ORIGINAL ARTICLE
DEPRESSION IN TYPE-2 DIABETIC PATIENTS PRESENTING TO A TERTIARY CARE HOSPITAL IN PAKISTAN

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Background: Diabetes affects almost every system including mental health. When depression and diabetes coexist, the outcome is even worse. This study was conducted to find the prevalence of comorbid depression in diabetic patients and its association with diabetic control. **Methods**: This was a descriptive cross sectional observational study conducted in the department of general medicine of Pakistan Institute of Medical Sciences, Islamabad from March to September 2014. A total of 223 adult diabetic patients 30–60 years of age were enrolled. Becks Depression score (BDI) and HDRS (Hamilton Depression Rating Score) of each patient was calculated. Patients were stratified into various categories based on their demographics, depressions scores and diabetic control (by means of HbA1C). Percentages, frequencies and means were calculated accordingly using SPSS-16. **Results**: Out of a total of 223 patients, 55.6% were females while the rest (44.4%) were males. The mean age of the patients was 51 years. Majority of the patients were uneducated (35.9%). Eighty-seven% were married, Mean BMI, duration of diabetes and HbA1C were 27 Kg/m^2, 8.3 years±6.1 years and 8.15±2.13% respectively. Mean BDI and HDRS were 9.97±9.42 and 6.27±6.74 respectively. 25.6% and 21.1% of the patients had at least some degree of depression when assessed by BDI and HDRS score respectively. **Conclusion**: Depression is common in diabetic patients especially females, uneducated, have social issues like widows, those having long standing diabetes and those who have uncontrolled blood sugars.
Keywords: Depression; Diabetes; HbA1C; BDI; HDRS

INTRODUCTION

Diabetes and depression are major public health issues especially in low income countries like Pakistan. Diabetes is known to be affecting 7.6–11% of Pakistani population.[1] The real burden of diabetes is due to its chronic complications. Depression usually complicates the course of chronic illnesses including diabetes. A study conducted in an urban area of Pakistan found that neuropathy was the most common complication comprising 38% of diabetic patients followed by retinopathy 30%, nephropathy 29% and gangrene 21.9%.[2] 33% of diabetic patients who attended diabetic clinics at primary health settings were found to have comorbid depression.[3] Another study showed the one-fourth of the screened patients were potential cases of depression.[4] Whether diabetes causes depression is not known but since diabetes is a chronic illness with devastating complications, diabetics are at very high risk of developing depression.

Patients with diabetes who have depression report higher social stress, poorer health related quality of life compared to the non-depressed diabetic patients.[5] HbA1c, fasting and postprandial sugars were higher in depressed patients in one study.[6] A study by Mathew, *et al* found that the mean HbA1c among all the patients in the study was 9.5% (SD±1.80). Only 5% (n=4) of patients among the 80 achieving the HbA1c targets of ≤7%. Another 17.5%

(n=14) had suboptimal control and the remaining 77.5% (n=62) had poor control of glycaemia at the time of the study interview.[7] Thirty-one (38.8%) out of 80 subjects recruited had some degree of depression to suggest a diagnosis based on scores obtained from the MDI (Major Depression Inventory).[7] There was average difference of HbA1c of 1% (9.1% vs. 10.1%, *p*=0.013) between the two groups.[7] Depression and anxiety in any chronic illness and especially in diabetics can lead to noncompliance with medications and diet, poor medication timings, under or overdosing and poor exercise tolerance. Type-II Diabetics are afraid of insulin injections and other diabetes related complications.[8] Beta adrenergic and neuroglycopenic symptoms of hypoglycaemia can be difficult to be distinguished from symptoms of anxiety and may further lead to skipped dose of diabetic medications or intake of sugar despite high blood sugars. On the other hand, when patients do not achieve their glycaemic targets their level of anxiety increases[8] which leads to further hyperglycaemia and the vicious circle continues. Anxiety scores were found to be related to HbA1c levels and postprandial blood glucose levels.[9] To break this cycle, apart from managing hyperglycaemia, treating depression will not only lead to improvement in better self-care but might also lead to a better glycaemic control. Our study aims to identify type 2 diabetic patients who

have associated comorbid depression by using the Beck's Depression Inventory score and Hamilton Depression Rating Score and their level of diabetic control on the basis of their recent glycated haemoglobin (HbA1C). Patients with diabetes and more importantly those with uncontrolled diabetes as reflected by their HbA1c values might be candidates for early screening of depressive symptoms and psychosocial support. On the other hand, achieving glycaemic targets in diabetic patients might alleviate their anxiety. Important health consequences associated with comorbid depression and diabetes necessitate optimal treatment of both conditions to maximize overall patient outcomes

MATERIAL AND METHODS

This was a cross-sectional observational study conducted in the department of General Medicine of Pakistan Institute of Medical Sciences Islamabad between April and September 2014. All consecutive Diabetic patients (who were on medical treatment for diabetes for at least one year) between 30–60 years of age and had their recent HbA1c done within the last one month were included in the study. Patients who were already on antidepressants, were bed bound, had a creatinine of more than 3 mg/dl, had been on treatment for congestive cardiac failure, pregnant and six months postpartum and those who had a haematological diagnosis like anaemia or polycythaemia were excluded from the study. Sample size of 215 was calculated via WHO calculator with a target population of 38.8%, absolute precision of 6.5% and 95% confidence interval.[7] Patient's Demographics, HbA1C levels, BDI and HDRS scores, along with BMI, education level, marital status and duration of diabetes were recorded on a predefined Performa. BDI and HDRS scores were further sub classified to categorize the severity of depression. A score of 0–10 was considered normal, 11–20 as mild depression, 21–30 as moderate depression and 31 and above as severe depression. Data was analysed using SPSS-16. Effect modifiers like age, weight, BMI, duration of diabetes, HbA1c levels, HDRS and BDI scores were derived as means±SD while categorical variables like gender, education, marital status, occupation, HbA1c levels, HDRS and BDI scores were described in percentages and frequencies. Effect modifiers like age, gender, HbA1C, duration of diabetes, education, marital status, occupation was controlled by stratification. Post stratification chi-square test was applied. The *p*-value of ≤0.05 was considered significant.

RESULTS

Out of a total of 223 patients, 55.6% were females while the rest (44.4%) were males. More than half (58.8%) of the patients were between 50–60 years of age. The mean age of the patients was 51 years. Majority of the patients were uneducated (35.9%). 87% were married; Mean BMI was 27 with majority (45.3%) of the patients having BMI between 25 and 29 Kg/m^2. Mean duration of diabetes was 8.3 years±6.1 years. The mean HbA1C of the study population was 8.15±2.13%. Mean BDI and HDRS were 9.97±9.42 and 6.27±6.74 respectively. 25.6% and 21.1% of the patients had at least some degree of depression when assessed by BDI and HDRS score respectively. 17.9% were found to have moderate to severe depression when assessed by BDI while only 5.8% had a moderate to severe depression when assessed by HDRS score. 16.6% of all the diabetic patients were females while only 4.5% were males when assessed by HDRS score. 20.2% females and 5.4% males were depressed when assessed by BDI score. Married and especially widows had a high percentage of depression. Similarly, diabetic patients who had uncontrolled diabetes had a higher percentage of depressed patients. Body mass index and age of the patients were not significantly correlated with depression. Correlation between BDI scores and HDRS score was significant (*p*-value<0.0001).

Table-1: Percentage of depressed patients in various categories

Category	Sub-category	% Depressed (HDRS)	*p*-value	Depressed (BDI)	*p*-value
Gender	males	10.1	<0.0001	12.1	<0.0001
	females	29.8		36.3	
Education (educated->10th grade)	uneducated	28.9	0.001	34.4	<0.0001
	educated	10.5		13.7	
Marital status	Married	19.6	0.026	24.2	0.028
	Widow	40.9		45.5	
	unmarried	0		0	
HbA1C	≤6.0	16.7	0.014	22.2	0.014
	6.1–8.0	12.8		16.3	
	≥8.1	29.7		34.7	
Duration of Diabetes	1–5 years	13.3	0.048	16.7	0.029
	6–15 years	24.8		29.7	
	>15 years	31.2		37.5	

DISCUSSION

Our study evaluated mood of diabetic patients and assessed various factors which could be contributing to low mood and depression. Because many somatic symptoms are present in diabetic patients due to their underlying complications of diabetes, proper assessment of mood is difficult. The classification based on severity of depression was therefore modified.

In our study depression was found in 21–26% of the diabetic population based on HDRS and BDI scores. Depression is very prevalent especially

in low income countries with an estimated prevalence of 10–44%.[10] Depression has been estimated to affect around 30–40% of Pakistani population.[11–15] Depression in diabetic population has been found to be much more prevalent than in the general population.[16] The mechanism of this association is still not clear. Depression in diabetic population may simply result from the strain of having a chronic medical condition rather directly from diabetes perse.[17] Other studies suggested that depressed mood in diabetics is related to the difficulties in adapting to the various complications of diabetes.[18,19]

Depression was found more in the female gender. In a systemic review by Ilyas Mirza *et al* the prevalence of depression in women in Pakistan ranged from 28.8–66% for women (overall mean 45.5%) and from 10–33% for men (overall mean 21.7%).[20] In our study, depression was found in 16.6–20.2% of all diabetic patients when assessed by HDRS and BDI scores, while the prevalence in men was only 4.5% and 5.4%. Among all the diabetic patients who were depressed (47 when assessed by HDRS, 57 when assessed by BDI), we found 78% were females while only 21% were males.

Apart from the gender factor, marital status also revealed significant results in our study. Out of a total 223 diabetic patients, 7 were unmarried, 22 were widows and 194 were married. Depression was found in 40–45% of the widows, 20–24% of the married diabetic patients and 0% among the unmarried. In a study in Karachi by B.S. Ali *et al*, the prevalence of depression in married people was 31.7%, in unmarried it was 15.4% and in the widows/divorced it was 45.5%.[13]

Among the depressed patients 54.4–61.7% of the patients were uneducated. In a study by Nefs *et al* depression was more prevalent in the uneducated group of patients.[21] HbA1C which was used as a marker of glycemic status of the patients was subdivided into three categories. These are as follows:

1. HbA1C of less than 6.0 (labelled as 1): these patients have a very tight glycaemic control and are at a disproportionately high risk of hypoglycaemic episodes.
2. HbA1C of 6.1–8.0 (labelled as 2): these patients glycaemic status is close to the target and were labeled as having a good glycaemic status.
3. HbA1C of greater than 8.0 (labelled as 3): these patients have uncontrolled blood sugars and were labeled as having a poor glycaemic status.

In our study the mean HbA1C of the patients was 8.15±2.13%. Mean HbA1c values of 8.0% and 8.9% was seen in other south East Asian studies.[22] In a study by Abdulbasit *et al* the mean HbA1c at a tertiary care centre in Pakistan was 9.1%.[23] Gender wise, the mean HbA1C of males was 7.96%±1.93 while the mean HbA1C of females was 8.35%±2.09. In a study by K. Hawthorne females were found to have a poor glycaemic control.[24] In our study depressed patients had a mean HbA1C of 8.8%–2.0 and 8.7%±2.0 STD as compared to patients who were not depressed 8.0%±2.0 STD when assessed by HDRS and BDI scores respectively (*p*-value=0.02). In a study by Egede *et al*. depressed patients had a higher HbA1C than patients who were not depressed.[25] Similarly, in a meta-analysis by Lustman *et al* depression had significant association with hyperglycemia.[26]

Our study pointed out multiple risk factors for depression. These include female gender, low educational background, marital status (widows having the highest percentage of depression), and last but not the least–a poor glycaemic control.

Poor glycaemic control as reflected by a high HbA1C was found in females, widows, the uneducated patients and those who were depressed.

CONCLUSION

Depression is common in our diabetic population especially females, uneducated, those with social issues like widows, those having long standing diabetes and those who have uncontrolled blood sugars. Whether depression is a risk factor for a poor glycaemic state or vice versa is not known but both the diseases when coexist probably initiate the vicious cycle leading to non-adherence to drugs and diet, noncompliance to exercise, poor monitoring of diabetes, neglect and loss of interest in self-care.

Depression should be screened in all the diabetics and psychosocial issues should be discussed apart from managing the diabetes adequately.

AUTHORS' CONTRIBUTION

AF: Designed the study, analysed data and prepared the manuscript. ARA: Collected and organized data. JZ: Edited the manuscript

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