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Evaluating the Prevalence of Diabetes Related Distress among Subjects with Type-II DM using an Instrument Called Diabetes Distress Scale-17 (DDS-17) and thereby Assessing the Correlation of Diabetes Related Distress with Glycemic Control and Treatment Modalities in Shillong, Meghalaya

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1. Abstract

This study aimed at evaluating the prevalence of Diabetes Related Distress (DRD) among subjects with Type-II DM using an instrument called Diabetes Distress Scale-17 (DDS-17) and to assess its correlation with Diabetes management. A cross-sectional study conducted among 400 Type-2 DM subjects (200 men and 200 women) aged between 25-65 years who visited the three tertiary hospitals in Shillong, Meghalaya during January to March 2017. Subjects with Type-1 DM, Gestational Diabetes and psychiatric illness were excluded. The total score of DDS-17 was calculated by taking the sum of the 17 items dividing by 17. The DDS score suggests the following thresholds of severity: little or no distress<2.0, moderate distress=2.0 - 2.9 and high distress>3.0. The mean age of men and women is 52.0 +- 8.4 and 51.7 +- 8.1 years respectively. The mean score in women was 2.79 +- 1.52 as compared to men (1.62+- 0.83) (p<0.001). The findings showed women had high levels of distress as compared to men. DRD should be considered a significant health issue and measures should be proactively taken for effective stress coping management.

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2. Keywords

Glycemic; Non-Insulin Dependent Diabetes Mellitus (NIDDM)

3. Overview of Non-Insulin Dependent Diabetes Mellitus (NIDDM)

NIDDM is a chronic non-communicable conditions which disturbs the body from its proper physiological functioning due to impairment of the insulin hormone of the pancreas. The magnitude of the illness has been increasing steadfastly over the years. NID Type-II DM is the most predominant form of Diabetes Mellitus which is primarily depicted by increase glucose in the blood, resistance in insulin production and its deficiency. As a result of the change in trend from the previous decade, the burden has increased grossly with the number of vulnerable believed to be double in the years to come [1]. It is primarily contributed from the genetic makeup and the lifestyle factors and sedentary habits [2]. Although the illness usually affects older individuals, but this has been diagnosed in younger age group too those with family history of diabetes [3]. Type 2 diabetics are more vulnerable to developing complications which can be of short term or long term and these

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could be life threatening if not controlled. These complications can affect any body organs thereby causing disorder or failure of the target organ(s). It not only affects an individual physical health, but can also have a profound effect on the individual mental wellbeing [4, 5].

India stands world ranking with the biggest proportion of diabetics acquiring the questionable refinement of being named as "Diabetes Capital of the World". As indicated by the Universal Diabetes Alliance in its Chart book 2006, at present the diabetics in India were 40.9 million approximately and by the year 2025, it is expected to ascend to 69.9 million unless there are pressing restoring and promoting strides being made available to the diseased ones [6].

Stress related to Diabetes often implies to the spectrum of patients physical and emotional changes in an individual battling severe demanding chronic NCD like [7]. It may be sometimes misdiagnosed as depression and has links to problematic glycemic control and difficulties with self-care behaviors. It causes frustration with diabetes management and patients experience fear about potential complications with erratic blood glucose levels [13]. Underlying causes of diabetes distress include feeling powerless about controlling diabetes, excessive worries about long-term complications, frustration with management tasks, fear that food constraints are controlling their life, poor confidence with regards to quickly identifying hypoglycemia, fear of embarrassment and potential risk of life, negative social perceptions, fear about being treated differently, less attractiveness to employers, family and friends over or under-involvement, treated as overly fragile and insufficient help or support[7].

With the expanding predominance anticipated comprehensively, a local study in Meghalaya, evaluating the commonness of Diabetes among the Urban Khasi and Jaintia populace which was observed to be 9.89% and 12.5% individually. Besides there is a similarly huge pool of People with Type-2 and having Impaired Glucose Tolerance (IGT), of which a number of them might developed the illness later on[8]. There is sparse data available on this topic, hence this study planned to evaluate the prevalence of diabetes related distress among subjects with Type-II DM using an instrument called Diabetes Distress Scale-17 (DDS-17) and to assess the correlation of Diabetes related distress with glycemic control and treatment modalities.

4. Rationale

In India there are studies that assess the prevalence of Diabetes related distress incurred by the diabetics in India and several other studies done on a national level, whereas very few are done at micro level. The study aimed at assessing the prevalence diabetes related distress caused due to Type-II DM in India.

The aim of the studywasto evaluate the prevalence of diabetes related distress among type-2 DM subjects and to assess the correlation of Diabetes related distress with glycemic control and treatment modalitiesin Shillong, Meghalaya.

5. Materials and Methods

We conducted a cross sectional study among 400 type-2 DM subjects (200 men and 200 women) aged between 25 to 65 years who visited the three tertiary hospitals of Shillong. The study sites included Dr. H. Gordon Roberts Hospital Shillong, Dr. Sethi's Hope Multispeciality Clinic Shillong and SuperCare Hospital Shillong. Consecutive sampling with time bound enumeration technique was used to select the study sites. The study was carried out between January 2017 to June 2017. The inclusion criteria were patients diagnosed with Type 2 DM on treatment for at least 1year duration and the newly diagnosed Type-II DM and seriously ill/ bed ridden patients were excluded. Ethical clearance for the study was procured from the Institutional Ethics Committee, Kasturba Medical College, tertiary care center in Manipal (IEC 789/2016). We used a Diabetes Distress Scale-17 (DDS-17) to define the extent of the distress.

6. Diabetes Distress Scale (DDS)

DDS is a validated 17- items self-reported measure with each item scored on a Likert scale from 1 (no distress) to 6 (serious distress) concerning distress related component experienced over the last month[7, 13]. The scale yields four reliable subscales via item mean scores: emotional burden, physician-related distress, regimen-related distress and interpersonal distress. The regimen distress scale assesses perceived problems with diabetes self-management. The total score is derived as the mean of all 17 items. Internal reliability of the total scale was excellent (α= 0.95). All scales are treated as continuous variables. The Diabetes Distress Scale (DDS) has a clinical validation which suggests the following thresholds of severity which is as follows: little or no distress < 2.0, moderate distress = 2.0-2.9 and high distress ≥ 3.0 [7, 13].

7. Statistical Analysis

The Statistical Package for Social Sciences for Windows (IBM SPSS Version 16) was used to analyzed the data. Through descriptive statistics, we described socio-demographics in terms of frequencies and percentages. Values reported are mean +-Standard Deviation (SD). Statistical comparison between different groups were made using independent samples t-test and Pearson

correlation was done to find out the association between age, HbA1c and distress dimensions and total distress. SPSS version 20 was used for statistical analysis. A "p-value of <0.05 was considered as statistically significant.

8. Results

The mean age of men was 52.0 ± 8.4 and women 51.7 ± 8.1 years. (**Table 1**) shows the distress levels among men and women. Analysis of DDS-17 results indicated that 77.5% of study subjects had moderate to high DRD based on the total score of the questionnaire. It was found that 22.5% of men and about 55% of women were screened positive for moderate to high levels of DRD on a DDS-17 scale with women having significantly higher DRD levels than men (p<0.001). (**Table 2**) presents the DDS 17 individual domain scores by gender. In total, analysis of DDS-17 scale indicated that women had higher levels of distress (mean score of 2.79 ± 1.52) as compared to men (1.62±0.83) (p<0.001). HbA1c was significantly higher in women with high combined distress and high emotional distress compared to men. The mean scores for the total and individual components of DDS-17 were analyzed separately. It was 6found that women showed high distress in emotional burden domain as compared to men. In other domains like physician related, regimen related and interpersonal distress, women showed moderate distress, whereas men showed little or no distress (**Table 3**).

Table 1: Over all distress levels among men and women.

Variable	Men [n(%)]	Women [n(%)]
Low distress (<2.0)	155 (77.5)	90 (45)
Moderate distress (2.0-2.9)	31 (15.5)	17 (8.5)
High distress (> 3.0)	14 (7)	93 (46.5)

Table 2: DDS-17 Domain score by Gender

Variable	Men (n=200)	Women (n=200)	Men Vs. Women (P-Value)
Emotional	1.78 ± 0.97	3.16 ± 1.55	<0.001
Physician	1.40 ± 0.70	2.21 ± 1.46	<0.001
Regimen	1.75 ± 1.01	2.98 ± 1.65	<0.001
Interpersonal	1.46 ± 0.90	2.66 ± 1.6	<0.001
Total	1.62 ± 0.83	2.79 ± 1.52	<0.001

Table 3: Correlation of age and HBA1C with distress domain scores.

	Variable	Emotional	Physician	Regimen	Interpersonal
AGE	Correlation	-0.15	-0.15	-0.16	-0.14
P-Value	0.00	0.00	0.00	0.00	0.00
HBA1C	Correlation	0.95	0.91	0.98	0.94
P-Value	0.00	0.00	0.00	0.00	0.00

9. Discussion

Diabetes distress is a common health issue which frequently co-exists with T2DM [9 - 11]. The present study highlighted that 22.5% of men and about 55% of women were screened positive for moderate to high DRD on a DDS-17 scale. Another study using DDS-17 total scores [12] also reported that T2DM subjects were more likely to have DRD especially women when they belonged to the low income, unemployed or had any diabetes complications. Similar results were also observed in our study which indicated high levels of diabetes distress in women.

An earlier study conducted in USA [7, 13] using the DDS-17 scale showed that 51.3% of the screened participants have moderate to high DRD. Similar distress proportions were shown from the studies conducted in Bangladesh (48.5%), China (43%) and Canada (39%) using DDS-17 [9, 14, 15]. Emotional burden was considered as the most important domain in measuring diabetes distress especially among women. This study finding is consistent with the study conducted in the Bangladesh [9] population. The current study showed a positive correlation between both DRD total score and emotional distress with the glycemic control. It was noted that those who had high levels of DDS had poor glycemic control. Similar finding was also observed in other populations [9, 16].

Diabetes related distress generally shows a closer association with glycemic control. This finding is consistent with another study [17]. DDS showed closer association with glycemic control than depression and appears to be more common and chronic than depression in adults with T2DM as shown [18]. International survey data also confirmed and suggested that emotional well-being is the domain of functioning most negatively affected by diabetes, second only to physical health [19]. It was also observed in the current study that as the age increased the diabetes distress levels decreased. This finding is consistent with the earlier study [13]which documented the positive association of DD with age. This may be attributed to their gradual adjustments towards their diabetes life style modifications. The following are the limitations of the current study. Parameters like level of education, socioeconomic status, employment have not been evaluated in association with DDS. Secondly, a comparative level of distress was not assessed in subjects with oral anti-diabetic drugs, insulin or combination. The factors associated with DRD should be explained and need to be further studied indepth in order to formulate proper guidance and empowerment in diabetes management plan.

10. Conclusion

This study highlights that women had high levels of distress in managing diabetes as compared to men. Diabetes distress should therefore be considered as a significant health problem and steps should be taken for effective management like lifestyle modifications as well as methods to cope with their stress and diabetes.

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