

Psychological health of caregivers of individuals with type 2 diabetes mellitus: A cross-sectional comparative study

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ABSTRACT

Introduction: The quality-of-life in individuals with diabetes is also dependent upon the quality of family relationships and general well-being of caregivers because the patient depends on them to uphold in the community. Only limited studies have assessed the psychological health of caregivers to individuals with diabetes. **Aims and Objective:** The current study aims at comparison of depression and anxiety levels among patients with diabetes and their caregivers. **Materials and Methods:** Fifty consecutive patients-care giver dyads of subjects having type 2 diabetes were recruited at an out-patient clinic of medicine at a tertiary care center. The dyads were assessed using a semi-structured proforma for the socio-demographic details and for anxiety and depression levels using the Hospital Anxiety and Depression Scale (HADS). The data were analyzed using SPSS version 17.0. Correlation analysis was performed for multiple variables including blood glucose profile. **Results:** The mean duration of illness (4.93 ± 3.53 years) and blood glucose parameters were not found to be associated to depressive or anxiety symptoms. Depressive and anxiety disorder was observed in 24% and 44% of patients and 10% and 18% of caregivers, respectively. Patients had significantly more HADS anxiety (HADS-A) scale scores than caregivers but not for HADS depression (HADS-D) scale. Female patients were found to be having more HADS-D scores than male patients ($P = 0.02$), but were not significantly different from caregivers. HADS-A scores were comparable among male and female gender in intragroup as well as intergroup comparison for patient and caregiver groups. **Conclusion:** Diabetes mellitus affects the psychological health of not only the patients but as well as the family caregivers and patients tend to be more anxious than the caregivers. Furthermore, it was seen that women with diabetes had higher rates of depression than their male counterparts.

Key words: Anxiety, caregiver, depression, diabetes, family

INTRODUCTION

Diabetes is one of the most common public health problems worldwide. The current estimates of almost 285 million individuals suffering from diabetes are expected to rise to 438 million by the year 2030.^[1] Majority of these will reside in developing countries. The Indian estimates

of the prevalence of Type 2 diabetes mellitus vary from 8% to 15% among the urban population, with a significantly increasing trend over the years.^[2]

Mental health disorders are well recognized to be coexisting with chronic illnesses.^[3] Compared to the general population, the risk of acquiring depression and anxiety is higher in individuals with diabetes.^[3-5]

The quality-of-life (QOL) in individuals with diabetes is also dependent upon the quality of family relationships.^[5] Caregivers play an important role in supporting people with illness. This is of special relevance in the context of chronic disorders. It is important to explore caregiver's emotional turmoil as it helps in exploring their burden that can have an impact on the patient's illness and

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functioning apart from their own. The well-being of caregivers is important because the patients extensively depend on them.

Few studies have assessed the psychological health of caregivers to individuals with diabetes.^[6-9] The studies indicate higher burden in caregivers,^[10] proneness to depression,^[9] and poorer QOL.^[9] Anxiety and depressive symptoms in caregivers is also found to be associated with adolescent glycemic control.^[11] Researchers examining this issue have clearly stated that clinicians should be aware of such psychological problems in caregivers and intervene for better patient management. Studies report that enhancing social support improves disease management among adults with diabetes.^[12,13]

The current study aimed at assessment of depression and anxiety levels among care givers of patients with diabetes being treated at out-patient department of tertiary care hospital. The levels of depression and anxiety were compared with that of the patients.

MATERIALS AND METHODS

Aim and objectives

The current study aimed at assessment of depression and anxiety levels among caregivers of patients with diabetes being treated at out-patient department of tertiary care hospital. The levels of depression and anxiety were compared with that of the patients.

Setting

The study was conducted at an out-patient clinic of Department of Medicine at a Tertiary Care Hospital in India.

Inclusion criteria

The patients selected for the study were diagnosed with type 2 diabetes. Only those patient-care giver dyads giving informed consent for participation in the study were recruited for the study.

Exclusion criteria

Those patients or caregivers with any history of psychiatric illness (prior to diagnosis of diabetes in patient) were excluded from the study. In addition, patients (except for complications due to diabetes) and caregivers having any other comorbid medical illness were excluded from the study.

Sample size

Fifty consecutive patients-caregiver dyads were recruited in the study.

Methodology

Following inclusion in the study, patients and caregivers were assessed using a semi-structured proforma for the socio-demographic details. Subsequently, these dyads were assessed for anxiety and depression levels using the Hospital Anxiety and Depression Scale (HADS).

Hospital Anxiety and Depression Scale is a self-report questionnaire commonly used to assess levels of anxiety and depression. It was developed by Zigmond and Snaith^[14] in 1983. The HADS comprises statements, which the patients rate, based on their experiences over the past week. The 14 statements are relevant to generalized anxiety (7 statements) or "depression" (7 statements), the latter being large (but not entirely) composed of reflections of the state of anaerobia. Each question has four possible responses. Responses are scored on a scale from 3 to 0. The maximum score is therefore 21 for depression and 21 for anxiety. The two subscales, HADS anxiety (HADS-A) and HADS depression (HADS-D), have been found to be independent measures. In its current form, the HADS is now divided into four ranges: Normal (0-7), mild (8-10), moderate (11-15) and severe (16-21).

The HADS questionnaire has been translated into many languages, and for many of these translations validation studies confirm the internationally applicable nature of this Questionnaire.^[15] It has been used in previous studies in Indian setting as well.^[16-18]

Data analysis

The data were analyzed using SPSS version 21 (IBM Corp., Chicago, USA). Descriptive analysis was performed for socio-demographic profile. Independent sample *t*-test (for continuous variables) and Chi-square test (for categorical variables) were used to find the difference between the patients and the caregivers on different variables. In Cramer's V-test and Phi-test were used for 2 × 4 contingency tables. Persons correlation coefficient was used to ascertain the correlation between continuous variables. Linear regression model was used to explore the relation between anxiety/depression levels among the patients and anxiety/depression levels among caregivers. The level of statistical significance was kept at $P < 0.05$.

The conditions of anonymity and confidentiality as specified in the institutional ethical guidelines were adhered to.

RESULTS

A total of 50 patient-care giver dyads were included in the study. The mean age was comparable for individuals with diabetes and their caregivers (46.98 ± 7.19 years and

45.32 \pm 7.61 years respectively, $P = 0.26$). All subjects were married. The details of patient and caregiver socio-demographic profile are given in Table 1.

The primary earning member of the family was predominantly of male gender in both patient and caregiver group, although there was no significant difference among the groups. There were no overall significant differences among the groups on gender comparison over socio-demographic profile.

Female patients and caregivers were significantly less educated ($P < 0.001$) than their male counterparts [Table 2]. Belonging to male sex significantly correlated to being employed in both patient and caregiver groups ($r = 0.66$, $P < 0.0001$; $r = 0.84$, $P < 0.0001$ respectively). Similarly being the primary earning member of household was also significantly correlated to male sex in patient and caregiver groups ($r = 0.61$, $P < 0.0001$; $r = 0.80$, $P < 0.0001$ respectively). There was no other significant gender difference in both groups over parameters of age, family background, family type and socio-economic status.

The mean duration of illness in patient group was 4.93 \pm 3.53 years (0.5–20) without any difference between males and females (4.43 \pm 2.65 and 5.35 \pm 4.13 years, respectively). The duration of illness was not found to be associated to depressive or anxiety symptoms. The mean levels of fasting and post-prandial blood sugar were 154.29 \pm 54.23 mg/dl and 230.84 \pm 68.28 mg/dl respectively in the patients. The mean glycated hemoglobin (HbA1c) levels were 9.18 \pm 1.69. There was no significant gender difference in any of the blood sugar parameter in patient group [Table 3]. Sixty per cent of patients were on oral hypoglycemic agents alone, whereas 36% were also taking insulin.

Glycated hemoglobin levels were significantly correlated to fasting and post-prandial blood sugar levels ($r = 0.66$, $P < 0.0001$ and $r = 0.70$, $P < 0.0001$ respectively) but not to HADS-D and anxiety scale ($r = 0.19$, $P = 0.22$, $r = 0.06$, $P = 0.67$ respectively).

Depression Hospital Anxiety and Depression Scale scores were significantly correlated to HADS-A scores in both patient and caregiver groups ($r = 0.72$, $P < 0.0001$; $r = 0.56$, $P < 0.0001$). Furthermore, a significant positive correlation was observed between anxiety scores of patients and depressive scores of care givers ($r = 0.29$, $P = 0.04$).

About a third of the subject population in either group was without any depressive or anxiety disorder [Figure 1]. Among patients, depressive symptoms were present in 66% subjects, and 64% had anxiety symptoms, while 62% and 74% caregivers were found to be suffering from depressive and anxiety symptoms, respectively. None of the subjects of either group had severe depressive episode. The majority of subjects had mild symptoms of depression or anxiety except among patient population, where moderate anxiety symptoms were observed to be more prevalent [Table 4]. When including only moderate and severe symptoms, depressive episode was observed in 24% of patients and 10% of caregivers.

Table 1: Socio-demographic profile of patients with diabetes and their caregivers

Parameter		Patients N (%)	Caregivers N (%)	P value
Gender	Male	23 (46)	27 (54)	0.43
	Female	27 (54)	23 (46)	
Marital status	Married	50 (100)	50 (100)	-
	Illiterate	19 (38)	18 (36)	
Education	Primary	3 (6)	2 (4)	0.24
	Secondary	-	5 (10)	
	Higher secondary	16 (32)	15 (30)	
	Graduate	12 (24)	10 (20)	
Employment status	Employed	28 (56)	27 (54)	0.84
	Unemployed	22 (44)	23 (46)	
Family background	Urban	42 (84)	46 (92)	0.22
	Rural	8 (16)	4 (8)	
Family type	Nuclear	39 (78)	39 (78)	1.00
	Joint	11 (22)	11 (22)	
Socio-economic status	Lower	27 (54)	27 (54)	0.89
	Middle	20 (40)	21 (42)	
	Upper	3 (6)	2 (4)	
Primary earning member		27 (54)	30 (60)	0.34

Table 2: Gender comparison of education as parameter among the patient and caregivers

Group	Education					P value
	Illiterate	Primary	Secondary	Higher secondary	Graduate	
Male patients	2	-	-	9	12	Phi=0.73 $r = -0.69$ $p < 0.001$
Female patients	17	3	-	7	-	
Male caregivers	6	-	-	13	8	Phi=0.64 $r = -0.47$ $p < 0.001$
Female caregivers	12	2	5	2	2	

Similarly, anxiety disorder was found in 44% of patients and 18% of caregivers.

Cramer's V-test and Phi-test for 2×4 contingency table revealed significant difference in HADS-A scale between patient and caregiver group, but not for HADS-D scale. Patient group had significantly more HADS-A scores than caregiver population (Phi = 0.385, $P = 0.002$), but the HADS-D scores were comparable among the groups [Table 4].

On gender comparison, female patients were found to be having more HADS-D scores than male patients ($P = 0.02$), but were not significantly different from caregivers. HADS-A scores were comparable among male and female gender in intragroup as well as intergroup comparison for patient and caregiver groups [Table 5].

DISCUSSION

The current cross-sectional study evaluated anxiety and depression levels among patients with type 2 diabetes and their caregivers in an out-patient setting.

The study sample had both the sexes equally represented in both groups. The mean duration of type 2 diabetes among the subjects was 4.93 (standard deviation ± 3.53) years. The patient and caregiver dyads included in the study were

comparable on different socio-demographic variables even on gender specific data except that males were found to be the primary earning member of the family irrespective of being a patient or a caregiver reflecting the usual Indian situation of a working male dominant society.

Our findings concur with other chronic disease models in having significant presence of psychological ill-health among patients and their caregivers. Majority of the subjects (about 2/3rd of the patients and their caregivers) were found to be suffering from anxiety and depression, at the time of assessment. The prevalence of Depressive disorder and Generalized Anxiety Disorder were found to be 24% and 44% respectively in patients. Majority of the patients were suffering from mild levels of anxiety and depression (20% and 42% respectively), and none had severe depression.

There are contradictory findings of prevalence of depression and anxiety among patients with type 2

Table 3: Gender comparison of blood glucose parameters in the patient group

Blood Sugar Parameter	Male Mean \pm SD	Female Mean \pm SD	P value
Fasting	150.61 \pm 44.75	151.37 \pm 53.93	0.95
Post-prandial	230.13 \pm 50.55	223.56 \pm 70.71	0.71
HbA1c	9.07 \pm 1.59	9.14 \pm 1.68	0.89

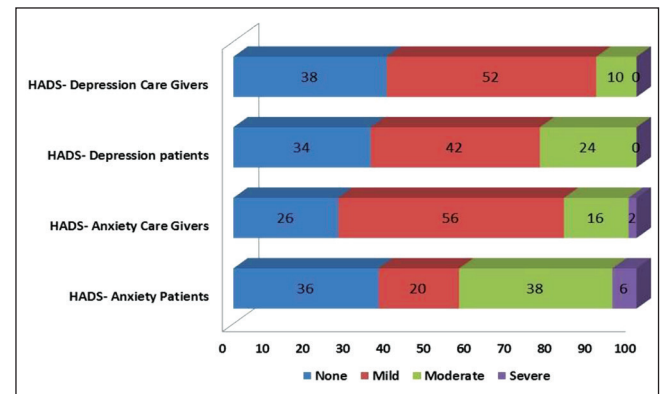


Figure 1: Distribution of scores on Hospital Anxiety and Depression Scale for patients and care givers

Table 4: HADS anxiety and depression scores of the patients and caregivers

Severity	None (0-7) (%)	Mild (8-10) (%)	Moderate (11-15) (%)	Severe (>16) (%)	P
HADS anxiety patients	36	20	38	6	Phi=0.385
HADS anxiety caregivers	26	56	16	2	Cramer's V=0.385
					$P=0.002$
HADS depression patients	34	42	24	—	Phi=0.188
HADS depression caregivers	38	52	10	—	Cramer's V=0.188
					$P=0.17$

HADS: Hospital Anxiety and Depression Scale

Table 5: Gender comparison of anxiety and depressive symptoms

Participant	Parameter	Male mean \pm SD	Female mean \pm SD	P	t	95% confidence interval	
						Lower	Upper
Patients	Anxiety	8.87 \pm 4.21	9.85 \pm 4.33	0.42	-0.80	-3.42	1.45
	Depression	7.48 \pm 2.79	9.30 \pm 2.68	0.02*	-2.34	-3.37	-0.25
Caregivers	Anxiety	8.56 \pm 2.88	9.13 \pm 2.76	0.47	-0.71	-2.91	1.04
	Depression	7.52 \pm 1.86	8.52 \pm 2.87	0.14	-1.48	-2.36	0.35

* $P < 0.05$; SD: Standard Deviation

diabetes. The prevalence of depression was found to be 16.9% in one and 41% in other previous work from tertiary care hospital setting in India.^[18,19] The studies from Western countries also report the prevalence rates of both anxiety and depression to be lower.^[4,20,21] Collins *et al.*^[21] found the prevalence of depression and anxiety to be 32.0% and 22.4%, respectively, as assessed by HADS in a cross-sectional study.^[21] In Malaysia, the prevalence of depression, anxiety and stress symptoms among Type II diabetics were 11.5%, 30.5% and 12.5% respectively.^[22]

Conversely, several studies among diabetic patients had found higher rates.^[23-25] Khuwaja *et al.*^[23] reported the prevalence of depression and anxiety as 44% and 58%, respectively,^[23] while another study reported rates as 48.27% and 55.10%, respectively.^[24] On combining moderate and severe categories, 31% of participants reported clinically significant levels of depressive symptoms out of the 58% reporting of any depressive symptom in a study from Appalachian counties.^[25] A study in Qatar reported of mild and severe depression scores in diabetic cases to be 38.9% and 13.6% respectively and scores for mild and severe anxiety to be 37.7% and 35.3%.^[26]

Duration of diabetes has also been found to be associated with a higher prevalence of depression.^[27,28] Chronic disease and disease duration were significantly associated with anxiety and depressive disorders in a study from Bahrain.^[29] However, no such association was observed between depression/anxiety and duration of diabetes and duration of treatment of diabetes in the current study. These findings were similar to that of Raval *et al.* who failed to find any significant association between duration of diabetes and depression.^[18] However, the mean duration of diabetes was lesser in our study (4 years) compared to previous study (10 years).^[18] Furthermore, one needs to consider the role of multiple modulators of the effect of duration of diabetes and the emergence of anxiety/depression.

We observed that female patients had significantly more depressive symptoms than male patients, but had comparable anxiety symptoms. Traditionally, female sex has been associated with higher rates of depression among the general population as well as those suffering from diabetes.^[23,29-32] A previous study by Roupia *et al.*^[32] reported that sex was strongly related to the occurrence of anxiety and depression symptoms with women appearing to have three times the percentages of anxiety and double the percentage of depression in comparison with men.^[32]

There was no correlation of HbA1c, fasting or post-prandial blood sugar levels to HADS-D or anxiety scales

in patient population. Neither was it observed on comparing male and female patients. Cross-sectional studies have found a significant positive correlation between depressive symptoms and HbA1c in patients with Type 1 diabetes but no significant correlation in patients with Type 2 diabetes,^[33-35] giving rise to the hypothesis that the depression affects glycemic control in patients with Type 1, but not Type 2 diabetes. Although few cross-sectional studies do report of poorer disease management and glycemic control in individuals with type 2 diabetes.^[36] A Dutch study also reported that depressive symptoms, but not anxiety is associated with glucose metabolism.^[4] The results of several prospective studies have been mixed.^[37-39]

The prevalence of depressive disorder and generalized anxiety disorder was found to be 10% and 18% respectively in caregivers on combining moderate and severe scores. Although, the majority of caregivers were suffering from mild levels of depression and moderate levels of anxiety, none had severe depression.

Previous literature reports of significant prevalence of depression in caregivers similar to the current findings.^[40] Three studies evaluated caregivers of patients with diabetes only on the parameter of QoL and social functioning.^[6-8] The only study evaluating mental health among caregivers of patients with diabetes reported the prevalence of 14% using Beck depression inventory.^[9] It was shown that caregivers of patients with type 2 diabetes mellitus were depressed, but not anxious, and the QOL of caregivers was not impaired statistically except for the social function.^[9]

Caregivers involved in the care of individuals with chronic conditions tend to feel tired, isolated, and overwhelmed. Furthermore, some family caregivers who are employed report missing work, and even quitting or retiring early to provide care.^[41] Thus, chronic illness affects not only the lives of those suffering from the disease, but also those of family members who care for them. Existing studies document how caring for chronically ill family members or significant others at home influences multiple aspects of caregivers' lives.^[40]

The importance of family stress theory in studying normative family transitions and adaptation to major life changes and illness is based on the central role that family strengths and capabilities play in understanding and explaining psychological and behavioral outcomes.^[42]

We observed males to be significantly more educated and employed than females in both patient and caregiver groups. While depression or anxiety was not observed to be related to education or employment in patient

group, it was seen that less educated caregivers had more depressive symptoms. Contrary to our study, which found comparable frequency of gender role as caregiver, in most studies the majority of caregivers have been reported to be a woman.^[7,9,43,44] Female caregivers, a daughter or spouse, generally have lower QoL and anxiety scores, but higher depression scores.^[45]

Other studies in diabetes caregivers report that being employed or having a higher education is associated with better QOL quoting that working outside home may have a protective effect on the caregivers.^[7,9,40]

We observed that the caregivers had comparable depressive as well as anxiety symptoms among the genders. Anafroglu *et al.*^[9] also reported no significant difference among the genders for presence of any depressive or anxiety disorder.^[9] This may be delineating that the role of males and females in society as caregiver is equally shared and that gender dominance, generally observed in Indian society, does not seem to govern the fact that psychological problems could be higher in any one of them.

We observed that the patients had significantly more anxiety than caregivers but the rate of depression was similar. This warrants a cautious approach while dealing with patients and their caregivers as the co-morbid depression and anxiety might get ignored, owing to the usual notion of lower rates among them.

Limitations and future directions

There is limited literature that has explored the depressive and anxiety levels among care giver of individuals with diabetes from the country. The current study has certain limitations. First, we did not assess the effect of diabetes complications on the patient's or caregivers' psychological state. Second, the present study was performed cross-sectionally in a relatively small group from a single center. Therefore, our findings may not represent those of the broader population. It would be interesting and insightful to prospectively follow up a larger cohort of patient-caregiver dyads in order to explore the association of various illness related factors and long-term outcome.

CONCLUSION

Diabetes mellitus affected the psychological health of not only the patients, but as well as the family caregivers and patients with type 2 diabetes tended to be more anxious than the caregivers. Furthermore, it was seen that women with diabetes had higher rates of depression than their male counterparts. Among caregivers, psychological health was comparable among both genders.

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