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Original Research Article

DEPRESSION, ANXIETY, STRESS, AND FAMILY SYSTEMS IN PATIENTS WITH TYPE 1 DIABETES MELLITUS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Type 1 Diabetes Mellitus (T1DM) is a chronic autoimmune disorder requiring lifelong insulin therapy and strict self-management. Beyond its physical burden, T1DM is associated with psychological challenges such as depression, anxiety, and stress. Family support plays an important role in influencing psychological well-being and disease outcomes among affected individuals. **Materials and Methods:** A cross-sectional study was conducted among 150 adults with Type 1 Diabetes Mellitus at a tertiary care hospital in Chennai using convenient consecutive sampling. Psychological symptoms were assessed using DASS-21, family functioning using the Family APGAR scale, and data were analysed using SPSS software. **Result:** Most patients were aged 21–30 years (29.3%) and 31–40 years (27.3%), with females comprising 52%. Normal BMI was observed in 51.3%, and 70% were married. The highest proportion had a diabetes duration of 11–20 years (36.7%). Normal stress levels were seen in 75.3%, with stress present in 24.7%. Normal anxiety was reported in 76%, with anxiety symptoms in 24%. Depression was less frequent, with 86% showing normal scores and 14% exhibiting depressive symptoms. Highly functional family environments were reported by 81.3% of patients. No significant association was found between duration of diabetes and severity of stress (p=0.582), anxiety (p=0.936), or depression (p=0.103). HbA1c showed weak, non-significant correlations with psychological variables and family functioning. **Conclusion:** Psychological symptoms were present in a minority of individuals with T1DM, with most demonstrating stable emotional health and supportive family systems. Routine psychosocial assessment and family-centred care may improve overall diabetes management and patient well-being.

INTRODUCTION

Type 1 Diabetes Mellitus (T1DM) is a chronic autoimmune metabolic disorder characterised by the destruction of pancreatic β-cells, resulting in absolute insulin deficiency and lifelong dependence on exogenous insulin and metabolic control.[1] T1DM often begins in childhood or adolescence and requires self-management, including frequent glucose monitoring, insulin administration, dietary adjustments, and vigilance for acute complications such as hypoglycaemia and diabetic ketoacidosis.[1,2] The disease condition not only affects the individuals physically, but also produces emotional and psychosocial troubles.[3]

Several studies have recorded high rates of psychiatric symptoms among T1DM patients, especially depression and anxiety. A comprehensive meta-analysis demonstrated that among children with T1DM, the prevalence of depression was approximately 22.2% and anxiety approximately 17.7%, with higher rates observed among female patients and those from lower-middle-income regions.[4] A systematic review of adolescent T1DM patients reported that about 30.04% experienced depression and 32% experienced anxiety symptoms, which created negative impacts on glycaemic control and self-management behaviours.[5] Thus, depression and anxiety are found to be the most prominent comorbid conditions in patients living with T1DM,

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often complicating both psychological well-being and medical outcomes.[4,5]

Along with psychiatric disorders, patients with T1DM frequently experience diabetes-related distress, which is caused by the relentless, daily responsibilities of disease management. Diabetes distress includes feelings of overwhelm, frustration, and burnout that arise from coping with the demands of T1DM care. It has been associated with poorer psychological functioning and glycaemic control and is recognised as an important target for psychosocial intervention.[6] While most studies focused on the individual psychological difficulties of T1DM, some suggest that family dynamics and environment play an important role in maintaining mental health and disease outcomes. Family systems, including patterns of emotional expression, cohesion, conflict, and support, have been linked to the psychological functioning and quality of life of children and adolescents with T1DM. T1DM patients were found to have significantly higher anxiety and depression scores compared to healthy individuals, and family cohesion produced a positive effect on mental health symptoms and glycaemic control.[3,7]

Positive family interactions, emotional support, and effective communication contribute to better psychosocial adjustment and improved diabetes management, whereas family conflict, overcontrol, and dysfunction are linked to greater emotional distress and poorer self-care. Family systems perspectives emphasise that families operate as interconnected units, where the emotional and behavioural responses of one member influence others, highlighting the importance of healthy family dynamics and communication in managing chronic illness stress.[7,8]

Although strong evidence supports psychosocial care in diabetes management, routine screening and family-focused interventions remain limited.[9] Clinical management often focuses primarily on biomedical markers such as blood glucose levels and HbA1c, whereas psychological comorbidities, including depression, anxiety, and stress, are addressed less consistently.[10] Given the high prevalence of mental health concerns among individuals with T1DM and the recognised influence of family environment on both psychological and clinical outcomes, further research is needed to examine psychological morbidity and its association with family systems across diverse healthcare settings.[11] Therefore, this study aims to determine the prevalence of depression, anxiety, and stress among patients with T1DM and examine their association with family systems in a tertiary care setting.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Department of Psychiatry in collaboration with the Institute of Diabetology, Kilpauk Medical College and Hospital, Chennai. The study was carried out over a period of 3 months. Ethical clearance was obtained from the Institutional Ethics Committee prior to the study, and written informed consent was obtained from all parents.

Inclusion Criteria
Patients aged above 18 years diagnosed with T1DM, belonging to either gender, and willing to provide informed consent.

Exclusion Criteria
Patients who were unwilling to participate, those with substance use, presence of other significant comorbid medical conditions, known history of psychiatric illness, and pregnant or lactating women.

Methods: Data were collected from patients with T1dM who met the inclusion and exclusion criteria using convenient and consecutive sampling. After obtaining informed written consent, socio-demographic details and clinical variables such as age, sex, marital status, duration of diabetes, and treatment history were recorded in a structured and customised case record form. Anthropometric measurements were obtained using standard techniques; body weight was measured with a calibrated digital weighing scale and height with a stadiometer, and body mass index (BMI) was calculated and classified according to WHO criteria. Glycaemic control was assessed using HbA1c values obtained from venous blood samples analysed in the central laboratory by standardised methods. Psychological morbidity was evaluated using the Depression, Anxiety and Stress Scale-21 (DASS-21), and the scores were categorised into normal, mild, moderate, severe, and extremely severe as per the recommended scoring system. Family system functioning was assessed using Smilkstein's Family APGAR scale, and patients were classified as having highly functional, moderately dysfunctional, or severely dysfunctional families based on the total score. All questionnaires were administered after the clinical and laboratory data collection.

Sample Size: The sample size was calculated based on previous literature using the formula:
$$N = (Z1 - \alpha/2)^2 \, pq/d^2$$
Where, Confidence Interval =95%, Power =80%, Absolute precision =8%. The estimated sample size was 147, which was rounded off to 150 patients.

Statistical Analysis: Data were entered in Microsoft Excel and analysed using IBM SPSS software (version 25). Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequency and percentage. The association between parameters was analysed using the Pearson chi-square test (or Fisher's exact test wherever the expected cell count was <5). The correlation was assessed using Pearson's correlation coefficient. A p-value of <0.05 was considered statistically significant, and all tests were two-tailed.

RESULTS

Among 150 patients, most were aged 21–30 years (29.3%) and 31–40 years (27.3%), with females constituting 52%. Normal BMI was seen in 51.3%, overweight in 32.7%, and obesity in 6.7%. Most were married (70%) and had a diabetes duration of 11–20 years (36.7%). Stress (24.7%), anxiety (24%), and depression (14%) were observed. Highly functional families accounted for 81.3% [Table 1].

Table 1: Socio-Demographic and Clinical Characteristics

Clinical Characteristics	Category	n (%)
Age group (years)	<20	13 (8.7%)
	21–30	44 (29.3%)
	31–40	41 (27.3%)
	41–50	28 (18.7%)
	51–60	24 (16%)
Sex	Female	78 (52%)
	Male	72 (48%)
BMI	Underweight	14 (9.3%)
	Normal weight	77 (51.3%)
	Overweight	49 (32.7%)
	Obese	10 (6.7%)
Marital status	Married	105 (70%)
	Unmarried	45 (30%)
Duration of diabetes (years)	<5	25 (16.7%)
	6–10	37 (24.7%)
	11–20	55 (36.7%)
	>21	33 (22%)
Stress	Normal	113 (75.3%)
	Mild	14 (9.3%)
	Moderate	17 (11.3%)
	Severe	3 (2%)
	Extremely severe	3 (2%)
Anxiety	Normal	114 (76%)
	Mild	7 (4.7%)
	Moderate	17 (11.3%)
	Severe	5 (3.3%)
	Extremely severe	7 (4.7%)
Depression	Normal	129 (86%)
	Mild	10 (6.7%)
	Moderate	6 (4%)
	Severe	2 (1.3%)
	Extremely severe	3 (2%)
Family APGAR	Highly functional family	122 (81.3%)
	Moderately dysfunctional family	10 (6.7%)
	Severely dysfunctional family	18 (12%)

Normal stress, anxiety, and depression levels predominated across all diabetes duration groups: stress (<5 years 76%, 6–10 years 67.6%, 11–20 years 76.4%, >21 years 81.8%; p=0.582), anxiety (<5 years 72%, 6–10 years 75.7%, 11–20 years 78.2%, >21 years 75.8%; p=0.936), and depression (<5 years 80%, 6–10 years 89.2%, 11–20 years 89.1%, >21 years 81.8%; p=0.103), with only a few showing mild to extremely severe symptoms [Table 2].

Table 2: Association Between Duration of Diabetes with Stress Levels, Anxiety Levels, and Depression Severity

	Duration (Years)	Normal	Mild	Moderate	Severe	Extremely Severe	P value
Stress Levels	<5	19 (76%)	3 (12%)	3 (12%)	0	0	0.582
	6–10	25 (67.6%)	5 (13.5%)	5 (13.5%)	2 (5.4%)	0	
	11–20	42 (76.4%)	5 (9.1%)	6 (10.9%)	1 (1.8%)	1 (1.8%)	
	>21	27 (81.8%)	1 (3%)	3 (9.1%)	0	2 (6.1%)	
Anxiety Levels	<5	18 (72%)	0	4 (16%)	1 (4%)	2 (8%)	0.936
	6–10	28 (75.7%)	3 (8.1%)	3 (8.1%)	2 (5.4%)	1 (2.7%)	
	11–20	43 (78.2%)	2 (3.6%)	7 (12.7%)	1 (1.8%)	2 (3.6%)	
	>21	25 (75.8%)	2 (6.1%)	3 (9.1%)	1 (3%)	2 (6.1%)	
Depression Severity	<5	20 (80%)	2 (8%)	1 (4%)	2 (8%)	0	0.103
	6–10	33 (89.2%)	2 (5.4%)	2 (5.4%)	0	0	
	11–20	49 (89.1%)	2 (3.6%)	3 (5.5%)	0	1 (1.8%)	
	>21	27 (81.8%)	4 (12.1%)	0	0	2 (6.1%)	

Highly functional families were common in all duration groups: <5 – 20 (80.0%), 6–10 – 33 (89.2%), 11–20 – 42 (76.4%), and >21 – 27 (81.8%). Moderate dysfunction ranged from 1 (2.7%) to 6 (10.9%), and

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severe dysfunction from 3 (8.1–12.0%) to 5 (15.2%). There was no significant association between duration and family functioning (p = 0.637) [Table 3].

Table 3: Association Between Duration and Family Functioning (APGAR Classification)

Duration (Years)	Highly Functional Family	Moderately Dysfunctional Family	Severely Dysfunctional Family	P value
<5	20 (80%)	2 (8%)	3 (12%)	0.637
6–10	33 (89.2%)	1 (2.7%)	3 (8.1%)	
11–20	42 (76.4%)	6 (10.9%)	7 (12.7%)	
>21	27 (81.8%)	1 (3%)	5 (15.2%)	

HbA1c showed weak and non-significant correlations with stress (r=0.008, p=0.927), anxiety (r=-0.076, p=0.356), depression (r=0.022, p=0.789), and family functioning (APGAR) (r=0.009, p=0.916) [Table 4 and Figure 1].

Table 4: Correlation Between HbA1c Levels and Psychological Variables and Family Functioning

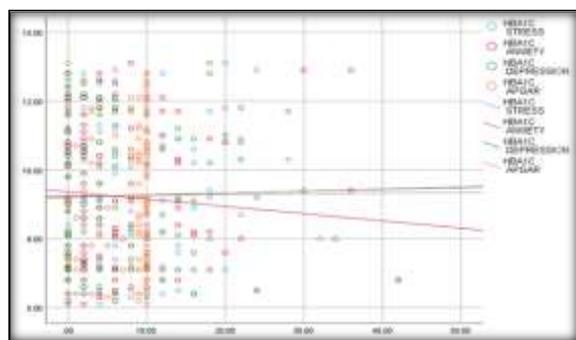|		Stress	Anxiety	Depression	APGAR
HBA1C	Pearson Correlation	0.008	-0.076	0.022	0.009
	P value	0.927	0.356	0.789	0.916

Figure 1: Scatter Plot Showing Relationship Between HbA1c Levels and Psychological Variables and Family Functioning

DISCUSSION

T1DM is a chronic condition that requires lifelong self-management and psychosocial adaptation, affecting the psychological well-being and family dynamics of affected individuals. The present study assessed the prevalence of depression, anxiety, and stress, and evaluated the association between family systems and psychiatric morbidities in patients with T1DM. Understanding these relationships can help identify patients' psychosocial needs and support a more holistic, family-centred approach to care, improving quality of life and long-term adjustment to the illness.

The study predominantly included young and middle-aged adults with nearly equal gender distribution; most had normal body weight, were married, and had longer disease duration, while the majority reported stable and supportive family environments, despite some experiencing psychological symptoms. Similar to this, van Duinkerken et al. noted that T1DM affects individuals across different life stages, including young and middle adulthood, with no clear gender predominance. It also highlighted that individuals with long-standing diabetes continue to manage occupational, social, and family responsibilities, consistent with the present study, where most patients were married, had prolonged illness duration, and largely maintained supportive family environments even with some psychological symptoms.[12]

In our study, stress levels varied across individuals with T1DM; however, most patients maintained normal stress levels irrespective of illness duration. Similarly, Alwani et al. reported that 64.6% of study participants experienced little or no diabetes-related distress, while 26.5% had moderate distress and 8.9% reported high distress. In contrast, although stress levels varied among patients in the present study, no significant association was observed between duration of illness and stress severity.[13] This difference may be due to variations in study population, assessment tools, or the presence of supportive family environments among patients in the present study.

In our study, anxiety symptoms were observed across different durations of diabetes, but most patients reported minimal or no anxiety symptoms. The severity of anxiety remained relatively uniform across duration groups, and no statistically significant association was identified between illness duration and anxiety levels. Similarly, Rechenberg et al. reported that anxiety symptoms occur in a subset of individuals with T1DM, with approximately 13% to 21.3% of youth screening positive for anxiety symptoms, and nearly 18.4% being diagnosed with an anxiety disorder during childhood or adolescence.[14] These findings indicate that anxiety is not universally present among patients and occurs in only a proportion of individuals. This supports the present study observation that most patients reported minimal or no anxiety symptoms across illness duration.

In our study, depressive symptoms were present in a few patients across varying durations of diabetes. Most individuals demonstrated minimal depressive symptoms regardless of illness duration. The analysis did not reveal a significant relationship between duration of diabetes and depression severity. Similarly, Subasinghe et al. reported that depressive symptoms occur in a subset of individuals with

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T1DM, with approximately one-fifth of patients experiencing clinical depression.[15]

In our study, highly functional families predominated across all duration groups, with relatively low levels of moderate and severe dysfunction, and no significant association between duration and family functioning. Similarly, Cho and Kim reported that duration of disease did not significantly influence parental quality of life, while diabetes family conflict showed a significant negative correlation with parental QoL (r = −0.48, p < 0.001) and adolescents' QoL (r = −0.66, p < 0.001). Diabetes family conflict significantly predicted parental QoL (B = −0.56, p = 0.021) and explained 35.7% of the variance, highlighting that family support rather than illness duration plays a more critical role in psychosocial outcomes.[16] Jaser et al. reported that diabetes-specific family functioning variables accounted for approximately 13%–34% of the variance in quality-of-life outcomes and about 34% of the variance in glycaemic control.[17] This study supports the present study's observation that stable and predominantly functional family environments may contribute to consistent family functioning irrespective of the duration of diabetes.

In our study, glycaemic control showed minimal correlation with psychological symptoms and family functioning. These findings suggest that metabolic control alone may not adequately explain psychological well-being or family dynamics among individuals living with T1DM. Similarly, Giannakopoulos et al. reported that depressive symptoms were present among individuals with T1DM and were associated with family functioning. Similar to their findings, the present study observed depressive symptoms in a smaller proportion of patients and noted that family functioning had a limited direct association with glycaemic control.[18] However, unlike their study, which reported a moderate relationship between depressive symptoms and glycaemic control, the present study found minimal correlation between metabolic control and psychological variables.

Most individuals with T1DM had normal psychological status and supportive family environments despite varying disease duration. The lack of significant association between illness duration, psychological symptoms, and family functioning suggests that psychosocial outcomes may be influenced more by family support than by disease chronicity. These findings highlight the need for routine psychological screening and family-centred care to improve long-term adjustment and quality of life.

Limitations: This study was conducted in a single tertiary care centre, which may limit the findings to other settings. As the study followed a cross-sectional design, relationships between psychological symptoms, family functioning, and glycaemic control could not be established. Psychological variables were assessed using self-reported questionnaires, which may be influenced by personal perception and reporting bias. The exclusion of patients with known psychiatric illness and major medical comorbidities may have led to an underestimation of psychological morbidity. In addition, the absence of long-term follow-up restricts understanding of changes in psychological well-being and family dynamics over time.

CONCLUSION

Individuals with T1DM experience psychological symptoms such as depression, anxiety, and stress; the overall prevalence remains relatively low, with most patients showing normal psychological functioning. The duration of illness does not significantly influence the severity of psychological morbidity. A majority of patients reported supportive and functional family environments, suggesting the protective role of positive family systems in psychological adjustment. The glycaemic control showed minimal association with psychological variables and family functioning. Including routine psychological screening and family-oriented support strategies in the comprehensive management of T1DM to support comprehensive patient management and enhance sustained quality of life outcomes.

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