

# Identifying the Burden and Predictors of Diabetes Distress among Adult Type 2 Diabetes Mellitus Patients

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## Abstract

**Background:** Diabetes is a psychologically challenging medical condition. Diabetes distress (DD) refers to the unique, often hidden emotional burdens and worries that the patient experiences when managing diabetes. **Objective:** The objective of the study was to find the burden and identify the predictors of DD in adult Type 2 diabetes mellitus (T2DM) patients. **Materials and Methods:** Two hundred and fifty T2DM patients were recruited for this study from the endocrine outpatient department from February to April 2019. DD was measured using the Diabetic Distress Scale. **Results:** The prevalence of DD was 19.6%. The risk of DD was 4.25 times more in those aged  $\leq 45$  years as compared to those aged  $>45$  years. Patients with hemoglobin A1c (HbA1c)  $>8\%$  had 8.8 times more DD. Patients on insulin had more DD (5.4 times) as compared to patients who were on oral antidiabetic drugs. Patients with a history of treatment interruption had 11 times more risk of DD as compared to patients who did not. **Conclusions:** DD was found to be high among patients aged  $\leq 45$  years, illiterates, patients on insulin, patients with a history of treatment interruption, and those with HbA1c  $>8\%$ . Patients with high DD were found to have higher HbA1c levels.

**Keywords:** Cross-sectional study, diabetic distress, hemoglobin A1c level, Type 2 diabetes

## INTRODUCTION

Diabetes mellitus (DM) is one of the most common metabolic diseases with a complex, multifactorial etiology and has varied clinical and biochemical manifestations.<sup>[1]</sup>

DM is a psychologically challenging medical condition for the patients as well as for their caregivers. Living successfully with DM requires lifelong discipline and commitment, which could be very demanding, stressful, and depressing.<sup>[2,3]</sup>

Diabetes distress (DD) refers to psychological distress specific to people living with diabetes. It can encompass a wide range of emotions such as feeling overwhelmed by the demands of self-management required through adherence to diet, exercise, and medications. They may worry about existing or future complications, be fearful of hypoglycemia, and harbor feelings of guilt or shame, notably in relation to obesity or lifestyle.<sup>[4]</sup>

DD lowers the motivation for self-care, often leading to lowered physical and emotional well-being, poor diabetes control, poor adherence to medication, and increased mortality among individuals with diabetes.<sup>[2,3]</sup>

The objective of the study was to find the burden and identify the predictors of DD in adult Type 2 diabetes mellitus (T2DM) patients.

## MATERIALS AND METHODS

This cross-sectional study was conducted on T2DM patients attending Endocrine Outpatient Department (OPD) of Mazumdar Shaw Medical Centre, Narayana Hrudayalaya, Bengaluru, over a period of 3 months from February to April 2019. The study protocol was approved by the ethics committee of the institute.

A total of 250 DM patients were included in the study. This sample size was calculated using EpI Info 7 software

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(Details: Epi Info™, Division of Health Informatics & Surveillance (DHIS), Center for Surveillance, Epidemiology and Laboratory Services (CELS) Other details of software: NH City, Bangalore, Karnataka, India). The prevalence was taken as 18% based on estimates in previous studies,<sup>[5-8]</sup> with 5% absolute error, and considering nonresponse rate of 10% patients to be nonrespondents.

### Inclusion criteria

T2DM patients  $\geq 18$  years visiting the endocrinology OPD who were on treatment for at least 6 months were included in the study.

### Exclusion criteria

(1) Inpatients, (2) patients on dietary modification and/or exercise alone, (3) patients on corticosteroids therapy, (4) patients who were having any psychiatric illness or on any psychotropic medications, (5) patients with cancer and/or on treatment (chemo or radiotherapy), and (6) patients who were on dialysis or awaiting for any major surgery or procedure (coronary artery bypass grafting and amputation) were excluded from the study.

Informed consent was obtained from all the study participants. They were interviewed using a predesigned, semi-structured questionnaire with variables related to their sociodemographic profiles, literacy, body mass index (BMI), the family history of diabetes, the duration of diabetes, their occupation and relevant past medical history. DD levels among the study participants were measured by using the Diabetes Distress Scale (DDS),<sup>[9]</sup> which was in English language, however questions were asked in the local language at the time of interview, which they can understand easily. The patients were also assessed for their glycemic control (hemoglobin A1c [HbA1c]).

DDS is a 17-item rating scale and gives a total DD score plus 4 subscores, each addressing a different kind of distress, namely, emotional burden, physician-related distress, regimen-related distress, and interpersonal distress. To score, simply sum the patient's responses to the appropriate items and divide by the number of items in that scale. Each item is rated on a 6-point scale considering the degree to which respective items may have distressed or bothered the diabetic patients during the past month.

### Operational definition

The mean item score in DDS  $\geq 3$  is taken as a level of distress worthy of clinical attention and defining DD in the study.

The data collected were entered in Microsoft Excel and were analyzed using SPSS software version 23 (NH City, Bangalore, Karnataka, India). Logistic regression (LR) was used to study the associations between selected variables and the DD.  $P < 0.05$  was considered statistically significant.

## RESULTS

The baseline characteristics of the study participants are shown in Table 1.

**Table 1: Profile of the study participants**

	Frequency (n=250), n (%)
Age (years), mean $\pm$ SD	54.67 $\pm$ 10.1
$\leq 45$	61 (24.4)
$> 45$	189 (75.6)
Gender	
Male	165 (66.0)
Female	85 (34.0)
Religion	
Hinduism	178 (71.2)
Islam	72 (28.8)
Education	
Illiterate	30 (12.0)
Literate	220 (88.0)
Occupation	
Working	129 (51.6)
Homemaker	71 (28.4)
Retired	50 (20.0)
Visit to doctor (months)	
$< 3$	136 (54.4)
3-6	60 (24.0)
6-12	37 (14.8)
$> 12$	17 (6.8)
Ongoing treatment	
Both	102 (40.8)
Insulin	23 (9.2)
OAD	125 (50.0)
Interruption in treatment	70 (28.0)
Current smoker	53 (21.2)
Current alcoholic	59 (23.6)
Family history of DM	151 (60.4)
BMI (kg/m <sup>2</sup> ), mean $\pm$ SD	27.48 $\pm$ 4.35
18.5-4.9	78 (31.2)
25-29.9	110 (44.0)
30-34.9	48 (19.2)
$\geq 35$	14 (5.6)
Duration of diabetes (years)	
$< 1$	19 (7.6)
1-5	74 (29.6)
5-10	66 (26.4)
$> 10$	91 (36.4)
HbA1c, mean $\pm$ SD	8.86 $\pm$ 2.35
$\leq 8$	127 (50.8)
$> 8$	123 (49.2)

OAD: Oral antidiabetic drug, DM: Diabetes mellitus, SD: Standard deviation, BMI: Body mass index, HbA1c: Hemoglobin A1c

Figure 1 shows the burden of different types of DD. The prevalence of DD (total), i.e., mean DDS score  $\geq 3$  for the current study, came out to be 19.6%. The highest level of DD was seen in emotional type (34.8%).

Table 2 shows the LR analysis of predictors of DD. Odds for DD were significantly higher among those who were young, illiterate, not going for an annual consult, on insulin, non adherant, smokers, consuming alcohol and with uncontrolled diabetes.

A positive moderate correlation (using Pearson’s correlation coefficient) was found ( $r = 0.707, P < 0.001$ ) between the participants’ mean DDS score and HbA1c levels, indicating a significant linear relationship between the two variables.

### DISCUSSION

The current study was conducted to find the burden and identify the predictors of DD in adult T2DM patients. The prevalence of DD (mean DDS score  $\geq 3$ ) was found to be 19.6% as compared to other studies, which was in the range of 18%–25%.<sup>[5,6,8]</sup>

This study also revealed that emotional DD was high as compared to regimen-, interpersonal-, and physician-related DD. There were two important emotions which contributed to high emotional DD. The first emotion was feeling that the diabetes is taking up too much mental and physical energy every day and the second emotion was a feeling that he/she will end up with serious long-term complications.

The risk of DD was 4.25 times higher in the study participants aged  $\leq 45$  years as compared to those aged  $>45$  years. Prior studies by Islam *et al.* and Wardian and Sun also showed similar findings of a significant association between age and DD.<sup>[6,10]</sup>

The study participants who were illiterates had 2.3 times more risk as compared to literates. In a study conducted by Gahlan *et al.*, low education level was one of the major predictors for high DD,<sup>[5]</sup> which was in support of our study findings. Probably, illiteracy leads to poor knowledge about DM, its management, and complications, which in turn leads to poor compliance to medication and nonadherence to follow-up visits. This study also revealed that patients who visited doctor less frequently (once in 12 months) had higher risk of DD by four times (approx.) as compared to people who visited a doctor once in 3 months.

Patients on insulin had more distress (5.4 times) as compared to patients who were on OADs, which was similar to the findings reported in the study conducted by Islam *et al.*<sup>[6,11]</sup> This could be possibly because of the complex regimen which includes multiple injections, frequent glucose monitoring, and the fear of hypoglycemia.

Patients with a history of treatment interruption had 11 times more risk of distress as compared to patients who did not have any treatment interruption. Smokers and alcoholics had 3.9 and 3.5 times the risk of having DD, respectively. Patients with HbA1c  $>8\%$  had 8.8 times more DD.

DD was 2.5 times more in patients with 1–5 years’ duration of diabetes as compared to patients having a long duration of diabetes ( $>10$  years). In a study conducted by Islam *et al.*,<sup>[6]</sup> smoking, duration of diabetes, and poor HbA1c had an influence on DD, which was statistically significant.

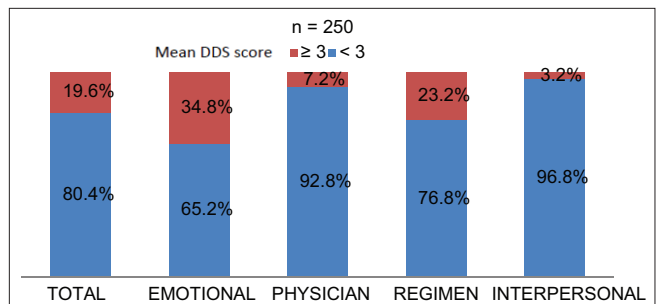
### CONCLUSIONS

The burden of DD was 19.6%, and the major determinants

**Table 2: Logistic regression analysis for predictors of diabetic distress\* ( $n=250$ )**

Total DDS	Absent (<3)	Present ( $\geq 3$ )	OR	P
Age (years)				
≤45	37	24	4.25	<0.001**
>45	164	25		Ref.***
Literacy				
Literate	181	39		Ref.
Illiterate	20	10	2.32	<0.048**
Visit to doctor (months)				
<3	113	23		Ref.
3-6	51	9	.867	0.739
6-12	28	9	1.579	0.306
>12	9	8	4.367	0.006**
Treatment				
OAD	107	18		Ref.
Insulin	12	11	5.44	0.001**
Both	82	20	1.45	0.297
Interruption in treatment				
No	166	14		Ref.
Yes	35	35	11.85	<0.001**
Smoking				
No	169	28		Ref.
Yes	32	21	3.96	<0.001**
Alcohol				
No	161	30		Ref.
Yes	40	19	2.54	<0.001**
Duration of diabetes (years)				
<1	15	4	1.93	0.307
1-5	55	19	2.51	0.027**
5-10	51	15	2.13	0.081
>10	80	11		Ref.
HbA1c (%)				
<8	120	7		Ref.
$\geq 8$	81	42	8.88	<0.001**

\*DD: Mean DDS  $\geq 3$ , \*\*Statistically significant, \*\*\*Ref.: Reference group. DD: Diabetes distress, DDS: Diabetes Distress Scale, HbA1c: Hemoglobin A1c, OR: Odds ratio, OAD: Oral antidiabetic drug



**Figure 1:** Burden of different types of diabetic distress in the study population

were young age, illiteracy, insulin treatment, short duration of diabetes, history of treatment interruption, and poor glycaemic control. Emotional DD was found to be more common than regimen-, interpersonal-, and physician-related

DD. Patients with high DD were found to have higher HbA1c levels.

The limitation of our study is a lack of follow-up of study participants with any intervention. DD still needs further research in the Indian scenario, and a validated tool should be developed which can be used with ease for diagnosing DD.

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Nil.

### Conflicts of interest

The principal author Dr. Ratnesh was present in the Department of Endocrine and Diabetes, Narayana Health City, Bengaluru, during the study period and after its completion left the department. He joined Dumka Medical College, Dumka, Jharkhand.

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