ORIGINAL ARTICLE

Anxiety, Depression and Diabetes-Associated Distress in Subjects with Type 1 Diabetes Mellitus

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ABSTRACT

Objective

To determine the frequency of anxiety, depression, and diabetes-associated distress in type 1 diabetes mellitus patients.

Methodology

This cross-sectional study was conducted at the Sugar Hospital of the Abasyn Institute of Medical Sciences, Peshawar, Pakistan. This study was based on using standardized questionnaires i.e. the Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder (GAD-7), and Problem Areas in Diabetes scale (PAID-5), respectively. Patients with T1DM were evaluated for anxiety, depression, and diabetes-related distress. Data have been analyzed to assess the prevalence and danger factors for depression, anxiety, and diabetes-related distress in this population.

Results

Children and adults suffering from T1DM (n = 80) with mean age of 18±6 years; with 53% male and 47% female subjects. Out of the total 80 patients, 77% had poor glycemic control and 72.5% had depression. Severe depression and severe anxiety had been existing in 15% and 36% of patients respectively. Diabetes-associated distress was experienced by 59% of patients, and a significant association of anxiety was found with the patient's glycemic control and education level.

Conclusion

In this study mental issues are extremely common in T1DM patients, and prevalence is more with poor glycemic control.

Key words: T1DM, Anxiety, Depression, Diabetes-associated Distress.

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INTRODUCTION

Diabetes is a major public health challenge and one of the most prevailing diseases around the globe.[1] The prevalence of diabetes has been increasing over recent times.[2] Worldwide, 15 per 100,000 men and women have type 1 diabetes which is nearly 9.5% burden across the globe.[3] Around 5.6 per 1000 people are suffering from T1DM. According to reports, Pakistan's incidence rate is 1.1 per 1000 people annually.[4]

T1DM is a lifelong disease and is usually not curable.[5] Patients with T1DM experience different challenges because the effects of diabetes go far beyond the physical symptoms of the disease. Psychosocial effects and emotional stress on the quality of life of these patients make it difficult to effectively treat their illness, which then leads to long-term irreversible complications.[6] due to the complications of the disease and when combined with co-morbidities, it can cause mental health problems including anxiety, depression, and diabetes-associated distress.[7, 8] These mental problems are found frequently in patients (adults and children) suffering from diabetes mellitus and are often associated with poor prognosis.[9-13] According to the published literature, about 20% of the patients suffering from diabetes mellitus are having depression.[14] Depression is three times more common in T1DM compared to the general population.[15] In a study that included 90,686 participants, anxiety and depression was found common in DM patients.[16] It has also been found that 40% of diabetic patients experience some form of anxiety.[11] Patients with diabetes who are also dealing with mental health issues like depression frequently experience poor motivation, despondency, and a lack of energy to carry out daily tasks. This leads to issues with medication adherence, self-care, and glycemic control. A

diabetic patient's quality of life may be impacted by poor self-care, which may then raise the risk of complications, disability, and occasionally even premature death.[17] Healthcare workers need to understand the mental health implications of the disease.

The need to regularly evaluate the mental health issues and glycemic levels among T1DM patients by healthcare providers is strongly recommended by American Diabetes Association and International Diabetes Federation.[18,19] Notwithstanding this, only a few studies from Pakistan have evaluated the association between mental health, glycemic control, and patient attributes among diabetes (mainly Type II diabetes) patients. However, no study from Pakistan has accessed this association among T1DM patients. This study aims to evaluate diabetes-related emotional distress, depression, and anxiety in patients living with T1DM. Moreover, we also reported the association between mental health issues with glycemic control and patient characteristics.

This study aims to find the prevalence and associated factors of diabetes-related distress, anxiety, and depression in patients with type 1 diabetes mellitus.

METHODOLOGY

The study was conducted at Sugar Hospital of the Abasyn Institute of Medical Sciences, Peshawar, Pakistan. Abasyn Institute of Medical Sciences has more than 35,000 registered diabetic patients and a daily outpatient department (OPD) of around 50 patients per day. Around 300 T1DM patients are registered in this hospital, providing free insulin every month. Only 80 patients presented for their regular follow-up during the data collection period. The staff of the hospital includes endocrinologists, medical officers, diabetic nurses, optometrists, and dieticians. Patients visiting the hospital are from all across the KP province.

Data from T1DM patients were gathered for this descriptive, cross-sectional study from July 2021 to December 2021. All T1DM patients of either gender and aged 12 years and above who were under the follow-up of AIMS Sugar Hospital were eligible to participate in the study. The selection of patients was based on informed consent and their willingness to participate in the study. Patients with impaired memory and intellectual disability or pre-existing diagnosis of a mental health condition were excluded from the study.

The survey instrument/questionnaire had five parts. The First two parts provided details about the patient's socio-demographic and clinical characteristics. The third, fourth, and fifth parts were the instruments for measurement of depression Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder GAD-7 and Problem Areas in Diabetes scale (PAID-5).

The problem Areas in Diabetes (PAID) questionnaire has 20 questions and is usually used for the assessment of diabetes-associated stress. A newly developed PAID-5 (5 items) is a short form of PAID and it was used in this study.[19,20] PAID-5 scores of ≥ 8 indicated severe diabetes distress.

PHQ-9 questionnaire comprises nine questions and is used for the assessment of symptoms of depression and its severity.[21,22] Depression was categorized based on PHQ-9 scores i-e (1-4) minimal depression, (5-9) mild depression, (10-14) moderate

depression, (15-19) moderately severe depression, and (20-27) severe depression.

The GAD-7 questionnaire consists **of** seven questions and is used for assessing symptoms of anxiety symptoms and their severity.[21, 22, 23]. Anxiety was categorized according to the severity on the GAD-7 scale, i.e., (0-4) none or minimal, (5-9) mild, (10-14) moderate, (15-21) severe.

Glycosylated (HbA1C) values were used to determine the glycemic control, a value of 7 or more was considered uncontrolled, while less than 7 was considered controlled.

SPSS (version 23) was used for statistical analysis**.** For categorical variables, percentages and frequencies were determined, whilst mean and standard deviations were used to describe continuous variables. The association between depression, anxiety, stress, and patient characteristics was investigated using a Chi-square test. A P-value of 0.05 or lower was considered significant 2016).[9]

RESULTS

During the study period, a total of 80 T1DM patients came to AIMS Sugar hospital which was included in the study. Out of the total 80 patients, n=42 (52.5%) were male and n=38 (47.5%) were females. The mean age of the patients was 17.9±5.6 (range 9-37) years (Table 1).

Out of the total 80 patients, n=63;76.8% had poor glycemic control. A total of n=58;72.5% were having depression. N=12;15% experienced severe depression. Severe anxiety was prevalent in n=29;36.3% of patients. Diabetes-associated distress was experienced by n=47; 59% of patients (Table 2).

There was a statistically significant association between glycemic control and anxiety (*p*=.041). Similarly, the education level of patients was significantly associated with anxiety (*p*=.043) Table 3.

Patient Characteristics	Patients (n)	Frequency (%)
Gender		
Male	42	52.5
Female	38	47.5
Age		
<15 years	27	33.8
15-34 years	52	65
35-54 years	1	1.3
>54 years	0	0
Patient education		
Uneducated	26	32.5
Primary	19	23.8
Secondary	26	32.5
Graduation	7	8.8

Table 1 Demographic characteristics of Type I diabetes patients visiting a specialized Diabetic Center in Peshawar, Khyber Pakhtunkhwa from July 2021 to December 2021 (N = 80)

ANOVA was also applied to determine the association between continuous variables (Age, years of education, duration of diabetes and glycosylated hemoglobin with "diabetes-associated distress" (PAID 5), Depression (PHQ9) and anxiety (GAD 7) (Table 4), according to ANOVA statistics only education has a significant association with anxiety

Clinical characteristics	Patients (n)	(%)
Glycemic control		
Controlled	17	21.4
Uncontrolled	63	78.6
Depression		
Mild	11	13.8
Moderate	26	32.5
Moderately Severe	20	25
Severe	12	15
Anxiety		
Mild	17	21.3
Moderate	21	26.3
Severe	29	36.3
Diabetes associated distress		
Yes	47	58.8

Table 2 Clinical characteristics of T1DM patients (n=80)

DISCUSSION

This study found that the prevalence of depression, anxiety, and diabetes-related distress is high in T1DM patients as compared to the prevalence reported in previous studies, mental health disorders were found more in males as compared to females and there was a statistically significant association found of anxiety with glycemic control and level of education of the patients. In our study moderately severe and severe depression was found in 40% (n=32) patients, severe anxiety was found in 15% (n=12) patients while diabetes-associated distress was found among 59% (n=47) patients. Depression and anxiety reported in our study are more than the depression and anxiety symptoms reported in the systematic review which were 30.04% and 32% respectively.[24] Another study determined that children with diabetes were more likely to experience mild, moderate, and severe psychosocial problems, respectively, at rates of 8.33%, 27.38%, and 20.24%.[25] This could be because Pakistan is a low-middle income country and disease management becomes challenging with the added socioeconomic issues. Investigating mental health issues in children and teenagers with T1DM is necessary for improving patient care.

In our study 47.5% (n=38) of females suffering from type 1 diabetes were having symptoms of the psychological disorder compared to 52.5% (n=42) of males, while other studies found that psychological issues were more common in females, even females from the general population are more predisposed to

psychological issues.[26] The possible reason for this finding in our study could be the small sample size or maybe because most of the females in our study were of younger age. There was no significant association between age categories and mental health disorders in our study. Some studies show older age to be a risk factor for an increased prevalence of depression, others show older age to be associated with lower rates of depression in older people with T1DM. [27] This aspect needs to be explored further.

This study also reports that 78.6% (n=63) of T1DM patients had poor glycemic control and there was a statistically significant association between glycemic control and anxiety which was also reported in other studies.[28] Patients suffering from higher levels of diabetes-related psychological distress have difficulty in adherence to treatment plans such as diet plans, regular exercise, and frequent monitoring of blood glucose levels. Because of diabetic distress, prescription medications can adversely affect diabetes management and treatment outcomes. Through alterations in psychophysiological processes or related self-management behaviors, stress itself can lead to the dysregulation of diabetes.[25] According to a study conducted in Spain, no association between the prevalence of depression and the degree of glycemic control in primary care settings was found which is consistent with the findings in our study.[29,30] There was also a significant association of anxiety with education level in our study which was not reported previously. In this study, the sample was taken from a specialized diabetic center visited by diabetic patients across the Khyber Pakhtunkhwa province. Data was collected by a single person who is trained in mental health screening. HbA1c was measured for all patients to assess their glycemic levels. PAID5 questionnaire was used to assess diabetes-related distress, which was not used before in our population. The PAID-5 has a sensitivity of 94% and specificity of 89% for the recognition of diabetes-related emotional distress.

CONCLUSION

In this study, the findings suggest that mental issues are extremely common in T1DM patients, and prevalence is more with poor glycemic control.

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Patient characteristics	Depression (n) (%)	P value*	Anxiety (n) (%)	P value*	Diabetes associated stress (n) (%)	P value*
Age (years)						
<15	19 (38)	.799	14 (28)	.298	19 (40.4)	.201
≥15	39 (78)		36 (72)		28(59.5)	
Gender						
Male	14 (64)	.219	17(56.66)	.563	23(49)	.446
Female	8 (36.3)		13 (43.33)		24 (51.06)	
Glycemic control						
Controlled	7 (32)	.155	10 (33.3)	**.041**	9 (27.2)	.270
Uncontrolled	15 (68.1)		20 (67)		24 (73)	
Education						
Uneducated	5 (22.7)	.269	6 (20.68)	**.043**	9 (27.2)	.331
Primary	8 (36.3)		10 (34.4)		9(27.2)	
Secondary	6 (27.2)		8 (27.5)		10 (30.3)	
Graduation	3(13.6)		5 (17.2)		5 (15.1)	
Duration of diabetes (years)						
≤5	29 (50)	.522	24 (48)	.907	24 (51.1)	.244
6-10	18 (31.03)		16 (32)		16 (34.04)	
>10	11 (19)		10 (20)		7 (15)	

Table 3. Association of patient characteristics with depression, anxiety and diabetes-associated stress in type 1 diabetic patients (N = 80)
*Chi-square test applied, p-value less than 0.05 considered statistically significant. p-values less than 0.05 in bold.

	PAID 5 (Mean ± SD)			PHQ 9 (Mean ± SD)						GAD 7 (Mean ± SD)				
	Normal	Distress	p-value	Normal	Mild	Moderate	Mod to Severe	Severe	p-value	Normal	Mild	Moderate	Severe	p-value
Age	17.82 (5.13)	17.96 (5.97)	.914	18.82 (7.6)	16.36 (4.20)	17.27 (3.98)	18.15 (5.42)	19.42 (7.98)	0.679	18.69 (7.44)	15.94 (7.44)	18.29 (3.74)	18.41 (6.25)	0.451
Education	6.15 (5.42)	5.15 (4.79)	.386	7.45 (4.91)	4.91 (5.54)	5.23 (4.85)	5.95 (5.24)	4.50 (5.20)	0.657	9.15 (5.22)	4.53 (4.59)	3.71 (4.18)	5.90 (5.14)	**0.014**
Duration of DM	7.64 (5.04)	6.32 (4.31)	.214	7.18 (6.08)	7.09 (4.09)	5.81 (4.25)	6.40 (3.6)	9.42 (5.71)	0.266	8.08 (6.07)	6.06 (3.97)	5.90 (3.98)	7.48 (4.77)	0.430
HbA1C	10.77 (3.26)	11.34 (2.51)	.392	9.39 (2.72)	10.81 (3.08)	11.23 (2.45)	11.99 (3.15)	11.37 (2.69)	0.184	10.23 (2.70)	10.85 (3.61)	11.64 (2.85)	11.24 (2.38)	0.547

Table 4. Association of T1DM patient characteristics with PAID 5, PHQ9 and GAD 7 scores (N = 80)

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