Symptoms of depression and anxiety among a Sample of Type 2 diabetic patients at Primary Health Care in Erbil city
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Abstract

Background and Objectives: Diabetes mellitus (DM) is exceedingly widespread disease with the highest prevalence in the Middle East countries. Co-existing psychological symptoms affect glycemic control and considered as an important problem in achieving target. The objective of this study was to determine the percentage of depressive and anxiety symptoms among diabetes patients.

Methods: This cross-sectional study was conducted among a sample of 300 adult patients with type 2 diabetes who attended Primary Health Care centers in Erbil City during the period from the 1st of July 2016 to the end of 28th of June 2017. The Patient Health Questionnaire (PHQ9) and Diagnostic and Statistical Manual of Mental Disorders DSM-5 questionnaires has been used as diagnostic tools for depression and anxiety. The glycemic control measured using glycated hemoglobin A1C.

Results: The mean age ± SD of the sample was 54.79 ± 9.16 years, ranging from 40 to 75 years, the median was 54 years and considerable proportion (44.7%) were of low socio-economic status (SES). Only one quarter of the patients are highly adherent to the treatment. 52.3% of the patients were complaining from anxiety whether mild (28%), moderate (23.3%) or severe (1%). Regarding depression, 58.7% had had depression of different severity. No significant association was detected between anxiety and depression with diabetes control as assessed by glycated hemoglobin A1C (p = 0.932) and (p = 0.220) respectively. The prevalence of depression among those who follow a healthy diet (53.6%) and who practice physical activity (41.4%) was significantly less (p = 0.024).

Conclusion: The study revealed that large percentage of type 2 diabetic patients suffered from anxiety and or depressive symptoms, a results should alert all physicians working in primary health centers to consider these symptoms since they have a direct impact in improving treatment.

Introduction

Diabetes is one of the commonest public health problems affecting 387 million people all over the world, of whom about nine in ten have diabetes type 2 (DM type 2),[1]. Diabetes counted to be the fourth leading cause of death and ill health, and has reached epidemic levels worldwide. Achieving good glycemic control early in course is crucial to prevent occurrence of complications and mortality,[2]. Even though only 53.6% of people with type 2 diabetes achieving target glycated hemoglobin (HbA1c) <7%,[3]. The American Diabetes Association (ADA) and European Association for the Study of Diabetes (EASD) recommends personalized targets based on various factors, counting patient preferences, needs, values, co-morbidities, duration of diabetes, risk of hypoglycemia, costs and, ensuring a patient-centered approach, [4]. In the UK, National Institute for health and Clinical Excellence (NICE) recommends targets of <6.5% in newly-diagnosed patients and <7.5% in patients on two or more therapies, [5]. Among major reasons for not achieving these targets are comorbid psychological disorders. Altogether with diabetes, depression and anxiety are considered as major health problems in adult life,[6]
about 10-20% of old persons had depressive symptoms,[7] for individuals with chronic illnesses, the risk is higher at 25 – 33%.[8]

These disorders disturb quality of life negatively,[9] and had important socioeconomic consequences.[10].

Several studies have found a higher prevalence of depression among diabetics that is responsible for poor glycemic control and complications, [11,12].

Other studies reported the association between depression with physical disability and cognitive impairment which both are increased in diabetics, [13,14]. and also suggest that the course of depression is often persistent, [15,16]. The neuroendocrine abnormalities associated with DM, like higher level of cortisol and altered concentration of dopamine may be involved in the development of depressive and anxiety symptoms, [17,18].

The aims of this study are to find out the percentage of depressive and anxiety symptoms among diabetics at primary health care and to identify the association of these disorders with glycemic control and patient’s treatment adherence.

**Subjects and Methods**

A cross-sectional study was carried out during a period between 1st of July 2016 to the 28th of June 2017. Participants recruited through six Primary Health Care centers (Brayatti, Shady, Kurdistan, Nawroz, Enkawa and Shahedan) centers. According to municipality division of Erbil City. These centers are opened daily (except for public holidays), from 8.00 am to 2.00 pm, and on average 100-150 patients are seen on daily bases. A convenience sample of approximately 300 patients was used and systematic random samples (every three day) of DM type 2 patients were taken from these centers.

All Participants interviewed to complete a semi-structured questionnaire which contains close-ended questions, upon giving a verbal informed consent. The questionnaire consists of 4 parts. Section A involved all relevant patients’ demographic characteristics. Section B concentrated on questions which focused on symptoms of the depressive and anxiety disorders. Patient Health Questionnaire (PHQ9),[19] a manual published by the American Psychiatric Association (APA) used to measures depression and is chosen because includes diagnostic items that have cut scores. It includes nine questions and participants asked if they are experienced any of the following symptoms over the last two weeks like loss of interest, falling down, change in the sleep, fatigue, moving or speaking slowly feeling bad, poor concentrating on things, poor appetite or overeating and any suicidal thoughts. To survey anxiety symptoms, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), [20] has been used. Its consist of questions such as feeling anxious, unable to control worrying, too much anxiety about different things, difficult in relaxing, restless, easily annoyed or irritable and feeling scared. For each question the response options include not at all (0), several days (1), more than half the days (2), or nearly every day (3).

The last part of the questionnaire (C) addresses the self-care and adherent to treatment of diabetes by a set of questions that include healthy diet, physically active advice and drug adherence by morisky 8 items adherence questionnaire [21]. HbA1c for participants were analyzed using diasys one HbA1CFS (particle enhanced immunoturbidimetric test) which is a specific immunosassay for human HbA1c in these centers, their blood pressure and BMI also measured. The statistical Package for Social Sciences (SPSS, version 22) was used for analysis. To equate proportion, Chi square test of association has been used and Fisher’s exact test if the expected count of more than 20% of the cells of the table was less than 5. A p value of ≤ 0.05 was considered statistically significant. The socioeconomic status (SES) scoring that range from 0-15 was calculated from educational level (0-5), occupation (0-4), home ownership (0-2), crowding index (0-1), car ownership (0-1), and monthly family income (0-2). Scoring lower than 5 is considered as low SES, 6-10 is medium SES, and more than 10 is considered as high SES. The risk of developing depression is calculated and range from 0-27. Then depression was stratified into quartiles, scoring lower than 4 is considered as minimal depression, 5-9 is mild depression, 10-14 moderate, 15-19 moderately severe depression; and ≥20 is considered severe depression. The anxiety total score for the 7 items ranges from 0 to 21. Scores of 5, 10, and 15 represent cutoffs for mild, moderate, and severe anxiety, respectively. The treatment adherence scoring ranges from 0-8 Scoring higher than 2 is considered as low adherence, 1–2 is medium adherence, and high adherence if score equal to 0. Diabetes control is defined as HbA1c <7%.

**Ethical issues**

Ethical approval for the study was obtained from the Scientific and Research Ethics Committees at Hawler Medical University - College of Medicine a formal permission letter from Erbil General Directorate of Health (DOH) was also obtained to conduct the study.

**Results**

The total number of the studied sample was 300 diabetic patients affected with DM type II. The mean age ± SD of the sample were 54.79 ± 9.16 years, ranging from 40 to 75 years. The median was 54 years. More than one third (35.3%) of the studied sample aged 40-49 years, and 34.7% aged ≥ 60 (Table 1). Around half of the samples (52%) were females, and the majorities (69%) were living in urban areas. The majorities (92%) of the sample were married, and considerable proportions (44.7%) were of low socioeconomic status (SES).

**Table 1. Socio-demographic characteristics of the studied sample.**

| Parameters | No. | (%) |
|------------|-----|-----|
More than 90% of the patients were on oral anti-diabetic drugs (OAD), either alone (46%) or combined with insulin (45.3%) as presented in Table 2. The table shows also that 44.3% of the patients had comorbidities, 61% were on healthy diet, and 23% practice physical activity. Regarding the drug adherence as assessed by Morsky scale, 39.3% of the patients were not adherent (low adherence) to the treatment regimen, while 24% of the patients were highly adherent to the treatment.

The prevalence rates of anxiety symptoms are presented in Table 3. The most common and prevalent symptoms were ‘Becoming easily annoyed or irritable’ and ‘Feeling nervous, anxious, or on edge’. The least common symptom was ‘Feeling afraid as if something awful might happen’ where 57.3% of the patients didn’t complain from it.

The prevalence rates of depression symptoms are presented in Table 4. The most common and prevalent symptom was ‘little interest or pleasure in doing things’. The least common depression symptom was ‘Thoughts that you would be better off dead, or of hurting yourself in some way’ where 80% of the patients were not complaining from such a symptom. It is evident that 71.3% of patients were not complaining from this symptom: ‘Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual’. Other symptoms are presented in the table. Results showed that more than half of the patients were complaining from anxiety whether mild (28%), moderate (23.3%), and severe (1%), and the rest (47.7%) had no anxiety. Regarding depression, (41.3%) had minimal depression, (24%) had mild form of depression, (31.3%) had moderate form, and only (3.3%) had moderately severe depression.

| Parameters | No. (%) | Parameters | No. (%) |
|------------|---------|------------|---------|
| Type of treatment | | Type of treatment | |
| OAD | 138 (46.0) | Insulin | 26 (8.7) |
| Both | 136 (45.3) |
| Comorbidities | | Comorbidities | |
| Yes | 133 (44.3) | No | 167 (55.7) |
| Healthy diet | | Healthy diet | |
| Yes | 183 (61.0) | No | 117 (39.0) |
| Physical activity | | Physical activity | |
| Yes | 70 (23.3) | No | 230 (76.7) |
| Morisky adherence | | Morisky adherence | |
| High adherence | 72 (24.0) | Medium | 110 (36.7) |
| Low | 118 (39.3) | Total | 300 (100.0) |
| Health status | | Health status | |
| People with complications | 300 (100.0) | People with complications | 300 (100.0) |
| People without complications | 300 (100.0) | People without complications | 300 (100.0) |

Table 2. Some clinical characteristics of the studied sample.

| Symptoms | Not at all | Several days | More than half the days | Nearly every day |
|----------|------------|--------------|-------------------------|------------------|
| Feeling nervous, anxious, or on edge | 12 (4.0) | 202 (67.3) | 79 (26.3) | 7 (2.3) |
| Not being able to stop or control worrying | 62 (20.7) | 164 (54.7) | 68 (22.7) | 6 (2.0) |
| Worrying too much about different things | 86 (28.7) | 164 (54.7) | 48 (16.0) | 2 (0.7) |
| Trouble relaxing | 127 (42.3) | 116 (38.7) | 54 (18.0) | 3 (1.0) |
| Being so restless that it is hard to sit still | 116 (38.7) | 134 (44.7) | 44 (14.7) | 6 (2.0) |
| Becoming easily annoyed or irritable | 13 (4.3) | 143 (47.7) | 106 (35.3) | 38 (12.7) |
| Feeling afraid as if something awful might happen | 172 (57.3) | 87 (29.0) | 35 (11.7) | 6 (2.0) |

Table 3. Frequency of anxiety symptoms.

| Type of treatment | No. (%) |
|-------------------|---------|
| OAD | 138 (46.0) |
| Insulin | 26 (8.7) |
| Both | 136 (45.3) |
| Comorbidities | | Comorbidities | |
| Yes | 133 (44.3) | No | 167 (55.7) |
| Healthy diet | | Healthy diet | |
| Yes | 183 (61.0) | No | 117 (39.0) |
| Physical activity | | Physical activity | |
| Yes | 70 (23.3) | No | 230 (76.7) |

Table 4. Frequency of depression symptoms.
| Symptoms                                                                 | Not at all | Several days | More than half the days | Nearly every day |
|------------------------------------------------------------------------|------------|--------------|-------------------------|------------------|
|                                                                       | No.        | %            | No.                     | %               |
| Little interest or pleasure in doing things                           | 14 (4.7)   | 194 (64.7)   | 80 (26.7)                | 12 (4.0)        |
| Feeling down, depressed, or hopeless                                  | 81 (27.0)  | 130 (43.3)   | 79 (26.3)                | 10 (3.3)        |
| Trouble falling or staying asleep, or sleeping too much               | 80 (26.7)  | 140 (46.7)   | 74 (24.7)                | 6 (2.0)         |
| Feeling tired or having little energy                                 | 23 (7.7)   | 178 (59.3)   | 88 (29.3)                | 11 (3.7)        |
| Poor appetite or overeating                                          | 78 (26.0)  | 155 (51.7)   | 64 (21.3)                | 3 (1.0)         |
| Feeling bad about yourself—or that you are a failure or have let yourself or your family down | 94 (31.3)  | 126 (42.0)   | 74 (24.7)                | 6 (2.0)         |
| Trouble concentrating on things, such as reading the newspaper or watching television | 174 (58.0) | 72 (24.0)    | 53 (17.7)                | 1 (0.3)         |
| Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual | 214 (71.3) | 76 (25.3)    | 10 (3.3)                 | 0 (0.0)         |
| Thoughts that you would be better off dead, or of hurting yourself in some way | 240 (80.0) | 54 (18.0)    | 6 (2.0)                  | 0 (0.0)         |

(Table.5) shows no significant association between anxiety and the following socio-demographic factors: age (p = 0.680), gender (p = 0.585), residency (p = 0.740), marital status (p = 0.538), and socio-economic status (p = 0.507). Other factors had been studied and showed no significant association with anxiety like smoking (p = 0.761), type of treatment (p = 0.245), type of insulin (p = 0.653), healthy diet (p = 0.066), physical activity (p = 0.655), HbA1c (p = 0.932), drug adherence (p = 0.411), and body mass index (BMI) (p = 0.573).

Table 5. Factors associated with anxiety.
Table 6 shows no significant association between depression and many socio-demographic factors like age (p = 0.966), gender (p = 0.198), residency (p = 0.0168), and marital status (p = 0.315). The table shows that the prevalence of depression among those of low SES (68.7%) was significantly (p = 0.002) higher than the rate among those of middle class (55%), and those of high class (42.1%). The table shows no significant association between depression and smoking (p = 0.760), type of treatment (p = 0.064), and insulin type (p = 0.163). The prevalence of depression among those who follow a healthy diet (53.6%) was significantly less than the prevalence (66.7%) among those who don’t follow a healthy diet (p = 0.024). The prevalence of depression was significantly (p = 0.001) less among those who practice physical activity (41.4%) than among those who do not practice exercise (63.9%). No significant association was detected between depression and diabetes control as assessed by HbA1c (p = 0.220). The table shows that the more the drug adherence, the less the prevalence of depression (p = 0.008). It is evident that the prevalence of
depression was higher among the obese people but the difference was not significant (p = 0.669). Despite of the use of Chi-square test showed non-significant association between HbA1c and both depression and anxiety but, using regression to detect the causative effect on depression it’s found that type of treatment, physical activity had positive effect on depression with p value (0.020, 0.033) respectively, while drug adherence had significant negative effect on depression with p value (0.018). HbA1c had very highly significant positive effect on depression with p value (0.000).

Regarding causative effect on anxiety home ownership, SES had very highly significant causative effect on anxiety with p value (0.000), while healthy diet and HbA1c had positive causative effect on anxiety with p value (0.006 and 0.004) respectively. Educational level and occupation had negative causative effect on anxiety with p value (0.009, 0.021) respectively.

Table 6. Factors associated with depression.

| Factors                  | N  | Prevalence of depression |
|--------------------------|----|-------------------------|
|                          | No | (%)                     |
| Age (years)              |    |                         |
| 40-49                    | 106| 62 (58.5)               |
| 50-59                    | 90 | 52 (57.8)               |
| ≥ 60                     | 104| 62 (59.6)               |
| Gender                   |    |                         |
| Male                     | 144| 79 (54.9)               |
| Female                   | 156| 97 (62.2)               |
| Residency                |    |                         |
| Rural                    | 93 | 60 (64.5)               |
| Urban                    | 207| 116 (56.0)              |
| Marital status           |    |                         |
| Married                  | 276| 161 (58.3)              |
| Single                   | 10 | 8 (80.0)                |
| Divorced                 | 1  | 1 (100.0)               |
| Widowed                  | 13 | 6 (46.2)                |
| SES                      |    |                         |
| Low                      | 134| 92 (68.7)               |
| Middle                   | 109| 60 (55.0)               |
| High                     | 57 | 24 (42.1)               |
| Smoking                  |    |                         |
| Smoker                   | 55 | 32 (58.2)               |
| Non-smoker               | 206| 119 (57.8)              |
| Ex-smoker                | 39 | 25 (64.1)               |
| Type of treatment        |    |                         |
| OAD                      | 138| 71 (51.4)               |
| Insulin                  | 26 | 17 (65.4)               |
| Both                     | 136| 88 (64.7)               |
| HbA1c                    |    |                         |
| Long                     | 5  | 5 (100.0)               |
| Mixed                    | 157| 100 (63.7)              |
| Healthy diet             |    |                         |
| Yes                      | 183| 98 (53.6)               |
| No                       | 117| 78 (66.7)               |
| Physical activity        |    |                         |
| Yes                      | 70 | 29 (41.4)               |
| No                       | 230| 147 (63.9)              |
| HbA1c                    |    |                         |
| Controlled               | 31 | 15 (48.4)               |
| Uncontrolled             | 269| 161 (59.9)              |
| Adherence (Morisky)      |    |                         |
| High                     | 72 | 39 (54.2)               |
| Medium                   | 110| 55 (50.0)               |
| Low                      | 118| 82 (69.5)               |
| BMI                      |    |                         |
| < 25                     | 37 | 21 (56.8)               |
| 25-29                    | 150| 85 (56.7)               |
| ≥ 30                     | 113| 70 (61.9)               |

*By Fisher’s exact test.

Discussion
Diabetes has bad effect on the body which can lead to considerable personal and public costs. Despite advocating healthy lifestyle and pharmacologic interventions yet, diabetes still increasing in a significant percentage both in developed and developing countries with high glycemic levels. [22,23]. The association between depression and or anxiety with DM was the interest of health care professionals’ years ago. The coexisting of these diseases has bad effects not on glycemic control only but also increase the risk of complications of DM and on the quality of life among patients, [24-27]. The present study revealed that the prevalence of depression and anxiety were high and approximately close to each other among diabetic patients attending outpatient clinics (58.6 and 55.10 % respectively), although previous researches mentioned a higher frequency of anxiety than depression among diabetes.

A reasonable explanation could be because the symptoms that we assess for the depression and anxiety have the same score. Unexpectedly, the percentage of patients that had poor glycemic control is 89.66, extremely higher than that detected in previous studies worldwide and the percentage of depression and anxiety among uncontrolled diabetes was 59.9 and 52.4 % respectively. The doctor's reluctance to intensify medication to patient at primary health care may be the reason for this high percent of HbA1c ≥7 %. The depression and anxiety percentages among diabetes are divisive among studies globally. Some studies showed approximately similar results (56.1% [28] and 60.0% [29] for depression) and (55.1% [30] and 57.9% [31] for anxiety) respectively. Other studies in India, Malaysia, and Saudi Arabia reported a lower result (26.3% [32], 26.6% [33] and 22.45% [34] for depression) and (27.6% [32] and 28.5% [34] for anxiety) respectively.

Some reasonable explanations for this high percentage of mental disorders among diabetes in this study could be the poor knowledge and social barriers which make general practitioners to refrain from looking after symptoms of these diseases. The time that the research conducted was during bad political situation (ISIS issue) and corrupt economic state which resulted in many social perplexities and also because of absence of health insurance system. All these factors accumulatively caused relatively high depressive and anxiety symptoms.

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اعراض الكآبة والقلق بين عينة من النوع الثاني لمرضى السكري في مراكز الرعاية الصحية الأولية في مدينة اربيل

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قسم طب المجتمع ، كلية الطب ، جامعة هولير الطبية ، اربيل/العراق

الملخص
الخلفية: مرض السكري هو مرض منتشر بشكل واسع مع أعلى معدل انتشار في دول الشرق الأوسط. وجود اعراض النفسية بشكل متزامن مع السكري والذي يؤثر على التحكم في مستويات السكر في الدم تعتبر مشكلة مهمة في تحقيق الهدف هدف هذه الدراسة هي تحليل نسبية اعراض الكآبة والقلق بين مرضى السكري من النوع الثاني المراجعين في المراكز الصحية الأولية في مدينة اربيل الفترات من شهر تموز من سنة 2016 إلى شهر حزيران من سنة 2017.

الطريقة: أجريت دراسة مقطعية مستعرضة بين عينة متكونة من 300 مريض والمصابين بمرض السكري من النوع الثاني المراجعين في المراكز الصحية الأولية في مدينة اربيل للفترة من شهر تموز من سنة 2016 حتى شهر حزيران من سنة 2017. استبانست صحة المريض 9 ودليل تشخيصي واحصائي اضطرابات النفسية 5 استخدمت كادوات تشخيصية لكل من الكآبة والقلق. تم تحليل نسبة السكر بالدم بنسبة الهيموغلوبين الغليكوزيلاتي بين المرضى والمصابين.

النتائج: متوسط العمر والانحراف المعياري للعينات كان 54,79±9,16 سنة تتراوح اعمارهم بين 40-75 سنة بمتوسط عمر 45 سنة. نسبة كبيرة منهم (43,7%) كانوا بحالة اجتماعية اقتصادية منخفضة. حوالي ربع المرضى المشاركين في البحث فقط هم الملتمسين بالعلاج. (35,2%) من المرضى كانوا يعانون من القلق بدرجات متوسطة (28%)، وقلق شديد بنسبة (11%)، أما بالنسبة للذين يعانون من الكآبة حوالي (85%) يعانون من القلق بدرجات متوسطة. تم اكتشاف ارتباط ملموس بين كل من القلق والكآبة مع نسبة السكر المتمثلة بنسبة الهيموغلوبين الغليكوزيلاتي -2.3 (0.932) و-0.220 (0.4) على التوالي. ان انتشار الكآبة بين الذين يعانون نظام غذائي صحي كان (53.6%) والذين يمارسون النشاطات البدنية (26%) وكانت اقل بشكل ملموس (0.024).

الاستنتاجات: أظهرت نتائج الدراسة أن نسبة عالية من المرضى المصابين بالسري من النوع الثاني يعانون من أعراض القلق والكآبة. ان النتاج هذه الدراسة تنبه جميع الأطباء الأخذ بنظر الاعتبار وجود هذه الأعراض بين المرضى لأن لها تأثير مباشر في فعالية العلاج وتحسينه.