

Assessment of diabetes related distress among type 2 diabetic patients: A Prospective study

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Abstract:

Introduction: Diabetes Mellitus (DM) is a complex, chronic illness requiring continuous medical care with multi factorial risk reduction strategies beyond glycemic control. Globally, the prevalence is expected to further increase to 9.9% that reflects a population of 628.6 million people by the year 2045. To assess the prevalence of diabetes related distress (DRD) among Type 2 diabetics.

Material and Method: This was a prospective, observational and descriptive study conducted in the Department of Medicine at Tertiary Care Teaching Hospital over a period of 1 year among T2DM patients who were seen and followed up. Patients who were at least 18 years old, and had all recent laboratory results were included in the study. Patients with T1DM, and those who had untreated hypothyroidism, gestational diabetes, cancer, mental retardation, and psychiatric illness, were excluded from the study.

Results: A total of 100 subjects were screened (69 males and 31 females). Their demographic and clinical data are presented. The subjects were aged 35–85 years with a mean \pm SD of 50.5 \pm 8.0 years. The mean age for subjects with T1DM was 51.25 \pm 9.36 years and for those with T2DM 50.41 \pm 0.642 years. Average scores for T1DM were DDS-2, 3.9 \pm 1.3 and DDS-17, 3.0 \pm 1.0 and for T2DM, DDS-2, 2.4 \pm 1.1 and DDS-17, 1.8 \pm 0.8. Scores for the different parameters of distress were graded in terms of severity. DD (score \geq 2 or moderate to severe distress) was present in 70.0% for DDS-2, 49.0% for DDS-17, 56.0% for EB, 13.0% for PRD, 51.0% for RRD, and 41.0% for ID.

Conclusion: Among type 2 diabetes patients, diabetic distress is a serious problem and needs to be addressed for better glycemic outcome. Among type 2 diabetes patients, diabetic distress is a serious problem which affects their living. It is necessary as clinicians to address diabetic distress in the patients for better glycemic outcome.

Keywords: Assessment, Type 2 diabetes, Body mass index, Diabetes distress, HbA1c.

Introduction

Diabetes Mellitus (DM) is a complex, chronic illness requiring continuous medical care with multi factorial risk reduction strategies beyond glycemic control. ^[1] Globally, the prevalence is expected to further increase to 9.9% that reflects a population of 628.6 million people by the year 2045. ^[2-4] Apart from this, DM caused a lot of health expenditure accounting for 43% of the total medical cost in the USA and 80% in the United Kingdom. ^[5] The multimodal intervention in diabetes in frailty (MID-FRAIL) intervention (clinical targets, physical activity plus nutritional education) reported that this multimodal intervention saved costs to the health care system and achieved favorable health gains. ^[6]

Diabetes related distress (DRD), also known as diabetes specific distress, is the emotional response to living with diabetes, the burden of relentless daily self management, and (the prospect of) its long-term complications. ^[8] It is associated with lower levels of self-care and general emotional wellbeing. ^[9] It can vary by diabetes type, insulin treatment, social consequences, food restriction, and obesity. ^[10] If left untreated, mild diabetes distress may develop into severe diabetes distress and/or depression. ^[11] It can also lead to adverse medical and psychological outcomes, including reduced physical activity, less healthy eating, not taking medication as recommended, less frequent self monitoring of blood glucose, elevated HbA1c, more frequent severe hypoglycemia, and impaired quality of life. ^[12] The accumulation of these problems and frustrations may lead to “diabetes burnout” and disengagement from diabetes care. ^[13]

Studies have shown the association between depression and diabetes complications and mortality. ^[14] Over 80% of T2DM patients with moderate or high DRD are not clinically depressed and that, among those who are clinically depressed, many of the depressive symptoms reported are related to diabetes. DRD was found to be significantly associated with HbA1c, and increased HbA1c was related to emotional functioning. Studies showed that 8.9% of outpatients with diabetes have high DRD, which was associated with higher HbA1c and among elderly people. In a German study, only 1.2% of outpatients on primary care level showed high DRD. ^[15]

In China, DRD was comparatively higher at 42%, with the regimen distress (RD) scoring the highest of the domains, interpersonal distress (ID) scored the lowest, and less sleep time of 6.5 h was significantly related to a higher DRD. On the contrary, two Malaysian studies showed a high prevalence of DRD, but no associations were noted between DRD and HbA1c, blood pressure or lipids, and emotional burden, physician related distress, regimen related distress, and internal distress. An Indian study showed an even higher prevalence of moderate to high DRD (77.5%), with women having higher DRD than men. Increasing age was also reported to be directly related to increased DRD. The emotional burden domain was considered the most important domain in measuring diabetes distress and was found to be

significantly correlated with duration, glycemic control, treatment modalities, diabetic complications, smoking, and BMI. ^[16]

Material and Methods

This was a prospective, observational and descriptive study conducted in the Department of Medicine at Tertiary Care Teaching Hospital over a period of 1 year among T2DM patients who were seen and followed up. Patients who were at least 18 years old, and had all recent laboratory results were included in the study. Patients with T1DM, and those who had untreated hypothyroidism, gestational diabetes, cancer, mental retardation, and psychiatric illness, were excluded from the study.

Data collection was done using a Diabetes Distress - Screening Scale (DDS17) to assess the DRD, which was translated to the Local language taken from a previous study. ^[18] Validation was performed with a high Cronbach's alpha of 0.95.

The questionnaire included questions on socio demographic data (age, gender, marital, literacy, occupation, and income), lifestyle (smoking, exercise, and sleep time), medical and diabetic status (duration, drugs, complications, visits interval, and associated diseases), vitals (blood pressure, height, weight, and body mass index), laboratory values (HA1c and lipid profile), and the DDS17 items of diabetes distress scale.

The questionnaire was administered through an interview by the researchers after the patient consented to participate in the study. Each item of the DDS17 tool was scored on a Likert scale from 1 (no distress) to 6 (serious distress) concerning distress experienced over the last month. The scale components included four reliable subscales via item mean scores: emotional burden, physician related distress, regimen related distress, and interpersonal distress. The total score of DDS-17 was calculated by summing the 17 items' results and dividing them by 17. The scores were classified regarding the severity into the following: <2.0 as little or no distress (not significant), 2.0 to 2.9 as moderate distress, and ≥ 3.0 as high distress. ^[19]

This study used the Diabetes Distress Scale-17 items (DDS-17) and found out that the ED component was the most prevalent followed by physician related distress. Furthermore, they also reported that HbA1c was significantly higher among those with high combined distress and high emotional distress compared to those with mild/moderate distress and was significantly correlated with triglyceride levels, BMI, T2D duration, and the interval between visits. ^[17] In this regard, we conducted this study to assess DRD among T2DM patients in our institution and confirm the findings of the previous study.

Statistical Analysis: Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 25.0. The data were reported as continuous variables. The results were expressed as mean and standard deviation. An independent *t*-test was performed

to determine significant differences between means. A *P* value of ≤ 0.05 was considered statistically significant.

Result

A total of 100 subjects were screened (69 males and 31 females). Their demographic and clinical data are presented in Table 1.

Table 1: Basic demographic and clinical data

Gender	Frequency	Percentage
Males	69	(69.0%)
Females	31	(31.0%)
Total patients	100	(100%)

Table 2: Distribution of Diabetes Mellitus

Diabetes mellitus	Frequency	Percentage
T1DM	8	(8.0%)
T2DM	92	(92.0%)

Table 3: Distribution of age of Diabetics patients

Diabetes mellitus	Age, years Mean \pm SD
	35–85, 50.5 \pm 8.0
T1DM	35–74, 51.25 \pm 9.36
T2DM	41–85, 50.41 \pm 0.642

The subjects were aged 35–85 years with a mean \pm SD of 50.5 \pm 8.0 years. The mean age for subjects with T1DM was 51.25 \pm 9.36 years and for those with T2DM 50.41 \pm 0.642 years.

Table 4: Distribution of drug Management

Treatment	Frequency	Percentage
Oral	80	(80.0%)
Insulin	20	(20.0%)

Table 5: Distribution of various parameters

Parameters	
Hypertension	75 (75.0%)
BMI, kg/m ²	15.1–40.1, 24.2 \pm 4.3
Waist circumference, cm	55.0–115.0, 88.4 \pm 10.1
Waist/hip ratio	0.59–1.4, 0.714 \pm 0.10
Medications, <i>n</i>	2–9, 4.0 \pm 1.0
HbA _{1C} , %	4.3–9.2, 7.3 \pm 1.9

Numbers (%), ranges (min–max), and means \pm SD are shown.

Hypertension was coexistent in 65% of the subjects. The subjects were prescribed 3–10 medications (4.8 ± 1.0) at the time of assessment. The male and female subjects were comparable in their demographics and differed significantly only in their occupation, BMI, waist circumference and waist/hip ratio ($p = 0.024$, $p = 0.010$, $p < 0.001$, and $p < 0.001$ respectively). (Table 5).

Table 6: Diabetes distress scale (DDS) scores

DDS	Males (<i>n</i> = 31)	Females (<i>n</i> = 69)	Total (<i>n</i> = 100)	
DDS-2	2.1 \pm 0.9	2.8 \pm 1.1	2.9 \pm 1.2	0.040
DDS-17	1.8 \pm 0.7	2.1 \pm 0.9	1.9 \pm 0.9	0.072
EB	2.2 \pm 0.8	2.7 \pm 1.0	2.6 \pm 1.0	0.300
PRD	0.8 \pm 0.2	1.1 \pm 0.6	1.0 \pm 0.5	<i>0.001</i>
RRD	1.8 \pm 0.9	2.3 \pm 0.9	2.1 \pm 1.0	0.071
ID	1.3 \pm 0.9	2.1 \pm 0.8	1.8 \pm 1.1	<i>0.014</i>

Means \pm SD. DM, diabetes mellitus; EB, emotional burden; PRD, physician-related distress; RRD, regimen-related distress; ID, interpersonal distress. Statistically significant values are italicized.

Table 7: Diabetes distress scale (DDS) scores

DM type	T1DM	T2DM	<i>p</i> value
DDS-2	3.9 \pm 1.3	2.4 \pm 1.1	<i>0.010</i>
DDS-17	3.0 \pm 1.0	1.8 \pm 0.8	<i>0.009</i>

Average scores for T1DM were DDS-2, 3.9 ± 1.3 and DDS-17, 3.0 ± 1.0 and for T2DM, DDS-2, 2.4 ± 1.1 and DDS-17, 1.8 ± 0.8 (Table 7). The difference was statistically significant ($p = -0.010$ and $p = 0.009$, respectively).

Moderate DD was recorded in all categories except for PRD. In ID, males recorded mild and females had moderate distress. Among the subscales, EB received the highest scores followed by RRD. PRD was the least. Males and females differed significantly in their scores for DDS-PRD ($p = 0.001$) and -ID ($p = 0.019$).

Table 8: Diabetes distress (DD) severity

DD	Severity, <i>n</i> (%)		
	Mild	Moderate	Severe
DDS-2	24 (24.0)	24 (24.0)	50(50.0)
DDS-17	50 (50.0)	24 (24.0)	25(25.0)
EB	40 (40.0)	11 (11.0)	45(45.0)
PRD	85 (85.0)	11 (11.0)	2(2.0)
RRD	40 (40.0)	21 (21.0)	30(30.0)
ID	55 (55.0)	12 (12.0)	29(29.0)

Scores for the different parameters of distress were graded in terms of severity (Table 8). DD (score ≥ 2 or moderate to severe distress) was present in 70.0% for DDS-2, 49.0% for DDS-17, 56.0% for EB, 13.0% for PRD, 51.0% for RRD, and 41.0% for ID.

Discussion

Diabetic distress is a significant health problem among patients with T2DM. Once diagnosed with diabetes, the patient has to bring about a drastic change in his/her lifestyle to achieve favorable metabolic control and to avoid complications.^[20] This process is complex which involves a multitude of self-care activities ranging from strict adherence to medication, diet, physical activity, and frequent blood glucose monitoring. On a longer run, the disease can create an emotional burden among patients which might affect the activities related to diabetes self-care.^[21]

Fisher *et al.*^[22] created a brief diabetes distress screening instrument that can be used to diagnose diabetic distress clinically. This scale builds upon a 17 item Diabetes Distress Scale that had been developed by Dr. William Polonsky and Dr. Fischer^[23] in 2007 (DDS 17). Dr. Fischer created a 2-item diabetes distress screening instrument (DS2) that asks patients to rate on 6 point scale. If a patient answers affirmatively to DDS2 questions, DDS17 can be administered to help define the content of distress.^[24]

Diabetes distress brings about unfavorable attitudes among patients toward tackling the disease such as poor compliance to medication, poor diet control, and disinterest in exercises, irregular follow-up visits, and poor self-care. There is a higher incidence of complications associated with diabetes associated with among patients having diabetes distress. Addressing the distress improves both self-care and glycemic control. Fortunately for both patients and clinicians, new tools are now available to help diagnose diabetes distress.

Lowering the HbA1C level to $<7\%$ has proved to reduce the micro vascular complications if it was implemented the long-term macro vascular disease.^[25] Glycemic control remains the major therapeutic objective for the prevention of target organ damage and other complications which arise due to diabetes. Hence, it is necessary to assess the factors which affect glycemic control in diabetic patients. A limited literature is available regarding the diabetes distress in diabetic patients.

Of total 280 diabetic patients, 186 (67%) were positive for screening in DDS 2, 34.3% of them had mild distress, 7.5% had moderate distress, and 58.2% had severe distress. Islam *et al.*^[26] estimated that among the adult T2DM patients, 51.5% had little or no distress, 26.1% had moderate distress and 22.4% had high distress. This proportion of diabetes distress in this study was consistent with the study findings of Fisher *et al.* where they found that the prevalence of diabetes distress was high among T2DM.

Across the 4 domains of diabetes distress, 83.1% had emotional burden, 59.2% had physician related distress, 60.4% had regimen related distress, and 83% had interpersonal distress. Major domain involved was emotional burden, and it is considered the most important domain in diabetes distress. Our findings are consistent with the study conducted by Islam *et al.* and Shojaezadeh *et al.* [27]

Significant association was found between glycemic control and age, BMI, and diabetes distress in our study. Islam *et al.* showed that the influence of glycemic status on the level of diabetes distress was statistically significant. A study by Hemavathi *et al.* [28] showed a positive correlation between both diabetes distress total score and emotional distress with the glycemic control. It was noted that those who had high levels had poor glycemic control. Similar finding was also observed in diabetic populations by Kuniss *et al.* [29] and Gonzalez *et al.* [30]

It was observed in the current study that as the age increased the diabetes distress levels decreased. This finding is consistent with the earlier study conducted by Fisher *et al.* which documented the positive association of DD with age.

Limitations of the study

It is a cross-sectional study, and there is a lack of long-term conclusions. The total DSS score was not compared with diabetic vascular complications. The study was conducted in tertiary care center which limits the generalization of results.

Conclusion

This study helps us to understand the factors that could predict the glycemic control in the diabetic patients. It addresses the question of possible relationship between diabetes distress and glycemic control in patients suffering from DM attending our diabetes clinic. Among type 2 diabetes patients, diabetic distress is a serious problem which affects their living. It is necessary as clinicians to address diabetic distress in the patients for better glycemic outcome. The factors associated with diabetes distress need to be further evaluated in depth to formulate an effective intervention program and rehabilitation. Measures need to be taken for effective management like lifestyle modifications as well as ways to deal with their stress and diabetes.

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