

# Burden and predictors of distress among persons with type 2 diabetes mellitus: Excerpts of an observational study from Eastern India

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## ABSTRACT

**Context:** Diabetes distress (DD) is a common psychological condition distinct from depression. This is a unique, hidden emotional burden and worry that the patient experiences under ongoing treatment. **Aim:** To assess the prevalence and predictors of DD among adult diabetics attending a tertiary healthcare facility. **Settings and Design:** This hospital-based observational, analytical, cross-sectional study recruited 152 adult patients with type 2 diabetes. **Materials and Methods:** The sociodemographic and diabetes-related information was collected with the help of a predesigned, structured proforma. Clinical and anthropometric examinations were conducted. Distress was determined by the standardized Diabetic Distress Scale (DDS). **Statistical Analysis Used:** The mean (SE) value was calculated for quantitative variables. The mean item score in DDS of  $\geq 2$  is taken as the presence of distress. Fisher's exact Chi-square test was done to check for association. Two-tailed significance test with a  $P$  value of  $< 0.05$  was considered statistically significant. **Results:** Majority of study participants were literate, married, and from the lower middle socioeconomic class. High blood pressure was the most common co-morbidity and tobacco use was the most prevalent addiction. The prevalence of diabetes distress was 77.0%. Emotional DD was found to be more common than regimen, interpersonal, and physician-related DD. The major determinants that emerged were young age, low socioeconomic class, physical inactivity, longer time duration to reach the hospital, associated known co-morbidities, and poor glycaemic control. **Conclusion:** A target-specific and routine counseling sessions merged with pronged strategic services are essential to improve the mental health of respondents.

**Keywords:** Diabetes Distress Scale, distress, lifestyle clinic, predictors, type 2 diabetes

## Introduction

Diabetes mellitus is a predominant cause of morbidity and mortality, imposing a significant economic burden on the healthcare system worldwide.<sup>[1]</sup> India has the unfortunate privilege of being the diabetes capital of the world. The prevalence rates have been estimated to be 12% in urban areas and 4% in rural

areas.<sup>[2]</sup> Diabetes distress (DD) is distinct from depression related to diabetic outcomes and decreases the motivation to take self-care, which results in low emotional and physical well-being, improper diabetic control, and poor compliance.<sup>[3,4]</sup> DD is a hidden negative emotional condition caused by worries and fears in patients with diabetes, which is mainly associated with poorer management. Studies reported a cyclical relationship between depressive symptoms and diabetes distress.<sup>[5-7]</sup> It is characterized by extreme apprehension and discomfort with an inability to cope with the challenges of life.<sup>[8]</sup> DD overlaps with the symptoms of major depression while distress is mild and depression is more extreme.<sup>[9]</sup>

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The present research was conducted to find out the prevalence and predictors of distress among the adult type 2 diabetic population.

## Subjects and Methods

An observational, analytical, cross-sectional study was carried out after obtaining permission from the institutional ethics committee for a period of six months in the lifestyle clinic of a teaching hospital in West Bengal. A predesigned structured proforma was made in English and that English proforma was then translated into a local language. The re-translation was done to check the validity of the proforma. The first part of the proforma had information on the socioeconomic and demographic parameters, medical history, time, and financial-related parameters while the second part consisted of Diabetic Distress Scale (DDS). The final part had variables like blood pressure, abdominal obesity, pallor, anthropometric measurements, and laboratory reports. Modified B.G. Prasad's socioeconomic scale was used to assess the social class.<sup>[10]</sup> The translated final proforma was pretested among 15 participants and modified accordingly. In the main research, these 15 participants were not included. The respondents aged older than 19 years of age, who have been on treatment for at least the last 6 months, and with one report of fasting blood glucose (FBG) and postprandial blood glucose (PPBG) in the last three months attending the clinic considered to be included in the study. In the present study, census cum complete enumeration was done and therefore all the adults with type 2 diabetes [as per World Health Organization (WHO) criteria], who complied with the inclusion criteria, and attended the lifestyle clinic of the hospital during the study period were included in the current research.<sup>[11,12]</sup> Pregnant females and participants with a known history of any psychiatric illness or on immune suppressant therapy were excluded. Confidentiality on the disclosure of respondent identity was strictly maintained. The patients were explained the purpose of the study and written consent was obtained. The study respondents were interviewed using the structured proforma in an attempt to keep the utmost privacy during the interview. Anthropometric and clinical examinations were carried out as per the structured proforma with the help of a standardized calibrated instrument.

DDS is a 17-item rating scale. This scale gives a total DD score along with scores in four domains that were counted as subscores. Each of the domains addresses a different kind of distress. These subdomains are emotional burden, physician-related distress, regimen-related distress, and interpersonal distress. In the process of calculation, the sum of the responses to the appropriate items was calculated and then the total sum was divided by the total number of items. In this way, the final score was obtained for each individual. Each item of the scale is rated on a six-point scale taking into consideration the degree to which each item may have distressed or bothered the diabetic patients during the past month. The mean item score in DDS of  $\geq 2$  is taken as the presence of distress requiring clinical attention and defining DD in the study.<sup>[13]</sup>

The respondents were interviewed with the DDS and their responses were noted. After that, their blood pressure was measured with the help of a dial sphygmomanometer. The weight of the patients was recorded with the help of a calibrated weighing scale and height was measured by a stadiometer. Waist and hip circumference were also measured with measuring tape. Women were not comfortable with male researchers taking their body measurements, so the measurements were recorded in the presence of a female attendant.

All the data on different parameters were coded, entered into Microsoft Excel after double-check, and analyzed using IBM SPSS 22.0 (licensed) software. The mean (SE) value was calculated for quantitative variables like age, income, duration of disease, duration of treatment, body mass index (BMI), FBG and PPBG level, time-related parameters, service-related expenditures, etc., The mean score of the DDS was calculated. Proportion was done for qualitative attributes. The presence of an association between sociodemographic variables with distress grade was assessed by Fisher's exact Chi-square test. Two-tailed significance test with a *P* value of 0.05 or less was considered statistically significant. Odds ratio and confidence interval were calculated as a relative risk estimate.

## Operational definitions used in this study

### Diabetes mellitus

Classical symptoms of diabetes like polyuria, polydipsia, polyphagia, and unexplained weight loss plus plasma glucose concentration  $\geq 200$  mg/dl at any time of day without regard to time since last meal (OR) fasting plasma glucose  $\geq 126$  mg/dl or two-hour plasma glucose  $\geq 200$  mg/dl following a 75 g oral glucose load.<sup>[14]</sup>

### Hypertension

Systolic blood pressure (SBP) between 120 and 139 mm Hg or diastolic blood pressure (DBP) between 80 and 89 mm Hg is considered prehypertension; SBP between 140 and 159 mm Hg or DBP between 90 and 99 mm Hg is considered stage 1 hypertension and SBP  $\geq 160$  or DBP  $\geq 100$  is considered stage 2 hypertension.<sup>[14]</sup>

### Overweight/abdominal obesity

As per WHO waist-hip ratio above 0.95 for males and above 0.85 for females, or a BMI above 30 is considered as abdominal obesity.<sup>[14]</sup>

## Results

### Background information of respondents and descriptive statistics

A total of 152 patients participated in the study. The respondents' age varied between 20 years and 85 years. Mean (SE) age of the study population was 50.13 ( $\pm 0.90$ ) years. The study reported nearly equal representation of both genders (74, 48.7% females vs. 78, 51.3% males). Nuclear family structure was prevalent in

60% of the study population and more than two-thirds (108, 71%) were from rural areas. Marital disharmony was present among one in every ten married patients. Illiteracy was more prevalent among females than males (13.5% vs. 3.8%), whereas 18% of males were unemployed. Most (44%) of the study population belonged to the lower middle class and 27% of respondents were from the middle class. The upper class was noted in merely 4% of respondents. The average (SE) monthly per capita income was Rs. 2508.27  $\pm$  204.06. The mean (SE) duration of diabetes was 70.11  $\pm$  5.44 months. The average time period between diagnosis and treatment initiation was 32.80 days while mean (SE) duration of treatment in the present setting was 32.66  $\pm$  2.30 months. The average (SE) BMI was 23  $\pm$  3.13 kg/m<sup>2</sup>. The mean (SE) FBG value of the participants was 157.54  $\pm$  4.63 mg/dl while the mean PPBG level was 240.16  $\pm$  7.11 mg/dl. The mean (SE) DD score was 2.59  $\pm$  0.05. The distance between home and the hospital varied from 1 to 60 km. The minimum time taken to reach the hospital from home was 5 min while the highest time was two-and-a-half hours. The average (SE) time spent on the day of hospital visit was 243.60  $\pm$  7.20 min, while the time taken on the day of hospital visit after reaching the hospital was at a mean of 171.00  $\pm$  6.00 min. The study revealed the mean standing time in the queue to show the physician and for getting medicine from the hospital pharmacy was 42 and 52.80 min, respectively. The waiting time for getting tests done from the hospital ranged between 1 and 20 days at an average of 4.38 days, while the mean waiting time for getting test reports from the hospital was 4.57 days [Table 1].

### Patient profile with regard to diabetes, addiction, lifestyle, and co-morbidities

In the present study, more than half (52.7%) of the patients reported taking only oral hypoglycemic agents (OHAs) while insulin was used by 19% of patients. Interruption in treatment was reported by nearly one in three respondents. Tobacco use (36.2%) was the most common addiction with more than

half were smokers and 38% of tobacco users using smokeless products. Two-thirds of respondents were currently on diet modification while 35.5% carried out physical activity as per recommendation. It was seen that 46% of the study population reported to have diabetes for more than 5 years. In the current study, more than one-third of participants had associated known co-morbidities. Among them, the most prevalent co-morbidity was hypertension (63%), followed by dyslipidemia (19%) and hypothyroidism (5%). Cardiac ailments were seen in 4% of patients.

### Distance and time-related parameters and diabetes-related financial attributes

It was reported in our study that more than half of the participants traveled over a distance of  $\geq 15$  km for treatment on the day of hospital visit. Every two in three participants had spent at least 30 min or more to reach the hospital from home. It was observed that 60.5% of respondents spent a total of 4 h or more on the day of visit inclusive of everything. In our study, every four out of five diabetics had to stand in queue for at least 30 min or more to show the physician, while more than two-thirds of patients (68.5%) had a standing time in queue for  $\geq 45$  min for getting medicine from the hospital pharmacy. Every three out of four patients waited for at least three days or more to get their tests done from the hospital laboratory. It was seen that more than half of the patients had spent  $\geq$  Rs. 100 on the day of hospital visit excluding the medicine bill. Twenty-four out of 152 patients reported wage loss due to hospital visits. It was observed that only one in every five patients ever received financial help from others for treatment.

### Clinical and laboratory findings

Pallor was observed in more than one-third (36.8%) of diabetics. Almost 40% of diabetics were found to be either overweight or

Table 1: Descriptive statistics of the study population (n=152)\*

Variables	Mean	Median	Range	Standard error (SE)
Age (in years)	50.13	49.50	65.00 (20–85)	0.90
Per capita income (in rupees)	2508.27	2000.00	25000.00 (00–25000)	204.06
Duration of diabetes (in months)	70.11	48.00	294.00 (06–300)	5.44
Duration between diagnosis and treatment initiation of diabetes (in days)	32.80	15.00	729 (01–730)	7.22
Duration of treatment in the present setting (in months)	32.66	24.00	114 (06–120)	2.30
BMI (in kg/m <sup>2</sup> )	23.00	23.84	14.19 (18.91–33.10)	0.41
Total mean DD score	2.59	2.70	3.35 (1.24–4.59)	0.05
Distance from home (in km)	16.80	15.00	59.00 (01–60)	1.13
Time taken to reach hospital (in min)	43.80	30.00	145.00 (05–150)	2.40
Time spent in the day of hospital visit (in min)	243.60	240.00	420.00 (60–480)	7.20
Time taken on the day of hospital visit after reaching hospital (in min)	171.00	180.00	390.00 (30–420)	6.00
Standing time in queue to show the physician (in min)	42.00	30.00	230.00 (10–240)	2.40
Standing time in queue to get medicines from hospital medicine store (in min)	52.80	45.00	114.00 (06–120)	1.80
*Waiting time for getting tests done from hospital (in days); n=101	4.38	2.50	20.00 (01–21)	0.40
*Waiting time for getting test reports from hospital (in days); n=101	4.57	3.00	22.00 (01–23)	0.43
Total expenditure on the day of hospital visit in rupees (excluding medicine bill)	98.94	100.00	280.00 (20–300)	5.19
*If wage loss, then amountt (in rupees) (n=24)	255.00	200.00	400.00 (100–500)	19.79

obese. According to the classification of obesity by waist-hip ratio, obesity was found to be more prevalent among women than men (61.7% vs. 33.9%). Among the diabetics, only 36 (23.7%) patients had normal blood pressure, while nearly half (45.4%) of the patients were in the stage of prehypertension. Stage 1 hypertension was observed in nearly one in every three individuals. In the present study, 70 and 67.3% of patients had FBG and PPBG levels in the diabetic range (as per WHO guidelines), respectively.

### DD and its attributes

The prevalence of total DD was (mean DD score tal ad FBG and PPBGre, evalent among women than men (61.7% v distress was

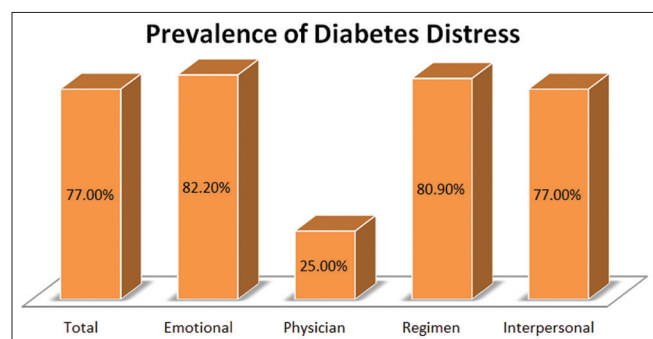


Figure 1: Domain-wise distribution of diabetes distress (N = 152)

in emotional domain (82.20%), followed by regimen (80.90%), interpersonal (77.00%), and physician (25.00%) domain [Figure 1]. This study revealed the presence of an association between DD and age and social class. In the study, 86% of participants aged ≤50 years had distress. In context with social class, it had been observed that the prevalence of DD was higher among those below middle-class (83.88%) as compared to those above middle-class (66.10%) which was statistically significant [Table 2].

Among diabetes and lifestyle-related parameters, distress was found to be significantly associated with participants who were on recommended physical activity. Distress was found to be present in more than 80% of the participants who did not follow recommended physical activity [Table 3].

There was a presence of an association between DD and the time taken to reach the hospital. Distress was observed more among the participants who took more than equal to 30 min to reach the hospital than those who spent less than half an hour. The difference in the proportion of distress was significant [Table 4]. In the present study, DD was found to be associated with patients with known co-morbidities and blood glucose levels in the diabetic range. The proportion of distress was significantly higher in participants having FBG and PPBG in the diabetic range in comparison with normal blood glucose levels.

Table 2: Sociodemographic and economic attributes with diabetes distress (n=152)

Variables	Diabetic distress		Statistics
	Absent (mean score <2.0)	Present (mean score ≥2.0)	
Age (in years)			
≤50	11 (13.93%)	68 (86.07%)	$\chi^2=7.689, P=0.005,$ OR=3.02 (1.35–6.75)
>50	24 (32.88%)	49 (67.12%)	
Sex			
Male	22 (28.20%)	56 (71.80%)	$\chi^2=2.424, P=0.119,$ OR=0.54 (0.24–1.17)
Female	13 (17.57%)	61 (82.43%)	
Types of family			
Nuclear	19 (20.88%)	72 (79.12%)	$\chi^2=0.589, P=0.442,$ OR=1.34 (0.62–2.88)
joint	16 (26.23%)	45 (73.77%)	
Residence			
Rural	21 (19.44%)	87 (80.56%)	$\chi^2=2.700, P=0.100,$ OR=1.93 (0.87–4.27)
Urban	14 (31.82%)	30 (68.18%)	
Marital status			
Married	31 (21.98%)	110 (78.02%)	$\chi^2=1.190, P=0.275,$ OR=2.02 (0.55–7.37)
Unmarried	04 (36.36%)	07 (63.64%)	
Marital disharmony (n=141)			
Present	02 (12.50%)	14 (87.50%)	$\chi^2=1.197, P=0.273,$ OR=2.30 (0.49–10.72)
Absent	31 (24.80%)	94 (75.20%)	
Education			
Below primary	08 (21.05%)	30 (78.95%)	$\chi^2=0.111, P=0.738,$ OR=1.16 (0.47–2.83)
Above primary	27 (23.68%)	87 (76.32%)	
Occupation			
Unemployed/homemaker/retired/student	11 (16.42%)	56 (83.52%)	$\chi^2=2.952, P=0.085,$ OR=2.00 (0.89–4.46)
Working outside	24 (28.23%)	61 (71.77%)	
Socioeconomic status			
Below middle class	15 (16.12%)	78 (83.88%)	$\chi^2=6.430, P=0.011,$ OR=2.66 (1.23–5.77)
Above middle class	20 (33.90%)	39 (66.10%)	

**Table 3: Diabetes, lifestyle, and addiction-related parameters with DD (n=152)\***

Variables	Diabetic Distress		Statistics
	Absent (mean score <2.0)	Present (mean score ≥2.0)	
Ongoing treatment			
OHA	25 (28.40%)	63 (71.60%)	$\chi^2=3.416, P=0.064,$ OR=0.46 (0.20–1.05)
Insulin/both	10 (15.62%)	54 (84.38%)	
Interruption in treatment			
Yes	09 (20.00%)	36 (80.00%)	$\chi^2=0.330, P=0.565,$ OR=1.28 (0.54–3.01)
No	26 (24.30%)	81 (75.70%)	
*Addiction			
Smoking tobacco (n=35)	11 (31.47%)	24 (68.53%)	$\chi^2=0.285, P=0.866$
Smokeless tobacco (n=20)	06 (30.00%)	14 (70.00%)	
Alcohol (n=13)	05 (38.47%)	08 (61.53%)	
Currently on diet modification			
Yes	26 (26.53%)	72 (73.47%)	$\chi^2=1.911, P=0.166,$ OR=0.55 (0.23–1.28)
No	09 (16.67%)	45 (83.33%)	
Currently on recommended physical activity			
Yes	20 (37.03%)	34 (62.97%)	$\chi^2=9.276, P=0.002,$ OR=0.30 (0.14–0.66)
No	15 (15.30%)	83 (84.70%)	
Family history of DM			
Yes	13 (18.05%)	59 (81.95%)	$\chi^2=1.907, P=0.167,$ OR=1.72 (0.79–3.73)
No	22 (27.50%)	58 (72.50%)	
Family history of HTN			
Yes	07 (20.00%)	28 (80.00%)	$\chi^2=0.235, P=0.627,$ OR=1.25 (0.49–3.19)
No	28 (23.93%)	89 (76.07%)	
Duration of diabetes (years)			
<5	21 (25.60%)	61 (74.40%)	$\chi^2=0.670, P=0.412,$ OR=0.72 (0.33–1.56)
≥5	14 (20.00%)	56 (80.00%)	

**Table 4: Distance and time-related attributes with diabetes distress (n=152)\***

Variables	Diabetic Distress		Statistics
	Absent (mean score <2.0)	Present (mean score ≥2.0)	
Distance from home (in km)			
<15	20 (27.02%)	54 (72.98%)	$\chi^2=1.302, P=0.253,$ OR=0.64 (0.30–1.37)
≥15	15 (19.23%)	63 (80.77%)	
Time taken to reach hospital (in min)			
<30	16 (34.78%)	30 (65.22%)	$\chi^2=5.143, P=0.023,$ OR=0.40 (0.18–0.89)
≥30	19 (17.92%)	87 (82.08%)	
Time spent on the day of hospital visit (in min)			
<240	18 (31.03%)	40 (68.97%)	$\chi^2=3.393, P=0.065,$ OR=0.49 (0.22–1.05)
≥240	17 (18.08%)	77 (81.92%)	
Time taken on the day of hospital visit after reaching hospital (in min)			
<180	19 (26.02%)	54 (73.98%)	$\chi^2=0.713, P=0.398,$ OR=0.73 (0.33–1.54)
≥180	16 (20.25%)	63 (79.75%)	
Standing time in queue to show the physician (in min)			
<30	07 (26.92%)	19 (73.08%)	$\chi^2=0.268, P=0.604,$ OR=0.77 (0.29–2.03)
≥30	28 (22.22%)	98 (77.78%)	
Standing time in queue for getting medicines from hospital medicine store (in min)			
<45	14 (30.43%)	32 (69.57%)	$\chi^2=2.042, P=0.152,$ OR=0.56 (0.25–1.24)
≥45	21 (19.81%)	85 (80.19%)	
*Waiting time for getting test done from hospital (in days); n=101			
<3	07 (28.00%)	18 (72.00%)	$\chi^2=0.329, P=0.566,$ OR=0.74 (0.26–2.06)
≥3	17 (22.36%)	59 (77.64%)	
*Waiting time for getting test reports from hospital (in days); n=101			
<3	05 (33.33%)	10 (66.67%)	$\chi^2=0.890, P=0.345,$ OR=0.56 (0.17–1.86)
≥3	19 (22.09%)	67 (77.91%)	

## Discussion

The current hospital-based, cross-sectional study was conducted to find out the burden and the predictors of DD in 152 adult type 2 diabetes mellitus patients. The mean age of patients in our study was 50.13 years, which is quite close to the mean age of the patients from a study conducted in South India.<sup>[15]</sup> The study population was aged between 20 and 85 years, similar to a study from Karnataka.<sup>[16]</sup> In our study, more or less 50% were female and majority belonged to rural areas. Marital disharmony was present among 11.75% of married patients. In the context of education level, illiteracy was present in 8.5% of patients, which is quite low in comparison with the previously reported literature. The reason might be the place of residence, which has a good number of educational establishments and behavioral changes toward literacy perspective.<sup>[15-17]</sup>

In the South India study, nearly 69% of the respondents were either unemployed or homemakers, while the present study reported the proportion as 47.1%. In our study, 61% belonged to below middle class, higher than the study conducted in Karnataka.<sup>16</sup> The reason may be area-wise sociocultural differences, disparity in employment opportunities, and maybe less per capita income due to more dependent members in the family. The proportion of tobacco use was seven times more in comparison with the South India study. In our study, 45.4% used tobacco in any form in the past, and among them, 63.6% were smokers. In an earlier study, it was noted that 89% of patients never smoked and 6% were past smokers; that may be attributed to the local cultural and behavioral factors.<sup>[17]</sup> Jali *et al.* in their study found nearly close mean FBG and PPBG levels in the current study.

The Karnataka study reported the presence of 14% co-morbidities such as hypertension, dyslipidemia, coronary artery disease, and cerebrovascular accident among respondents.<sup>[17]</sup> Our study reported co-morbidities more than two times in comparison with this study. The prevalence of hypertension in our study was the highest which may be attributed to the practice of adding extra salt to the diet.<sup>[16]</sup> The median period of diabetes was less in the current study than in the study from urban South India and overindulgence in carbohydrates by the South Indians may be the reason behind this outcome.<sup>[15]</sup> On analysis of BMI, the prevalence of overweight or obesity was comparatively less in the current study than in the earlier studies. The reason may be again attributed to their carbohydrate preference in the diet.<sup>[16,17]</sup>

The overall prevalence of DD (mean DDS score  $\geq 2$ ) in our study was 77%. Literature from other regions reported a prevalence ranging between 18 and 25% for severe distress.<sup>[5-7]</sup> This might be due to the consideration of only severe distress (mean DDS score  $\geq 3$ ) as DD in the earlier studies. The present study also revealed that the prevalence of emotional DD was highest as compared to regimen, interpersonal, and physician-related DD. There were two important emotions that contributed to high emotional distress in our research. The first emotion was

the feeling that diabetes was taking up too much mental and physical energy every day and the second emotion was a feeling that he/she would end up with serious long-term complications.

The risk of DD was 1.15 times higher in our study participants aged either 50 years or less as compared to those aged more than 50 years. Prior studies showed a significant association between age and DD because of the difference in the median value of age groups.<sup>[6,18]</sup> The study participants belonging to below middle social class were at 1.26 times more risk as compared to those above the middle class, different from the previous study.<sup>[6]</sup> This may be due to the services being not provided by the government free of cost in the hospital which is difficult to afford by below middle-class families.

Patients on insulin or both insulin and OHAs had more distress (1.17 times) as compared to patients who were only on OHAs, which was similar to the findings reported in the study conducted by Islam *et al.*<sup>[6,19]</sup> This could be possible because of the complex regimen that included multiple injections, frequent glucose monitoring, and the fear of hypoglycemia. Smokers and alcoholics had 2.18 and 1.6 times the risk of having DD in the current study. Participants not compliant with recommended physical activity had 2.14 times more risk of developing DD. Development of DD was significantly more among the participants who took 30 min or more to reach the hospital than those who needed less than 30 min.

Patients with a history of treatment interruption had 1.05 times more risk of distress as compared to patients who did not have any treatment interruption and DD was 1.07 times higher in patients with having diabetes for 5 years or more as compared to patients having a short duration of diabetes (less than 5 years). This is reverse from the result shown in the study done by Ratnesh *et al.*<sup>[20]</sup> It may be due to the low mean DD score in our study to include both moderate and severe distress along with the financial burden on family members after a certain period. Patients with associated known co-morbidities had more distress in our study.

In the current study, the burden of DD was 77% and the major determinants came out as young age, low socioeconomic class, physical inactivity, more time to reach the hospital, having known co-morbidities, and poor glycemic control. Emotional DD was found to be more common than regimen, interpersonal, and physician-related DD. This study was carried out at a single center in India and included patients mainly from the below-middle socioeconomic class. Therefore, the findings may not be generalized. A prospective study may be done in the near future to evaluate the impact of services and therapeutic interventions provided by the government on diabetes. Therefore, a target-specific, routine, and well-planned clinical approach including proper counseling sessions along with pronged strategic services related to diabetic care and management is essential to improve the mental health of respondents.

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## Conflicts of interest

There are no conflicts of interest.

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