ORIGINAL ARTICLE

Diabetes Distress: Identifying Prevalence and Associated Factors in Type 2 Diabetes Mellitus Patients in Western India

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Abstract

Background: Type 2 diabetes mellitus (T2DM) poses a significant health burden globally, with India accounting for a large proportion of cases. Beyond physical complications, diabetes distress (DD)—the emotional and psychological strain associated with diabetes management—is increasingly recognized as a critical factor affecting patient outcomes. However, data on the prevalence and determinants of DD in Western India remain limited.

Materials and methods: A cross-sectional study was conducted among 158 adult T2DM patients attending an outpatient clinic in Vadodara, Gujarat. DD was assessed using the validated Diabetes Distress Scale-17 (DDS-17). Demographic, clinical, and psychosocial variables were collected and analyzed using descriptive statistics, Chi-squared tests, *t*-tests, and logistic regression to identify factors associated with DD.

Results: The prevalence of DD was 70.2%, with 31.6% experiencing moderate distress and 38.6% experiencing high distress. Emotional burden was the most prevalent distress domain, followed by regimen-related, interpersonal, and physician-related distress. Factors significantly associated with lower DD included higher education, good family support, regular physical activity, and diabetes duration over 10 years. Conversely, poor glycemic control, insulin therapy, hypoglycemic episodes, and the presence of diabetic complications were linked to higher DD.

Conclusion: DD is highly prevalent among T2DM patients in Western India and is influenced by both clinical and psychosocial factors. Incorporating routine psychosocial screening and patient-centered interventions into diabetes care is essential to address this underrecognized burden and improve overall disease management.

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Introduction

Type 2 diabetes mellitus (T2DM) is one of the most prevalent noncommunicable diseases worldwide. India contributes significantly to the global burden (International Diabetes Federation, 2021)[1] and is often referred to as the "diabetes capital of the world." In 2019, over 77 million people were living with diabetes in India, a number projected to rise to 134 million by 2045.[2]

While the physical complications of T2DM—such as cardiovascular disease, nephropathy, retinopathy, and neuropathy—are well recognized, the psychological and emotional challenges associated with diabetes management have received comparatively less attention.[3,4] Among these, diabetes distress (DD) has emerged as a critical yet underdiagnosed psychosocial concern.[5,6] DD refers to the unique, often overwhelming emotional responses arising from the daily demands of diabetes self-management, including frustration, burnout, fear of complications, and concerns about inadequate support from health care providers or family members.[7,8] Unlike depression, DD is specifically linked to the burden of diabetes care and fluctuates over time with disease progression and treatment regimens.[5]

Unrecognized and untreated DD is associated with poor self-care, decreased medication adherence, suboptimal glycemic control, and deterioration in quality of life.[9] Evidence suggests that nearly one-third to one-half of patients with T2DM worldwide experience moderate to severe distress.[4,10] In India, where disparities in health care access, literacy, and social support are profound, emerging studies have reported varying prevalence rates, ranging from 30% to over 50%.[11] Despite this, routine psychosocial assessment is rarely integrated into diabetes care in India.

Although several studies have assessed DD in southern and eastern India, there is a paucity of data from Western India specifically addressing the prevalence and correlates of DD among T2DM patients. Against this backdrop, the present study aimed to determine the prevalence of DD among T2DM patients in Western India and to identify demographic, clinical, and psychosocial factors associated with its occurrence.

Materials and Methods

Study Settings and Participants

This cross-sectional study was conducted at the General Medicine Outpatient Department (OPD) of Parul Sevashram Hospital, Vadodara, Gujarat, India, after obtaining approval from the Institutional Ethics Committee. The primary objectives were to determine the prevalence of DD among patients with T2DM and to identify factors associated with DD in this population. A total of 158 patients diagnosed with T2DM, aged 18 years or older, and undergoing diabetes treatment for at least 3 months were enrolled in the study. Only patients who were cooperative and provided informed consent were included. Exclusion criteria were type 1 diabetes, pregnancy, impaired cognitive function, including dementia, Alzheimer's disease, psychosis, or other psychiatric illnesses under treatment; current cancer diagnosis or ongoing chemotherapy/radiotherapy; physical disabilities such as blindness, deafness, or aphasia; those managed solely with dietary modifications and/or exercise; patients on corticosteroid therapy; and individuals undergoing dialysis or awaiting major surgeries such as coronary artery bypass grafting or amputations.

Data Collection

Data collection involved documenting demographic and clinical variables, including age, gender, residence, education, addiction, family history of diabetes, age at diabetes diagnosis, duration of diabetes, routine physical activity, type of glucose-lowering medication, diabetes control, family support, presence of diabetic complications, and

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associated comorbid conditions, using a predesigned questionnaire. An HbA1c <7% was defined as controlled DM. Adequate physical activity was defined as approximately 150 minutes per week of moderate-intensity activity, based on the definition given by WHO.

Diabetes distress was measured using the validated 17-item Diabetes Distress Scale (DDS-17), which evaluates diabetes-related emotional and psychological burdens experienced over the preceding month. The DDS-17 uses a Likert scale from 1 (no problem) to 6 (serious problem), generating a total distress score and four subscale scores representing emotional burden (five items), physician-related distress (four items), regimen-related distress (five items), and diabetes-related interpersonal distress (three items). Subscale scores were calculated by averaging the responses to their respective items, while the overall distress score was computed by averaging all 17 items and presented as the mean item score. A mean item score of <2.0 indicates little or no distress, 2.0–2.9 indicates moderate distress, and ≥3.0 indicates high distress. DD was considered a dichotomous variable in our study, with patients considered to have DD if DDS-17 scores were ≥2.

Statistical Analysis

For statistical analysis, all the collected data were entered into a Microsoft Excel sheet. The data were analyzed using SPSS software (version 22.0). Categorical variables were represented as percentages, and continuous variables were presented as the mean ± standard deviation (SD) or median [interquartile range (IQR)]. A Chi-squared test was applied to compare categorical variables, and an independent *t*-test was applied to compare continuous variables. Bivariate logistic regression analysis was performed to determine the risk factors for DD. For all the statistical analyses, $p < 0.05$ was considered statistically significant.

Results

A total of 158 adults with T2DM were included in the study. The mean age was 53.16 ± 13.23 years, with 63.9% (n = 101) of patients being >50 years of age. A total of 108 (68.4%) study participants were males, and 50 (31.6%) were females. A total of 107 (67.7%) participants were from rural areas, whereas 51 (32.3%) were from urban areas. A total of 127 (80.4%) subjects were educated. A total of 30 (19%) participants were smokers, and 19 (12%) were alcoholics. A total of 48 (30.4%) participants had a family history of diabetes in a first-degree relative. In 24 (15.2%) cases, diabetes was diagnosed before 40 years of age, whereas in 134 (84.8%) cases, it was first diagnosed at a later age. A total of 112 (70.9%) participants had diabetes for >5 years, and 77 (48.7%) had associated comorbidities.

Mean HbA1c was 8.286 ± 1.392%, and 85 (53.8%) cases had uncontrolled diabetes mellitus. A total of 112 (70.9%) cases were only on oral hypoglycemic agents (OHAs), whereas 46 (29.1%) cases were on both oral and insulin therapy. A total of 25 (15.8%) cases complained of at least one hypoglycemic event in the last 6 months. Long-term diabetes complications were seen in 40 (25.3%) participants. A total of 129 (81.6%) patients admitted to having good family support, and 63 (43.7%) patients met WHO recommendations for physical activity. There was no significant difference between those with DD and those without DD in terms of age, gender, residence, age at diagnosis, smoking status, alcohol intake, first-degree relative(s) with DM, and comorbidity (Table 1).

Among the study participants, 111 (70.2%) had DD [50 (31.6%) moderate and 61 (38.6%) high DD]. Emotional burden was the most crucial domain in total DD, presenting in 133 (84.2%) participants, followed by regimen-related distress in 122 (77.2%), interpersonal distress in 97 (61.4%), and physician-related distress in 77 (48.7%) (Table 2).

Significantly less diabetes-related distress was observed in educated participants [OR 0.2894 (CI 0.0951–0.8804)], those doing regular exercise meeting WHO recommendations for physical activity [OR 0.2720 (CI 0.1330–0.5563)], those with a duration of diabetes of >10 years [OR 0.3690 (CI 0.1811–0.7518)], and those who had good family support [OR 0.320 (CI 0.1047–0.9780)]. Significantly more diabetes-related distress was observed in those with poorly controlled diabetes compared to those with well-controlled diabetes [OR 2.1614 (CI 1.0787–4.3306)] and/or with events of hypoglycemia compared to those without a history of hypoglycemia [OR 3.6255 (CI 1.0292–12.7713)], in those with complications compared to those without complications [OR 3.0173 (CI 1.1704–7.7787)], and in those who were on insulin therapy compared to those who were not [OR 4.9200 (CI 1.8024–13.4299)] (Table 3).

Discussion

Diabetes distress is a relatively new term that has been in use since the last decade. It is defined as the combined medical and psychological burden of DM resulting in a QoL issue due to emotional distress that remains hidden from providers as well as sufferers and has an unfavorable impact on diabetes management and outcomes. It results from constant worry about the disease, the need to adhere to dietary restrictions, monitoring and exercise recommendations, and the associated anxiety, anger, and burnout. In traditional medicine, physical and mental health are regarded as separate entities, due to which long-term psychiatric complications of chronic diseases such as diabetes often go unaddressed. This may give rise to more psychiatric diseases, including personality disorders, depression, anxiety, as well as impulse-control disorders that can further complicate the chronic treatment of DM.[3,4]

In a meta-analysis conducted by Sinha et al.,[11] the prevalence of DD among patients with T2DM in India ranged from 8.45 to 61.48%, with a pooled prevalence of 33%. The prevalence rates from various studies across different Indian states ranged from 8.45 to 100%.[12–31] For example, Sreedevi et al.[13] in Kerala reported a DD prevalence of 42.5%, Ghosh et al.[18] in West Bengal found that 38% of patients experienced significant distress, and Sharma et al.[30] from Rajasthan documented a prevalence of 34.2%. This study demonstrates that the prevalence of moderate to severe diabetes distress in Western India is 70.2%. Emotional burden was the most prominent domain, affecting over four-fifths of participants, followed by regimen-related distress, interpersonal distress, and physician-related distress.

When compared with international data, our prevalence (70.2%) is substantially higher than global averages. For instance, the multinational DAWN2 study[10] reported that approximately 45% of people with diabetes experienced moderate to high levels of distress, while other studies from Europe and the United States have reported prevalence rates ranging between 30 and 40%.[4,8] This disparity may suggest that Indian patients face additional psychosocial challenges, likely influenced by health care access, socioeconomic disparities, stigma, and lower integration of mental health services within diabetes care. These differences underscore the urgent need for context-specific psychosocial interventions in India to reduce distress and improve outcomes.

A previous study observed that the level of diabetes distress is much higher in patients who are younger, female, non-White, have a higher body mass index (BMI), and are being treated with insulin vs patients who are treated with oral hypoglycemic agents.[18] They reported no relation of diabetes distress with duration of diabetes, level of education, number of medications, or presence of comorbidity. However, in this study, we did not find any relation with age or gender, while higher education, good family support, longer diabetes duration, and regular physical activity were found to be inversely associated

Table 1: Sociodemographic, clinical, and biochemical characteristics of the study subjects according to the DD categories (*N* = 158)

Variables	*Subgroups*	*All subjects (n = 158)*	*With DD (n = 111)*	*Without DD (n = 47)*	*p-value*
Age (mean ± SD)		53.16 ± 13.23	53.09 ± 13.43	53.34 ± 12.89	0.9138
Age-group	<50 years	57 (36.1%)	40 (36%)	17 (36.2%)	0.9872
	>50 years	101 (63.9%)	71 (64%)	30 (63.8%)	
Gender	Male	108 (68.4%)	75 (67.6%)	33 (70.2%)	0.7438
	Female	50 (31.6)	36 (32.4%)	14 (29.8%)	
Residence	Urban	51 (32.3%)	33 (29.7%)	18 (38.3%)	0.2923
	Rural	107 (67.7%)	78 (70.3%)	29 (61.7%)	
Education	Educated	127 (80.4%)	84 (75.7%)	43 (91.5%)	0.0221*
	Uneducated	31 (19.6%)	27 (24.3%)	4 (8.5%)	
Smoking	Yes	30 (19%)	20 (18%)	10 (21.3%)	0.6331
	No	128 (81%)	91 (82%)	37 (78.7%)	
Alcohol intake	Yes	19 (12%)	13 (11.7%)	6 (12.8%)	0.8522
	No	139 (88%)	98 (88.3%)	41 (87.2%)	
Family history of diabetes	Yes	48 (30.4%)	32 (28.8%)	16 (34%)	0.5148
	No	110 (69.6%)	79 (71.2)	31 (66%)	
Age at diagnosis of diabetes	<40 years	24 (15.2%)	17 (15.3%)	7 (14.9%)	0.9462
	>40 years	134 (84.8%)	94 (84.6%)	40 (85.1%)	
Duration of DM	>5 years	112 (70.9%)	83 (74.8%)	29 (61.7%)	0.0982
	<5 years	46 (29.1%)	28 (25.2%)	18 (38.3%)	
Comorbidities	Yes	77 (48.7%)	53 (47.7%)	24 (51.1%)	0.7030
	No	81 (51.3%)	58 (52.3%)	23 (48.9%)	
HbA1C (mean ± SD)		8.286 ± 1.392	8.945 ± 1.510	7.627 ± 0.911	0.022*
Control of diabetes	Controlled	73 (46.2%)	45 (40.5%)	28 (59.6%)	0.0283*
	Uncontrolled	85 (53.8%)	66 (59.5%)	19 (40.4%)	
Treatment	OHA	112 (70.9%)	70 (63.1%)	42 (89.4%)	<0.001*
	OHA + insulin	46 (29.1)	41 (36.9%)	5 (10.6%)	
Routine physical activity	Yes	69 (43.7%)	36 (32.4%)	30 (63.8%)	<0.001*
	No	89 (56.3%)	75 (67.6%)	17 (36.1%)	
Family support	Yes	129 (81.6%)	86 (77.5%)	43 (91.5%)	0.0375*
	No	29 (18.4%)	25 (22.5%)	4 (8.5%)	
Hypoglycemia in last 6 months	Yes	25 (15.8%)	22 (19.8%)	3 (6.4%)	0.0344*
	No	133 (84.2%)	89 (80.2%)	44 (93.6%)	
Diabetes complications	Yes	40 (25.3%)	34 (30.6%)	6 (12.8%)	0.0182*
	No	118 (74.7%)	77 (69.4%)	41 (87.2%)	

* These represent significant values ($p < 0.05$)

with DD, as seen in other studies from India and abroad.[14–16,20,21,23,26,32]

Consistent with previous literature, our study found that poor glycemic control,[16,17,27] insulin use,[16,32] recent hypoglycemic events,[32] and the presence of diabetic complications[20,23,27,32] were strongly associated with DD. These findings suggest that patients on insulin may perceive their disease as more severe, and recurrent hypoglycemia further adds to fear and anxiety. The protective role of family support is especially relevant in Indian settings, where family-centered care plays a central role. Patients who receive emotional, logistical (including regular follow-ups, medication adherence, and dietary control), and financial assistance from family members reported lower distress and better adherence.[32,33] Education empowers patients with knowledge and coping strategies, whereas physical activity has known benefits for both glycemic control and psychological well-being.

We also found that patients with a duration of diabetes exceeding 10 years reported significantly less distress. This observation contrasts with the findings of Alwani et al.[34] and Geleta et al.,[35] who demonstrated significantly higher distress levels among patients with longer disease duration, attributing this to the cumulative treatment burden, risk of complications, and fatigue associated with chronic disease management. However, we observed lower distress among patients with a longer history of diabetes (>10 years). Possible explanations could be that individuals develop familiarity with treatment regimens over time, achieve better acceptance of their condition, and may gain confidence in self-management, collectively reducing the emotional burden of living with diabetes.

The findings underscore the need to integrate psychosocial screening into routine diabetes care in India. Instruments like DDS-17 are practical, validated, and can be administered within a few minutes in outpatient settings. Identifying patients at risk for DD enables timely counseling, peer-support interventions, and lifestyle guidance. Importantly, unlike depression, DD is dynamic and potentially reversible with appropriate interventions, which makes its early recognition clinically valuable.

The strengths of our study included the use of a validated tool (DDS-17) and the

Table 2: Prevalence of diabetes distress and its domains as per Diabetes Distress Scale-17 ($N = 158$)

Variable		*Prevalence (%)*
Diabetes distress	Little or no distress (<2)	47 (29.8%)
	Moderate distress (≥2–2.9)	50 (31.6%)
	Severe distress (≥3)	61 (38.6%)
Domains of diabetes distress		*Prevalence (%)*
Physician-associated distress	Little or no distress (<2)	81 (51.3%)
	Moderate distress (≥2–2.9)	54 (34.2%)
	Severe distress (≥3)	23 (14.5%)
Emotional burden	Little or no distress (<2)	25 (15.8%)
	Moderate distress (≥2–2.9)	52 (32.9%)
	Severe distress (≥3)	81 (51.3%)
Regimen-related distress	Little or no distress (<2)	36 (22.8%)
	Moderate distress (≥2–2.9)	40 (25.3%)
	Severe distress (≥3)	82 (51.9%)
Interpersonal stress	Little or no distress (<2)	61 (38.6%)
	Moderate distress (≥2–2.9)	59 (37.3%)
	Severe distress (≥3)	38 (24.1%)

Table 3: Odds of finding diabetes distress with various risk factors

Variables	*Odds ratio (95% confidence interval)*	*p-value*
Age >50 years	1.0058 (0.4945–2.0460)	0.9872
Male gender	0.8838 (0.4214–1.8539)	0.7439
Urban residence	0.6816 (0.3334–1.3937)	0.2936
Educated	0.2894 (0.0951–0.8804)	0.0289*
Current smoker	0.8132 (0.3476–1.9023)	0.6334
Alcohol intake	0.9065 (0.3224–2.5486)	0.8533
Diabetes in first degree relative present	0.7848 (0.3783–1.6283)	0.5152
Age at diagnosis <40 years	1.0334 (0.3977–2.6851)	0.9462
DM since >5 years	1.8399 (0.8888–3.8087)	0.1005
DM since ≥10 years	0.3690 (0.1811–0.7518)	0.0060*
Regular exercise	0.2720 (0.1330–0.5563)	0.0004*
Good family support	0.3200 (0.1047–0.9780)	0.0456*
Presence of comorbidities	0.8757 (0.4425–1.7329)	0.07031
Insulin use for therapy	4.9200 (1.8024–13.4299)	0.0019*
Poor glycemic control	2.1614 (1.0787–4.3306)	0.0297*
Hypoglycemia events in last 6 months	3.6255 (1.0292–12.7713)	0.0450*
Diabetes complications present	3.0173 (1.1704–7.7787)	0.0223*

* These represent significant values ($p < 0.05$)

evaluation of multiple clinical and psychosocial correlates. However, limitations include its single-center setting and relatively small sample size, which may limit generalizability. Longitudinal studies across diverse Indian regions are needed to assess temporal trends and evaluate the effectiveness of targeted psychosocial interventions.

Conclusion

Diabetes distress is a rather new front for health care providers, who already struggle with providing optimal care to their patients. An optimal treatment plan requires paying attention to every nuance of a complex condition like DM in the time-constrained environment of current health care provision. This study reveals a high burden of diabetes distress among T2DM patients in Western India, particularly in the domains of emotional and regimen-related burden. The findings reaffirm the importance of screening for distress in routine diabetes care and highlight the need for holistic, patient- and family-centered management strategies.

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