulin, hypertension, hyperlipidemia, macrovascular complications, HbA1c and depression status.

Analytical results showed that there were no significant relationship between depression and HbA1c control (P=0.918), hypertension (P=0.54), hyperlipidemia (P=0.94), type of insulin (P=0.089) and disease duration (P=0.089). But there was a significant relationship between depression and macrovascular complications, (P<0.001). Patient with moderate depression had more complications (Table 2).

There were no significant relationship between HbA1c control and Hypertension (P=0.55), gender (P=0.56), age (P=0.31) and disease duration (P=0.89) but there were significant relationship with type of insulin (P=0.005), and macrovascular complications (P=0.009) (table 3).

Mean of HbA1c in depressed and non-depressed patients were respectively; 8.49±1.55 and 8.53±1.61 (P=0.425).

Discussion

In the present study, there was no significant relationship between depression and HbA1c control. Also in other studies did not report significant relationship, including Parham et al (22), Nejati Safa et al (24), Taziki et al (27), Georgiades et al (25), de Groot et al (26), Kaholokula et al (43). But, Richardson et al (44), Sepehrmanesh et al (34) reported significant relationship. The prevalence of

Table 1. Studied variables in T2DM patients

Variable		Frequency	%
Type of insulin	Oral medication	76	50.7
	NOVO	35	23.3
	NPH	19	12.7
	LAN	20	13.3
Hypertension	Yes	88	58.7
	No	62	41.3
Hyperlipidemia	Yes	57	38
	No	93	62
Macrovascular complications	No	93	62
	Retinopathy	45	30
	Nephropathy	2	1.3
	Cardiomyopathy	10	6.7
HbA1c control	<7	28	18.7
	>7	122	81.3
Depression Status	No	48	32
	Mild	38	25.3
	Moderate	56	37.3
	Severe	8	5.3

depression among diabetics is most common, but it's not considered as important factor in the control of HbA1c.

It should be noted, In other studies, such as Lustman et al (48) depression was related with poor HbA1c control, in Gonzalez et al study (49) Depression was as a risk factor for non-adherence to diabetes self-care and in Hassan et al study (50) depression increased the likelihood of worse glycemic control.

In present study, there was no significant relationship between depression and disease duration. But in other studies Behnam and Ghorbani (23), Taziki et al (27), Salehi et al (36) and Sepehrmanesh et al (34) reported a significant relationship. It seems, these differences can be due to disease prevalence in different populations.

In present study, there was significant relationship between depression and complications which is against mazloomy et al study (45).

In our study, depression was significantly higher in women than men, which was according Anderson et al (46), Sevincok et al (47), Behnam and Ghorbani (23), Mahmodi and Sharifi (18), Sepehrmanesh et al (34), and mazloomy et al (45).

Prevalence of depression in diabetic population in other studies such as Parham et al (22), mazloomy et al (45), Nejati Safa et al

Table 2. Relationship between depression and macrovascular complications

Macrovascular complications	No		Mild		Moderate		Severe		*P*-value
Status depression	n	%	n	%	n	%	n	%	
No	30	62.5	25	65.8	35	62.5	3	37.5	
Retinopathy	14	29.2	11	28.9	17	30.4	3	37.5	
Nephropathy	0	0	0	0	0	0	2	25	<0.001
Cardiomyopathy	4	8.3	2	5.3	4	7.1	0	0	
Total	48	100	38	100	56	100	8	100	

Table 3. Relationship between HbA1c control with macrovascular complications

Macrovascular complications	No		Retinopathy		Nephropathy		Cardiomyopathy		*P*-value
HbA1c control	n	%	n	%	n	%	n	%	
Yes	19	20.4	7	15.6	2	100	0	0	
No	74	79.6	38	84.4	0	0	10	100	0.009
Total	93	100	45	100	2	100	10	100	

(24) Behnam and Ghorbani (23) respectively were 70.7, 64, 28 and 71.6 percent. There was not significant relationship between level of HbA1c control and depressed and non-depressed patients with HbA1c control that it same with results of Parham et al. (22), Nejati Safa et al. (24), Taziki et al. (27), Georgiades et al. (25), Salehi et al. (36).

Conclusion

Despite the lack of significant relationship between depression status and HbA1c control and the significant relationship between moderate depression status and HbA1c control

with macrovascular complications, more extensive studies are needed.

Conflict of Interest

The authors declare that they have no conflict of interest.

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