Determination of the Level of Depression among Diabetic Foot Patients at Al-Najaf Al-Ashraf Teaching Hospitals

التحري عن مستوى القلق والاكتئاب بين مرضى القدم السكري في مستشفيات النجف الاشرف التعليمية

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الخلاصة:

خلفية البحث: مرضى القدم السكري هم أكثر عرضة للإصابة باضطرابات نفسية مثل القلق والاكتئاب، والتي يمكن أن يكون لها تأثير كبير على الأداء العاطفي والنفسي مقارنة بمرضى السكري الذين لم يتعرضوا لمضاعفات في القدم.

الاهداف: أجريت الدراسة لتقييم مستوى القلق والاكتئاب لدى مرضى القدم السكري في مستشفيات النجف الأشرف التعليمية. وكذلك لمعرفة العلاقة بين القلق والاكتئاب لدى مرضى القدم السكري وخصائصهم الديموغرافية.

المنهجية: اجريت الدراسة بتصميم ارتباط وصفي، في الفترة من 10 / تشرين الأول / 2020 إلى 1 / حزيران / 2021. وقد أجريت الدراسة على عينة غير احتمالية (ملائمة) من (120) مريض مصابين بالقدم السكري تم اختيارهم من مستشفى الصدر التعليمي ومستشفى الفرات الاوسط التعليمي في محافظة النجف الاشرف. استخدم الباحث مقياس القلق والاكتئاب في المستشفى لتقييم مستوى القلق والاكتئاب.

النتائج: أظهرت نتائج الدراسة أن (37.5٪) من أفراد عينة الدراسة لديهم قلق متوسط. كما أظهرت الدراسة أن (36.6٪) من المشاركين في الدراسة يعانون من اكتئاب متوسط. أظهر تحليل معامل التوافق أن القلق والاكتئاب لهما علاقة معنوية مع عدد مرات دخول المستشفى، ومدة الإقامة الحالية في المستشفى، والبتر السابق. بالإضافة إلى ذلك، كان القلق مرتبطا ارتباطاً معنويا بالجنس والمستوى التعليمي ومدة الاصابة بالقدم السكري. إلى جانب ذلك، كان الاكتئاب مرتبطًا ارتباطاً معنوياً بالعمر والحالة الاقتصادية والإصابة بأمراض مزمنة أخرى.

الاستنتاج: استنتج الباحث ان مستوى القلق والاكتئاب كان متوسط لدى مرضى القدم السكري.

التوصيات: أوصت الدراسة عند التعامل مع مرضى القدم السكري بتكريس العاملين في مجال الرعاية الصحية وقتهم لفحص الصحة العقلية. كذلك توقع الآثار السلبية للتأثيرات الاجتماعية والنفسية على الصحة العقلية والجسدية.

الكلمات المفتاحية: الاكتئاب، القدم السكري.

ABSTRACT:

Background: Diabetic foot patients are more likely to have mental disorders such as anxiety and depression, which can have a significant impact on emotional and psychological performance compared to diabetics who have not experienced foot complications.

Aims of the study: The study aims to assess the level of depression among diabetic foot patients at Al-Najaf Al-Ashraf Teaching Hospitals and to find out relationships between depression among diabetic foot patients and their demographic characteristics.

Methodology: a study conducted by a descriptive design cross-sectional, this study carried out for a period from 10th October, 2020 to 1st June, 2021. Anon-probability (accidental) sample including 120 patients who have a diabetic foot which was selected from Al-Sadder teaching hospital and Al-Furat teaching hospital in Al-Najaf Al-Ashraf Governorate, the researcher is using the Hospital Anxiety and Depression Scale to assess the level of anxiety and depression.

Results: The result showed (36.6%) of the study participant have moderate depression. Contingency correlation analysis showed that depression is a significant correlation with the number of hospital admission, duration of current admission, and previous amputation, in addition, significantly correlated with age, economic status, having other chronic diseases.

Conclusion: The researcher concludes that the level of anxiety and depression among diabetic foot patients has moderate.

Recommendations: The study has recommended when dealing with diabetic foot patients, the health care workers devote their time to examining mental health. Also, predict the negative effects of social and psychological effects on mental and physical health.

Keywords: depression, diabetic foot.

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INTRODUCTION

Diabetes Mellitus (DM) is one of the most important chronic diseases worldwide, with regards to the impact on health and the fifth leading cause of death worldwide [1, 2], DM is a chronic genetic disorder that has been recognized as one of the main causes of life with disabilities [2].

Diabetes mellitus is a multi-system disorder characterized by impaired glycemic control and is associated with a range of medical complications. Adverse events may occur due to medication dosing and complications of the disorder may slow progress, these factors make individuals with diabetes predisposed to have psychological disturbance such as depression and anxiety [3].

Diabetes mellitus has become a worldwide problem as its prevalence rises. In 1980, 108 million people were diagnosed with diabetes, rising to 422 million in 2017. By 2035, it is expected that 592 million people will have the disease [4]. All types of diabetes mellitus can lead to complications in many parts of the body and increase the risk of dying prematurely, diabetes was the direct cause of 1.5 million deaths globally (World Health Organization [WHO], 2020).

Iraq is living with a DM epidemic, with a prevalence of about 20 percent, this prevalence has risen fourfold in the last four decades, and it is predicted to continue increasing in the future. Long-term DM complications are more frequent in Iraqi patients than in other parts of the world, approaching 80 percent for certain micro vascular complications [retinopathy and neuropathy], and 25 to 48 percent for macro vascular complications [cardiovascular diseases and stroke, respectively] [5].

Diabetic Foot (DF) is a severe diabetic complication characterized by deep tissue lesions in the lower limbs, as well as neurological problems and peripheral vascular disease. The diabetic foot has become more common as the global prevalence of diabetes mellitus has increased [6].

Diabetic Foot Ulceration (DFU) is a serious and potentially limb-threatening complication of diabetes that can lead to pain, tissue necrosis and amputation, and may significantly affect an individual's well-being and mobility [7]. Around 25 percent of people with diabetes will be suffering from DFU during their lifetime. In addition, every 20 seconds a lower limb is amputated due to diabetic complications. In fact, every year 5 percent of all the patients with diabetes develop foot ulcers, and 1 percent requires amputation [8].

Foot complications can be the most common cause for hospitalization in people with diabetes, and the duration of stay may be up to 59 percent longer than in people with diabetes hospitalized for a non-foot-related reason [9]. Diabetes complications are associated with amputation rates and life-threatening problems. A foot ulcer affects about 15 percent of diabetic patients, and 14-24 percent of those with foot ulcers need amputation [10].

Diabetic patients suffer from a variety of health problems, including mental and psychological challenges that have an effect on their overall health [11]. On the other hand, diabetic foot patients are more likely to experience depression and anxiety than diabetics without foot problems, and depression and anxiety levels increased with hospitalization [10, 12]. Diabetes mellitus and depression are two of the most serious public health problems in the United Kingdom (UK) and around the world [12].

AIMS OF THE STUDY

The study was done to assess the level of depression among diabetic foot patients at Al-Najaf Al-Ashraf Teaching Hospitals and to find out relationships between depression among diabetic foot patients and their demographic characteristics.

METHODOLOGY:

- **Design of the Study**

A descriptive Design Cross-sectional study was conduct on diabetic foot patient in Al-Najaf Al-Ashraf teaching hospitals. The study was carried out to assess the level of anxiety and depression among diabetic foot patient and to find out the relationship between the anxiety and depression and their socio-demographic characteristic.

- **The Setting of the Study**

     The study is conducted in Al-Najaf city/ Al-Najaf Al-Ashraf Health Directorate/ Al-Sadder teaching hospital and Al-Furat teaching hospital.

- **Sample and Sampling of the Study**

     Accidental (non-probability) sample was including 120 diabetic foot patients which were selected from Al-Najaf Al-Ashraf teaching hospitals.

- **Instrument of the Study**

     The research instrument which was consisting of two parts, **part I:** list of common items for assessing demographic characteristics of patient with diabetic foot and information about their illness and **part II:** Depression subscale of Hospital Anxiety and Depression Scale (HADs) to assess the depression among diabetic foot patients.

- **Part I: Socio-Demographic Characteristic**

     This section is dedicated to the collection of socio-demographic data including age, gender, residence, marital status, economic status, education level, occupational status, and information about their disease including duration of diabetes mellitus, duration of diabetic foot, if they have other chronic diseases, smoking history, alcohol history, number of admissions, duration of current hospitalization if they have a previous amputation and complications of diabetes mellitus.

- **Part II: Hospital Anxiety and Depression Scale**

     This scale assesses depression the subscale consists of seven items for depression (e.g. "I enjoy the things I used to enjoy"; "I have lost interest in my appearance") [13]. The score for each scale ranges from 0 to 21 and each item has a choice of four response statements (scored 0–3). A Total score which divided into four levels: Scores represent: normal 0-7, Mild 8-10, Moderate 11-14, severe 15-21 for depression [14].

- **Validity and Reliability of Scale:**

- **Validity of Scale**

     The instrument was introduced to a panel of (12) experts with more than ten years of experience in their field to make the instruments more valid using content and face validity methods. The changes have been made in accordance with the recommendations of the experts.

- **Reliability of the Scale**

     The scale was previously used [15], the reliability had shown that for Time 1 and Time 2, Cronbach's Alfa for the HADS depression subscale were 0.77 (95 percent CI: 0.7–0.83) and 0.8 (95 percent CI: 0.75–0.86), respectively. Internal consistency was found to be adequate for HADS depression subscale at both time points among patients.

- **Method of Data Collection**

     After determining the validity and reliability, data was collected using an 'Arabic version' self-report questionnaire as a means of data collection, as well as a semi-structured interview with patients who do not read or write, unless they refused to participate in the research. The questionnaire takes about 10 to 15 minutes to complete. The data was collected from 10th January 2021 to 10th May 2021.

- **Method of Statistical Analysis**

     The statistical package for social sciences (SPSS) version 24.0 application of statistical analysis framework was used to analyze the results. The resulting research was analyzed and evaluated using the subsequence statistical data analysis technique.

RESULTS:

Table (1): Distribution of the sample according to demographic characteristics

Section	Divisions	Frequency N= 120	Percent Total :100.0
Age	30-39 years	7	5.8
	40-49 years	36	30.0
	50-59 years	45	37.5
	60 years and more	32	26.7
	Mean = 53.43		
	Std. Deviation = 9.652		
Gender	Male	66	55.0
	Female	54	45.0
Residence	Urban	74	61.7
	Rural	46	38.3
Marital Status	Married	91	75.8
	Widowed	23	19.2
	Divorced	6	5.0
Economic status	Satisfied	10	8.3
	Satisfied to same extent	57	47.5
	Unsatisfied	53	44.2
Occupational status	Employee	20	16.7
	Retired	12	10.0
	Unable to work	25	20.8
	Unemployed	8	6.7
	Free job	8	6.7
	Housewife	47	39.2
Educational level	Don't read and write	45	37.5
	Read and write	17	14.2
	Primary school	23	19.2
	Secondary school	5	4.2
	Preparatory school	4	3.3
	Diploma	9	7.5
	Bachelor	17	14.2
Do you have another chronic disease	Yes	55	45.8
	No	65	54.2
Type of chronic disease	Hypertension	27	49.1
	CVA	24	43.6
	Asthma	4	7.3
Duration of DM	1-5 years	3	2.5
	6-10 years	31	25.8
	11-15 years	37	30.8
	16-20 years	27	22.5
	21 years and more	22	18.3
Duration of diabetic foot	1-10 Days	30	25.0
	11-20 Days	28	23.3
	21-30 Days	23	19.2
	31 Days and more	39	32.5
Do you smoker	Yes	38	31.7
	No	55	45.8

	Quit smoke	27	22.5
Do you drinking Alcohol	Yes	2	1.7
	No	118	98.3
Number of admission	1-2 times	64	53.3
	3-4 times	32	26.7
	5 times and more	24	20.0
duration of current hospitalization	1-2 days	54	45.0
	3-4 days	39	32.5
	5 days and more	27	22.5
Do you have previous amputation	Yes	61	50.8
	No	59	49.2
Complication of DM	CVA	14	11.7
	Retinopathy	40	33.3
	Neuropathy	10	8.3
	Nephropathy	24	20.0
	Other complication	32	26.7

Table 1 shows that nearly thirds of the age of the study sample were between (50-59) years at an age mean of 53.43 ± 9.65 years, regarding gender, the results of the current study showed that males were more than females with diabetic foot, regarding residence, the study reported that less than two-thirds of the study sample living in the urban area, concerning the marital status, the study finding shows that three-quarters of DF patient participant in the study were married, About economic status, the result of the study shows the less than half of the study sample have satisfied to some extent with their financial status, and (44.2%) they are unsatisfied, As for the occupational status, the current study found that more than one-third of the DF patients in this study are housewives, with regard to educational level, the study found a higher percentage of the study participants are do not read and write, as for the presence of other chronic diseases, the patients who didn't have another chronic disease are more than half of the study sample, the study showed that the high percentage of the patient participating in the current study had diabetes for 11 to 15 years and the mean is 15.49± 6.79 years. Further more details discussed in discussion.

Table (2): Assessment of depression status among diabetic foot patients

Section	Divisions	Frequency	Percent
Depression	Normal	20	16.7
	Mild	29	24.2
	Moderate	44	36.7
	Severe	27	22.5
	Total	**120**	**100.0**
	Mean 11. 93		
	St Deviation 3.68		

Table (2) indicates that more than one-third of the patients in the current study have moderate depression and about a quarter of them have mild depression,

Table (3): Correlation between anxiety and depression with demographic characteristics among diabetic foot patients

Section	Depression		
	CC	p-value.	Sig.
Age	.375	**.020**	**S.**
Gender	.232	.078	**NS.**

Residence	.216	.119	**NS.**
Marital Status	.194	.583	**NS.**
Economic status	.398	**.001**	**HS.**
Occupational status	.404	.075	**NS.**
Educational level	.344	.584	**NS.**
Do you have another chronic disease	.265	**.028**	**S.**
Type of chronic disease	.312	.167	**NS.**
Duration of DM	.277	.621	**NS.**
Duration of diabetic foot	.293	.260	**NS.**
Do you smoker	.163	.772	**NS.**
Do you drinking Alcohol	.110	.692	**NS.**
Number of admission	.413	**.000**	**HS.**
duration of current hospitalization	.404	**.001**	**HS.**
Do you have previous amputation	.426	**.000**	**HS.**
Complication of DM	.332	.250	**NS.**

Table 3 shows there is a significant correlation between depression and (age, economic status, if they have another chronic disease, number of hospital admission as a result of DF, duration of the current admission, and previous amputation.

DISCUSSION

- **Discussion of Socio-demographic Data of the Study Sample (table 1)**

Table (1) shows that nearly thirds of the age of the study sample were between (50-59) years at an age mean of 53.43 ± 9.65 years, this result coincides with the result of previous studies [1], asserted that the mean age of DFU patients was 59.4±10.1 years. [16] Reported that 32.8% of their study participant had ages from (51-60) years. [9] Reported that the median age of the study sample was 58 years. [17] Reported that the mean age of the patients was 53.7 ± 12.08 years. [18] Stated that most of the study sample was that at age mean 54.8 ± 11.05 years. [19] noted that 56.55 ± 3.32 mean of the age in their study. [20] Found that the mean age of the patients having diabetic foot ulcers was 52.36 ± 7.8 years. [21] Indicate that the majority of the study sample was 59.1 ± 9.9 years the age mean.

Regarding gender, the results of the current study showed that males were more than females with diabetic foot, according to the findings of this study, which are consistent with earlier findings that show that the males were more than females [10, 9, 12, 1, 21, 22, 23, 24, 18, 20, 25, 19, 26, and 6].

Regarding residence, the study reported that less than two-thirds of the study sample living in the urban area, the result of this study congruent with other studies, [17] stated that more than two-thirds of diabetic foot patients who participate in their study dwelled in urban areas. The result also agree [26] determining that there are just 21.3% DF patients living in the rural area and the other lives in the urban areas. [22] Asserted that more than half of the study participants was lives in urban areas. While [27] noted that more than three-quarters of their study sample resided in urban areas.

Concerning the marital status, the study finding shows that three-quarters of DF patient participant in the study were married, this result is agree with previous studies reported that more than three-quarters of DF patients were married [1, 27].

About economic status, the result of the study shows the less than half of the study sample have satisfied to some extent with their financial status, and (44.2%) they are unsatisfied. This result agree with the study [17] asserted that more than half of DF patient participants in their study were had middle income. Also, agree with [27] reported that nearly two-thirds of the study sample had intermediate income. While, [10] found that the average DF

patient's family monthly outcome less than expected, this result disagree with the result of the current study.

As for the occupational status, the current study found that more than one-third of the DF patients in this study are housewives, which is consistent with [28] who indicated that housewives composed more than one-third of the study sample.

Educational level: the study found a higher percentage of the study participants are do not read and write this result agrees with another previous study that asserted a similar result of the current study, the study [27] indicated that more than half of study participants were illiterate, this result agree with our result. As for, [18] was reported that more than half of the study sample were had a non-education or primary school. Also, [23] stated that more than two-thirds had elementary education or less.

As for the presence of other chronic diseases, the patients who didn't have another chronic disease are more than half of the study sample, the result of this study congruent with [18] documented that the patients with other comorbid conditions were more than one quarter while the patients without other chronic diseases they were less than three quarters in their study sample, furthermore, the study [25] noted that more than three-quarters of DF patients did not have other chronic diseases.

As for those who have chronic diseases, the current study showed that most of them had hypertension, this result agree with previous studies showed highly percentage of DF patients have hypertension [10, 23, 29, 30, 31, 26, and 6].

The study showed that the high percentage of the patient participating in the current study had diabetes for 11 to 15 years and the mean is 15.49± 6.79 years, this result congruent with [19] who reported that the mean DM duration was 15.52 years. Also, agree with these studies asserted [6, 20, and 32] the mean of DM duration among DF patients who participate in their study was 11 years. While found [10, 18, and 33] highly percentage of their study sample had DM more than 10 years this result agrees with a current study that found that a high percentage of them having diabetes 11 to 15 years.

Regarding the duration of diabetic foot, the study shows that the majority of the study sample have diabetic foot more than one month, this result agrees with [24] stated that less than three quarters have diabetic foot more than 1 month, Also documented [32] the mean of DF duration was 1.6 months. While noted [25] the median of DF duration was 11 weeks that also agree with our study.

About current smoking, the finding demonstrates that less than one-third of patients are a smoker and other non-smoker or ex-smoker this result congruent with [1, 10, 24, and 23] asserted that the DF patients participant in their study less than one-quarter were a smoker. Likewise, [17, 27] reported that nearly two-thirds of the study sample was a non-smoker. Also indicated [4, 32] that the majority of the study participant was a non-smoker this result agrees with the current study.

Drinking alcohol: the study found that the vast majority of the participants don't drink alcohol, and these results are in agreement with most of the previous studies, as [32, 34] found that the majority of their study sample didn't drink alcohol. While [1, 26] found that only a quarter of the participants in their study drink alcohol.

Regarding the number of times patients with the diabetic foot are admitted to the hospital due to diabetic foot and its complications, it was found through the results that nearly half of the study participants have admitted to the hospital once or twice, that these results incongruent with the previous study, as [28] indicated that there is 50% of DF patients had 3-4 times hospital admitted, perhaps the reason is that the majority of patients resort to private clinics to treat diabetic foot complications, and their admission to hospital is limited to severe cases or if they need an amputation.

The duration of stay of current diabetic foot patients in the hospital, it was found through the results that the mean of duration hospitalization is 3.24 days and that these results contradict the previous study, as [35] indicated that the mean duration of hospitalization was 22.5 days. Perhaps the reason is the lack of treatment and service facilities in government hospitals, and maybe also the spread of Coronavirus and fear of infection, which made them leave the hospital as soon as possible.

Previous amputations, the result found that half of DF patients had a previous amputation, and this result does not completely agree with previous studies that showed that the percentage of patients who did not have a previous amputation was more than those who had it [36, 24, 30, and 37].

Diabetes complications, the results show that one-third of patients suffer from retinopathy, and this result is consistent with [24] it has been reported that more than half of diabetic patients have retinopathy. Also, the study [22, 25, and 6] found that less than two-thirds of the study sample had retinopathy. While asserted [30] that the majority of the study participant had retinopathy.

- **Discussion of Depression among of the Study Sample**

Table (2) indicates that more than one-third of the patients in the current study have moderate depression and about a quarter of them have mild depression. The study [1] stated that more than half of the study sample had mild depression while less than one-third of them had moderate depression. In addition, [16] found that more than two-thirds of the DF patients in their study experienced mild depression. According to a study [29], 28.3 percent of DF patients suffer from moderate to severe depression. Moreover, [25] that it was the mean score of depression was 9.39 +_ 5.90 moderate depression.

- **Discussion of Correlation between Depression and Socio-Demographic Data among of the Study Sample**

Concerning the result related to the correlation between depression and socio-demographic data in table (4) the existing study exposes that there is no significant correlation between depression and demographic data of the study sample related to (gender, residence, marital status, occupational status, educational level, type of other chronic diseases, duration of DM, duration of DF, smoking history, alcohol history, and complication of DM.

While the study shows there is a significant correlation between depression and (age, economic status, if they have another chronic disease, number of hospital admission as a result of DF, duration of the current admission, and previous amputation. The results of the study [10, 16] showed that there was a significant correlation between depression and age and the presence of another chronic disease. Also, asserted [32] that there was a significant correlation between depression and economic status. Besides that, found [25] there was a significant correlation between depression and (age, the number of hospital admission as a result of DF, and the duration of the current admission).

CONCLUSION

Based on the interpretation and discussion of the results, the researcher concludes that the following:

This study found a significant prevalence of anxiety and depression as identified with HADs in subjects with diabetic foot ulcers, the level of depression among diabetic foot patients participant in the current study was moderate. The depression was significantly associated with the number of times patients were admitted to hospitals and the length of stay of patients in the hospital, and were also significantly associated with patients who had a previous amputation.

RECOMMENDATIONS

The findings of this study will provide fundamental information to nurses and healthcare institutions, including the Iraqi Ministry of Health, in order to raise awareness depression in the country's healthcare settings. The findings of this study highlight the need for more research on diabetic foot patients' mental health in Iraqi health care settings. More study employing qualitative and quantitative research methodologies in a variety of healthcare institutions is encouraged since this will provide a broader view of treating depression in diabetic foot patients, lead policy reform, and devise successful improvement initiatives.

REFERENCES:

1. Chen, H., Cai, C., & Xie, J. (2020). The effect of an intensive patients' education program on anxiety, depression and patient global assessment in diabetic foot ulcer patients with Wagner grade 1/2: A randomized, controlled study. *Medicine*, 99(6).
2. Kennedy, N. A., Faye, K. I., & Chukwuemeka, S. P. (2015). Psychiatric comorbidity and quality of life in persons with diabetes mellitus and people living with HIV (PLWHIV) in Port Harcourt, Nigeria. *Am J Psychiat Neurosci*, 3(6), 154-164.
3. Siva Ilango, T., Maithreyi, P., Siddharth, S., Anand, N. N., & Nambi, S. (2017). Predictors of psychological distress and depression among patients with type 2 diabetes mellitus. *Int. J Cur Res Rev*, Vol., 9(3), 48.
4. Sari, Y., Purnawan, I., Taufik, A., & Sumeru, A. (2018). Quality of life and associated factors in Indonesian diabetic patients with foot ulcers. *Nurse Media Journal of Nursing*, 8(1), 13-24.
5. Mikhael, E. M., Hassali, M. A., & Hussain, S. A. (2020). Need of Self-Management Education for Iraqi Diabetic Patients. *Journal of Social Health and Diabetes*.
6. Zhang, P., Lu, J., Jing, Y., Tang, S., Zhu, D., & Bi, Y. (2017). Global epidemiology of diabetic foot ulceration: a systematic review and meta-analysis. *Annals of medicine*, 49(2), 106-116.
7. Howarth, D. (2019). Preventing foot complications in people with diabetes mellitus. *Nurs Stand*, 34(7), 69-74.
8. Marzoq, A., Shiaa, N., Zaboon, R., Baghlany, Q., & Alabbood, M. H. (2019). Assessment of the outcome of diabetic foot ulcers in Basrah, Southern Iraq: A cohort study. *International Journal of Diabetes and Metabolism*, 25(1-2), 33-38.
9. Ahn, J., Del Core, M. A., Wukich, D. K., Liu, G. T., Lalli, T., VanPelt, M. D., ... & Raspovic, K. M. (2018). Scoring mental health quality of life with the SF-36 in patients with and without diabetes foot complications. *The international journal of lower extremity wounds*, 17(1), 30-35.
10. Ahmad, A., Abujbara, M., Jaddou, H., Younes, N. A., & Ajlouni, K. (2018). Anxiety and depression among adult patients with diabetic foot: prevalence and associated factors. *Journal of clinical medicine research*, 10(5), 411.
11. Yavari, A., Abbasi, N. M., Vahidi, R., Najafipoor, F., & Farshi, M. G. (2011). Effect of Exercise on Psychological Well-being in T2DM. *Journal of stress physiology & biochemistry*, 7(3), 132-142.
12. Chapman, Z., Shuttleworth, C. M. J., & Huber, J. W. (2014). High levels of anxiety and depression in diabetic patients with Charcot foot. *Journal of foot and ankle research*, 7(1), 1-8.
13. Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. Acta psychiatrica scandinavica, 67(6), 361-370.
14. Stern, A. F. (2014). The hospital anxiety and depression scale. *Occupational Medicine*, 64(5), 393-394.

15. Terkawi, A. S., Tsang, S., AlKahtani, G. J., Al-Mousa, S. H., Al Musaed, S., AlZoraigi, U. S., ... & Altirkawi, K. A. (2017). Development and validation of Arabic version of the hospital anxiety and depression scale. *Saudi journal of an aesthesia*, 11(Suppl 1), S11.

16. Polikandrioti, M., Vasilopoulos, G., Koutelekos, I., Panoutsopoulos, G., Gerogianni, G., Alikari, V., ... & Zartaloudi, A. (2020). Depression in diabetic foot ulcer: Associated factors and the impact of perceived social support and anxiety or depression. *International wound journal*, 17(4), 900-909.

17. Saber, H. J., & Daoud, A. S. (2018). Knowledge and practice about the foot care and the prevalence of the neuropathy among a sample of type 2 diabetic patients in Erbil, Iraq. *Journal of family medicine and primary care*, 7(5), 967.

18. Mohammed, S. I., Mikhael, E. M., Ahmed, F. T., Al-Tukmagi, H. F., & Jasim, A. L. (2016). Risk factors for occurrence and recurrence of diabetic foot ulcers among Iraqi diabetic patients. *Diabetic foot & ankle*, 7(1), 29605.

19. Sehlo, M. G., Alzahrani, O. H., & Alzahrani, H. A. (2016). Illness invalidation from spouse and family is associated with depression in diabetic patients with first superficial diabetic foot ulcers. *The International Journal of Psychiatry in Medicine*, 51(1), 16-30.

20. Neeru, B., Gagandeep, K., Pal, A. J., Bajwa, S. J. S., Harbandna, S., & Rajesh, K. (2015). Psychosocial, psychiatric, and clinical implications of diabetic foot ulceration: A prospective analysis. *Journal of Social Health and Diabetes*, 3(2), 89-94.

21. Fejfarová, V., Jirkovská, A., Dragomirecká, E., Game, F., Bém, R., Dubský, M., ... & Wu, S. (2014). Comment on "Impact of Diabetic Foot on Selected Psychological or Social Characteristics". *Journal of diabetes research*, 2014.

22. Hoban, C., Sareen, J., Henriksen, C. A., Kuzyk, L., Embil, J. M., & Trepman, E. (2015). Mental health issues associated with foot complications of diabetes mellitus. *Foot and ankle surgery*, 21(1), 49-55.

23. Limongi, F., Noale, M., Crepaldi, G., Maggi, S., & ILSA Working Group. (2014). Prevalence of diabetes and depressive symptomatology and their effect on mortality risk in elderly Italians: *The Italian Longitudinal Study on Aging. Diabetes & metabolism*, 40(5), 373-378.

24. Messenger, G., Masoetsa, R., Hussain, I., Devarajan, S., & Jahromi, M. (2018). Diabetic foot ulcer outcomes from a podiatry led tertiary service in Kuwait. *Diabetic foot & ankle*, 9(1), 1471927.

25. Pedras, S., Carvalho, R., & Pereira, M. G. (2018). Predictors of quality of life in patients with diabetic foot ulcer: the role of anxiety, depression, and functionality. *Journal of health psychology*, 23(11), 1488-1498.

26. Spanos, K., Saleptsis, V., Athanasoulas, A., Karathanos, C., Bargiota, A., Chan, P., & Giannoukas, A. D. (2017). Factors associated with ulcer healing and quality of life in patients with diabetic foot ulcer. *Angiology*, 68(3), 242-250.

27. Salih, N., & Al-Asadi, J. N. (2012). Herbal remedies use among diabetic patients in Nassyria, Iraq. *World Family Medicine Journal: Incorporating the Middle East Journal of Family Medicine*, 99(316), 1-7.

28. Yildiz, E., & Aşti, T. (2015). Determine the relationship between perceived social support and depression level of patients with diabetic foot. *Journal of Diabetes & Metabolic Disorders*, 14(1), 1-8.

29. Pearson, S., Nash, T., & Ireland, V. (2014). Depression symptoms in people with diabetes attending outpatient podiatry clinics for the treatment of foot ulcers. *Journal of foot and ankle research*, 7(1), 1-8.

30. Pemayun, T. G. D., Naibaho, R. M., Novitasari, D., Amin, N., & Minuljo, T. T. (2015). Risk factors for lower extremity amputation in patients with diabetic foot ulcers: a hospital-based case–control study. *Diabetic foot & ankle*, 6(1), 29629.

31. Rice, J. B., Desai, U., Cummings, A. K. G., Birnbaum, H. G., Skornicki, M., & Parsons, N. B. (2014). Burden of diabetic foot ulcers for Medicare and private insurers. *Diabetes care*, 37(3), 651-658.
32. Winkley, K., Sallis, H., Kariyawasam, D., Leelarathna, L. H., Chalder, T., Edmonds, M. E., ... & Ismail, K. (2012). Five-year follow-up of a cohort of people with their first diabetic foot ulcer: the persistent effect of depression on mortality. *Diabetologia*, 55(2), 303-310.
33. Nash, T., Ireland, V., & Pearson, S. (2013). Assessment of depression in people with diabetes attending outpatient clinics for the treatment of foot ulceration. *Journal of Foot and Ankle Research*, 6(1), 1-1.
34. de Jesus Pereira, M. T., Magela Salome, G., Guimaraes Openheimer, D., Cunha Esposito, V. H., Aguinaldo de Almeida, S., & Masako Ferreira, L. (2014). Feelings of powerlessness in patients with diabetic foot ulcers. *Wounds*, 26(6), 172-7.
35. Cawich, S. O., Islam, S., Hariharan, S., Harnarayan, P., Budhooram, S., Ramsewak, S., & Naraynsingh, V. (2014). The economic impact of hospitalization for diabetic foot infections in a Caribbean nation. *The Permanente Journal*, 18(1), e101.
36. Jarl, G., & Lundqvist, L. O. (2017). Beyond dichotomous thinking: a process perspective on diabetic foot disease. *Diabetic foot & ankle*, 8(1), 1380477.
37. Sekhar, M. S., Unnikrishnan, M. K., Vijayanarayana, K., & Rodrigues, G. S. (2019). Impact of patient-education on health related quality of life of diabetic foot ulcer patients: A randomized study. *Clinical Epidemiology and Global Health*, 7(3), 382-388.