EFFECT OF DEPRESSION ON DIABETES CONTROL; A CROSS-SECTIONAL STUDY IN A TRUST HOSPITAL

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ABSTRACT

Background and Aim: Diabetes and dementia represent prevalent health conditions in our population, imposing a significant burden of disease on society. Despite the increasing prevalence of diabetes in Pakistan, there is no prominent study investigating the relationship between depression and diabetes**.** The objective of the current study was to see the effect of depression in the local population so that measures should be taken accordingly.

Patients and Methods: A cross-sectional was conducted on 70 patients in the department of Endocrinology, Bahria International Hospital, Lahore Pakistan from January 2023 to June 2023. Patient Health Questionnaire-9 (PHQ-9) and protocol was used for the assessment of depression severity. Patients were grouped in five different categories for state of mind of the patients ranging from "no to minimal depression" to "severe depression". HbA1C was checked at the same point of time as evidence of control of diabetes. Collected data was processed using SPSS.

Results: The optimal HbA1C control target is set at 7%. However, the mean HbA1C level in our population was 10.7%± 1.75%, indicating a significant improvement over the recommended 7%. Age-wise distribution of patients were as follows; 14 (20%) in 20-35 years, 27 (38.6%) in 36-50 years, and 29 (41.4%) had >50 years. There were 41 (58.6%) male and 29 (41.4%) female. The incidence of no depression, mild, moderate, and severe depression based on PHQ-9 was 30 (42.9%), 18 (25.7%), 14 (20%), and 8 (11.4%) respectively. There was no statistically significant difference in HbA1C between different groups of population. Similarly, there was no statistically significant effect of degree of depression on the control of diabetes. Frequency of severe depression in our population was also higher than general population, which may be due to either poor socio-economic status or poor diabetes control.

Conclusion: The present study observed that people presenting to the trust hospital have poor control of diabetes. There was no apparent effect of depression on glycemic control in this population, particularly among individuals with poorly controlled diabetes.

Keywords: Depression, Diabetic control, Cross-Sectional Study, Trust Hospital, Comorbidity

INTRODUCTION

Diabetes and depression are prevalent diseases in our population causing major disease burden in our society. The prevalence of diabetes in Pakistan is estimated to be 13.7 % [1]. In Pakistan significant majority of diabetics do not have good control of their disease [2]. Depression as a cause of diabetes has been extensively reported. Depression and diabetes when co-exist in an individual are associated with increased incidents of complications [3]. Diabetes is characterized by the chronic metabolic disorder causing increased resistance to insulin and elevate the blood glucose level [4]. Remarkably, there is drastic increase in the prevalence of diabetes worldwide; it has greatly exceeded 79% of diabetics -middle- income countries [5, 6]. In Pakistan, the incidence of diabetes has gone increased dramatically over the last two decades due to rapid economic growth and changing lifestyles [7].

Diabetes management often requires a combination of medication and lifestyle changes. However, ongoing diabetes care requires, including a strict diet, regular exercise, blood glucose monitoring, daily checkups, management of symptoms, and complications a preventing alertness can have a significant impact on individuals dealing with diabetes with high levels of stress. Psychological stress activates anti-hormones, including dopamine (neurotransmitter), glucocorticoids, growth hormone, and glucagon [8]. Induction of these hormones work disrupts normal insulin action, causing blood glucose levels to rise. The challenge of maintaining metabolic control intensifies as glucose levels rise. For diabetics, struggles with poor glycemic control and functional limitations associated with diabetes-related complications may contribute to depression and anxiety [9-12]. This interaction establishes a close relationship the intensity between psychological stress, hormonal responses, and functional challenges governing emphasize the occurrence of diabetic complications. There is limited data available regarding the co-existence of depression and diabetes in local setting of Pakistan. Therefore, the objective of the current study was to assess the effect of depression on diabetes control in Trust Hospital, Lahore.

METHODOLOGY

A cross-sectional was conducted on 70 patients in the department of Endocrinology, Bahria International Hospital, Lahore - Pakistan from January 2023 to June 2023. Patient Health Questionnaire-9 (PHQ-9) and protocol was used for the assessment of depression severity. Patients were grouped in five different categories for state of mind of the patients ranging from "no to minimal depression" to "severe depression". HbA1C was checked at the same point of time as evidence of control of diabetes. The questionnaire used a two-stage design to collect data. The first phase focused on collecting demographic information, including sex, age, national origin, education, occupation, and complete history of type 2 diabetes (including complications, medications, and dependence). The severity of symptoms was categorized as mild (5 to 9), moderate (10 to 14), severe (15 to 19), and severe (20 to 27) as per PHQ-9 questionnaire.

Collected data was processed using SPSS. Frequency of state of depression was plotted. One way ANOVA was applied to see if there is statistically significant difference of HbA1C in different groups of the patients based on the state of mind.

RESULTS

The optimal HbA1C control target is set at 7%. However, the mean HbA1C level in our population was 10.7%± 1.75%, indicating a significant improvement over the recommended 7%. Age-wise distribution of patients were as follows; 14 (20%) in 20-35 years, 27 (38.6%) in 36-50 years, and 29 (41.4%) had >50 years. There were 41 (58.6%) male and 29 (41.4%) female. The incidence of no

depression, mild, moderate, and severe depression based on PHQ-9 was 30 (42.9%), 18 (25.7%), 14 (20%), and 8 (11.4%) respectively. There was no statistically significant difference in HbA1C between different groups of population. Similarly, there was no statistically significant effect of degree of depression on the control of diabetes. Frequency of severe depression in our population was also higher than general population, which may be due to either poor socio-economic status or poor diabetes control. Sociodemographic details of patients are shown in Table-I. Table-II represents different age groups of patients. Severity of depression are illustrated in Figure-1. Different comorbidities associated with depression are depicted in Figure-2. ANOVA test was used on HbA1C of the patients as shown in Table-III. Test of Homogeneity of Variances are shown in Table-IV.

**Table-I** Sociodemographic details of patients

Parameters	Value (Mean ± SD) N (%)
Age (years)	48.62±8.72
Gender	
Male	41 (58.6%)
Female	29 (41.4%)
Marital Status	
Single	8 (11.4%)
Married	48 (68.6%)
Widowed	9 (12.6%)
Divorced	5 (7.1%)
Medication	
Oral drugs	32 (45.7%)
Insulin	24 (34.3%)
Both	14 (20%)
Diabetes related complications	
Yes	38 (54.3%)
No	32 (45.7%)

Table-I Distribution of patients based on their age groups

Age group (years)	N (%)
20-35	14 (20%)
36-50	27 (38.6%)
>50	29 (41.4%)
Total	70 (100%)
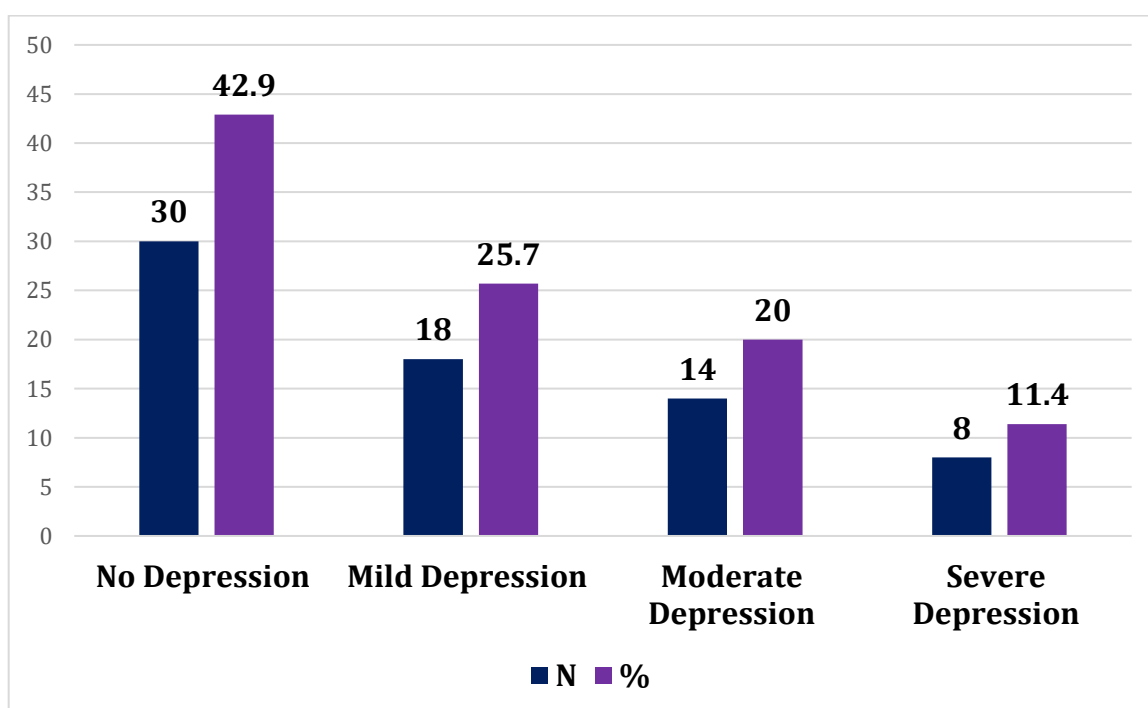
Figure-1 Severity of depression (N=70)
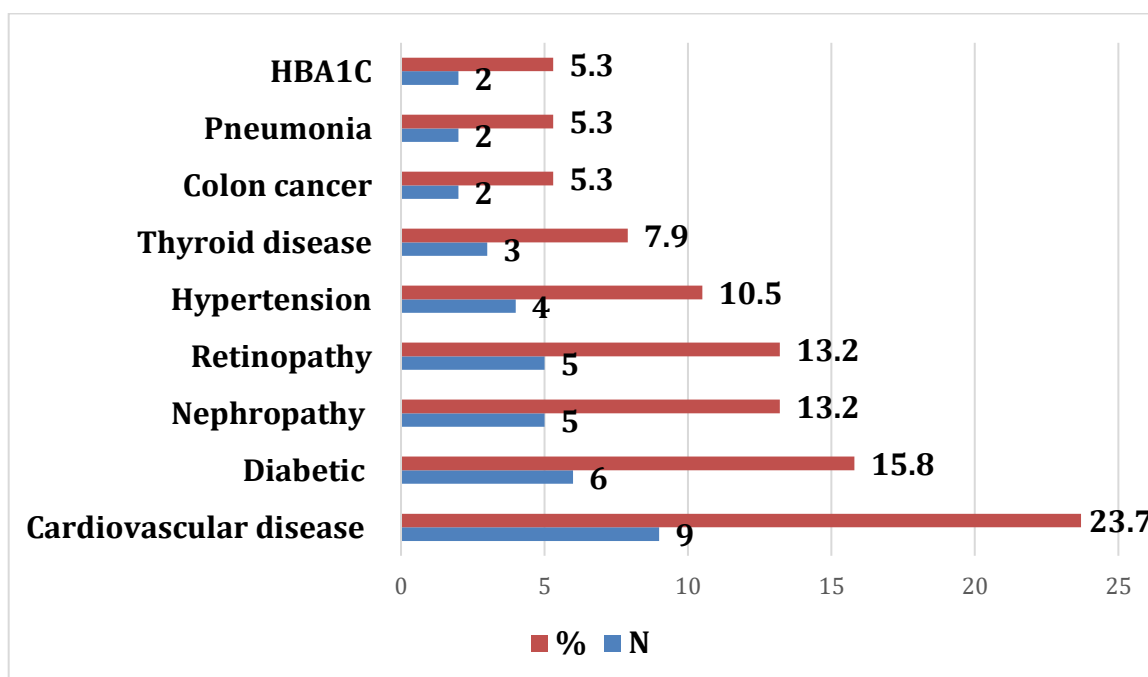
Figure-2 Different comorbidities related to Depression (N=70)

Table-III ANOVA test HbA1C of the patients

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	19.417	4	4.854	1.631	.177
Within Groups	193.498	65	2.977		
Total	212.916	69			

Table-IV Test of Homogeneity of Variances
Test of Homogeneity of Variances, HbA1C of the patients

Levene Statistic	df1	df2	Sig.
.380	4	65	.822

DISCUSSION

The present study mainly focused on the effect and prevalence of depression on diabetic control at Trust Hospital in Lahore and found that there was no apparent effect of depression on glycemic control in this population, particularly among individuals with poorly controlled diabetes. Numerous studies have delved into the bidirectional association between depression and diabetes [13]. A prevailing perspective from these studies suggests that depression is a substantial contributor to the development of diabetes [14]. Specifically, the risk of developing type 2 diabetes is elevated by 60% in individuals with depression, while diabetes is only marginally associated with an increased risk of depression [15]. Asian studies indicate that the prevalence of depression ranges from 17% to 44% and of anxiety from 4% to 58% [16, 17]. Furthermore, studies in Bangladesh and India reported high levels of depressive symptoms among diabetic patients, respectively, which correlates with our study results contradictory [18, 19].

An earlier research indicates that individuals with diabetes are more susceptible to developing depression [20]. Furthermore, a systematic review and meta-analysis reported a slightly elevated likelihood of depression among individuals with type 2 diabetes [21]. These diverse findings underscore the complexity of the relationship between depression and diabetes control, necessitating a nuanced exploration of factors influencing this association.

Earlier studies reported that the incidence of depression was 33.8% and 33.7% respectively with increasing trend that depressive symptoms were prone among women [22, 23]. A significant proportion of diabetic patients with type 2 diabetes in our present study exhibited diabetes problems, and the presence of one or more problems was significantly associated with depression. These cases resemble earlier studies suggesting an association between depression and diabetic complications [24, 25]. Notably, cardiovascular disease emerged as the most prevalent comorbidities, presented in a variety of other studies as a cause of depression in individuals in diabetes [26].

Numerous investigations reported that depression and physical activity are significantly associated with diabetes, indicating that those who did not exercise regularly were comparatively vulnerable to depression for their exercising peers [27, 28]. These findings resemble with an earlier investigation supporting the strong association between physical inactivity and depression, as a sedentary lifestyle is associated with symptoms of depression there is an association [29].

Our study found a high prevalence of depression in patients with diabetic complications, including renal disease, cerebrovascular, cardiac, neurological, and ophthalmic disorders [30]. These physiological changes contribute to poor glycemic control and increase risk as diabetes complications will be greater, Interactions between psychiatric factors and physiological mechanisms involved in diabetes underscore the complex relationship between psychological well-being and diabetes outcomes [31].

The current study findings indicate that there is no statistically significant difference in HbA1C levels among different population groups, suggesting that the degree of depression does not exert a statistically significant effect on diabetes control. Additionally, the observed higher frequency of severe depression in our population compared to the general population could potentially be attributed to factors such as poor socio-economic status or suboptimal diabetes control. Notably, diabetes has been established as a risk factor for depression, and this association might contribute to the elevated prevalence of severe depression within our study population. The complex interplay between socio-economic factors, diabetes control, and mental health underscores the multifaceted nature of the relationship between depression and diabetes outcomes.

CONCLUSION
People presenting to the trust hospital have poor control of diabetes. There was no apparent effect of depression on glycemic control in this population, particularly among individuals with poorly controlled diabetes.

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