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Correlations of Depressive Symptoms with Glycemic Control in Patients with type 2 Diabetes in Karbala City Iraq

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Abstract: **Background:** Diabetes mellitus is a well-known co-occurring illness that has been around for 21 centuries. Diabetes mellitus and depression symptoms can both have an impact on a person's capacity to complete daily tasks. **Objectives:** To evaluate correlations of depressive indications with deprived glycemic control in patients with type 2 Diabetes Mellitus in Karbala city Iraq. **Methods:** A cross-sectional research aiming to examine depression symptoms in 200 persons suffering from type 2 diabetes mellitus. Before the interview, each participant gave verbal informed permission. The Patient Health Questionnaire-9 (PHQ-9) was rummage-sale to amount the individual's symptoms of depression. All names were left blank on the surveys. By employing Spearman's rho correlation, depression was found to be connected with tests of liver and kidney function. **Results:** 200 diabetic patients aged 30-65 showed no significant differences in variables such age, monthly income, duration, social status, medications, and concomitant disease. Significant differences exist between education levels and family history. Mild positive statistically significant association between depression and HbA1c in diabetics versus healthy people. However, FSG, FSI, and HOMA-IR are not significantly different between healthy and diabetic persons ($p>0.05$). **Conclusions:** Poor glycemic control in individuals with type 2 diabetes is associated with depression, indicating that early identification is critical for maintaining glycemic control and averting future difficulties. To fully comprehend the effects of depression therapy, more study is required.

Key Words: Depressed indications, danger factors, DM2, PHQ-9

I. INTRODUCTION

The illness known as diabetes has an impact on the body's metabolism. Characterized by hyperglycemia induced by abnormalities in production of insulin, action, or both problems [1]. At the moment, it ranks as the third most dangerous chronic condition for human health. Globally, the incidence of the disease is increasing as a result of increased living standards, urbanization, industrialization, and aging populations. Rendering to the World Health Organization, 422 million persons worldwide are estimated to have diabetes now; by 2040, this amount is predicted to upsurge to 600 million [2]. Among those with type 2 diabetes, depression and diabetic distress are prevalent mental health issues. Both increase the risk of patient death. In long-lasting illnesses similar diabetes, depressive symptoms are a prevalent comorbidity [3].

Though depression can afflict anybody, those with type 2 diabetes are further possible to knowledge it than non-diabetics. Comorbid diabetes and depression increase HbA1c levels, complications, and death. According to earlier studies, the occurrence of depression among persons with diabetes is double that of the over-all people [4]. Suicide can result from severe depression. Age, education level, income, and gender all affect depression risk [5]. The prevalence of depressive symptoms is estimated to be 4% worldwide. In the Middle East, more than 5% of people suffer from depression [6]. Glycemic control is worse in these patients than in those with diabetes alone, hence it is important to take T2DM psychopathology into consideration for improved health outcomes 7.

A. OBJECTIVE

To look at whether depression symptoms and inadequate glucose management are correlated in type 2 diabetes patients.

II. PARTICIPANTS AND METHODS

A. STUDY DESIGN & PARTICIPANTS

200 T2DM patients, aged 51.5 ± 9.1 years, who were treated at an isolated diabetic midpoint and AL-Huja hospital in Karbala, Iraq, participated in cross-sectional research. Every patient receives routine check-ups at the clinic and is prescribed diabetes medicines under the guidance of a consultant endocrinologist. The study is open to Type 2 diabetic patients aged 30-65 years who are willing to accept and participate. Interview questions were not accepted from individuals in this study who were pregnant, had mental health issues, or had long-term diseases.

B. DATA COLLECTION

The study collected demographic and diabetes-related data from participants, including age, gender, weight, height, public status, education, and monthly income, indicating a family history of diabetes. The researcher used the Arabic version of the (PHQ-9) to test for depression symptoms. The PHQ-9 is a useful tool for screening, monitoring, and evaluating depression severity over two weeks. Each statement on a four-point scale indicates a diagnosis. A total notch ranging from 0 to 27 was designed, with f ranging from 0-4 for no depression to 20-27 for severe depression [8].

C. BLOOD ILLUSTRATION COLLECTION AND PREPARATION

A blood sample was calm from fasting patients, who were interviewed and filled out research questionnaires. Three shares were shaped from the collected blood samples: total blood, separated into separate tubes, and serum samples. Biochemical parameters like blood glucose, insulin, and lipid profile were automatically analyzed by means of Designer and Clinical chemistry analyzer in fasting conditions.

D. ETHICAL APPROVAL

The study acquired permission from the al Huja hospital in Karbala, obtained verbal agreement from participants, and kept patient data secret to prevent unauthorized dissemination.

E. STATISTICAL ANALYSIS

The study utilized SPSS software and Microsoft Excel 2019 for data analysis, employing tests like Kolmogorov-Smirnov, independent t-test, and Mann-Whitney U to compare normally distributed numerical variables and qualitative and quantitative values, and Chi-square test for non-parametric comparisons. Pearson's rank was used for correlation coefficient analysis, point-biserial correlation coefficient was used for continuous and binary data, odds ratio and 95% confidence intervals calculated.

III. RESULTS

A. PATIENTS DEMOGRAPHICS CHARACTERISTICS

The study involved 200 diabetes patients aged 30-65, our data found that there are insignificant differences ($p>0.05$) when compared the demographics features such as age, monthly income, duration, and social status, medications number, and concomitant disease however, there are significant difference ($p<0.05$) among education levels, and family history, see Table 1 and Figure 1.

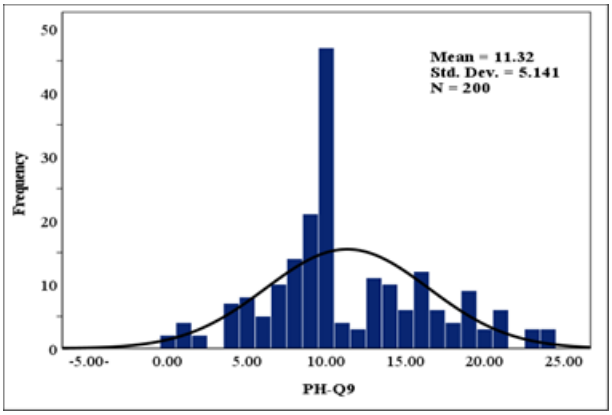

FIGURE 1: Distribution of (DM Patients according PHQ-9 in to depressed and non- depressed

B. PATIENT'S DEPRESSION CORRELATION WITH DM

We observed that there is a weak positive statistically significant relationship ($r=0.023$, $p=0.001$) between depression and HbA1c when comparing healthy individuals to diabetic patients. This was determined by the scores on the Patient Health Questionnaire-9; depression. On the other hand, there is no statistically significant difference ($p>0.05$) between healthy individuals and diabetic patients in terms of FSG, FSI, and HOMA-IR, see Table 2.

IV. DISCUSSION

Diabetes is a metabolic disorder with medicinal and economic consequences. In 2030, the Arab world will consume the second-highest percentage of DM patients [9]. Depression was shown to associated with poor glycemic control patients (HbA1c7) at high significant level in this study. These findings are corroborated by similar findings in people with diabetes in meta-analyses and systematic reviews of diabetes patients' diabetics depression was shown to be modestly linked with glycemic status [10]. Unlike earlier studies that found no link between poor glycemic control and depression, [11] higher depressive symptoms were associated with higher HbA1c The results are similar to those of prior research [12]–[14].

The study's cross-sectional design is the second. Regardless of whether a link exists between depression and HbA1c levels, it is unclear if some other factors such as changes in self-care behavior, poor adherence to diabetes education programs, oral hypoglycemic medications and dietary interventions, or counter-regulatory hormones mediate the link between depression and glycemic control. Although this was not the focus of the current study, it is something that should be looked into in future studies. however future studies need

Variables	Target HbA1c		All patients	p-value
Glycaemic control	Poor (HbA1C≥7%)	Good (HbA1C<7%)		
Number	155	45	200	-
Age (y), mean ± SD	51.3 ± 8.9	52.0 ± 9.7	51.5 ± 9.1	0.651
Gender, n (%)				
Female	87 (56.1%)	21 (46.7%)	108(54.0%)	0.262
Male	68 (43.9%)	24 (53.3%)	92 (46.0%)	
BMI (kg/m2), mean ± SD	29.6 ± 3.8	29.4 ± 4.2	29.6 ± 3.9	0.744
Education level				
Illiterate	31 (20.1%)	9 (20%)	40 (20.1%)	0.002
Primary	61 (39.6%)	6 (13.3%)	67 (33.7%)	
Secondary	42 (27.3%)	16 (35.6%)	58 (29.1%)	
College	20 (13%)	14 (31.1%)	34 (17.1%)	
Monthly income (ID) n (%)				
<500	49 (28.2%)	7 (26.9%)	56 (28.0%)	0.586
500 – 1000	87 (50.0%)	11 (42.3%)	98 (49.0%)	
>1000	38 (21.8%)	8 (30.8%)	46 (23.0%)	
Family history of DM				
Negative	57 (37%)	25 (55.6%)	82 (41.2%)	0.026
Positive	97 (63%)	20 (44.4%)	117(58.8%)	
Duration of DM				
<1 year	22 (14.2%)	5 (11.1%)	27 (13.5%)	0.125
1 – 5 years	47 (30.3%)	21 (46.7%)	68 (34.0%)	
>5 years	86 (55.5%)	19 (42.2%)	105(52.5%)	
Social status, no (%)				
Married	100(50%)	95	47.5%	0.245
Single	20 (10%)	18	9%	
Widowed	80 (40%)	87	.43.5%	
Medications number				
Single	81 (52.6%)	24 (53.3%)	105(52.8%)	0.629
Two medications	58 (37.7%)	18 (40.0%)	76 (38.2%)	
>2 medications	15 (9.7%)	3 (6.7%)	18 (9.0%)	
Concomitant disease				
Hypertension	35 (22.6%)	14 (31.1%)	49 (24.5%)	0.241
Dyslipidaemia	56 (36.1%)	12 (26.7%)	68 (34.0%)	0.238
Hypertension and dyslipidaemia	15 (9.7%)	3 (6.7%)	18 (9.0%)	0.534

TABLE 1: Assessment of Demographics characteristic according to target HbA1c

Parameters	Healthy N=120	DM N=200	r	p-value
	Mean ± SD	Mean ± SD		
Total PH-Q9	8.3±4.01	11.32±5.14	0.023	0.001**
FSG (mg/dL)	88 ± 2	91 ± 3	0.025	0.721 N. S
HbA1c (%)	5.3±4.01	10.32±5.14	0.220	0.002**
FSI (µIU/ml)	12 ± 1.0	13.4 ± 2.2	0.044	0.541 N. S
HOMA-IR	3.2 ± 0.3	3.9 ± 0.2	0.042	0.554 N. S

TABLE 2: Correlation of PHQ-9 score and glycemic parameters between health and diabetic patients

to validate our findings in different patient populations, and with prospective study design.

V. CONCLUSIONS

Depressive symptoms are associated with poor glycemic control in this study, must be found good attention from clinicians to ensure better management.

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CONFLICTS OF INTEREST

No conflicts of interest have been declared by the authors.

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