PSYCHOLOGICAL IMPACTS AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS: A CROSS SECTIONAL STUDY

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ABSTRACT

BACKGROUND

People with diabetes experience higher rates of psychological disorders like depression, anxiety, eating disorders, phobias, adjustment disorders, substance use, psychotic and bipolar disorders and sexual dysfunction. The most common diagnoses among them being depression and anxiety. The aim of the study is to compare the level of anxiety and depression among diabetic and non-diabetic healthy population and to assess the level of distress and functional level in terms of self-care among the diabetic population.

MATERIALS AND METHODS

A semi-structured pretested questionnaire was used to assess the socio-demographic profile, Morisky Medication Adherence Questionnaire to assess the level of treatment adherence of the diabetic population, Hospital Anxiety and Depression Scale (HADS) for comparing the level of anxiety and depression between the diabetic and normal subjects and the Diabetes Distress Scale (DDS) and the Diabetic Self-Care Activities questionnaire (SDSCA-Summary of Diabetes Self-Care Activities) to assess the level of distress and functional level in terms of Self-Care among the diabetic population were used respectively.

RESULTS

The diabetic population had increased levels of depression than anxiety, which was found to be statistically significant. Based on the Diabetes Distress Scale, most of them had emotional distress of clinical attention and emotional distress. Based on the Summary of Diabetes Self-Care Activities Scale, most of the diabetics did not opt for a strict diet or exercise plan, blood sugar testing or foot care.

KEYWORDS

Psychological Problems, Type 2 Diabetes Anxiety and Depression Scale.

INTRODUCTION

Quality of life is diversely compromised in diabetes mellitus as in other chronic diseases and has an important impact on patient's daily life. Living with diabetes provides a daily challenge, as its management requires frequent and continuous effort from the person living with the condition. The co-morbidities associated with type 2 diabetes mellitus are categorized into the following groups: (1) cardiovascular; (2) hypertension; (3) locomotors morbidity; (4) psychosocial problems (Depression, anxiety, bereavement); (5) eye diseases (Cataract, retinopathy); (6) cancer; and (7) pulmonary morbidity (Asthma, COPD).[1] The persons with Diabetes Mellitus must incorporate lifestyle changes in careful dietary planning, eventual use of medication and

regular blood glucose monitoring which are usually difficult for most of the patients and impose a psychological burden on them.[2]

Diabetes mellitus places serious constraints on patient's activities and it also permanently changes a patient's life causing a number of psychological, emotional, social and psychosexual problems and conflicts affecting their quality of life.[3] Psychological stress factors in turn play an active role in both the aetiology and the metabolic control of diabetes mellitus.[4] The economic and social costs of diabetes are enormous by both means, i.e. through loss of productivity and health care services.

People with diabetes experience disproportionately high rates of psychological disorders like depression, anxiety, eating disorders, phobias, adjustment disorders, substance use, psychotic and bipolar disorders and sexual dysfunction. The most common diagnoses among them being depression and anxiety.[5] The DAWN (Diabetes Attitudes, Wishes and Needs) study results showed that as many as 41% of the Type 2 Diabetes Mellitus patients had poor psychological well-being.[6] Review of literature revealed that when compared to the general population psychiatric disorders, depression and anxiety in particular are more frequent in diabetic patients.[7,8] Hence, this study was taken up to know the psychological

status of Type 2 diabetic patients with that of normal individuals among patients attending a Tertiary Care Medical College Hospital in Tamilnadu.

MATERIALS AND METHODS
Study Site
This cross sectional observational study was carried out in the Department of Psychiatry along with the Department of Medicine of a Tertiary Care Medical College Hospital located in a rural area of Trichy District, Tamil Nadu, India between the months of June and July 2014.

Sample Collection
Subjects were taken up for this study by convenience sampling method.

Inclusion Criteria
The subjects who were included in this study were fifty type 2 Diabetes Mellitus patients free from any overt complications who attended the Diabetic review OPD and fifty normal subjects. Both male and female subjects aged between 25 and 65 years were included in this study.

Exclusion Criteria
People aged more than 65 years, those with severe medical illness, those who did not give the consent, those diagnosed to have psychiatric illnesses before diagnosed to have diabetes mellitus and those who use other psychoactive substance in a dependent manner were excluded from the study.

Institutional Ethics Committee Clearance
The study was approved by Institutional Ethics Committee and informed consent was obtained from each individual.

Method of Study
A semi-structured pretested questionnaire was used to assess the socio-demographic profile. The level of treatment adherence of the subjects with diabetic medication was assessed by Morisky Medication Adherence Questionnaire.[9] which consists of 8 items. The Hospital Anxiety and Depression Scale (HADS).[10] comprising of 14 items was used for comparing the level of anxiety and depression between the diabetic and normal subjects. The level of distress of the subjects with diabetes was assessed by the Diabetes Distress Scale (DDS).[11] which covers 17 potential problem areas. The Diabetic Self-Care Activities questionnaire (SDSCA-Summary of Diabetes Self Care Activities).[12] was used to assess functional level in terms of diet, exercise, blood sugar testing and foot care.

The instruments used to find out the difference between type 2 diabetics and normal subjects were all scalable measurements. The descriptive data of the socio-demographic data obtained was presented as mean±standard deviation with the ranges given within brackets and the descriptive data for that of the HADS, DDS and SDSCA scales are presented as the number and percentage of subjects who reported to have such complaints when interviewed with the respective scales. Pearson Chi-Square test, Unpaired t test and Mann-Whitney test were employed to find out any significance in the anxiety and depression levels between the two groups considering the normal subjects as control group and the diabetics as experimental group. Observations of

normal subjects and diabetics are combined, grouped and then ranked for analysis. The data were analysed by computing the data in the SPSS version 21 software.

RESULTS
In this study group, 50 diabetics (25 males and 25 females) and 50 normal subjects (25 males and 25 females) were included. The socio-demographic profile of the study group is incorporated in Table 1.

Sl. No.	Socio-Demographic Data	Non-Diabetic	Diabetic
1	**Age**		
	Mean Age	44.12	53.98
	Standard Deviation	±14.346	±8.392
	Minimum Age	25	31
	Maximum Age	65	65
2	**Gender**		
	Female	25	25
	Male	25	25
3	**Marital Status**		
	Single	28%	10%
	Married	66%	90%
	Separated	0%	0%
	Divorced	0%	0%
	Widowed	6%	0%
4	**Geographical Status**		
	Urban	4%	4%
	Semi urban	12%	8%
	Rural	84%	88%
5	**Educational Status**		
	Professional course	14%	0%
	Post Graduates and Graduates	16%	2%
	Intermediate and Post High School Diploma	8%	8%
	High School	4%	18%
	Middle School	24%	40%
	Primary School	8%	8%
	Illiterate	26%	24%
6	**Occupation**		
	Professionals	26%	0%
	Semi Professionals	0%	2%
	Clerical, Shopkeeper, Farmers	0%	18%
	Skilled	16%	6%
	Semi-Skilled	44%	26%
	Unskilled	8%	6%
	Unemployed	6%	42%
7	**Income Status [Monthly]**		
	Rs 1000-5000	10%	34%
	Rs 5001-10000	48%	58%
	Rs 10001-15000	42%	8%
	Monthly mean Income	Rs-8000	Rs-6880
	Standard Deviation	±3094.696	±14057.201
	Table 1: Socio-Demographic Data		

The duration of diabetes in the diabetic subjects ranged from 1 to 780 weeks with a mean of 227.26. All the diabetic subjects were on anti-diabetic measures and about 62% and 54% of the diabetic subjects followed diabetic diet and regular aerobic exercises respectively.

Based on the Morisky Medication Adherence Questionnaire, we identified that 40% of the diabetic subjects sometimes forget to take the medicine. Among them 68% had

missed taking the medicine over the past 2 weeks, 8% of them had cut back the medicine without telling the doctor as they felt worse when they took it, 16% of them forgot to take along with them the medicine while travelling and 10% of them did not take all the medicine the previous day. About 24% of the diabetics had stopped taking the medicine as they felt that their symptoms were under control, 48% of them felt that taking medicine every day is inconvenient to them and also felt hassled about sticking to the treatment plan; 32% of the diabetics never or rarely felt any difficulty in remembering to take all the medicine and the rest found it difficult once in a while sometimes, usually or all the time;

60% and 40% of the diabetics belonged to the low and moderate category of treatment adherence respectively based on the Morisky Medication Adherence Questionnaire.

Descriptive statistics for the variables of the Hospital Anxiety and Depression Scale (HADS) are presented in Table 2. Based on the HADS Scale to assess the level for anxiety and depression between the diabetic and the normal subjects, the prevalence of depression was found to be higher in the diabetic subjects (82%) when compared with the normal subjects (34%) and this difference was found to be statistically significant using the unpaired t test, Pearson Chi-Square test and the Mann-Whitney test ($p < 0.05$).

Sl. No.	Question of HADS	Response	Diabetics n=50	Normal Subjects n=50
1.	I feel tense or wound up	Most of the time	4 (8)	5 (10)
		A lot of the time	7 (14)	5 (10)
		Time to time, occasionally	29 (58)	30 (60)
		Not at all	10 (20)	10 (20)
2.	I feel as if I am slowed down	Nearly all the time	4 (8)	1 (2)
		Very often	16 (32)	14 (28)
		Sometimes	30 (60)	26 (52)
		Not at all	0 (0)	9 (18)
3.	I still enjoy the things I used to enjoy	Definitely as much	4 (8)	18 (36)
		Not quite so much	13 (26)	16 (32)
		Only a little	12 (24)	13 (26)
		Hardly at all	21 (42)	3 (6)
4.	I get a sort of feeling like 'butterflies' in the stomach	Not at all	36 (72)	44 (88)
		Occasionally	10 (20)	6 (12)
		Quite often	4 (8)	0 (0)
		Very often	0 (0)	0 (0)
5.	I get a sort of frightened feeling as if something awful is about to happen	Very definitely & quite badly	3 (6)	5 (10)
		Yes, but not too badly	20 (40)	14 (28)
		A little, but doesn't worry me	20 (40)	20 (40)
		Not at all	7 (14)	11 (22)
6.	I have lost interest in my appearance	Definitely	17 (34)	13 (26)
		I don't take so much care as I should	20 (40)	9 (18)
		I may not take quite as much care	11 (22)	11 (22)
		I take just as much care as ever	2 (4)	17 (34)
7.	I can laugh and see the funny side of things	As much as I always could	5 (10)	14 (28)
		Not quite so much now	11 (22)	16 (32)
		Definitely not so much now	16 (32)	13 (26)
		Not at all	18 (36)	7 (14)
8.	I feel restless as if I have to be on the move	Very much indeed	0 (0)	0 (0)
		Quite a lot	5 (10)	13 (26)
		Not very much	33 (66)	20 (40)
		Not at all	12 (24)	17 (34)
9.	Worrying thoughts go through my mind	A great deal of the time	6 (12)	1 (2)
		A lot of the time	8 (16)	9 (18)
		From time to time, but not too often	11 (22)	13 (26)
		Only occasionally	25 (50)	27 (54)
10.	I look forward with enjoyment to things	As much as I ever did	2 (4)	15 (30)
		Rather less than I used to	3 (6)	10 (20)
		Definitely less than I used to	22 (44)	17 (34)
		Hardly at all	23 (46)	8 (16)
11.	I feel cheerful	Not at all	14 (28)	9 (18)
		Not often	26 (52)	10 (20)
		Sometimes	8 (16)	16 (32)

Sl. No.			2 (4)	15 (30)
12.	I get sudden feelings of panic	Most of the time	2 (4)	15 (30)
		Very often indeed	0 (0)	1 (2)
		Quite often	1 (2)	16 (32)
		Not very often	12 (24)	13 (26)
		Not at all	37 (74)	20 (40)
13.	I can sit at ease and feel relaxed	Definitely	1 (2)	8 (16)
		Usually	16 (32)	17 (34)
		Not often	29 (58)	18 (36)
		Not at all	4 (8)	7 (14)
14.	I can enjoy a good book or radio or TV programme	Often	3 (6)	18 (36)
		Sometimes	13 (26)	17 (34)
		Not often	18 (36)	5 (10)
		Very seldom	16 (32)	10 (20)
15.	HADS Score- Anxiety	0-7 (Non case)	34 (68)	32 (64)
		8-10 (Borderline)	9 (18)	9 (18)
		≥11 (Case)	7 (14)	9 (18)
16.	HADS Score- Depression	0-7 (Non case)	4 (8)	22 (44)
		8-10 (Borderline)	5 (10)	11 (22)
		≥11 (Case)	41 (82)	17 (34)
Table 2: Hospital Anxiety and Depression Scale (HADS)				

Figures in the Parenthesis denotes percentage

Descriptive statistics for the variables of the Diabetes Distress Scale (DDS) are presented in Table 3. Based on the DDS scale to assess the level of distress among the diabetic subjects, 2% of them had distress of clinical attention, 32% had emotional distress, 8% of them had physician related distress, 10% with regimen related distress and about 4% of them had interpersonal distress.

Sl. No.	Problem Areas	Degree of Distress in Diabetics n (%)					
		Not a Problem	Slight Problem	Moderate Problem	Somewhat Serious Problem	Serious Problem	Very Serious Problem
1.	Feeling that diabetes is taking up too much of my mental and physical energy everyday	5 (10)	19 (38)	18 (36)	6 (12)	1 (2)	1 (2)
2.	Feeling that my doctor doesn't know enough about diabetes and diabetes care	45 (90)	3 (6)	1 (2)	0 (0)	0 (0)	1 (2)
3.	Feeling angry, scared and/or depressed when I think about living with diabetes	5 (10)	25 (50)	14 (28)	5 (10)	1 (2)	0 (0)
4.	Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes	43 (86)	2 (4)	0 (0)	0 (0)	2 (4)	3 (6)
5.	Feeling that I am not testing my blood sugars frequently enough	36 (72)	10 (20)	1 (2)	1 (2)	1 (2)	1 (2)
6.	Feeling that I am often failing with my diabetes routine	13 (26)	23 (46)	5 (10)	6 (12)	3 (6)	0 (0)
7.	Feeling that friends or family are not supportive enough of self-care efforts	44 (88)	5 (10)	1 (2)	0 (0)	0 (0)	0 (0)
8.	Feeling that diabetes controls my life	4 (8)	11 (22)	16 (32)	11 (22)	5 (10)	3 (6)
9.	Feeling that my doctor doesn't take my concerns seriously enough	43 (86)	2 (4)	1 (2)	1 (2)	2 (4)	1 (2)
10.	Not feeling confident in my day-to-day ability to manage diabetes	10 (20)	26 (32)	11 (22)	1 (2)	2 (4)	0 (0)
11.	Feeling that I will end up with serious long-term complications, no matter what I do	4 (8)	35 (70)	11 (22)	0 (0)	0 (0)	0 (0)
12.	Feeling that I am not sticking closely enough to a good meal plan	18 (36)	15 (30)	6 (12)	7 (14)	3 (6)	1 (2)
13.	Feeling that friends or family don't appreciate how difficult living with diabetes can be	44 (88)	4 (8)	2 (4)	0 (0)	0 (0)	0 (0)
14.	Feeling overwhelmed by the	11 (22)	11 (22)	14 (28)	9 (18)	4 (8)	1 (2)

	demands of living with diabetes						
15.	Feeling that I don't have a doctor who I can see regularly enough about diabetes	34 (68)	8 (16)	4 (8)	2 (4)	1 (2)	1 (2)
16.	Not feeling motivated to keep up my diabetes self-management	6 (12)	32 (64)	7 (14)	3 (6)	2 (4)	0 (0)
17.	Feeling that friends or family don't give me the emotional support that I would like	45 (90)	3 (6)	1 (2)	1 (2)	0 (0)	0 (0)
	Table 3: The Diabetes Distress Scale [DDS]						

DDS mean item score (≥3)

	Total score	1 (2)
	Emotional burden	16 (32)
DDS mean item score (≥3)	Physician-related distress	4 (8)
	Regimen-related distress	5 (10)
	Interpersonal distress	2 (4)

Figures in the Parenthesis denotes percentage.

Descriptive statistics for the variables of the Summary of Diabetes Self Care Activities Scale (SDSCA Scale) are presented in Table 4.

Sl. No.	Self-Care Activities	No of Days/Week the Activity followed by Diabetics-n (%)							
		0	1	2	3	4	5	6	7
Diet:									
1.	On average, over the past month, how many days per week have you followed your eating plan?	3 (6)	2 (4)	8 (16)	10 (20)	5 (10)	8 (16)	6 (12)	8 (16)
2.	On how many of the last seven days did you eat five or more servings of fruits and vegetables?	2 (4)	10 (20)	12 (24)	15 (30)	6 (12)	3 (6)	2 (4)	0 (0)
3.	On how many of the last seven days did you eat high fat foods such as red meat or full-fat dairy products?	9 (18)	27 (54)	7 (14)	1 (2)	4 (8)	2 (4)	0 (0)	0 (0)
4.	On how many of the last seven days did you space carbohydrates evenly through the day?	1 (2)	5 (10)	4 (8)	7 (14)	7 (14)	15 (30)	7 (14)	4 (8)
5.	On how many of the last seven days have you followed a healthful eating plan?	3 (6)	4 (8)	7 (14)	17 (34)	8 (16)	7 (14)	4 (8)	0 (0)
Exercise:									
1.	On how many of the last seven days did you participate in at least 30 minutes of physical activity	13 (26)	4 (8)	2 (4)	5 (10)	4 (8)	5 (10)	7 (14)	10 (20)
2.	On how many of the last seven days did you participate in a specific exercise session other than what you do around the house or as part of your work	22 (44)	2 (4)	2 (4)	3 (6)	5 (10)	3 (6)	5 (10)	8 (16)
Blood Sugar Testing:									
1.	On how many of the last seven days did you test your blood sugar?	20 (40)	9 (18)	8 (16)	11 (22)	1 (2)	0 (0)	1 (2)	0 (0)
2.	On how many of the last seven days did you test your blood sugar the number of times recommended by your healthcare provider?	23 (46)	6 (12)	5 (10)	11 (22)	5 (10)	0 (0)	0 (0)	0 (0)
Foot Care:									
1.	On how many of the last seven days did you check your feet?	15 (30)	9 (18)	4 (8)	3 (6)	6 (12)	2 (4)	3 (6)	8 (16)
2.	On how many of the last seven days did you inspect the inside of your shoes?	33 (66)	2 (4)	2 (4)	3 (6)	3 (6)	0 (0)	5 (10)	2 (4)
	Table 4: The Summary of Diabetes Self Care Activities Scale (SDSCA)								

Figures in the Parenthesis denotes percentage

The correlation coefficients of anxiety and depression levels between the diabetic and the normal subjects using unpaired t test is given in Table 4. The components of HADS enquiring about the levels of anxiety and depression showed that the diabetic population had an increased prevalence of depression than anxiety (p<0.05). The correlation coefficient for anxiety and depression among the Diabetics and the Non-Diabetics are 0.628 and 0.000 (p<0.05) using the Mann-Whitney test [Table 5].

Variable	Unpaired t Test (P value)
I feel tense or wound up	1.000
I feel as if I am slowed down	0.015
I still enjoy the things I used to enjoy	0.000
I get a sort of feeling like 'butterflies' in the stomach	0.019
I get a sort of frightened feeling as if something awful is about to happen	0.490
I have lost interest in my appearance	0.002
I can laugh and see the funny side of things	0.001
I feel restless as if I have to be on the move	0.661
Worrying thoughts go through my mind	0.257
I look forward with enjoyment to things	0.000
I feel cheerful	0.000
I get sudden feelings of panic	0.000
I can sit at ease and feel relaxed	0.136
I can enjoy a good book or radio or TV programme	0.000
HADS Score- Anxiety	0.601
HADS Score-Depression	0.000

Table 5: Correlation Coefficients of Anxiety and Depression Levels between the Diabetic and the Normal Subjects

DISCUSSION

Factors affecting the quality of life of people with Diabetes Mellitus are varied, one among which is the psychiatric co-morbidities associated with Diabetes Mellitus. In the present study in which the socio-demographic profile of the two groups (Type 2 Diabetes Mellitus and normal subjects) is comparable, the level of depression is higher than that of anxiety in the diabetic population when compared with the normal subjects.

In this study, forty one out of fifty (82%) diabetics were found to have depression based on the HADS scale. Whereas according to a meta-analysis conducted by Anderson RJ et al[13] and DeGroot M et al[14], the prevalence of major depression among adults with diabetes was found to be 11% and clinically relevant depression was 31% respectively.

The relationship between depression and diabetes appears to be bi-directional, i.e. those with diabetes are at increased risk for developing depression; and conversely, those with depression are at increased risk for developing diabetes.[15] A substantial, positive and significant association exists between the incidence of diabetes and untreated depression among adults 55 years of age or older.[16] For the people diagnosed with diabetes, the addition of depression serves to increase symptom burden, diabetes-related complications, unemployment, work-related disability and healthcare costs.[17] Individuals with both diabetes and depression have a 2.3 times greater risk of early mortality than do non-depressed people with diabetes.[18] Co-morbid depression is associated with poorer control of blood glucose levels, increased incidence of diabetes complications and impaired engagement in self-management including ability to take medications as prescribed, follow treatment plans and actively engage in self-care behaviors.[19] A study conducted by Fischer L et al[20] revealed that people with diabetes exhibit relatively high rates of diabetes-specific distress, affective and anxiety disorders. People with diabetes had a 20% higher prevalence of lifetime diagnosis of anxiety than those without diabetes.[21] whereas in this study the prevalence of anxiety among diabetics is found to be about 34% (Seventeen out of fifty patients).

Generalized Anxiety Disorder (GAD) appears to be the most common anxiety disorder in patients with diabetes with reviews suggesting point-prevalence rates between 13 and 14%.[22] This increased prevalence may be related to fears of self-injecting or self-testing. Fear of hypoglycaemia or low blood sugars which is often associated with unpleasant symptoms such as tremors, profuse sweating, cognitive dysfunction and irritability is another common fear in patients taking insulin.[23] Taken together these lead to suboptimal outcomes, increased medical co-morbidity and diabetes-related mortality. Hence, diabetes self-management is crucial to management of the disease and has been shown to mitigate future complications, reduce risk of co-morbidities, and improve the overall health. Emotional well-being and decrease of psychiatric co-morbidities such as depression or anxiety would decrease the patient's distress, strain and would increase one's confidence which would result in better self-care, quality of life and relation of family. Family behaviours such as communication, life styles and dynamic of family interaction could influence the health outcome such as depression, anxiety and perception of quality of life.[24]

In a study conducted at Dhaka by Islam et al have reported that the overall diabetic distress was 48.5%, of which 22.4% were having high distress.[25] In an another study at Malaysia, it was reported that 19.6% had moderate distress.[26] In this study, 32% had emotional distress. A study conducted at Karnataka, India by Rajasekharan et al reported out that self-care practices were found to be unsatisfactory in all aspects except blood sugar monitoring.[27] But this study showed that the participants were very poor in Diabetes Self-Care Activities such as diet, exercise, blood sugar testing and foot care. Since the studied population was limited to single centre, similar studies in multiple centres may be carried out in different geographical and different socioeconomic groups before arriving at valid conclusions.

LIMITATIONS

This study was conducted in a single area and is a single centred study.

CONCLUSION

1. On comparing the diabetics and the normal individuals, the diabetic population had increased levels of depression than anxiety which was found to be statistically significant, the prevalence of depression was found to be higher in the diabetic subjects (82%) when compared with the normal subjects (34%) and this difference was found to be statistically significant using

the unpaired t test, Pearson Chi-Square test and the Mann-Whitney test (p<0.05).

2. Based on the Diabetes Distress Scale, 32% had emotional distress and most of them had an emotional distress rather than the physician related distress, regimen related distress or interpersonal distress.

3. Based on the Summary of Diabetes Self Care Activities Scale, most of the diabetics did not opt for a strict diet or exercise plan, blood sugar testing or foot care and 40% of the diabetic subjects sometimes forget to take medicine.

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