Original Article

Prevalence of Major Depression Among Types II Diabetes: A Cross Sectional Study In Riyadh, Saudi Arabia

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Received on 22.05.2019, accepted for publication on 5.10.2019
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Abstract:

Background: Depression is the second most prevalent disorder seen by the doctors of the primary care. Early diagnosis and proper management of this depression significantly reduce its adverse effects.

Aim: To determine the prevalence of major depressive symptoms among patients with type II diabetes, compare the prevalence between diabetic and non-diabetic patients and determine the associated factors.

Methods: It is a cross-sectional study that was conducted in Al Imam Mohammed Ibn Saud Islamic University medical center in Riyadh, during the interval from November 2017 to January 2018. In which we used a patient health questionnaire-9 that was administered to randomly selected diabetic and non-diabetic patients. This survey included 200 diabetic type II and 241 non-diabetic participants who anonymously completed the questionnaires. Data were analyzed using SPSS-16 and chi-square test was used to assess the statistical association.

Results: The percentage of major depression among diabetics was 38.5%, whereas it was 26% among non-diabetic participants with odds ratio of 1.7 (p = 0.007). The percentage of diabetic females suffering from major depression was higher (45%) than the percentage of diabetic males suffering from depression (32%). Diabetic patients who were living alone were more liable to have depression than those who were living with their spouses (OR 2.97; p = 0.001)

Conclusion: Over than one third of diabetics and one fourth of non-diabetics were detected to have major depressive symptoms. Diabetes type II and being single are significantly associated with the prevalence of depression.

Keywords: depression, Major depressive symptoms, type-II diabetics.

الملخص

خلفية: الاكتئاب هو ثاني الأمراض الأكثر شيوعاً التي يراها الأطباء بوحدات الرعاية الأولية، خصوصاً بين مرضى السكري. إن التشخيص المبكر والعلاج لهذا الاكتئاب يقلل من آثاره السلبية بشكل كبير.

الأهداف: تهدف الدراسة الى تحديد مدى انتشار أعراض الاكتئاب الرئيسية لدى مرضى السكري من النوع الثاني مقارنة بأولئك الذين لا يعانون من مرض السكري. وكذلك معرفة العوامل التي تؤدي لحدوث ذلك الاكتئاب.

طريقة الدراسة: هذه دراسة مقطعية اعتمدت على استبيان خاص بصحة المرضى والذي تم توزيعه على مجموعة من المرضى المتطوعين الذين يعانون من مرض السكري من النوع الثاني وكذلك الذين لا يعانون منه، والذين تم اختيارهم عشوائياً. أُجريت هذه الدراسة بالمركز الطبي لجامعة الإمام محمد بن سعود الإسلامية بمدينة الرياض، وذلك خلال الفترة من نوفمبر ٢٠١٧ إلى يناير ٢٠١٨. اشتملت الدراسة على ٢٠٠ مريض يعانون من مرض السكري من النوع الثاني، و٢٤١ مريض لا يعانون من مرض السكري. تم تجميع البيانات وتحليلها ودراسة العلاقات الإحصائية بينها.

النتائج: بلغت نسبة انتشار أعراض الاكتئاب الرئيسية لدى مرضى السكري ٣٨,٥٪، بينما بلغت ٢٦٪ في المشاركين الذين لا يعانون من مرض السكري (القيمة الاحتمالية ٠,٠٠٧). معظم النساء المصابات بمرض السكري يعانين من الاكتئاب مقارنة بالرجال حيث كانت نسبة الاحتمال ١,٧، والقيمة الاحتمالية ٠,٠٥٩. وجدت الدراسة أن مرضى السكري الذين يعيشون بمفردهم أكثر عرضة للإصابة بالاكتئاب مقارنة بأولئك الذين يعيشون مع أزواجهم حيث كانت نسبة الاحتمال ٢,٩٧، والقيمة الاحتمالية ٠,٠٠١.

الخلاصة: يعاني أكثر من ثلث مرضى السكري وكذلك ربع المرضى الذين لا يعانون منه من الاكتئاب. ويؤثر مرض السكري من النوع الثاني وكذلك الحياة بدون شريك بشكل كبير على معدل انتشار الاكتئاب.

الكلمات المفتاحية: الاكتئاب، الأعراض الأساسية للاكتئاب، مرض السكري من النوع الثاني.

Introduction

Depression is the second most prevalent chronic disorder seen by the doctors of the primary care. [1,2] In the United States, nearly seventy five percent of individuals who require care for depression, go to the doctors of primary care instead of mental health professionals. Persons who are suffering from major depressive symptoms may develop impairment of functional activities and this leads to decrease their productivity power. There is increase in their health care expenses and they are more liable to suicide. Complaints as sleep disruption, exhaustion and general pain are the most prevalent presentations of depressed patients seen by family physicians. [3] Recognizing depression among patients in a primary care centers may be difficult issue because patients, especially men, rarely talk about their emotional problems. [4] Therefore, family physicians may be unsuccessful to detect about 30 to 50% of patients suffering from major depressive episodes. [5, 6] Studies have shown that early diagnosis and proper management significantly reduce the adverse effects of depression in most patients. [7]

Previously, it was proposed that there is a relation between depression and the risk of diabetes. This relation has been confirmed in the recent times by Eaton et al. [8] and Kawakami et al. [9] whom studies confirmed elevation of the incidence of type II diabetes in those patients who were suffering from the symptoms of depression initially. Both studies suggest that depression may occur before the onset of type II diabetes and possibly has a role in its occurrence. These studies confirmed that major depressive symptoms may progress to type II diabetes i.e. they have a major role in its development.

The ability of the body to deal with excess carbohydrate may be impaired by the increased release of counter-regulatory hormones that occurs in depression, and this could increase the risk type II diabetes development. Major depressive symptoms may increase the risk of evolving type II diabetes either through changes in eating habits or physical activities or due to the drugs used for their treatment. [8]

A well-established way to measure major depression is by a survey which is usually achieved by short, easily administered questionnaire that provides information and insight on patients' symptoms. The aim of this study was to evaluate the prevalence of depression in patients suffering from diabetes type II as well as non-diabetic patients who presented to the clinics of family physicians.

Patients And Methods

This is a cross sectional study that has been approved by the Family Medicine Research Committee and the IRB of Al-Imam Muhammad Ibn Saud Islamic University, in session number 21, the number of this ethical approval is 23-2019. It was performed during the period of November 2017 - January 2018 at the family medicine clinics of Al Imam Mohammed Ibn Saud Islamic University medical center in Riyadh. Confidentiality of the pa-

tients was highly respected and therefore no identifying marks were in the questionnaire. An informed consent has been obtained from each participating patient before sharing in this study and their role in sharing by filling the questionnaire has been explained to them.

A total of 441 adult subjects were chosen randomly by using systematic random technique by odd numbers of diabetic and non-diabetic patient's list. The American Diabetic Association criterion was used for the diagnosis of Diabetes mellitus. [10]

Participating patients were interviewed by well-trained medical students after their acceptance to share in the study.

The first portion of the questionnaire consisted of demographic data including (age, gender, marital status, education level, is the patient diabetic or not, and diabetes duration). In the second part, Patient Health Questionnaire-9 was used for diagnosis of depressive symptoms. The 9 items in this instrument are based on the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) diagnostic criteria. [11] We used English as well as Arabic versions of Patient Health Questionnaire-9, which has been validated and tested in primary care settings in Arab countries. [12]

Each one of the 9 questions were scored from 0 to 3 which means (not at all) and (nearly every day) respectively. So, PHQ-9 score ranges 0 to 27, which has been used as a measure for the severity of disorder. We used the cut points of 5 which means mild disorder, 10 which means moderate disorder, 15 which means moderately severe disorder and 20 which means severe depression. They have been used to assess the threshold of depression. Major depression is diagnosed when the patient has a total score of 10 or more and so it is an indication for the need to start treatment. [13]

Data were entered and analyzed by Statistical Package for Social Sciences (SPSS) with statistical significance at P value (<0.05) a confidence level of 95%. Descriptive analysis including frequencies, percentages of the study variables were carried out. Chi-square test was used to measure statistical association.

Results

Among 441 patients, the ratio of male to female was 1:1.4 (41.5% Vs 58.5%) in non-diabetics while it was 1:1 (50% Vs 50%) in diabetics.

The total diabetic patients were 200 (45.4%) with the mean age of 49.4 (SD 11.2) ranging to 28 – 77 years, whereas the average age of 241 (54.6%) non-diabetic participants was 42.4 (SD 11.8) ranging 23-75 years. Further characteristics of participants are revealed in **table 1**

Table 1: Demographic Information of study population

Characteristics	Diabetic patients (n=200)	Non-Diabetic patients (n=241)
Age		
Mean ±SD	49.4±11.2	42.48±11.8
Marital status		
Single	13 (6.5%)	42 (17.5%)
Married	156 (78%)	162 (67%)
Widow	24 (12%)	24 (10%)
Divorced	7 (3.5%)	13 (5.5%)
Education		
Illiterate	60 (30%)	37 (15.4%)
Educated	140 (70%)	204 (84.6%)
Depression as per PHQ-9 score criteria	77(38.5%)	63(26%)

Out of 200 diabetic patients, 77 (38.5%) screened positive for clinically significant depressive symptoms (PHQ-9 score of 10 or higher), while 35.5% had minimal depressive symptoms (PHQ -9 score less than 10) as revealed in **table -2.**

Table 2: Different levels of depressive disorder among diabetic patients, as per PHQ-9 severity score

Provisional Diagnosis	N (%)
Community normal (PHQ-9 scores <5)	52 (26%)
Mild depressive symptoms (PHQ-9 scores 5 - <10)	71 (35.5%)
Major depression, Moderate symptoms (PHQ-9 scores 10 - 14)	**21 (10.5%)**
Moderately severe Major depression (PHQ-9 scores 15 - 19)	**40 (20%)**
Severe Major depression (PHQ-9 scores ≥20)	**16 (8%)**
Total	**200 (100%)**

Of those who have significant depressive symptoms, 21 (10.5%) had PHQ-9 scores between 10 and 14 (moderate depressive symptoms), 40 (20%) had scores between 15 and 19 (moderately severe major depression) and 16 (8%) had scores of 20 and above (severe major depression) as shown in table 2.

Seventy-seven (38%) diabetic patients were depressed as compared with 63 non-diabetic patients (26%) p=0.007 and odds ratio 1.7 (95% C.I. 1.16 - 2.7). Most of diabetic females (45%) were suffering from depression as compared to diabetic males (OR 1.7) but this difference was not statistically significant (p=0.059) (95% CI 0.94 – 3.22). Depression was also significantly more common among diabetic patients living alone as compared to those diabetics who were living with their spouses (52.9% Vs 33%); P=0.001, as shown in table 3.

Table 3: Prevalence of depression among diabetics and non-diabetic patients and factors related with depression among diabetic patients

Characteristics	Major Depression (%)	No Major Depression	OR	**P**
Participants (n=441)				
Diabetics	77 (38.5%)	123 (61.5%)	1.76	**0.007**
Non-diabetics	63 (26%)	178 (74%)		
Gender of diabetics(n=200)				
Female	45 (45%)	55 (55%)	1.74	**0.059**
Male	32 (32%)	68 (68%)		
Duration of diabetes in years (n=200)				
>10	22 (40.75%)	32 (59.25%)	1.14	**0.692**
≤ 10	55 (37.7%)	91 (62.3%)		
Diabetic's Age in years (n=167)				
>40	48 (38.4%)	77 (61.6%)	1.33	**0.439**
≤ 40	14 (33.3%)	28 (66.7%)		
Diabetic's Education(n=200)				
Illiterate	24 (40%)	36 (60%)	1.09	**0.775**
Educated	53 (37.9%)	87 (62.1%)		
Diabetic's Spouse Company(n=167)				
Living alone	18 (52.94%)	16 (47.06%)	2.97	**0.001**
Living with a partner	44 (33%)	89 (67%)		

Discussion

Depression is a common medical problem that frequently coexists with Diabetes Mellitus (DM). [14] Reports indicated that >25% of patients with DM reached clinical criteria for depression. [15] Many explanations account for this finding that have been integrated into 3 hypotheses. [16, 17] The first one is that the disease severity and different management mo-

dalities represent a load on patients and affect their normal daily life. The second one is that the long-term duration of the disease and its associated complications produce a chronic continuous stress on the patient, which affects the quality of his life. The third one is that DM and depression are portions of a related group of metabolic disorders. Individuals suffering from depression have negligence of self-care, which in result leads to low compliance with receiving their diet and treatments. Diabetes mellitus is an illness that needs significant compliance to diet, medications and exercise and these needs are potentially ignored by depressed patients.

In this primary clinic-based study, we observed a high risk of developing depression individuals suffering from diabetes. The prevalence rate of depression in those patients was 38.5%, which is in accordance with other studies. [18, 19] Study in a western region of Saudi Arabia showed 34% prevalence of depression among diabetic patients. [20]

The results of this study, in alignment with the reported results by Keita [21], showed that the prevalence of depression was higher among women than men. It prevalence is two folds higher in women than men. This statistic has also been observed among women with Diabetes in this study but it was not statistically significant (p-value =**0.059**). There are some biological and socioeconomic factors that clarify the reason of higher prevalence of depression in the female group such as hormonal changes during pregnancy, postpartum and premenopausal periods, Genetic vulnerability and being dependent to others. [21]

The educational level is another factor which is associated with the prevalence of depression; where it helps to protect against it. It seems that educated people tend to use health care services more than those who are illiterate. [22] Education would help to lower their trend to unhealthy behaviors such as smoking, obesity and fewer tendencies to crime committing. [23, 24] The study performed by Bjelland I et al [23] showed that high level of education is a protective agent against anxiety and depression although in this study we did not find any relation between depression and the level of education (p-value=**0.775**).

The study conducted by Palizgir et al [25] revealed that younger individuals had higher level of depression and anxiety than the older ones. This is closely related to the amount of the patients' experience in coping with different situations such as their concerns about their treatment procedure and the challenge of diabetes. The influence of disease on physical and psychological functioning and decreased quality of life resulting from the disease are the factors that increased the ratio of depression and anxiety among younger patients.[25] A study conducted by Zhao et al.[26] to investigate the relationship between the age and depression and it showed that younger adults were more likely to have adolescence-onset diabetes and the prevalence of depression was three folds higher than in the adolescences without diabetes.

But in this study, we have not found any significant correlation between diabetic patient age, duration of diabetes and the prevalence of depression among them.

Another interesting finding is the higher prevalence of depression among patients who are living alone in comparison with those living with a partner (OR = 2.97, P = 0.001).

Conclusion

More than one third of diabetics and one fourth of non-diabetics were found to have major depressive symptoms. Diabetes type II and living alone is significantly associated with depression. These findings reflect the importance of screening such patients for depression and educational efforts directed to medical team who treat patients with diabetes mellitus type-II

The study recommends that early detection of depression among diabetics. Prompt intervention by treating depressed diabetic patients would improve the overall outcome among those patients.

Current evidence-based guidelines are required to be applied in order to guide practitioners in the detection and treatment of depression in diabetic patients.

Family physicians should work "hand in hand" with the psychiatrist to improve detection and treatment of depression among diabetics and the population in general. Further research should focus on the impact of depression and how it impairs functioning, quality of life, the development and exacerbation of diabetic complications.

Acknowledgement

I would like to thank medical students at the college of medicine, Al Imam Mohammed Ibn Saud Islamic University for their active contribution in the collection of data.

Funding:

This research did not receive any specific grant from funding agencies in public, commercial or not-for-profit sectors.

Conflict of interest

I have no conflict of interest with any one regarding this research to declare.

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