ORIGINAL RESEARCH PAPER

Volume-8 | Issue-8 | August - 2019 | PRINT ISSN No. 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PREVALENCE OF DEPRESSION AMONG TYPE 2 DIABETICS AND ITS IMPACT ON SELF CARE- A PILOT STUDY

Physiology

Dr Pratyusha Kamakshi Attaluri MBBS Dr.Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinnavutapalli -521286 AP.

Dr S Srikanth* M.D Professor and Head, Department of Physiology Dr.Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinnavutapalli -521286 AP. *Corresponding Author

Dr.S.Jaydev M.D., D.M Consultant Endocrinologist, Santhi Nursing home, opp to Nirmala convent, patamata , Vijayawada. AP

ABSTRACT

Self-care is critical to outcome of diabetes and it includes compliance to medication, diet modifications, and regular exercise. Primary aim of the present study was to study the prevalence of depression and its impact on self care among type 2 diabetic patients. 100 male subjects with type2 diabetes (ADA criteria) within age of 35-50 years were included in the study. Data was collected using a predesigned questionnaire based on Summary of Diabetes Self- Care Activities (SDSCA) to assess self-care and Patient Health Questionnaire (PHQ-9) to assess depression. Prevalence of depression in type 2 diabetic subjects was 13% from our study population of which majority of them experiencing mild depression. Self care activities like adherence to diet, medication and physical activity decreased in subjects with co morbid diabetes and depression.

KEYWORDS

Depression, type2 diabetes, self care, foot care, physical activity

INTRODUCTION:

Diabetes is a chronic disease which affects virtually every organ in the human system. The World Health Organization projected that 300 million people will suffer from diabetes by 2025. India has the largest number of diabetic population in the world and it is expected that there will be 69.9 million diabetic populations in India by 2025. [1] Depression is common among people with diabetes. [2] People with type 2 diabetes mellitus experience depression twice higher than the general population, and diabetic patients with depression show greater difficulty with self-care. Self-care is the cornerstone of diabetes management. Healthy diet, physical activity, and adherence to medical regimens can slow the disease progression and reduce the morbidity and mortality associated with diabetic complications. [3, 4] The data regarding the prevalence of depression in patients with type 2 diabetes from India are scarce. However, studies from other countries like USA and UK reported the prevalence of depression in patients with type 2 diabetes vary from 30 to 83 percent. [5, 6] There are conflicting reports regarding the association between glycaemic control and depression. [7, 8,] Poor glycaemic control may result in depression and vice versa i.e., depression may result in poor glycaemic control. When depression accompanies diabetes, there may be poor glycaemic control, decreased physical activity, higher obesity which may potentially worsen the diabetes complications.

Self-care is critical to outcome of diabetes and it includes compliance to medication, diet modifications, and regular exercise [9]. If any of these are compromised, the target glycemic control may not be achieved. Several studies have documented low levels of adherence to treatment among patients with diabetes [10-12].

Depression is associated with poor health behaviours (i.e., smoking, physical inactivity, caloric intake) that increase risk of type 2 diabetes. [13] Depression is also related to central obesity and potentially to impaired glucose tolerance. [14] Depression is associated with physiological changes which may include activation of the hypothalamic-pituitary-adrenal axis, sympathoadrenal system, and proinflammatory cytokines, all of which can induce insulin resistance leading to the risk of diabetes. [15]

Depression is a complex condition characterized by disruptions in all facets of life-social, psychological, behavioural, and biological. Diabetes is a serious metabolic disorder that has life changing consequences for individuals affected by it. Diabetes may increase risk of depression because of the sense of threat and loss, associated with receiving this diagnosis and loss of substantial lifestyle changes necessary to avoid developing debilitating complications. The co-occurrence of depression in diabetes is attributed to a variety of factors, including the psychological and psychosocial impact of the disease, a potential common genetic susceptibility and common pathophysiological abnormalities involving neuro immunological and neuro endocrinal pathways, as well as micro vascular brain lesions due to diabetes mellitus.[16] According to a meta-analysis of a large number of studies by Gonzalez et al [17], depression was significantly negatively associated with adherence to diabetes treatment regimen, regarding almost all self-care aspects evaluated [diet, medication, exercise, self-monitoring of blood glucose (SMBG), medical appointments attendance and composite self-care measures] except for diabetic foot care.

AIMS AND OBJECTIVES:

Primary aim of the present study was to study the prevalence of depression among type 2 diabetic patients and also, to study the impact of depression on self-care among type 2 diabetic patients.

MATERIAL AND METHODS:

This is a hospital-based cross-sectional study undertaken at teaching hospital. The research protocol was approved by the Institutional Ethical Committee. 100 male subjects with type2 diabetes within age of 35-50 years were included in the study. Informed consent was taken from all the study participants. The study subjects comprised patients with established type 2 diabetes as per American Diabetic Association (ADA) criteria. [9] Subjects who were extremely ill, subjects with known neurological/ psychiatric problems shall be excluded from the study.

Data was collected using a predesigned questionnaire based on Summary of Diabetes Self- Care Activities (SDSCA) [10] to assess self-care and Patient Health Questionnaire (PHQ-9) [11] to assess depression. The subjects were enquired about their adherence to self-care activities over the previous 1 week. The self-care activities to be considered were adherence to diabetic diet, recommended diabetic medications, foot care, and physical activity of at least 30 min duration daily. The subjects were enquired about their smoking status in the previous 1 week.

PHQ-9 questionnaire was used to assess depression among the subjects. The subjects were asked about the depressive symptoms experienced over the last 2 weeks. Scoring of the symptoms was done, and the score was interpreted as follows: 0–4, no depression; 5–9, mild depression; 10–14, moderate depression; 15–19, moderately severe depression, and 20–27, severe depression.

STATISTICAL ANALYSIS:

Data entered in Microsoft Excel, and analysis was done using Graph

pad Prism 7statistical software. The Chi square ($\chi 2$) test was applied to find association between two variables. A p value of <0.05 was considered as statistically significant.

OBSERVATIONS AND RESULTS:

The study was conducted in 100 male type 2 diabetics. The mean age of study subjects was 44.52 years. The mean duration of Type 2 Diabetes among the study subjects was found to be 6.12 years. As observed in Table 2, the majority of the study subjects (75%) were taking oral hypoglycemic agents, 4% were taking insulin, 17% were taking both oral hypoglycemic agents and insulin, and 4% of the study subjects were not taking any medications. When enquired about the last blood glucose examination, about 17% of the study subjects underwent blood glucose estimation 1 week before the study.

When questioned about their self-care behaviour over the last 1 week, about 16% of the subjects had adhered to the diabetic diet on all the days of the week, 16% of the subjects had followed the diabetic diet only few days of the week, and 68% of the subjects did not follow the diabetic diet on any day of the week.

Majority of the subjects (91%) had not missed any dose of their diabetic medications, while 4% of the subjects missed all the doses. When enquired about foot care, only 5% of the subjects were practicing foot care on all days of the week, 11% of the subjects followed it on some days of the week, and 84% did not follow it even for a single day. When questioned about the physical activity, about 72% of the subjects were sedentary, 17% of the subjects were engaged in physical activity for some days of the week, and only 11% of the subjects were engaged in physical activity on all the days of the week (Table 2).The male subjects were enquired about smoking over the last 1 week. Majority of the subjects (78%) did not smoke, while 22% of the subjects were smokers.

Majority of the subjects (87%) showed no depression, 9% mild depression, 3% moderate depression, and 1% moderately severe depression. The type 2 diabetic subjects with depression (6.25%) were less likely to adhere to diabetic diet on all days of the week when compared with the subjects without depression (93.75%) which was not statistically significant (p value=0.6626, Table 3). Adherence to medications was also found to be less among diabetic subjects with depression (13.18%) when compared with the subjects without depression (86.81%) which was not statistically significant (p value=0.6646, Table 3). Only few diabetic subjects without depression (60%) and with depression (40%) were following foot care on all days of week and this difference was not statistically significant (p value = 0.1443, Table 3). Only few diabetic subjects without depression (72.72%) and with depression (27.27%) were engaged in physical activity on all days of week and this difference was not statistically significant (p value = 0.3277, Table 3).Of the 22 subjects who gave history of smoking in the last week, 22.72% showed depression (Table 3).

Table1: Prevalence of Depression among subjects with type 2 diabetes

	0–4, no depression	5–9, mild depression	10–14, moderate depression;	15–19, moderately severe depression,	20–27, severe depression.
No. of subjects	87	9	3	1	0

Table 2: Self-care behaviour and complications (n = 100)

	Frequency	Percentage (%)
Medications		
No medications	4	4
Oral hypoglycemic agents (OHAs)	75	75
Insulin	4	4
OHA + Insulin	17	17
Blood glucose examination		
Within week	17	17
A month back	77	77
2 months back	5	5
Between 3 and 6 months back	1	1
More than 6 months back	0	0
Adherence to diet		
All days	16	16
Some days	16	16
None of the days	68	68
Nonadherence to medications		
Missed all doses	4	4
Missed some doses	5	5
Not missed any dose	91	91
Foot care		
All days	5	5
Some days	11	11
None of the days	84	84
Physical activity		
All days	11	11
Some days	17	17
None of the days	72	72
Smoking		
Yes	22	22
No	78	78

Table 3: Association between self-care behaviour and depression

Variable	No Depression (n =87), n (%)	Depression (n =13),n (%)	χ^2	P
Adherence to diet				
All days	15(93.75)	1(6.25)	0.8231	0.6626
Some days	14(87.5)	2(12.5)		
None of the days	58(85.29)	10(14.70)		
Adherence to Medications				
Missed all dose	4(100)	0(0)	0.8171	0.6646
Missed some dose	4(80)	1(20)		
Not missed any dose	79(86.81)	12(13.18)		
Foot care				
All days	3(60)	2(40)	3.872	0.1443
Some days	9(81.81)	2(18.18)		
None of the days	75(89.28)	9(10.71)		
Physical activity				
All days	8(72.72)	3(27.27)	2.231	0.3277
Some days	15(88.23)	2(11.76)		
No activity	64(88.88)	8(11.11)		
Smoking				
Yes	17(77.27)	5(22.72)	2.36	0.1245
No	70(89.74)	8(10.25)		

DISCUSSION:

In our study the prevalence of depression among subjects with type 2 diabetes was 13%. About 87% showed no depression, 9% mild depression, 3% moderate depression, and 1% moderately severe depression. In other studies from other countries, the prevalence of depression in diabetic subjects in Spain was 5.8% [18], Taiwan 10.6% [19],Malaysia 11.5% [20], Addis Ababa 13% [21], London 22% female and 13% male [22], Pakistan 14.7% [23], Brazil 18.6% [24], Jordan 19.7% [25], Bangladesh 30.5% female and 29% male [26], the Netherlands 38% female and 35% male [27], India 38.8% and 46.15% in two studies [28,29], and in Mexico 48.27% [30]. Prevalence of depression in our study correlates with the findings of other similar studies. [21, 22] One possible reason for the differences in the prevalence of depression among diabetic subjects reported by different studies is the use of different scales used to screen for depressive symptoms. Some studies used the PHQ-8, others used Ham-D or BDI II scales.

There are conflicting reports regarding the association between glycaemic control and depression [31]. Poor glycaemic control may result in depression and vice versa i.e., depression may result in poor glycaemic control. The increased vulnerability to depression in individuals with type 2 diabetes is not yet clearly understood. However, depression involves physiological changes of the neuroendocrine system. The underlying cause of depression is thought to be related to changes in the neurotransmitters in the brain such as serotonin (5-HT), dopamine (DA), and norepinephrine (NE) which are monoamine neurotransmitters which affect mood and behaviour. It is believed that during psychological stress, counter regulatory hormones such as catecholamine, glucocorticoids, growth hormone and glucagon are activated interfering the action of insulin which may lead to elevated blood glucose.[32]

Adherence to diet and medication on all days of the week among type 2

diabetic patients was found to be 6.25% and 13.18% respectively, which is very less when compared to type 2 diabetic patients without depression. Only 40% of diabetic patients with depression followed foot care daily (p value = 0.1443). Only 27.27% of the diabetic patients with depression were engaged in physical activity on all days of the week when compared with 72.72% of diabetic patients without depression (p value = 0.3277). 22.72% of diabetic patients with smoking history showed depression (p value = 0.1245). Poor diabetes self-care management behaviour, low adherence to medicine and less physical activity observed in diabetics with depression corroborates with the findings of other similar studies. [33-35]

Depression adversely affects the highest-order capacities of the individual such as motivation, energy, concentration and self-confidence, subsequently worsening their quality of life. This might be the cause for the lack of adherence to self-care activities, physical activity. Lin et al showed that coexisting major depression among diabetics was associated with smoking, lack of exercise, reduced adherence to diet and medications. [3] The study by Gonzalez et al [17] suggested that there is a continuous relationship between symptoms of depression and non adherence to self-care for diabetes, and among type 2 diabetic patients, even symptoms of mild depression are associated with important decrements in self-care.

Our study also showed coexisting depression among patients with type 2 diabetes which is associated with poor adherence to diet, medications, foot care and physical activity. Surprisingly among the diabetics without depression we observed that 66.67% and 86.21% of the subjects showed non adherence to diet and foot care on all days of the week respectively, 73.56 % showed no physical activity, and 80.45% were not smokers. As such there is a need to focus more emphasis on self care activities also in type 2 diabetics without depression.

CONCLUSIONS:

Prevalence of depression in type 2 diabetic subjects was 13% from our study population of which majority of them experiencing mild depression. Self care activities like adherence to diet, medication and physical activity decreased in subjects with co morbid diabetes and depression.

Summary:

Improving the public knowledge about diabetes, developing training programs for diabetics may decrease the prevalence of depression in diabetics. Patients with diabetes should be screened for depression, referred to appropriate social services and psychosocial support.

Limitations of the study:

This study has several limitations. Firstly, the cross sectional design is not without limitation since causality cannot be established. Generalization of study findings would require similar studies with a large sample size. Selection bias and recall bias cannot be eliminated. Further research is needed to address these limitations.

Acknowledgment:

The authors would like to express many thanks and gratitude to **Dr Pinnamaneni Siddhartha Institute of Medical Sciences and SAGTE** for their help to conduct this study. We would like to thank all the study participants.

Funding: Non ICMR grant from SAGTE,Vijayawada.
Conflicts of Interest: Nil

REFERENCES:

1) King H, Aubert RE, Herman WH. (1998). Global burden of diabetes 1995-2025-prevalence, numerical estimates, and projections. Diabetes Care; 21: 1414-31.
2) Gavard JA, Lustman PJ, Clouse RE. (1993). Prevalence of depression in adults with type2 diabetes. An epidemiological evaluation. Diabetes Care; 16: 1167-78.
3) Lin EH, Katon W, Rutter C, Simon GE, Ludman EJ, Korff MV et al. (2006). Effects of enhanced depression treatment on diabetes self-care. Ann Fam Med; 4(1):46–53.
4) Kolappa K, Henderson DC, Kishore SP. (2013) No physical health without mental health: Lessons unlearned? Bull World Health Organ; 91:3–3A.
5) Li C, Ford ES, Strine TW, Mokdad AH. (2008). Prevalence of depression among U.S. adults with diabetes: findings from the 2006 behavioural risk factor surveillance system. Diabetes Care; 31: 105-7.
6) Kendrick T, Dowrick C, McBride A, Howe A, Clarke P, Maisey S et al.(2009). Management of depression in UK general practice in relation to scores on depression severity questionnaires: analysis of medical record data. Br Med J; 338: 750.
7) Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE.(2000). Depression and poor glycaemic control: a meta-analytic review of the literature. Diabetes Care; 23: 934-42.
8) Katon WJ, Simon G, Russo J, Von Korff M, Lin EH, Ludman E et al.(2004). Quality of depression care in a population-based sample of patients with diabetes and major depression. Med Care; 42: 1222-9
9) American Diabetes Association (2009). Standards of Medical Care in Diabetes- 2009. Diabetes Care, 32(Supplement 1):s13-s61.
10) Shobana R, Augustine C, Ramachandran A, Vijay V. (2005). Improving psychosocial care: The Indian experience. Diabetes Voice; 50:19-21.
11) Chew LD. (2004). The impact of low health literacy on diabetes outcomes. Diabetes Voice; 49:30-2.
12) Kalyango JN, Owino E, Nambuya AP. (2008). Non-adherence to diabetes treatment at Mulago Hospital in Uganda: Prevalence and associated factors. Afr Health Sci ; 8:67-73.
13) Strine T, Mokdad A, Dube S, Balluz L, Gonzalez O, Berry J et al .(2008). The association of depression and anxiety with obesity and unhealthy behaviours among community-dwelling US adults. Gen Hosp Psychiatry; 30:127- 137.
14) Weber B, Schweiger U, Deuschle M, Heuser I.(2000). Major depression and impaired glucose tolerance. Exp Clin Endocrinol Diabetes; 108:187-190.
15) Golden S. (2007). A review of the evidence for a neuroendocrine link between stress, depression and diabetes mellitus. Curr Diabetes Rev; 3:252-259.
16) Andreoulakis E, Hyphantis T, Kandylis D, Iacovides A. (2012). Depression in diabetes mellitus: a comprehensive review. Hippokratia ; 16(3): 205-214.
17) Gonzalez JS, Peyrot M, McCarl LA, Collins EM, Serpa L, Mimiaga MJ et al.(2008). Depression and diabetes treatment non-adherence: a meta-analysis. Diabetes Care; 31: 2398-2403.
18) Lopez-de-Andres A, Isabel Jimenez-Trujillo M, Hernandez-Barrera V, de Miguel-Yanes JM, Mendez-Bailon M, et al. (2015).Trends in the Prevalence of Depression in Hospitalized Patients with Type 2 Diabetes in Spain: Analysis of Hospital Discharge Data from 2001 to 2011. PLoS One; 10: e0117346.
19) Wu SF, Huang YC, Liang SY, Wang TJ, Lee MC, et al.(2011). Relationships among depression, anxiety, self-care behaviour and diabetes education difficulties in patients with type-2 diabetes: A cross-sectional questionnaire survey. Int J Nurs Stud; 48: 1376-1383.
20) Kaur G, Tee GH, Ariaratnam S, Krishnapillai AS, China. (2013). Depression, anxiety and stress symptoms among diabetics in Malaysia: a cross sectional study in an urban primary care setting. BMC Fam Pract ; 14: 69.
21) Habtewold TD, Radie YT, Sharew NT. (2015) Prevalence of Depression among Type 2 Diabetic Outpatients in Black Lion General Specialized Hospital, Addis Ababa, Ethiopia. Depression Research and Treatment.
22) Bhattarai N, Charlton J, Rudisill C, Gulliford MC .(2013). Prevalence of depression and utilization of health care in single and multiple morbidity: a population-based cohort study. Psychol Med; 43: 1423-1431.
23) Zahid N, Asghar S, Claussen B, Hussain A. (2008). Depression and diabetes in a rural community in Pakistan. Diabetes Res Clin Pract; 79: 124-127.
24) Papelbaum M, O Moreira R, Coutinho W, Kupfer R, Zagury L, et al.(2011). Depression, glycemic control and type 2 diabetes. Diabetolo Metab Syndr; 3: 26.
25) Al-Amer R, Sobeh M, Zayed A, Al-domi H. (2011). Depression among adults with diabetes in Jordan: risk factors and relationship to blood sugar control. J Diabetes Complications; 25: 247-252.
26) Asghar S, Hussain A, Ali SMK, Khan AKA, Magnusson A. (2007). Prevalence of depression and diabetes: a population-based study from rural Bangladesh. Diabet Med 2007; 24: 872-877.
27) Pouwer F, Geelhoed-Duijvestijn PH, Tack CJ, Bazelmans E, Beekman AJ, et al.(2010). Prevalence of comorbid depression is high in out-patients with type 1 or type 2 diabetes mellitus. Results from three out-patients clinics in the Netherlands. Diabet Med; 27: 217-224.
28) Mathew CS, Dominic M, Isaac R, Jacob J. (2012). Prevalence of depression in consecutive patients with type 2 diabetes mellitus of 5-year duration and its impact on glycemic control. Indian J Endocrinol Metab ; 16: 764-768.
29) Das R, Singh O, Thakurta RG, Khandakar MR, Ali SN et al. (2013). Prevalence of Depression in Patients with Type II Diabetes Mellitus and its Impact on Quality of Life. Indian J Psychol Med; 35: 284-289.
30) Tovilla-Zarate C, Juarez-Rojop I, Jimenez YP, Jimenez MA, Vazquez S, et al. (2012) Prevalence of Anxiety and Depression among Outpatients with Type 2 Diabetes in the Mexican Population. PLoS One 2012; 7:e36887.
31) Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE. (2000)Depression and poor glycemic control: a meta-analytic review of the literature. Diabetes Care; 23: 934-42.
32) Grisel JE, Rasmussen PR, Sperry L. (2006). Anxiety and depression: physiological and pharmacological considerations. J Individ Psychol, 62(4):398-416.
33) Nawaz AS, Mane AB, Ramakrishna MR. (2015). Diabetes and depression: Impact of depression on self-care among patients with type 2 diabetes. Int J Med Sci Public Health; 4:901-905.
34) Leonard E Egede, Charles Ellis. (2010). Diabetes and depression: Global perspectives. Diabetes research and Clinical Practice; 87:302-312.
35) Seides, R. Affects of Depression on Aspects of Self-Care in Type 2 Diabetes. Health 2014; 6, 1522-1531.