Original Research Article

Assessment of depression and diabetes distress in type 2 diabetes mellitus patients in a tertiary care hospital of South India

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ABSTRACT

Background: Depression is one of the many complications seen among diabetics. Depression leads to lack of self-care by the diabetic and endangers the therapeutic compliance, accounting for a derangement in metabolic control which in turn causes further diabetic complications and may even result in hospitalization. This leads to an increase in depressive symptoms and thus the vicious cycle continues.
Methods: It is a Descriptive, cross sectional study conducted in the Medicine outpatient department. Depression was assessed by Hamilton depression rating scale. Diabetic distress was assessed by diabetic distress scale.
Results: Out of the 250 study participants, 142 (56.8%) were found to be suffering from depression and 6 (2.4%) were found to have diabetes distress. The magnitude of depression was similar in both male and female. Depression was high among illiterates, unemployed (70%), single, separated individuals and patients with complications of diabetes. There was no significant association between religion and low economic status with depression. Treatment modalities, complications of diabetes, sociodemographic factors like age, sex, occupation, education, marital status, religion and socio-economic status had no significant correlation with diabetic distress. But there was a statistically significant association between diabetic distress and co-morbid conditions. 95.8% with depression had no distress and this association was found to be statistically significant (0.038).
Conclusions: The magnitude of depression and distress is much high among diabetics. Early detection, counselling and treatment are required for all diabetics, especially those who have additional risk factors for the development of depression.

Keywords: Comorbidity, Depression, Diabetes complications, Risk factors

INTRODUCTION

Out of the 415 million diabetics in the world, South East Asia has 78.3 million and a whopping 70 percent reside in developing countries. By 2040, this number is projected to reach 642 million. India is currently home to 69.2 million diabetics, second only to China.[1,2]

Diabetes is a chronic disease with life altering consequences. It not only forces one to question and alter one's life style but also thrusts the added responsibility of self-care upon them. Patients are required to maintain controlled levels of glycalated hemoglobin (HbA1c). But up to 50 percent fail to do so and land up with a wide array of complications.[3] One among these many complications is the psychiatric co-morbidity of depression.

Depression is an increasingly common cause of seeking heath care, especially in developed countries. Many a time it is referred to as the "common cold" of out patient populations, affecting almost 350 million people

worldwide so much so that the World Health organization has ranked depression as one of the leading causes of disability.[4] The true burden of depression is difficult to estimate, especially in a country like India where mental health disorders are considered a taboo and are often ignored.

Depression is characterized by anhedonia, low mood, reduced energy, feelings of guilt and disrupted sleep or appetite. The spectrum of symptoms may range from a feeling of hopelessness and listlessness, to an inability to manage daily life. The symptoms may be incapacitating to such a degree that they may deprive an individual of his or her will to live ultimately culminating in suicide.

Studies that have attempted to link the two diseases have found that the presence of diabetes doubles the odds of co-morbid depression.[5] The cause for this is largely unknown but it has been postulated that this could either be due to the psychological stress that comes with the burden of management of the disease or due to direct effects of diabetes affecting the brain.

Based on current knowledge, the relationship between diabetes and depression is bidirectional. Depression leads to lack of self-care by the diabetic and endangers the therapeutic compliance, accounting for a derangement in metabolic control which in turn causes further diabetic complications and may even result in hospitalization.[6] This leads to an increase in depressive symptoms and thus the vicious cycle continues.

Some studies though, have argued against this relationship instead, implicating a new cause, "diabetes distress" as the reason for these apparent depressive symptoms. Diabetes distress is a distinct condition which is present in patients struggling to manage their disease in a day to day life. It refers to the stresses and worries that arise while coping with a demanding disease like diabetes.[7] This condition may simulate depression to such an extent that it may be confused with clinical depression and treated as such.

India is a country with significant economic hardship and development of depression over pre-existing diabetes may be catastrophic for the patient in terms of increased sickness absenteeism and decreased productivity. Early recognition of depressive symptoms may prevent occurrence of other complications of diabetes and alleviate the need for hospitalization thereby resulting in a reduced burden on the patient as well as on the health care system.

Objectives of present study were to estimate the magnitude of depression and diabetes distress among type 2 diabetes mellitus patients in a tertiary care hospital of South India, to determine sociodemographic factors that influence this magnitude, to assess if the development of complications of diabetes have a bearing on this magnitude, to determine if a relationship exists between diabetic distress and depression.

METHODS

It is a descriptive and cross-sectional study carried out at Medicine outpatient department of JSS hospital, a tertiary care centre in Mysuru, Karnataka for 2 months (June 2016 to August 2016). Number of outpatients interviewed were 250. 250 patients attending general medicine OPD of JSS Hospital were interviewed during May 2016 to August 2016. The sample was determined by using the below mentioned formula.

$$Z_{1-a/2}\ 2\ p(1-p)/\ d2.$$

Inclusion criteria

Previously diagnosed adult cases of Type 2 diabetes mellitus who give informed consent and are willing to participate in the study.

Exclusion criteria

Patients diagnosed with other chronic diseases (TB, HIV, type 1 diabetes), patients with alcohol or drug dependence, pregnant women and patients who have been diabetic for less than 1 year or on antidepressant therapy were excluded from the study.

Informed consent was obtained from the participants for the test. Confidentiality regarding the patients and their personal details were strictly maintained. The patients who satisfied the inclusion criteria were assessed for depression and diabetes distress.

Depression was assessed by Hamilton depression rating scale. Diabetic distress was assessed by diabetic distress scale. Both these scales were translated to local language.

Statistical analysis

All statistical calculation was performed using statistical package for social sciences (SPSS), version 17.0. Descriptive statistics like mean and standard deviation for quantitative data and percentage (rates) for the qualitative data were estimated. Inferential statistical tests like chi square test, unpaired t test, Pearson's correlation was applied. Data was Interpreted statistically significant at $p<0.05$.

RESULTS

Totally 250 diabetic patients were screened for depression, out of which, 143 (57.2%) were male. Most of the patients registered were in the age group of 40 to 70 years, with the maximum of 85 (34%) in the age group of 51 to 60.87 (34.7%) of patients were non-literates. 87 (34.7%) of patients were either unemployed (n=78) or semi-skilled (n=80).

Most of the patients who were registered were from the Hindu community. 235 (94%) were married. There was not much difference in the socioeconomic status of the patients according to the modified B. G. Prasad criteria.

Table 1: Demographic information of the patients.

Sociodemographic characteristics		Frequency
Age	31-40 years	14 (5.6%)
	41-50 years	46 (18.4%)
	51-60 years	85 (34%)
	61-70 years	72 (28.8%)
	70 years and above	33 (13.2%)
Sex	Male	143 (57.2%)
	Female	107 (42.8%)
Education	Non-literates	87 (34.8%)
	Primary school	21 (8.4%)
	Middle school	36 (14.4%)
	High school	36 (14.4%)
	PUC	28 (11.2%)
	Graduates	42 (16.8%)
Occupation	Unemployed	78 (31.2%)
	Unskilled	23 (9.2%)
	Semi-skilled	80 (32%)
	Skilled	34 (13.6%)
	Semi-professional	30 (12%)
	Professional	5 (2%)
Socioeconomic status (Modified BG Prasad)	1	49 (19.6%)
	2	48 (19.2%)
	3	49 (19.6%)
	4	56 (22.4%)
	5	48 (19.2%)
Religion	Hindu	227 (90.8%)
	Muslims	20 (8%)
	Christians	3 (1.2%)
Marital status	Single	2 (0.8%)
	Married	235 (94%)
	Separated	13 (5.2%)

197 (78.8%) of the total participants of the study were not suffering from any diabetic complications, 13 (5.2%) were suffering from diabetic retinopathy, 13 (5.2%) were suffering from diabetic foot, 13 (5.2%) had suffered a myocardial infarction, 6 (2.4%) were suffering from diabetic neuropathy, 5 (2%) from diabetic nephropathy and 3 (1.25%) from cerebrovascular accidents.

215 (86%) of the study participants had no other comorbidities whereas in 35 (14%) one or the other comorbidities were present such as hypothyroidism 6 (2.4%), asthma 4 (1.6%), anemia 2 (0.8%), gastritis 2 (0.8%), obesity 2 (0.8%), osteoarthritis 2 (0.8%), otitis media 2 (0.8%), sinusitis 2 (0.8%), varicose veins 2 (0.8%), BPH 1 (0.4%), Bursitis 1 (0.4%), cellulitis 1 (0.4%), dengue 1 (0.4%), disk prolapse 1 (0.4%), DVT 1

(0.4%), hernia 1 (0.4%), cured breast carcinoma 1 (0.4%), penile infection 1 (0.4%), renal calculi 1 (0.4%), skin infection 1 (0.4%).

HbA1C could be done only in 71 patients. The details of which are mentioned in the Table 2.

Table 2: HbA1C information of the patients.

HbA1c	Frequency (n=71)
Well controlled (6.5 - 7%)	7 (2.8%)
Unsatisfactory control (7.1-8%)	9 (3.6%)
Poor control (>8%)	54 (21.6%)
Non-diabetic	1 (0.4%)
Total	71

Table 3: Treatment modalities of all the patients.

Current treatment	Frequency (n=250)
Lifestyle modification	12 (4.8%)
Oral hypoglycemic agents	184 (73.6%)
Insulin	8 (3.2%)
Oral hypoglycemic agents and insulin	46 (18.4%)
Total	250

According to the Hamilton Depression Scale, out of the 250 study participants, 142 (56.8%) were found to be suffering from depression and 6 (2.4%) were found to have diabetes distress according to Diabetes Distress Scale.

19 (7.6%) were found to have emotional distress according to the Diabetes Distress Scale. 5 (2%) were found to have physician related distress. 9 (3.6%) were found to have regimen related distress. 34 (13.6%) were found to have interpersonal distress. The distribution of depression according to the demographic profile was studied and the results are as mentioned in the Table 4.

The association between current treatment and depression was analyzed and was found to be statistically insignificant. Similarly, the association between depression and comorbidities were analyzed and 22 (62.9%) with depression had comorbidities and was found statistically not significant (P= 0.467).

In a similar way, the association between diabetic distress and comorbidities were analyzed and it was found that 11.4% of patients with distress had comorbidities and was found to be statistically significant (P=0.004).

39 (73.6%) of those suffering from depression were found to be having diabetic complications and this association was found to be statistically significant (0.008). 2 (3.8%) of the study participants who were distressed were also having other complications of diabetes and this association was found to be statistically insignificant. 136 (95.8%) with depression had no

distress and this association was found to be statistically significant (0.038).

Table 4: The distribution of depression according to the demographic profile.

Sociodemographic characteristics		Depression			p-value
		Present (n=142)	**Absent (n=108)**	**Total**	
Age	Less than 59	65 (51.2%)	62 (48.8%)	127	0.075
	More than 59	77 (62.6%)	46(37.4%)	123	
Sex	Male	85 (59.4%)	58 (40.6%)	143	0.367
	Female	57 (53.3%)	50 (46.7%)	107	
Education	Illiterate	54 (62.1%)	33 (37.9%)	87	0.005
	Primary school	15 (71.4%)	6 (28.6%)	21	
	Secondary school	25 (69.4%)	11 (30.6%)	36	
	High school	21 (58.3%)	15 (41.7%)	36	
	PUC	8 (28.6%)	20 (71.4%)	28	
	Diploma or graduation	19 (45.2%)	23 (54.8%)	42	
Occupation	Unemployed	55 (70.5%)	23 (29.5%)	78	0.017
	Unskilled	13 (56.5%)	10 (43.5%)	23	
	Semi-skilled	41 (51.2%)	39 (48.85%)	80	
	Skilled	20 (58.8%)	14 (41.2%)	34	
	Semi professional	10 (33.3%)	20 (66.7%)	30	
	Professional	3 (60%)	2 (40%)	5	
Socioeconomic status (modified BG Prasad)	1	24 (49%)	25 (51.0%)	49	0.451
	2	32 (66.7%)	16 (33.3%)	48	
	3	27 (55.1%)	22 (44.9%)	49	
	4	30 (53.6%)	26 (46.4%)	56	
	5	29 (60.4%)	19 (39.6%)	48	
Religion	Hindu	127 (55.9%)	100 (44.1%)	227	0.339
	Muslim	14 (70%)	6 (30.0%)	20	
	Christian	1 (33.3%)	3 (66.7%)	3	
Marital status	Single	0 (0.0%)	2 (100.0%)	2 (100%)	0.033
	Married	13 (55.7%)	104 (44.3%)	235 (100%)	
	Widowed	11 (84.6%)	2 (15.4%)	13 (100%)	

DISCUSSION

Out of the 250 participants in the study, we found that 142 (56.8%) participants were depressed which is substantially higher than the numbers western studies have put forward. Present findings are closer to those of middle eastern where they estimated the prevalence to be 49.6%.[8]

Study from India varied from 30 to 45%.[9,10] The wide variations in results may be attributed to the different rating scales used and to the fact that present study sample was derived from an OPD based population. The magnitude of depression was found to be almost similar in males (59.4%) and females (53.3%). This is in contrary to the female preponderance most studies have reported wherein they have reported a two-fold higher risk of depression in women as compared to men.[11,12,10] We found a statistically significant association between the level of education of present study sample and depression.

In present study, we found that depression was high among the illiterates. This is similar to the studies done by Katon W et al and Ajit Avasthi from India which showed that low levels of education as increased risk of major depressive disorder.[13,10]

Whereas, the study done in Bangladesh showed that depression was common among patients who had studied up to secondary and higher secondary and above.[14]

70 percent of the unemployed diabetics in our sample population were depressed. This percentage was lower for unskilled, semiskilled, skilled and semi-professional workers but touched 60 percent in professionals which was found to be statistically significant. This may have been due to multiple factors like income, diet, duration and quality of sleep.

This correlates with the study done by Maryam Palizgir et al, where depression among unemployed was 83.1%.[12] However, we found no significant associations between depression and religion, this is similar to a study done by Cheryl P Lynch et al where there was no relation between religion and depression.[15]

Table 5: The distribution of diabetic distress according to sociodemographic characteristics (n=250).

Sociodemographic characteristics		Distress		Total	p-value
		Present	Absent		
Age	Age less than 59 years	4 (3.1%)	123 (96.9%)	127	0.684
	Age more than 60 years	2 (1.6%)	121 (98.4%)	123	
Sex	Male	3 (2.1%)	140 (97.9%)	143	1.000
	Female	3 (2.8%)	104 (97.2%)	107	
Education	Illiterate	3 (3.4%)	84 (96.6%)	87	0.750
	Primary school	1 (4.8%)	20 (95.2%)	21	
	Middle school	1 (2.8%)	35 (97.2%)	36	
	High school	1 (2.8%)	35 (97.2%)	36	
	PUC	0 (0.0%)	28 (100.0%)	28	
	Graduate/ diploma	0 (0.0%)	42 (100.0%)	42	
Occupation	Unemployed	3 (3.8%)	75 (96.2%)	78	0.825
	Unskilled	0 (0.0%)	23 (100.0%)	23	
	Semiskilled	2 (2.5%)	78 (97.5%)	80	
	Skilled	1 (2.9%)	33 (97.1%)	34	
	Semi professional	0 (0.0%)	30 (100.0%)	30	
	Professional	0 (0.0%)	5 (100.0%)	5	
Socioeconomic status (modified BG Prasad)	1	1 (2%)	48 (98%)	49	0.499
	2	1 (2.1%)	47 (97.9%)	48	
	3	0 (0%)	49 (100%)	49	
	4	3 (5.4%)	53 (94.6%)	56	
	5	1 (2.1%)	47 (97.9%)	48	
Religion	Hindu	6 (2.6%)	221 (97.4%)	227 (100.0%)	0.732
	Muslim	0 (0.0%)	20 (100.0%)	20 (100.0%)	
	Christian	0 (0.0%)	3 (100.0%)	3 (100.0%)	
Marital status	Single	0 (0.0%)	2 (100.0%)	2 (100.0%)	0.432
	Married	5 (2.1%)	230 (97.9%)	235 (100.0%)	
	Widowed	1 (7.7%)	12 (92.3%)	13 (100.0%)	

Single and separated individuals had a higher prevalence of depression than their married counterparts suggesting a protective influence of marriage against depression. This association was found to be statistically significant. Similar observations have been made by studies conducted in Morocco and Pakistan.[16,17] But the study from Bangladesh showed that it was common in the married (80.5%) when compared to unmarried.[14]

We also found that presence of complications of diabetes had a bearing on depression and were significantly associated with depression. Comparable results have been put forward implicating the complications of diabetes as one of the risk factors for the development of depression.[14] In present study, there was no significant correlation between Depression and current medication of the participant. This is similar to the study done in India where insulin usage had no effect on depression.[9] This is in contrast to the results of studies that have found that

insulin usage is a risk factor for developing depression.[14,17] Similarly there was no significant correlation between low socio-economic status and depression. But according to Islam SM et.al and Ajit Avasthi et al depression was more common among the lower socio-economic condition.[14,10]

A very small group (6%) was revealed to be having Diabetic distress. In present study, there is no significant correlation between diabetic distress and treatment modalities. Similarly, according to the study done by Polonsky WH et al, no significant association was observed between diabetic distress and treatment modalities.[18] Sociodemographic factors like age, sex, occupation, education, marital status, religion and socio-economic status had no significant correlation with diabetic distress. According to Jana Wardian et. al, and Fischer et. al, younger age group and females had higher

diabetic distress.[7,19] But according to Polonsky et al, gender had no role.[20]

According to Islam et al age, occupation, treatment modalities, diabetic complications had significant correlation with diabetic distress.[21] According to Tol A et al, gender and education had no significant correlation with diabetic distress, whereas there was significant correlation with marital status, co morbidity, type of treatment, diabetic complications.[22] There are not much studies correlating diabetic distress with religion and socio-economic status.

In current study, the relationship between comorbidities and depression was not statistically significant. But there was a statistically significant association between diabetic distress and co-morbid conditions. Studies done by Fischer et al and Raval A et al showed significant correlation with comorbidity and depression and diabetic distress.[23,24] But in the study done by Egede et al, there was no correlation between comorbid disease and diabetic depression.[25]

In this study, there was no statistically significant association between diabetic complication and diabetic distress. This is similar to the study done by Stoop CH et. al of Netherlands where there was no effect of diabetes-related complications of Diabetes related distress.[26] But according to the study done by de Groot M et al, Diabetes complications were often associated with diabetes-related distress.[27]

A statistically significant association was also found between depression and diabetic Distress, but a true understanding of this association is not possible at our level and requires further studies to establish a cause-effect relationship. In this study 95.8% with depression had no distress and this association was found to be statistically significant (0.038). This is similar to the study done by Fisher et al where there was no correlation between diabetic distress and diabetic depression.[28]

Other than this, it was noted that out of the HbA1c values that were available, only 2.8 percent had their HbA1c values under control, bringing to light the poor glycemic control of the study sample and the need for immediate interventions. There are lot of studies correlating HbA1C level and its relation to Diabetic depression and diabetic distress. But we could not analyze in present study as the number of patients undergoing HbA1C is too small.

Limitations

Due to the low socioeconomic status of a majority of present study sample, HbA1c values were not routinely estimated and as a result, were not available in many cases. This was the major drawback to present study. Other limitations were the lack of a longitudinal follow up, restricted sample size and the absence of comprehensive psychiatric evaluation as this is a questionnaire based study.

CONCLUSION

The magnitude of depression in diabetics is much higher than in general population. Depression in diabetics was found to have statistically significant associations with level of education, occupation, marital status, presence of complications of diabetes and diagnosis of other co-morbidities.

Diabetic distress, on the other hand was found to be significantly associated only with the presence of co morbid conditions. Depression and Diabetic distress were also found to have a statistically significant association with each other. Further studies highlighting the true relationship between the two entities need to be conducted to establish causality. Also, studies need to be conducted evaluating interventions and their effectiveness.

Early detection, counselling and treatment are required for all diabetics, especially those who have additional risk factors for the development of depression. This can only be done by keeping a keen watch for signs and symptoms of depression. Due to the poor economic status of most of the Indian population and the steadily increasing burden of diabetes, it may be wise to begin screening and counselling at a primary level.

On a tertiary level however, there may be a need for a physician-psychiatrist team. This may provide an integrated approach to adequately manage diabetes and prevent depression. Even though significant data exists to prove the link between these two diseases, it has not translated into changes in clinical practice.

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