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Prevalence of Depression in Diabetic Patients Type 2

Dr. Adil Jafaar Abdul Sahib, Dr. Saad H. Saad*,
Dr. Dergham Majeed Hameed and Fatima Dheidan Mejbi

Abstract--- Background: *Diabetes mellitus (DM) is one of the commonest disease in the world, it leads to inability and to many fatal complications if left without good treatment, good care delays the appearance of complications , improves the quality of life and reduces the cost of treatment, It has become known that there is an increase in the prevalence of depression in diabetics and this accompanying depression leads to the deterioration in the quality of life for these patients.*

Aims: *To study the prevalence of depression in people with type 2 diabetes and its effect on controlling blood sugar and the quality of life.*

Settings and Design: One diabetes center, one cross-sectional study, one interview

Materials and Methods: *A group consisting of 80 patients with type 2 diabetes is included in this study. In order to diagnose depression, the DSM 5 diagnostic criteria for depressive episode (Arabic) was used. All patients were interviewed using a semi-structured form to assess Sociodemographic data, "Hamilton Rating Scale for Depression (HAM-D)" and "Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES–Q) SF" (Short Form) to measure the quality of life.*

Conclusion: *This study concluded that the presence of depression in patients with type 2 diabetes leads to a deterioration in the quality of life. Therefore, treatment of depression will lead to an improvement in the quality of life.*

Keywords--- *Depression, Type 2 Diabetes, Quality of Life.*

Abbreviation: *(Q-LES-Q-SF), Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form, QoL, Quality of Life, DM, Diabetes Mellitus, HbA1c, Glycated Hemoglobin.*

I. INTRODUCTION

Diabetes represents a group of chronic metabolic disorders that are characterized by high blood sugar as a result of low insulin secretion or as a result of insufficient insulin action, or the disease can result from both causes. High blood sugar for a long time leads to many complications in the long run, so the result will be damage, dysfunction, or deficiency in the organs of the body, especially the eyes, nerves, heart, kidneys and blood vessels(1). According to the International Diabetes Federation, diabetes is one of the most urgent health emergencies worldwide in the 21st century (2).

Dr. Adil Jafaar Abdul Sahib, Al-Hussien Teaching Hospital, Al-Muthanna, Iraq.
Dr. Saad H. Saad, Al-Muthanna University, College of Medicine, Department of Medicine, F.I.C.M.S., MBChB.*
E-mail: dr_saeed76@yahoo.com, dr_saeed76@mu.edu.iq
Dr. Dergham Majeed Hameed, Al-Muthanna University, College of Nursing, Iraq.
Fatima Dheidan Mejbi, Al Muthanna Health Directorate Al-hussein Teaching Hospital.

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Type 2 diabetes makes up approximately 90% of diabetics. Type 2 diabetes results from a reduced response to the hormone insulin and this is known as insulin resistance, here insulin is ineffective and this leads to increased secretion of the hormone insulin to maintain the level of sugar in the blood.

Over time, insulin production decreases and this leads to type 2 diabetes. Type 2 diabetes usually appears at the age of more than 45 years, but it has been observed that there is an increase in this disease in adolescents, children and young adults as a result of increased rates of obesity and less movement and Lack of exercise and increased consumption of high-calorie foods (3).It means that diabetes is associated with dangerous lifestyles and also related to hereditary and family factors (4).

Depression is a mental illness that affects the body, mood, and thoughts and clearly affects the patient's eating, sleep and how he feels about himself or herself, and how he or she thinks about the things that surround him or her. Depression is different from sadness (5). It is not a sign of sadness. It is a common and severe disease, affecting approximately 11% in low-income countries and 15% in high-income countries (6). With proper treatment, the patient can benefit from the treatment and gets adequate help to control the disease (5).

Generally, organic diseases increase the rate of exposure to depression; in fact it is assumed that severe organic diseases have the ability to affect, in a sustainable and Depression is the first mental illness that is diagnosed by physicians who are not specialists in psychiatry.

Depression is one of the most common mental illnesses that come as one of the psychological complications of organic diseases and is the most common mental illness in diabetics. It has been found to accompany a third of all organic diseases (7).

A clue suggests that the relationship between depression and type 2 diabetes has two directions. For example, research by Knol et al. Proposes that in addition to depression being an outcome of diabetes, depression may also be a hazard factor for the attack of diabetes (8).

Two considerable theories presently occur to interpret the nature of the relationship between diabetes and depression. I e which one gives rise to the other. One theory maintains that depression precedes type 2 diabetes (i.e. depression raises the risk of developing diabetes). Unluckily, the relationship between depression and diabetes is noticeably unclear.

Theoretically, it is believed that increased risk of diabetes is the result of increased counter-regulatory hormone release and action, or changes in sugar transfer function and increased immunoinflammatory activation (9). These physiologic changes are supposed to lead to insulin impedance and beta islet cell malfunction, which finally lead to the evolution of type 2 diabetes. The second supposition is that Depression in diabetic patients results from the psychological and social distress associated with chronic medical diseases (10).

Really the psychological components are of essential grandness in determining control of diabetes and hence in stopping complications (11).

Quality of life is a multidimensional concept that reflects the self-assessment of a person's satisfaction with life and his fears, as well as elements such as the health of the individual, his relationship with family, relatives and

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friends, the health of people close to him and important people in his life, as well as economic status, religion and recreational activities (12).

However, the term quality of life in medicine refers to self-awareness and self-assessment related to the impact of the disease and its consequences on person's life(13).

Many diabetes patients live healthy lives and have good adaptability, but although there are studies that have found different results, these studies were looking at aspects such as attitudes towards diabetes, wishes and needs, these studies have found that there is a lack of psychological support for diabetics. This undoubtedly led to a poor quality of life and reduced the feeling of good health (14.15).

Many diabetics encounter difficulty in taking medications for life. This difficulty leads to non-compliance with the treatment plan and lack of compliance with the instructions of the treating doctor and treatment of the disease away from the doctor and on the patient's own responsibility (16). These psychological and social problems ultimately lead to depression or one of the other mental illnesses that.

Accompanies the behavior of not caring for personal health, or accompanies poor blood sugar control and then increasing the death rate and also accompanies physical disability and an increase in health care costs, loss of production and poverty of quality of life (17.18).

Diabetes is considered a chronic disease and like any other chronic disease it has the ability to negatively affect the patient's life. There are many studies that have shown the effect of diabetes on the quality of life and that clearly decreases when compared to the quality of life for a healthy person (19.20.21)

It is known that depressive symptoms affect the quality of life clearly (20). The presence of both diseases, diabetes and depression, leads to a further deterioration in the quality of life. Actually the symptoms of depression are important factors in determining the quality of life in diabetics.

II. METHOD AND MATERIAL

Diabetes patients of the second type were picked up at the Specialized Diabetes Center at Al Hussein Teaching Hospital in Samawah, knowing that these patients included new and old cases.84 patients were randomly selected in this study, provided that they do not suffer from psychosis and have good mental strength that enables them to answer questions. Patients suffering from other chronic organic diseases were excluded from the study and patients who took medications other than those used to treat diabetes were also removed.

Patients suffering from other chronic organic diseases were excluded from the study and patients who took drugs known to cause depression were also removed, while patients who take medications used to treat diabetes are undoubtedly present in this study.

The study design was cross-sectional, and each patient was interviewed once, and due to the lack of availability of the HBA1c examination in the Diabetes Center, the last test was approved, all patients have a new test result that does not exceed a month and is applied in a private laboratory, The study was conducted from July 2019 to January 2020. All patients interviewed with semi-structured Formula, which was specifically designed for this study and it

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includes the following:

1. socio-demographic data
2. DSM-5 Diagnostic Criteria for depression in Arabic (22).
3. Hamilton Rating Scale for Depression (HAM-D),Arabic version(23)

(Q-LES–Q- SF) (24) to measure the quality of life. It was translated into Arabic and the back translation method was used to ensure the quality of the translation. All data in this study were subjected to statistical analysis using chi-square,t-test and correlation coefficient.

The confidence interval in this study was ninety-five percent, and the value of p was considered to determine the statistical significance.

If it is less than five percent, it is statistically significant.

Aim

1. To know the prevalence of depression in diabetes patients and to know the severity of depression in these patients
2. To know is there a relationship between depression and adequate control of the level of sugar in the blood, as well as to know the relationship between the intensity of depression (HAM-D scores) and the level of sugar in the blood (HbA1c level).
3. A comparison of the quality of life for people with diabetes who suffer from depression with those with diabetes who do not suffer from depression.
4. Comparing the quality of life (QLESQ-SF scores) with the degree of controlling blood sugar (HbA1c).

III. RESULTS

Table 1 shows the socio-demographic characteristics of diabetic patients, those with depression and those without depression. Among the study participants, sixty patients (25 males: , 35 females:) met the DSM-V diagnostic criteria for major depressive episodes, whereas twenty patients (15 males: , 5 females:) did not have a major depressive episode in the past month.

The difference in gender was statistically significant. Mean age of the depressed group was 54, 63 ±8.77 years and that of the non-depressed group was 47.85 ± 7.42 years (P>0.05). The difference in the age of both groups was not statistically significant.71.6 % of the depressed patients was married, while 20% of non- depressed were married, the result was statistically significant.

61.6% of the depressed patients were illiterate, while only one patient (5%) from non-depressed group was illiterate, the difference was statistically significant, 55% of the patients were rural and 81.6 % were unemployed in the depressed group vs 15% and 25% in the non-depressed group respectively.

The differences were statistically significant.

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Table 1: Characteristic of Diabetic Patients

Characteristics	Pt.withdepression No. =60 %= 75		Pt. without depression No.=20 %=25		Level of significant	
Age	Mean=54.63 SD=8.77		Mean=47.85 SD=7.42		X2=7.712 DF=4	P.V.=0.103 N. S.
<30	0	0	0	0		
30-40	4	6.667%	4	20%		
41-50	23	38.333	11	55%		
51-60	18	30%	4	20%		
>,=61	15	25%	1	5%		
Male	25	41.667%	15	75%	X2=8.087 DF=1	P.V.=0.004 S.
Female	35	58.333%	5	25%		
Marital status					X2=7.196 DF=2	P.V.=0.027 S.
Single	1	1.667%	0	0		
Married	43	71.667%	20	100		
Divorced	0	0	0	0		
Widowed	16	26.666%	0	0		
Level of education					X2=29.431 DF=3	P.V.=0.000 Highly S.
Illiterate	37	61.667%	1	5%		
Read &write	11	18.333%	5	25%		
Primary	10	16.666%	6	30%		
Secondary	1	1.667%	1	5%		
College and higher education	1	1.667%	7	35%		
address						
Rural	33	55%	3	15%	X2=9.697 DF=1	P.V.=0.002 S.
Urban	27	45%	17	85%		
Occupation						
Unemployed	49	81.667%	5	25%	X2=24.026 DF=3	P.V.=0.000 Highly S.
Worker	6	10%	7	35%		
Employed	5	8.333%	6	30%		
Retired	0	0%	2	10%		

Figure 1 shows the severity of depression in diabetic depressed patients, 28% were mildly depressed (N=17), 33 % were moderately depressed (N=20), 13 % had severe depression (N=8), and 25% had very severe depression (N=15) according to the HAM-D scale .

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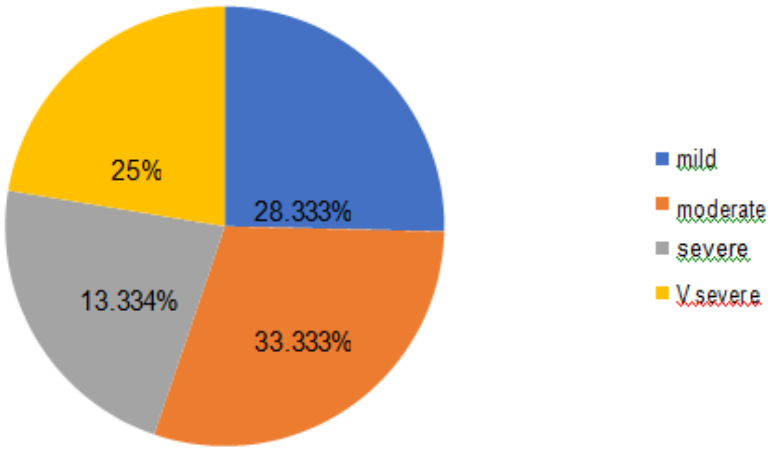

Figure 1: Pie Chart Shows Severity of Depression in Depressed Diabetics

Figure 2 shows the severity of depression among the both sexes of study population, females showed higher severity of depression than males.

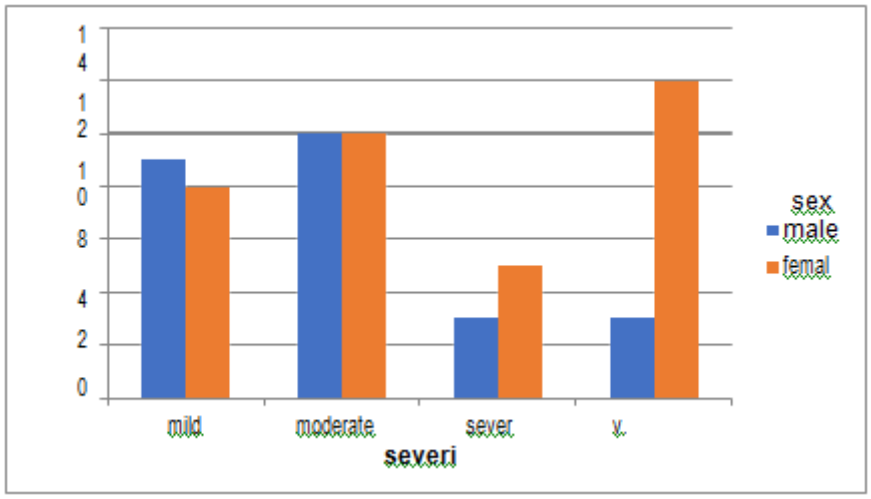

Figure 2: Shows the Severity of Depression Over Males and Females

Table 2 shows the mean duration of DM in the depressed and non-depressed groups was

9.21 ±6.9 Years and 4.65 ± 3.3 years, respectively. The difference in the duration of diabetes between groups was statistically insignificant.

Table 2: Shows the Mean of Duration of Diabetes in Depressed and Non-Depressed pt

Character	Depressed diabetics	Non-depressed diabetics
Mean of duration of DM.(in years)	9.216	4.650
SD	6.962	3.313
X2 P value df S	16.453 0.688 20 Non-significant	

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Table 3 shows the mean of HbA1c in depressed (9.88 ± 2.02) and non-depressed (8.6 ± 1.9) groups, the difference is statistically significant.

Table 3: Shows the Mean of HBA1C in Depressed and Non-Depressed Diabetics

Character	Depressed diabetics	Non-depressed diabetics
Mean of HbA1c	9.883	8.600
SD	2.042	1.902
T test P value Df S	-2.473 0.016 78 S.	

Table 4 shows the relationship between severity of depression rated by Hamilton's scale and mean of HbA1c .this table shows no significant relationship between severity of depression in diabetic patients and strict glycemic control.

Table 4: Shows Severity of Depression Rated by Hamilton Scale & Mean of HbA1c in Depressed Diabetics

Character	Mean of Hamilton score	Mean of HbA1c
Mild depression	11	9.529
Moderate depression	17	10.100
Severe depression	19	9.500
V. severe depression	28	9.533
X2	-0.101	
P. value	47.179	
Df.	36	
S.	Non Sign	

Figure 3 is the graphic presentation of this relationship between mean of HAM-D and mean of HbA1c

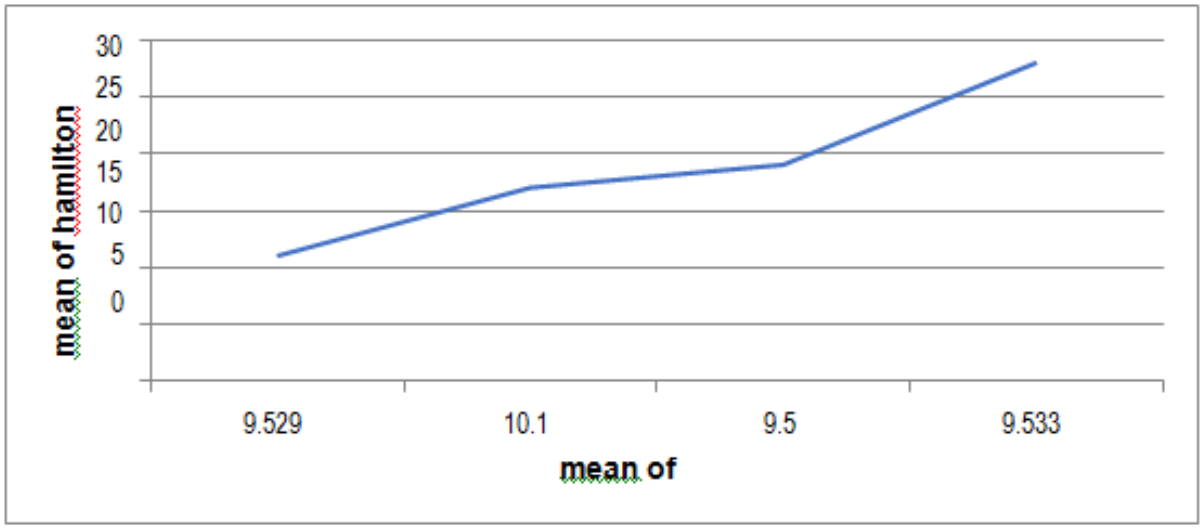

Figure 3: Shows Relationship between Severity of Depression and HbA1c

To study the QoL, raw scores on QLESQ-SF were converted to percentage maximum scores (QLESPER).Table5 shows the mean of percentage maximum scores of depressed(52.7 ± 14.2) and non-depressed(76 ± 6.02) patients, which is significantly lower in the depressed group.

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Table 5: Shows the Mean of Q-LES-Q-SF in Depressed and Non-Depressed Diabetics

character	depressed diabetics	non-depressed diabetics
mean	52.783	76
SD	14.284	6.026
X2 P value DF S	46.781 0.026 30 S.	

Table 6 showed the relationship between severity of depression (Hamilton's rating scale)and degree of QoL score, the relationship was inverse and statistically significant.

Table 6: Relationship between Hamilton's Rating Scale & QoL Score

Character	Mean of scores of Hamilton	Mean of QoL score
Non-depressed	5	56
Mild depression	11	48
Moderate depression	17	44
Severe depression	19	44
V. severe depression	28	37
T test DF P value S.	7.039 78 0.000 Highly S.	

Figure 4 is the graphic presentation of this relationship between HAM-D and QLESQ-SF scores. It was inverse relationship.

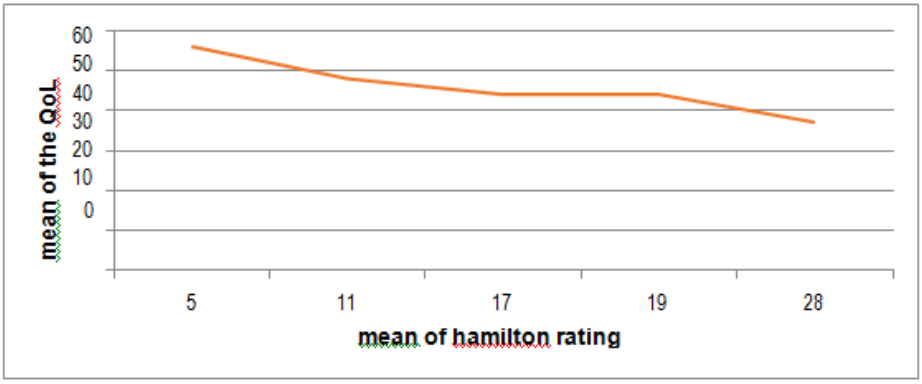

Figure 4: Shows Relationship between the Mean of QoL Score and the Mean of Hamilton Rating Scale

Table 7 shows the correlation coefficient between HbA1c and Qol. the correlation was inverse but not significant.

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Table 7: Shows Correlation Coefficient between HbA1c & QoL

Pt. number	HbA1c	QoL
1	10	71
2	10	46
3	9	55
4	11	48
5	9	46
6	10	41
7	12	59
8	12	68
9	6	46
10	10	36
11	7	66
12	7	54
13	7	77
14	7	80
15	11	57
16	13	50
17	10	39
18	12	50
19	8	27
20	8	55
21	11	43
22	11	39
23	9	75
24	11	43
25	6	41
26	9	66
27	6	66
28	9	29
29	9	63
30	7	66
31	10	45
32	8	45
33	8	45
34	9	68
35	9	61
36	11	43
37	8	59
38	11	48
39	11	39
40	9	54
41	11	48
42	7	59
43	12	45

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44	9	38
45	11	82
46	10	36
47	14	32
48	12	30
49	14	50
50	10	63
51	12	36
52	13	39
53	13	61
54	7	91
55	12	70
56	10	52
57	12	46
58	10	57
59	12	48
60	11	75
61	8	75
62	9	68
63	7	73
64	9	80
65	8	71
66	8	75
67	8	82
68	8	71
69	10	70
70	15	75
71	8	66
72	6	75
73	9	75
74	8	80
75	7	91
76	11	82
77	8	79
78	10	80
79	8	82
80	7	70
Pearson correlation	0.354-	
Sign . (2tailed)	0.01	

IV. DISCUSSION

No study in Iraq has been done to throw light on prevalence of depression in diabetic patients, so the goal of this study is to estimate the prevalence of major depressive disorder in diabetics and to evaluate its impact on QoL and to increase the awareness of this comorbidity to both physicians and psychiatrists working in general medical settings.

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The result of this study shows the rate of depression to be 60%% in DM patient. Among the depressed group, majority are (33 %) moderately depressed.

There are worldwide studies that estimated the prevalence of depression among individuals with diabetes, and their results were vary by diabetes type and among developed and developing countries ,among these studies only one showed higher rate to our study. This study was carried out in Iran by Khamseh et al, who found that 71.8% of their type 1 and type II diabetic sample were depressed(25). While our results were higher than the results of the Greek study conducted by a group of researchers in Greece who found only 33% of type 2 diabetes patients were depressed (26) , and higher than the results of the study carried out by Mier et al. on Hispanic diabetes patients in northern Mexico, which found that about 40.5% of these patients had depression(27) and also higher than the results of the study carried out by Asghar et al .in the villages of Bangladesh, as the results were that 29% of men and 30.5% of women who suffer from diabetes who recently had also suffered from depressive symptoms(28),While Zahid et al. recorded the lowest rate of depression in patients with diabetes. The rate was 14.7% in the rural area of Pakistan (29).

So far there is no answer to a question, why do women suffer from depression more? Perhaps the answer lies in the psychology of women, their nature, mood, and ways of dealing with life problems and how to face them, as well as what has been observed that women need more social support, and also because of the menstrual cycle, birth and child rearing, all of these factors may make females suffer from depression at a higher rate than males.

In addition, it was found that men do not admit that they are depressed while reality imposes the opposite, and they also have a tendency to forget the symptoms of depression in the previous episode that they suffered (30).

There are many studies that clearly showed that there is no relationship between gender and the degree of severity of depression, and if there is a relationship, it is very slight(31.32), but our study showed a different result, as it showed that depression in women is more severe than depression in men, perhaps this is because Women always examine their feelings more than men and have the ability to describe the feelings of depression, in reality the depression strikes them strongly, while men lose the ability to distinguish the feelings of depression, perhaps this is because of their denial of feelings of sadness or their concealment of these feelings.(33)

There is a statistically significant difference between the group of depression and the group that does not suffer from depression (43% vs. 20%) with regard to marital status. Most demographic studies have found a relationship between depression and marital status.

Divorced or separated people were suffering from depression more than those who continue to marry (34, 35),. This is the opposite of what we found. Our study showed that there is more depression among married couples, and this can be explained by the fact that Iraqis maintain a bond of marriage despite the existence of problems and differences between the spouses and despite the lack of similarity in attitudes and desires between the spouses, while the Western spouses take the decision to divorce faster when they see no benefit for the continuation of the marriage. In fact, there are many studies that have found that marital problems and dissatisfaction are closely and importantly related to depressive symptoms (36.37).

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Another explanation for the result of our study is why we experienced more depression in married couples. Perhaps the reason is that married couples who suffer from two chronic diseases need a life companion more than those who do not suffer from this condition.

This study found a relationship between depression in diabetics and the educational level as one of the reasons that may accelerate the emergence of depression, this result is consistent with the results of many studies that found that the suspension of education is linked to the early emergence of mental illness (38.39. 40).

There are studies that found that most depressed patients were villagers, and that living in the village was one of the very important factors that contributed so much to the emergence of depression (41). While another study indicated the opposite, this study found that the rate of depression in the village is more than the city (42), and the study explained this difference as the result of the villagers' failure to review the specialized health centers when they suffer from psychological problems. There are many studies that found that staying in the village increases or decreases The rate of depression as a result of the overlap of other factors (43), and the reasons for the difference in rates of depression between the village and the city are complex, and this includes the overlap of several factors such as age, immigration, race, employment status, marital status and the provinces in which they live (42).

Other factors may determine the relationship between depression and the place of residence, such as poor living, poor academic achievement, and modest or poor health for individuals (44). The results of our study were inconsistent with the results of old studies, which found the prevalence of depression in the city is higher than in the village, and this may be due to living In the city it is not easy and it puts pressure on the individual who may face many psychological and social adversities(45). We believe that in our Iraqi society there are no very big differences between the village and the city after one of them approached the other and they became almost intertwined to the degree that they became similar Rather than being different

Table one also showed that most of depressed diabetic patients were unemployed. This result agree the findings of many studies,

McKee-Ryan et a .found a relationship between unemployment and the psychological state, including depression(46). Melisa Bubonya Deborah A et al.found that people who are unemployed for an extended period are more likely to suffer from symptoms of depression and found that the relationship between symptoms of depression and working condition is bilateral in nature(47). Work and employment may provide protection for the individual from depression, this may be due to the high financial situation and the improved social status of those who work(48).

This study showed that there was no relationship between the prolonged period of diabetes and their possible depression.

Our interpretation of this is that the Iraqi diabetic patient becomes depressed as a result of the psychological trauma of the diagnosis, then he adapts to the event and his psyche becomes more comfortable. The result of our study was contrary to the result of several previous studies, which indicated that the increase in the diabetic period is related to the appearance of depression. Perhaps due to the appearance of complications of diabetes and increased

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treatment costs (49). It is worth noting that our study did not include diabetics with complications.

In this study, the mean of HbA1c is higher in depressed patients than in non-depressed ,this leads to the possibility that depression is one of the causes of inability to control blood sugar.

In fact, there is controversy about the nature of the relationship between depression in diabetics and poor control of blood sugar. There are several cross-sectional studies that record the responsibility of depression for poor control of an acceptable level of blood sugar such as studies carried out by (Lustman et al., Lustman and Clouse, Papelbaum et al., Zhang et al.,)(50.18.51.52) and these results are consistent with our study.

On the other hand, there are other studies that have declared that anxiety, not symptoms of depression, leads to high blood sugar(Tsujii et al.,) (53). Other long studies have shown that anxiety and stress in diabetes are related to poor blood sugar control (Fisher et al.,) (54).

As a matter of fact, our study showed a lack of real relationship between severity of depression and degree of blood sugar control. Because of this inconsistency in results, we believe that this matter has not been resolved yet.

This study showed a significant relationships between "QLESQ-SF total percentage maximum scores" and "HAM-D" scores . These results were consistent with the results of previous studies. For example, there is a study that reached the conclusion that patients who suffer from two chronic diseases, one of which is a chronic organic disease and the other is depressive disorder showing a poor quality of life compared to patients who suffer only from chronic organic disease(55), another study reached a similar result, as this study found that Diabetic patients with depression assess themselves with QoL questionnaire less than that of diabetics only(56).

Based on the studies carried out by each of Based on the studies carried out by each of "Iliffe et al".,[57] "Jaffe et al".,[58] and "Laukkanen et al".,[59].These researchers have found that the degree of deterioration in the QoL is proportional to the severity of symptoms of depression and this is consistent with our study, which concluded that there is an inverse

relationship between "HAM"-D and QoL scores. This study also shows that there were negative correlations between HbA1c and QoL scores. This correlation was not significant statistically .

Actually the link between glycemic control and QOL is unclear. A number of randomised controlled double-blind trial showed that improved "Haemoglobin A1c" was associated only with short-term improvement in QOL in Type II diabetes.(60)

While "Vivek Bhanubhai Prajapati et al". found that HbA1c among other various factors such as age of the patient and duration of diabetes significantly reduce the QoL of diabetic patients(61).

Given the presence of some limitations in this research, we can say that generalizing the results of this study should be taken with some caution.

We may need more patients and more than one diabetes treatment center in the upcoming studies.

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V. CONCLUSION

This study shows increased prevalence of depression in diabetes, there was a significant relationship between poor HbA1c control and depression, but not with severity of depression. It shows that the presence of depression in diabetic patients has a negative effect on the QoL of the patients and with increasing severity of depression there is more deterioration in the quality of life. The study also shows that an adequate control of blood sugar may be associated with good QoL.

Based on these results, we recommend internal medicine and diabetes doctors that, in addition to their medical follow-up to diabetics, they should not forget the patient's psychological side and they should enjoy the opinion of psychiatrists by referring them to psychiatric units or consultations located in most public hospitals in Iraq and this is may Contributes to controlling blood sugar and increasing the quality of life after dealing with the psychological dimension of diabetes.

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