Correlations Between Depression and Anxiety in Patients with Type Ii Diabetic Mellitus – A Descriptive Study

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Abstract

Problem: Mental health and metabolic health play a pivotal role in nurturing one's physical and mental well-being. Depression and anxietyare common among people with diabetes mellitus. The triangular merge of these diseases increases the risk of diabetes complications and reduces the overall quality of life. It further adds stress for diabetes patients due to the never-ending demands of diabetes care, such as eating and maintaining physical health, exercising, monitoring blood glucose, regular follow-up, and management of symptoms, dependence on family members for financial support for medicines and fears about or the reality of complications. As a result, they experience feelings of depression, anxiety, and stress, which affect their health and overall quality of life. This study aimed to find the correlations between depression and anxiety among type 2 diabetes mellitus patients. **Approach:** A descriptive cross sectional study was conducted among patients with type 2 diabetes mellitus who were attending Out Patient Department of Chettinad Hospital and Research Institute, Chengalpattu. A group of 100 participants were selected using a purposive sampling technique. A self-structured demographic profile, Beck Depression Inventory and Beck Anxiety Inventory was used to collect the data. The gathered information was coded and examined. **Findings:** The results showed that 39% of them had mild mood disturbance and 24% had borderline clinical depression and 17% had up & downs are normal and moderate depression, 2% had severe depression and 1% of extreme depression among patients with type II diabetes mellitus. In anxiety, majority 50% had moderate anxiety, 32% had severe anxiety, 16% had mild anxiety and 2% had minimal anxiety level among patients with type II diabetes mellitus. Mean depression score of patients with type II diabetes mellitus was 2.51 and Standard Deviation ±1.087 whereas the Mean anxiety score was 3.12 and Standard Deviation was ±0.742.There was a positive correlation (r = 0.286) of depression and anxiety among patient with type II diabetes mellitus. **Conclusion**. Majority of type II diabetic patients were having moderate level of depression and anxiety. Regular screening services are essential along with diabetes management plan for timely identification and treatment of the vulnerable groups in the healthcare centers.

Keywords;Correlation, Depression, Anxiety, Type II Diabetes mellitus, mental health

Introduction

Diabetes is a metabolic disorder that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood glucose. Hyperglycemia also called raised blood glucose or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels.[1]It is a disease that acquires epidemic form, as its prevalence has five folded during the last fifteen years and constitutes one of the major threats to human health in 21st century.[2]

About 537 million adults (20-79 years) are living with diabetes and it is predicted to rise in number to 643 million by 2030 and 783 million by 2045[3]In India, there are estimated 77 million people above the age of 18 years are suffering from diabetes (type 2) and nearly 25 million are prediabetes (at a higher risk of developing diabetes in the near future). More than 50% of people are unaware of their diabetic status which leads to health complications if not detected and treated early[4]

Indian Council of Medical Research – India Diabetes (ICMR INDIAB) a cross-sectional population-based survey, assessed a representative sample of individuals aged 20 years and older drawn from urban and rural areas of 31 states, union territories, and the National Capital Territory of India. A total of 113 043 individuals (79 506 from rural areas and 33 537 from urban areas) participated in the study between Oct 18, 2008 and Dec 17, 2020. The overall weighted prevalence of diabetes was 11·4%[5]

Need for the study

Patients with type II diabetes frequently experience anxiety and depression, and several research studies have highlighted the same. Compared to the general population, diabetes patients experienced far higher levels of anxiety and depression. The co-occurrence of depression with diabetes lowers life expectancy and overall quality of life increases the risk of diabetic complications, and leads to poor glycemic control and self-management. Therefore, in order to achieve the best possible outcomes for management and the general quality of life of patients, prevention, early detection, and treatment of these disorders are crucial. [6]

The incidence of diabetes mellitus is on the upswing due to swift cultural and social transformations, including an aging population, heightened work-related stress, escalating urbanization, dietary shifts, and inadequate attitudes and behaviors towards diabetes mellitus. These factors contribute to the emergence of psychiatric disorders such as depression and anxiety.

Sharma K.et.al(2019) conducted a descriptive survey among 296 purposively selected clinically diagnosed type 2 diabetes patients admitted in the Chitwan Medical College Teaching Hospital. Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorders-7 (GAD-7) were used to interview the patients. The results highlighted that depression and anxiety were observed among 57.8% and 49.7% of diabetes patients, respectively. While observing the severity, 27.4%, 19.6%, 8.4%, and 2.4% of patients had mild, moderate, moderately severe, and severe depression, respectively. Likewise, 24.7%, 20.3%, and 4.7% of patients had mild, moderate, and severe anxiety respectively.[7]

Anxiety disorders are prevalent, ranking highest among all psychiatric conditions, and they carry a significant burden, akin to what is seen in chronic diseases like diabetes mellitus. Research indicates that the connection between depression, anxiety disorders, and diabetes is linked to elevated blood sugar levels, diabetes-related complications, and the limitations posed by the disease. The presence of depression in individuals with diabetes appears to be associated with factors such as socio-economic status, family situation, obesity, smoking, physical activity, and a sedentary lifestyle. Surveys and meta-analyses on diabetes and depression have revealed that having diabetes doubles the likelihood of experiencing depression, with a higher prevalence of depressive symptoms in women compared to men. This gender predisposition for anxiety and depressive disorders is also observed in the general population.

In 18% of adults with diabetes, there is a documented need for psychiatric support. Nevertheless, it is worth noting that 10% of these psychological conditions go unnoticed. Hence, it is crucial to consider not only the physical symptoms but also the mental, emotional, and behavioral well-being of the patient. Mental symptoms, particularly those related to depression and anxiety, can arise in response to diabetes, its complications, and the various diagnostic and treatment procedures. Among the psychiatric conditions associated with diabetes mellitus, anxiety and depression are the most prevalent. Depression is more commonly observed in individuals with diabetes compared to the general population.[8]

Depression and anxiety disorders are frequently observed in individuals with diabetes mellitus. The concurrent presence of diabetes and depression/anxiety elevates the likelihood of diabetes complications and diminishes overall quality of life. Therefore, the objective of this study was to investigate the relationship between depression and anxiety in patients with type II diabetes.

Objectives of the study

The research study objective was to assess the level of depression and level of anxiety among patients with type II diabetes mellitus, to find the correlation between depression and anxiety, and to find the association between the levels of depression and levels of anxiety with selected demographic variables of patients type II diabetes mellitus.

Methods and Materials

A quantitative descriptivecross-sectional survey research design was adopted and the study was conducted in Out Patient Department (OPD), Chettinad Hospital and Research Institute (CHRI),Kelambakkam, Chengalpattu District, Tami NaduThe ethical clearance was obtained from the Institutional Human Ethics Committee of Chettinad Academy of Research and Education (CARE) (IHEC-I/1688/23).Theparticipants were enrolled after obtaining written informed consent. A purposive sampling technique was used to recruit the 100 participants attending the OPD who were clinically diagnosed with type II diabetes mellitus, on treatment for a period of at least one year irrespective of their sex, who can understand Tamil and English, and who were present during the time of data collection. Gestational Diabetes, Severe and acute diabetic complications and severe chronic diseases and who were had known mental illness and under treatment were excluded from the study. The purpose of the study was explained to the participants before data collection. Socio-demographic variable sheet, Beck's Depression Inventory and Beck Anxiety Inventory in the form of rating scale was used to collect the personal information, to assess the level of depression, to assess the level of anxiety of the type II diabetes mellitus clients respectively. All the study participants were interviewed personally by the investigator for 20 – 30 minutes. Data collection completed in the month of March 2023.

Description of Tool

General Questionnaire:

Semi structured Questionnaire consists of demographic variables such as age, gender, marital status, educational status, occupational status, family monthly income, impact of illness to quit the job and Disease related variables like presence and number of comorbidities, Duration of years as a known case of diabetes, medicine adherence, H/o of diabetes and H/o mental illness in the family.

Beck Depression Inventory (BDI)

This inventory is frequently used in patients with chronic diseases such as diabetes (Lustman & Clouse, 2005; Steed, Cooke, & Newman, 2003).The BDI consists of 21-item self-report inventory designed to assess the presence and severity in depressive symptoms and suitable for all patients. Each items are rated on a 4-point likert-type scale ranging from 0 to 3 based on the severity in the last two weeks.Subjects will rate their level of depression between 0 and 3. ''0'' indicates no

depression at all, whereas ‘‘3’’ indicates very depressed. The final score ranges between 0 and 63, where a higher score suggests a higher level of depression. Specifically, a BDI score of 0-13 points indicates ‘‘normal’ (i.e., no depression), 11-16 points indicates mild mood disturbance, 17-20 points indicates Borderline clinical depression, 21-30 points indicates moderate depression, 31- 40 points indicates severe depression and above 40 points indicates severe depression. The internal consistence reliability was0.91 for people with diabetes and reliability (Cronbach’s alpha value) was .92 (Wu SF.et.al. (2013).

Beck Anxiety inventory (BAI)

It is a 21-items self-reporting questionnaire for evaluating the severity of anxiety in normal and psychiatric populations developed by Dr. Aaron T. Beck and Dr. Steer in 1997.Each items are rated on a 4-point Likert-type ranging from 0 to 3 based on the severity in the last two weeks. Subjects will rate their level of anxiety between 0 and 3. ‘‘0’’ indicates not at all, “1” Mildly indicates but it didn’t bother me much, “2” Moderately -it wasn’t pleasant at times, “3” Severely indicates it bothered me a lot to all questions.The total score ranges from 0-63. The final score ranges between 0 and 63, where a higher score suggests a higher level of anxiety. Specifically, a BAI score of 0-7 points indicates minimal anxiety level, 8-15 points indicates mild anxiety level, 16-25 points indicates moderate anxiety,26-63 points indicates severe anxiety. The internal consistence reliability was 0.94for people with diabetes and reliability (Cronbach’s alpha value) was .93 (Wu SF.et.al. (2011)&(Beck, Steer, & Garbin, 1988).

Statistical methods

Data were entered into Microsoft Excel and the SPSS software package version 21.0 was used to conduct statistical analysis. The categorical data was expressed as percentage, whereas the continuous data were expressed as mean ± standard deviation. Chi-square test was used to test the association of different variables with socio demographic data of the participants. Karl Pearson’s Correlation coefficient was calculated to find the correlation among depression and anxiety. A probability value of <0.05 was considered as statistically significant.

Results

Table:1

Frequency and percentage(%)distribution of type II diabetes mellitus according to their demographic variable

S.NO	DEMOGRAPHIC VARIABLES	CATEGORIES	N =100	
			FREQUENCY F	PERCENTAGE %
1.	Age in years	<40	35	35
		40-60	47	47
		>60	18	18
2.	Gender	Male	41	41
		Female	59	59
		Transgender	0	0
3.	Marital status	Unmarried	18	18
		Married	70	70

		Widow/Widower	12	12
4.	Educational status	No formal education	25	25
		Primary education	36	36
		High school education	18	18
		Higher Secondary Education	10	10
		Graduation and above	11	11
5.	Occupational status	Employment full time	28	28
		Employment part-time	33	33
		Unemployed	32	32
		Unable to work due to health problem	3	3
		Retired	4	4
6	Family Monthly income	Insufficient	42	42
		Just sufficient	54	54
		Surplus	4	4
7.	Impact of illness to quit the job	Yes	48	48
		No	52	52
8.	Presence of comorbidity	Yes	48	48
		No	52	52
9.	Number of comorbidities	None	47	47
		One	41	41
		Two and more	12	12
10.	Duration of years as a known case of diabetes.	Less than 3 years	41	41
		More than or equal to 3 years	59	59
11.	Medicine adherence	Yes	77	77
		No	23	23
12.	H/O Diabetes in family	Yes	55	55
		No	45	45
13.	H/O Mental illness in family	Yes	4	4
		No	96	96

Table -1:The study encompassed demographic attributes of Type II Diabetes mellitus patients at Chettinad Hospital and Research Institute's Out Patient Department. Out of the 100 participants, nearly half of them 47 (47%) were in the age group of 40-60 years and 18 (18%) were above 60

years. Among the patients, 59 (59%) were females and 41 (41%)were males. A majority of patients 70 (70%)were married, 18(18%) unmarried, and 12(12%) widowed. In terms of education, 36 (36%) had primary education, 25(25%) had no formal education, 18(18%) had high school education, 11(11%) had higher secondary education, and 10(10%) had graduated or higher. Employment-wise, 33(33%) worked part-time, 4(4%) were retired, and regarding income, 54 (54%) had just sufficient family income, and 4(4%) had a surplus income. While 48(48%) considered their illness impactful for quitting jobs, 52(52%) felt no impact. More than half of them 59(59%) were known cases of diabetes for more than and equal to 3 years and 41(41%) of them for less than 3 years, Family history revealed 55(55%) had a history of diabetes, 45% did not, while 4(4%) had a mental illness history in their family, and 96(96%) did not.

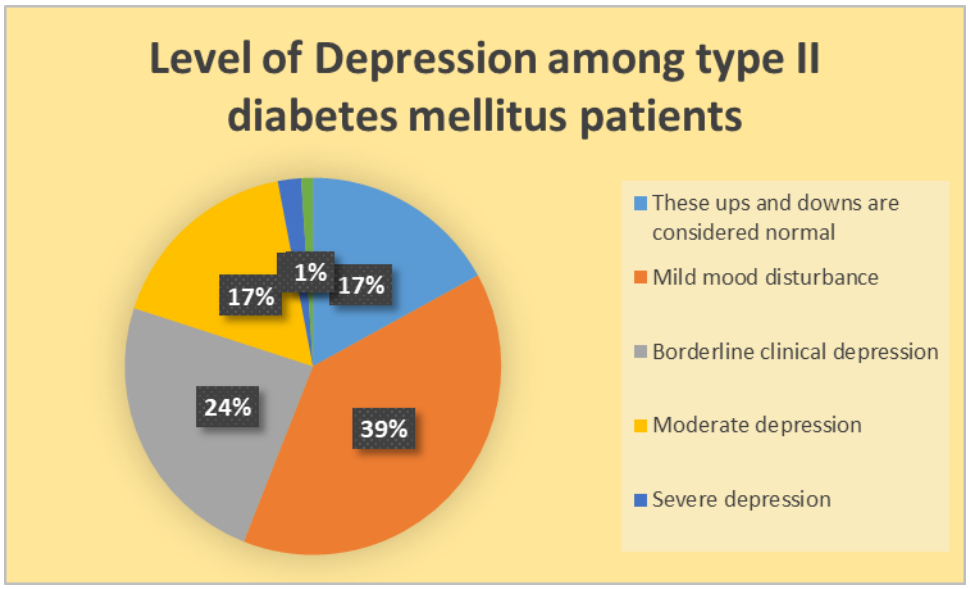

Fig:1 Percentage distribution of Type II diabetic patients based on level of depression

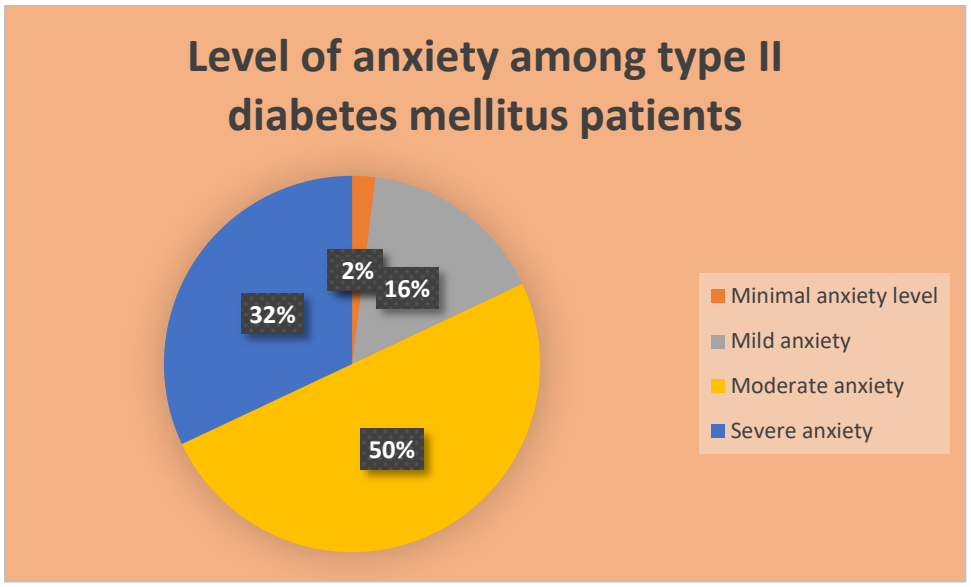

Fig:2 Percentage distribution of Type II diabetic patients based on level of anxiety

The study result reveals that the mean depression score of patients with type II diabetes mellitus was 2.51 and Standard Deviation was ±1.087 whereas the mean anxietyscore was 3.12 and Standard Deviation was ±0.742. There is a positive correlation (r = 0.286) of depression and Anxiety among patients with type II diabetes mellitus.

Table-2.1: Association between the levels of depression and demographic variables of type II diabeticmellitus patients

S. No	Demographic Variables	No ofSample	Levelofdepression						Pvalue
			Ups and downs are normal	Mild	Border line	Moderate	Severe	Extreme	
1	Ageinyears a. a.>40 b. b.40-60 c. c.>60	 35 47 18	 6 9 2	 15 19 5	 7 12 5	 7 5 5	 0 1 1	 0 1 0	0.714
2	Gender a. Male b. Female	 41 59	 11 6	 15 24	 12 12	 5 12	 0 2	 0 1	0.410
3	Maritalstatus a. Unmarried b. Married c. Widow/Widower	 18 70 12	 7 10 0	 3 30 6	 6 16 2	 2 12 3	 0 1 1	 0 1 0	0.117
4	Educationalqualification a. Noformaleducation b.Primaryeducation c.Highschooleducation d.Highersecondaryeducation e.Graduation andabove	 25 26 18 10 11	 2 9 2 3 1	 8 11 10 6 4	 8 9 2 0 5	 5 6 4 1 1	 1 1 0 0 0	 1 0 0 0 0	0.480
5	Occupational status a. Employment full b. Employment part c. Unemployment d. Unable to work due to health problem e. Retired	 28 33 32 3 4	 4 9 3 1 0	 12 11 12 2 2	 8 7 8 0 1	 3 5 8 0 1	 1 1 0 0 0	 0 0 1 0 0	0.893

6	Family monthly income a. Insufficient b. Just sufficient c. Surplus	42 54 4	8 9 0	13 24 2	13 11 0	6 9 2	1 1 0	1 0 0	0.593
7	Impact of illness to quit the job a. Yes b. No	42 52	11 6	20 19	9 15	7 10	0 2	1 0	0.271
8	Presence of comorbidity a.Yes b.No	48 52	7 10	24 15	10 14	5 12	1 1	1 0	0.220
9	Number of comorbidities a.None b.One c.Two and more	47 41 12	9 5 3	16 20 3	13 8 3	9 8 0	0 0 2	0 0 1	0.002*
10	Duration of years as a known case of diabetes. a.Less than 3 years b.More than equal to 3 years	41 59	5 12	17 22	9 15	9 8	1 1	0 1	0.710
11	Medicine adherence a.Yes b.No	77 23	12 5	28 11	22 2	12 5	2 0	1 0	0.392
12	H/O Diabetes in family a.Yes b.No	55 45	10 7	22 17	15 9	8 9	0 2	0 1	0.444
13	H/O Mental illness in family a.Yes b.No	4 96	1 16	0 39	1 23	1 16	1 1	0 1	0.023*

p value statistically significant at less than 0.01 level is Significance

Association between the level of depression with the selected variables of patients with type II diabetes mellitus among 100 respondents shows chi square value of: age (p=0.714), gender (p=0.410), marital status(p=0.117), educational status (p=0.480), occupational status (p=0.893), family monthly income (p=0.593), impact of illness (p=0.271), presence of comorbidity(p=0.220), number of comorbidities (p=*<0.002), duration of years as a known case of diabetes (p=0.710), medicine adherence(p=0.392),history of diabetes in family(p=0.444),history of mental illness in family(p=*<0.023). Number of comorbidities and history of mental illness in family were significantly associated with a chi-square value of <0.002,<0.023 respectively.

Table-2.2: Association between levels of anxiety and selected demographic variables of patients with type II diabetes mellitus.

S. No	Demographic variables	No of Samples	Level of Anxiety				P value
			Minimal anxiety level	Mild anxiety	Moderate anxiety	Severeanxiety	
1	Age in years						0.053*
	a. <40	35	1	5	14	15	
	b. 40-60	47	1	4	28	14	
	c. >60	18	0	7	8	3	
2	Gender						0.890
	a. Male	41	1	7	18	15	
	b. Female	59	1	9	32	18	
	c. Transgender	0	0	0	0	0	
3	Marital status						0.448
	a. Unmarried	18	0	5	9	4	
	b. Married	70	2	11	33	24	
	c. Widow/Widower	12	0	0	8	4	
	d. Divorcee or others	0	0	0	0	0	
4	Educational status						0.421
	a.No formal education	25	1	6	9	9	
	b.Primary education	36	0	3	23	10	
	c.High school education	18	1	1	9	7	
	d.Higher secondary education	10	0	3	5	2	
	e.Graduation and above	11	0	3	4	4	
5	Occupational status						0.398
	a. Employment full time	28	0	5	11	12	
	b. Employment part time	33	1	8	19	5 11 1	
	c. Unemployment	32	1	3	17	3	
	d. Unable to work due to health problem	3	0	0	2		
	e. Retired	4	0	0	1		

6	Family monthly income a. Insufficient b. Just sufficient c. Surplus	 42 44 4	 1 0 1	 6 10 0	 20 28 2	 15 16 1	0.042*
7	Impact of illness to quit the job a.Yes b.No	 48 52	 0 2	 9 7	 22 28	 17 15	0.401
8	Presence of comorbidity a. Yes b.No	 48 52	 2 0	 13 3	 19 31	 14 18	0.009*
9	Number of comorbidities a. None b. One c. Two and more	 47 41 12	 1 1 0	 2 10 4	 28 19 3	 16 11 5	0.017*
10	Duration of years as a known case of diabetes. a. Less than 3 years b. More than equal to 3 years	 41 59	 1 1	 5 11	 20 30	 15 17	0.759
11	Medicine adherence a. Yes b. No	 27 23	 2 0	 12 4	 42 8	 21 11	0.226
12	H/O Diabetes in family a. Yes b. No	 55 45	 1 1	 8 8	 34 16	 12 20	0.056*
13	H/O Mental illness in family a. Yes b. No	 4 96	 0 2	 0 16	 2 48	 2 30	0.760

p value statistically significant at less than 0.01 level is Significance

Association between the level of anxiety with the selected variables of patients with type II diabetes mellitus among 100 respondents shows chi square value of: age (p=0.53), gender (p=0.890), marital status(p=0.448), educational status (p=0.421), occupational status (p=0.398), family monthly income(p=*<0.042),impact of illness (p=0.401), presence of comorbidity(p=0.220),number of comorbidities (p=*<0.017), duration of years as a known case of diabetes (p=0.759),medicine adherence(p=0.226),history of diabetes in family(p=*<0.056),history of mental illness in family(p=0.760)).Age,Family monthly income, presence of comorbidity, number of comorbidities, history of diabetes in family and history of mental illness in family were significantly associated with a chi-square value of <0.053,<0.042,<0.009,<0.017,0.056 respectively.

Discussion

This study assessed the depression and anxiety among patients with type II diabetes mellitus attending Out Patient Department of a tertiary care hospital of Chengalpattu district. Out of100 patients with type II diabetes mellitus, 24% had shown borderline clinical depression, 39% has mild mood disturbance and 50 % has moderate anxiety and 32% had severe anxiety.Many variables are associated with the level of depression and anxiety of the patients. The study highlights that type II diabetes patients have more anxiety than depression.

The prevalence of depression in our sample is almost similar to the studies conducted type II diabetes mellitus patients in Sunsari district(22.7%).[10]Similar studies observed on prevalence of anxiety in 15 nations showedvery low prevalence of anxietyand in United States, Baltimorewhich showed 18.0% and 21.8% overall prevalence of anxiety respectively among type II diabetes patients.[11]Nature of the patients and different measurement tools used for the studies might shows variation in results. In our study that 17% had normal ups and down and whereas mild mood disturbance, borderline clinical depression, moderate depression, severe anxiety and extreme depression was found in 39%, 24%, 17%, and 2% and 1% of patients, respectively. Studies conducted in Nepal highlighted severity of depression as 27.4%, 14.6%, 8.4%, and 2.4% of patients had mild, moderate, moderately severe, and severe depression, respectively whereas a study in Saudi Arabia showed mild, moderate, severe, and extremely severe depression among 9.3%, 14.0%, 7.1%, and 3.3% of patients with type II diabetic mellitus.[12]

The present study showed severity of anxiety as minimal, mild, moderate, and severe anxiety was found in 2%,16%, 50% and 32% of patients, respectively among patients with type II diabetes mellitus. Our finding is slightly higher than the finding reported by the study in India which showed overall prevalence of anxiety among 34% of patients where mild, moderate, and severe anxiety was found in 22%, 8%, and 4%, of patients. a study in Saudi Arabia showed mild, moderate, severe and extremely severe anxiety among 13.4, 13.0%, 6.0%, and 5.8% of patients with type II diabetic mellitus.[12]

Regarding depression, our study found the significant association with selected variables such as presence of comorbidities and history of mental problem in family. The significant association of anxiety with selected variables such as age, family monthly income, presence of comorbidity, number of comorbidities, history of diabetes in family and history of mental illness. Ahmad and colleagues highlighted in their study that anxiety is positively associated with ≥ three comorbid diseases (P = 0.00) and educational level was not significantly associated with the educational level of patients. And in contrast to our study, it showed that depression is positively associated with patients of < 50 years of age (P = 0.03), females (P = 0.01), with ≥ three comorbid diseases (P = 0.00) than their counterparts.[13]Correlational analyses revealed that the level of anxiety was in lower end than the level of depression also in lower end hence positively correlates.

Conclusion

To achieve long-term control of blood glucose within the normal limits in patients with diabetes, self-care activities such as dietary restrictions, regular physical exercise, and taking patients with type II diabetes pharmaceuticals are necessary. Medical professionals should help patients adapt to their disease, as this plays a very important role in improving disease management. Thus, to achieve breakthroughs in the condition of patients with type II diabetes, obstacles in disease control must be understood. Psychologically disturbing symptoms derived in the process of adapting to diabetes such as depression and anxiety can create more problems and complications that worsen a patient's condition, especially if he or she is not managed in a timely manner

Recommendation

To rule out the symptoms of depression and anxiety among diabetic patients during their OPD visits, a mandated mental health assessment to be included along with regular diabetic follow-up

to address these mental health issues. Physicians can be trained to assess the psychological issues while assessing diabetes clients in order to do referral services. Nurses as a first line contact health professionals should be involved actively in assessing the patients. Also, plan a teaching program for diabetes patients and their families to create awareness of depression and anxiety.

Limitation

The limited enrollment of participants in our study could pose a limitation, potentially leading to demographic variability among subjects and rendering the results less applicable to a broader population. Additionally, the insights gained from our cross-sectional, descriptive study on the depression, and anxiety of diabetes patients may be context-specific and not universally generalizable. To address these concerns, future research could employ a longitudinal design to investigate causal relationships or assess the effectiveness of interventions. Moreover, the study could be replicated as a comparative analysis between urban and rural populations.

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Conflict of interest - There are no conflicts of interest

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