

Association of depression with type 2 diabetes and relevant factors

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Abstract

Background: Based on the high prevalence of diabetes and depression in Rasht, we conducted a study to evaluate the prevalence of depression in type 2 diabetic patients, and its association with glycemic control, chronic complications, and some clinical and paraclinical parameters in this northern state of Iran.

Materials and Methods: Beck depression inventory was used for evaluating depression on 90 type 2 diabetics and 90 healthy controls selected. Information on demographic and clinical and paraclinical characteristics was collected by interviews and from medical records.

Results: This cross-sectional study was performed on 90 type 2 diabetic patients (63 female and 27 male with a mean age of 54.17 ± 10.57 years) and 90 healthy matched controls. Overall, depression was significantly more prevalent in case group [37.8% vs. 16%, odds ratio (OR) = 3.29, $P = 0.001$]. The prevalence of depression in diabetic women was significantly higher than nondiabetic ones (39.7% vs. 15%, $P = 0.002$). We could not find any significant correlation between depression and positive family history of depression, duration of diabetes, HBA1c level, and body mass index. The prevalence of depression was prominently more in diabetic patients with retinopathy than in those without this complication (55.6% vs. 24%, $P = 0.015$). Logistic regression analysis indicated that diabetes itself was the only significant determinant of having depression (OR = 3.29, $P = 0.005$, 95% confidence interval: 0.118-0.667).

Conclusion: There was a prominent prevalence of depression in type 2 diabetics overall. Depression was not correlated with duration of diabetes and glycemic control. There was a significant association between depression and retinopathy in diabetic patients. Diabetes itself was the only significant determinant of having depression after matching with other variables.

Key Words: Depression, diabetes complications, diabetes, glycemic control

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INTRODUCTION

Diabetes mellitus is a frequently encountered metabolic disease with chronic features and involves numerous complications throughout its course, which causes severe restriction and disability in an individual's life. It has been reported that the incidence of depression is higher in diabetic patients and that diabetes is one

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of the risk factors in the development of depression. It has also been reported that comorbid depressive disorders cause further deterioration in the quality of life and diabetes complications in these patients.^[1,2] The relationships between comorbid depression in people with diabetes and adverse outcomes including poor HbA1c control, adherence to medication, and mortality have been examined in several studies.^[3-7]

The existing literature is inconsistent with regard to the relevance of poor glycemic control and depression. Besides contradictory reports regarding the correlation of depression with diabetic microvascular complications have been cited in the literature.^[4,8,9] There are also some discrepancies concerning the prevalence of depression in type 2 diabetes^[10-16] and also gender distribution of depression.^[13,16] With regard to both national and international recommendations for screening of depression in people with diabetes^[17] and the high prevalence of both diabetes and depression in Rasht, a northern state of Iran^[18] with different socioeconomic and cultural situation with other countries, we conducted a cross-sectional study to find out the relationship between these two illnesses and the comorbid factors in this district.

MATERIALS AND METHODS

This cross-sectional study was conducted on 90 type 2 diabetic patients selected by consensus sampling in the endocrine clinic of Razi Hospital in Rasht city over the period between 2011 and 2012. Ninety healthy people referring to clinic for check up were selected as control group. Information on demographic and clinical and paraclinical characteristics was collected by face-to-face interviews and from medical records and inserted in a standard questionnaire. Age, gender, education, and other important factors were matched in both groups. The exclusion criteria was previous history of psychiatric problem antedating diabetes, patients with diabetes complications such as coronary artery diseases, history of coronary artery bypass graft (CABG), visual disturbance, renal failure, and comorbid medical diseases. Beck depression inventory was exploited for evaluating depression. A questionnaire including 21 questions (13 cognitive and 8 somatic questions) was used. Each question was then valued between zero and 3 scores according to Beck test. The scores were accumulated and were categorized as: 0-15 scores as no depression, 16-30 scores as mild depression, 31-47 scores as moderate depression, and 47-63 scores as severe depression. Chi-square statistical analysis was performed by SPSS version 10. Mantel-Haenszel, Chi-square, Pearson's correlation, and Logistic regression analysis were used to evaluate the study variables (age, gender,

literacy level, marriage status, and severity of depression). A $P < 0.05$ was considered significant.

RESULTS

There were 90 cases, 63 (70%) females and 27 (30%) males and 90 matched controls recruited in the study. The demographic features of subjects are shown in table 1. In the case group mild, moderate, and severe depression was detected in 30%, 5.6%, and 2.2% of the patients, respectively, whereas in control group mild depression was observed in 11%, moderate depression in 3%, and severe depression in 2%. Overall depression was significantly more prevalent in case group [37.8% vs. 16%, odds ratio (OR) = 3.29, $P = 0.001$]. The distribution of depression in the case and control groups is illustrated in Figure 1.

Mantel-Haenszel statistical analysis depicted that diabetes mellitus was observed more in depressed patients older than 50 years ($P = 0.014$). The male-to-female ratio of depression in the case and control groups was 33% to 39.7% and 15% to 17%, respectively. The prevalence of depression in diabetic women was significantly higher than nondiabetic

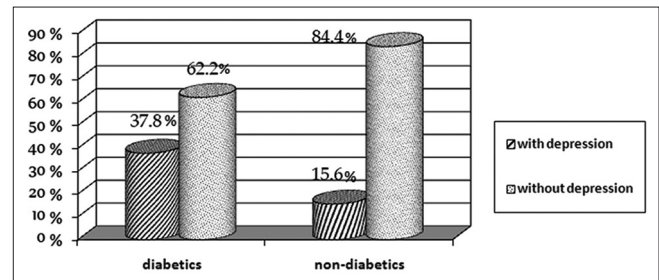


Figure 1: The distribution of depression in the case and control group

Table 1: The demographic characteristics of subjects

Variable	Diabetics		Non-diabetics		Total	
	No.	Percent	No.	Percent	No	Percent
Gender						
Male	27	30	17	18/9	44	24/4
Female	63	70	63	70	73	1/81
(Y age)						
50<	37	41/1	31	34/4	68	37/8
50>	53	9/58	59	6/65	112	2/62
(Y age)						
Mean±SD	57/10±17/54		55/03±8/46		54/6±9/56	
Education level						
Illiterate	53	58/9	41	45/6	94	52/2
Primary	94	52/2	38	21/1	48	26/7
Diploma and higher	25	27/8	23	25/6	48	26/7
Marital status						
Single	4	4/4	5	5/6	9	5
Married	86	95/6	85	94/4	171	95

SD: Standard deviation

ones (39.7% vs. 15%, $P = 0.002$). In contrast, depression was nonsignificantly more in diabetic men than their matched controls (33.3% vs. 17.6%). The distribution and severity of depression with regard to gender and age are shown in Figures 2 and 3, respectively.

However, there was no significant relationship between depression and literacy in diabetic and nondiabetic patients overall. It was shown that depression in educated diabetic patients was less than that in illiterate patients. This study illustrated that married diabetic patients were more depressive than unmarried ones significantly (38.4 vs. 15.3%, $P = 0.001$).

The distribution and severity of depression for marital status is depicted in Figure 4. In this study we could not find any significant correlation between depression and positive family history of depression, duration of diabetes, HbA1c level, and body mass index. The prevalence of depression was prominently more in diabetic patients with retinopathy than in those

without this complication (55.6% vs. 24%, $P = 0.015$). Logistic regression analysis indicated that age, gender, education level, and marital status were not correlated with depression, but in contrast diabetes itself was the only significant determinant of having depression (OR = 3.29, $P = 0.005$, 95% confidence interval: 0.118-0.667).

DISCUSSION

It is now commonly accepted that depressive symptoms and major depressive disorders are twice as prevalent in diabetics as general population.^[10] Depression has been associated with diabetes and poor glycemic control. There are also significant health care costs associated with depression in diabetes. Symptoms of depression and anxiety may be more prevalent in individuals with diabetes.^[5] The prevalence of mood disturbances in diabetics are also approximately twice than in the general population, and affects health outcomes and patients' quality of life in an undesirable way. Although subsyndromal depression is an important predictor of a more serious clinical depression, it is often overlooked.^[11] The relationship between depression and diabetes may be complicated by sociodemographic factors, such as education, race, ethnicity, social support, socioeconomic status, and access to health care.

In our study, 37.8% of diabetic patients had depression with different severities. It is consistent with some studies^[10-13] and in contrast with some others reporting a lower (15-30%) and higher rate (53-84%) of depression in diabetics.^[14,15,19-22] In disagreement with other studies,^[20,23,24] and in line with other studies we found a more significant prevalence of depression in diabetic women than men.^[10,13,19,25,26]

In this study, 39% of diabetic patients older than 50 years were depressed, which was statistically significant and consistent with previous studies.^[19,24,27] Accordant to Musavi's study,^[20] we found no significant relationship between the duration of diabetes and depression in our patients; this is in contrast with other studies reporting significant relationship between depression and duration of diabetes.^[19,21,22,28]

In accordance with the Sahota's study^[13] we could not find any significant relationship between depression and BMI.

The existing literature is inconsistent with regard to the relevance of poor glycemic control and depression. Our study in line with others^[24,29-33] indicated a nonsignificant relationship between depression and HbA1c level. This is contradictory to other studies reporting higher HbA1c level in those with

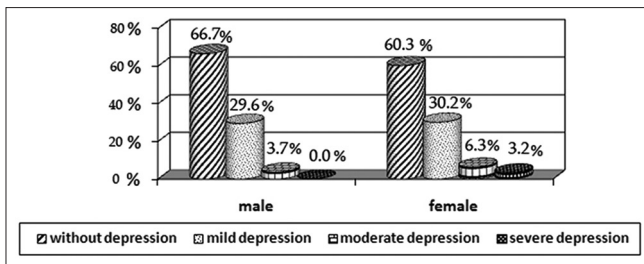


Figure 2: The distribution and severity of depression for gender in diabetics

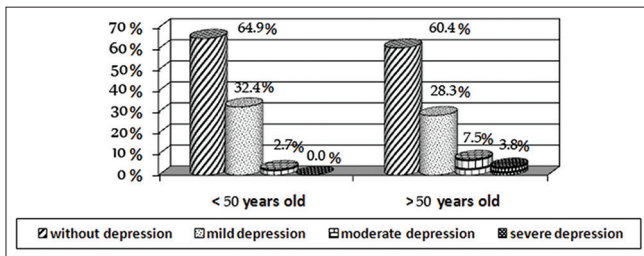


Figure 3: The distribution and severity of depression for age in diabetics

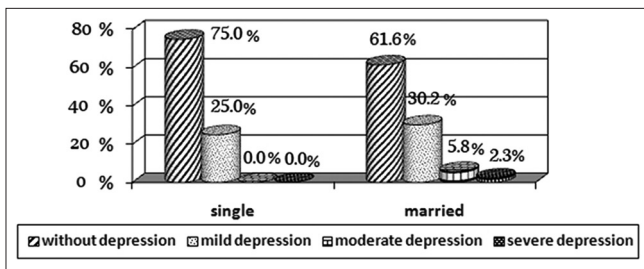


Figure 4: The distribution and severity of depression for marital status in diabetics

depression.^[17,10,19,22,34,35] This association remained significant in a multivariate linear regression model that included age, gender, duration of diabetes, and BMI.^[5,8,13,23]

In contrast, Engum *et al.*'s found that hyperglycemia was not associated with depression in type 1 or type 2 diabetes and there was actually an inverse relationship between A1C and level of depression in both types of diabetes, although the associations were not significant.^[36] These findings are in accordance with those of some other studies. Kruse *et al.*^[37] did not find positive associations between depression and A1C in a community sample. In addition, they concluded that individuals with diabetes and A1C level <7% more often had affective disorders than those with poor glycemic control. In the general population, patients with high A1C levels reported slightly but significantly higher levels of well-being than patients with low A1C levels.^[38] One study^[9] suggested that personality traits might be important in achieving glycemic control.

In the present study, diabetic patients with a family history of depression were nonsignificantly more depressive than ones with a negative history. This finding disagrees with the others reporting a significant relationship between these two diseases.^[8,19]

In our study, in comparison with other complications, patients with diabetic retinopathy had a significant more rate of depression. This is in contrast with some studies, reporting a significant correlation between depression and a variety of diabetes complications, including, diabetic retinopathy, nephropathy, neuropathy, macrovascular complications, and sexual dysfunction^[4,19]; and with Eren *et al.*'s study, describing a significant correlation between depression and neuropathy and no evidence for a notable association with nephropathy and retinopathy in depressed diabetic patients.^[39] Contradictory to others, some studies failed to show any significant association between the specific complication of diabetes (neuropathy, nephropathy, and retinopathy) with depression.^[38,40]

In our study, in accordance with other studies,^[20,27] there was found no significant relationship between depression prevalence and its severity, presumably because of a better understanding of the disease and thus more likely and education level, which can implicate the lack of self-care knowledge and skills even in literate population. This is in contrast with other studies reporting education level as the only social factor associated with depression in diabetics. Those with higher education were less likely to be depressed adherent to the diet, exercise, and

drug regimens.^[9,19,41] Contrary with our findings, some studies reported a significant more rate of depression in singles than married ones.^[19,42] These findings disagree with Ranjbar's study^[43] explaining a nonsignificant relationship between depression and marital status. Matching other variables, our study illustrated that diabetes itself was the only significant determinant of having depression.

CONCLUSION

There was a prominent prevalence of depression in type 2 diabetic women and older age groups. Depression was not correlated with duration of diabetes and glycemic control. There was a significant association between depression and retinopathy in diabetic patients. Diabetes itself was the only significant determinant of having depression after matching with other variables.

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