Original Article

Anxiety among patients with diabetes mellitus evaluated using generalized anxiety disorder 7-item scale

Amit Thour, Ramninder Nagra, Arunjeet Gosal, Tejasav Sehrawat, Subhash Das[1], Yashdeep Gupta

Departments of Medicine and [1]Psychiatry, Government Medical College and Hospital, Chandigarh, India

ABSTRACT

Background: Anxiety has been shown to be associated with poor outcomes in people with diabetes. However, there has been limited data, especially from India, which has specifically examined whether diabetes mellitus is associated with an increased likelihood of comorbid anxiety. **Aim:** The aim was to estimate the prevalence of anxiety in patients with diabetes and to determine the association of anxiety with age, sex, and other related parameters. **Setting:** Endocrine clinic, tertiary care hospital. **Design:** Cross-sectional. **Materials and Methods:** The study was cross-sectional carried out in endocrinology clinic of tertiary care hospital in North India. Cases were patients with type 2 diabetes mellitus above 30 years of age. Anxiety was assessed using the generalized anxiety disorders 7-item (GADs-7) scale. The relationship with a sociodemographic profile, duration of diabetes, hypertension, and microvascular complications was also analyzed. **Results:** Seventy-three subjects (42.5% females) with mean age 50.8 ± 9.2 years were evaluated. The prevalence of anxiety was 34%. Severe anxiety (GAD-7 score ≥15) was present in three (4%) subjects, moderate anxiety (GAD-7 score ≥10) was present in six (8%) subjects, and mild anxiety was present in 16 (22%) of subjects. Anxiety increased with fasting plasma glucose, hypertension, was more in women, but the differences were not statistically significant. **Conclusions**: Our study demonstrates a higher prevalence of anxiety in patients with type 2 diabetes. No factor was significantly associated with anxiety. Therefore, anxiety should be assessed in each and every patient, irrespective of other factors.

Key words: Diabetes mellitus, generalized anxiety disorders, generalized anxiety disorders-7, prevalence

INTRODUCTION

The prevalence of type 2 diabetes has rapidly increased globally. India ranks at number 2 in terms of an absolute number of people affected by diabetes.[1] Sixty-five million people had diabetes by 2013, in India. The number of people with diabetes in India has been projected to increase to 109 million by 2035.[1] Diabetes is associated with an increased risk of both physical and psychological complications, both of which impact on mortality.[2] Depression and anxiety are highly prevalent psychological disorders in the general population. Though depression is the most investigated psychological disorder associated with diabetes, there has been little research conducted on the association of diabetes with anxiety.[3]

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Corresponding Author: Dr. Yashdeep Gupta, Department of Medicine, Government Medical College and Hospital, Sector 32, Chandigarh - 160 030, India. E-mail: dryashdeepgupta@gmail.com

This study adds to the limited available information on the association between anxiety and diabetes, from India.[4,5] To the best of our knowledge, the utility of generalized anxiety disorders 7-item (GAD-7) scale has been evaluated for the first time in India to study this association.[4,5]

Materials and Methods

This cross-sectional study was carried out in September 2014 at the Government Medical College and Hospital, Chandigarh, India. This is a tertiary care hospital serving patients from both urban and rural areas. The patients with a diagnosis of type 2 diabetes above age 30 years were recruited on the voluntarily basis for this study. The GAD-7 scale was used for evaluation of anxiety, and relevant clinical details were obtained. No intervention was part of the study and the investigations that were available with the patient were used for analysis purpose. The cases were not receiving any psychiatric treatment which could have an effect on the result.

Generalized anxiety disorder 7-item scale

Anxiety was assessed by administering the GAD-7 scale. This scale is useful for evaluating the presence and severity of GAD in clinical practice. This tool has several advantages.[6] First, a 7-item anxiety scale — the GAD-7 — is a useful tool with strong criterion validity for identifying probable cases of GAD. Second, the scale is also an excellent severity measure as increasing scores on the GAD-7 are strongly associated with multiple domains of functional impairment and disability days. Third, although many patients had anxiety and depressive symptoms, factor analysis confirms GAD and depression as distinct dimensions, GAD-7 measuring GAD with high sensitivity and specificity with appropriate cut-offs. It assesses the symptoms experienced by participants during the 2-week period before they take the survey. On the basis of participant response to the frequency of any particular symptom (0 = not at all, 1 = several days, 2 = more than half of the days, and 3 = nearly every day), a total score ranging from 0 to 21 was obtained, with higher scores indicating patients' increased self-report of anxiety severity. The division of GAD-7 scores into ratings of mild (5-9), moderate (10-14), and severe anxiety (≥15) was used in this study.[6] Those who had moderate to severe anxiety based on cut-off points in GAD-7 ≥10 were referred to Psychiatry Department for further management. This cut point identifies patients with GAD with a sensitivity of 89% and specificity of 82%.

Clinical details

The variables included in the study were sociodemographic factors, the presence of hypertension, and microvascular complications were also assessed. Since most of the patients were recruited as first-timers attending the endocrine clinic of the hospital, glycated hemoglobin (HbA1c) was not available for all patients. The analysis is, therefore, with recent fasting blood glucose (FBG) value (within the last 7 days), which was available for all patients. Moreover, the value of FBG is more easily understood by the patient, rather than an interpretation of HbA1c.

Statistical analysis

Numerical data are presented as a mean ± standard deviation or percentages. Differences in characteristics between participants were tested with unpaired *t*-test for normally distributed variables, with the Wilcoxon rank sum test for skewed variables, and with the Chi-square test or Fisher exact test for categorical variables. The significance level was set at 5%. All statistical analyses were carried out using Statistical Package for Social Sciences (SPSS Version 20.0, Chicago, IL, USA). A sample size of 73 was as per convenience. This sample size gave us the power of 90% with an alpha error of 10%.

Results

Baseline characteristics

We report data from 73 subjects. The mean age of the study population was 50.8 ± 9.2 years. About 42.5% of the subjects were males and 61.6% were from the urban area. Sixty percent of them had coexistent hypertension. About 45% had at least one microvascular (retinopathy, nephropathy, and neuropathy) complication. The mean duration of diabetes was 6.3 ± 6.3 years. Nearly, 50% of the subjects had moderate to severe hyperglycemia as indicated by fasting plasma glucose values >150 mg%.

Prevalence and characteristics of subjects with anxiety

Anxiety as defined by GAD-7 score ≥5 was present in 34% of the individuals. Severe anxiety (GAD-7 score ≥15) was present in three (4%) subjects, moderate anxiety (GAD-7 score ≥10) was present in six (8%) subjects, and mild anxiety was present in 16 (22%) of subjects. Anxiety was more prevalent in rural subjects as compared to urban ones. Women, subjects with hypertension, microvascular complications, and subjects with moderate to severe hyperglycemia had more anxiety [Table 1]. The differences were, however, nonsignificant. GAD-7 scores positively correlated only with fasting plasma glucose. The correlation was statistically nonsignificant [Table 2].

Risk factor analysis

In bivariate risk factor analysis [Table 3], men had 28% fewer chances of anxiety than women. The presence of hypertension was associated with 29% more risk of having

Table 1: Baseline characteristics of study population

Variable	Number of subjects	Mean ± SD/ percentage	GAD		*P*
			Normal (*n* = 48) (%)	Anxiety (*n* = 25) (%)	
Age (years)	73	50.8±9.2	51.8±9.1	48.9±9.5	0.20
Duration of diabetes (years)	73	6.3±6.3	6.7±6.8	5.6±5.3	0.49
Sex					
Women	42	57.5	26 (61.9)	16 (38.1)	0.46
Men	31	42.5	22 (71.0)	09 (29.0)	
Place of residence					
Urban	45	61.6	30 (66.7)	15 (33.3)	1.00
Rural	28	38.4	18 (64.3)	10 (35.7)	
Hypertension					
Yes	44	60.3	28 (63.6)	16 (36.4)	0.80
No	29	39.7	20 (69.0)	09 (31.0)	
Any microvascular complication					
Yes	39	53.4	25 (64.1)	14 (35.9)	0.81
No	34	46.6	23 (67.6)	11 (32.4)	
Fasting plasma glucose (mg %)					
≤150	33	45.8	24 (72.7)	09 (27.3)	0.45
>150	39	54.2	24 (61.5)	15 (38.5)	

GAD: Generalized anxiety disorder, SD: Standard deviation

Table 2: Correlation of generalized anxiety disorder score with continuous variables

Variable	Correlation coefficient	*P*
Age	−0.06	0.64
Fasting plasma glucose	0.21	0.08
Duration of diabetes	−0.01	0.93

Table 3: Risk factor analysis for anxiety

Variable	*n*	Subjects with anxiety	Bivariate OR (95% CI)	*P*
Sex				
Women	42	16	1.00	0.54
Men	31	09	0.72 (0.26-2.04)	
Residence				
Urban	45	15	1.00	0.92
Rural	28	10	1.06 (0.35-3.16)	
Complications				
Yes	39	14	1.00	0.97
No	34	11	1.02 (0.32-3.50)	
Hypertension				
No	29	09	1.00	0.65
Yes	44	16	1.29 (0.44-3.74)	
Fasting plasma glucose (mg %)				
≤150	33	09	1.00	0.73
>150	39	15	1.23 (0.39-3.93)	
Duration of diabetes (years)				
<3	28	08	1.00	0.51
≥3	44	16	1.47 (0.47-4.61)	
Age (years)				
<50	33	13	1.00	0.17
≥50	39	11	0.44 (0.14-1.42)	

OR: Odds ratio, CI: Confidence interval

anxiety. The risk of anxiety was nearly same with presence or absence of microvascular complications. Subjects from urban or rural residence had nearly equal chances of having anxiety. Fasting plasma glucose ≤150 mg% was associated with 23% lesser risk for depression.

Discussion

The main anxiety disorders associated with medical illness are GAD and panic disorder.[3] This study evaluated the presence of GAD in patients with type 2 diabetes mellitus and found the prevalence of 34% using a GAD-7 scale. Though the data from India is limited,[4,5] similar results have been found in other populations.[4,7-9] The meta-analysis also showed an excess risk of 48% for elevated anxiety symptoms in patients with diabetes as compared to those without diabetes.[3]

In our earlier study, we found high prevalence (41%) of depression among patients with type 2 diabetes.[10] A meta-analysis indicates that people with diabetes are 2-fold more likely to be diagnosed with depression as compared to people who do not have diabetes.[11] This implies that psychological factors, such as depression and anxiety, are common symptoms in patients with diabetes.[3] If social support can be strengthened in these patients, then psychological factors can be improved. A recent study assessed the benefits of an education program on diabetes, patient self-management, adherence to medication, anxiety, depression, and glycemic control in type 2 diabetics in Saudi Arabia and found positive results with this approach.[12] Identification and treatment of anxiety disorder in patients with type 2 diabetes is important, as in people with diabetes co-morbid anxiety disorders and elevated anxiety symptoms have been shown to be associated with increased diabetes symptom burden, increased diabetes complications, increased pain, worsened blood glucose levels, reduced quality of life, increased depression, increased body-mass index, and greater disability.[3]

In our study, we found that patients with a higher fasting plasma glucose (>150 mg/dl) had a higher prevalence of anxiety (38.5%) than those with fasting plasma glucose (<150 mg/dl) (27.3%). This may be due to fear in the patient regarding the efficacy of his/her treatment regimen or fear of developing complications. The relationship may be bi-directional. Worse glycemic control may be associated with higher anxiety scores, and high anxiety levels may deteriorate glycemic control. This lay emphasizes the need to take care of both aspects so that both outcomes and quality of life can be improved in these patients.

A large proportion of women were found to have GAD, as compared to men. The similar results have been reported by others.[4,13] Lower literacy levels among women may be one of the factors, lack of social support may be other factor for this result. In general, women also have higher anxiety levels than men. We found no significant correlation with age and duration of diabetes. No significant difference was found with presence or absence of microvascular complications. This may imply the overall need for assessment for GAD irrespective of other factors.

The comorbid conditions of anxiety and depression may easily go unnoticed, especially in the tertiary care settings in developing countries like India due to the huge patient load on the physicians in busy outpatient departments. As these co-morbid conditions reduce the efficacy of the treatment regimens of diabetes and add an additional burden on the patient, it is highly imperative we diagnose and treat these conditions along with. It has been previously seen that if patients can get a better understanding of the correlation between their disease and psychosocial factors in addition to having access to social support, then they can more easily improve attitude toward the chronic illness.[12]

Our study has some limitations including the fact that the study was conducted in a tertiary hospital setting which may in itself mean higher anxiety levels in the participants. Another drawback is the limited sample size. Moreover, the causality relationship cannot be fully ascertained it being a cross-sectional study. Further studies with a larger sample may shed light on the issue.

Conclusions

The study clearly establishes a connection between anxiety disorders and diabetes. In this age of medicine where highly successful treatment modalities are present and the association between the two conditions is widely known, the detection of the psychological issues is highly important. The higher prevalence of anxiety in women portrays a gender gap which needs to be addressed. With increased severity of the disease, it becomes necessary for an endocrinologist to provide psychosocial relief to the patient. This may significantly improve the quality of life in a patient.

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Conflicts of interest

There are no conflicts of interest.

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