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Original Research Article

Worries About Type 2 Diabetes Mellitus and Depression in Enugu, Southeastern Nigeria

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Abstract: ***Background****:* Several efforts have been made to improve the quality of life of diabetic patients, but obtaining information about the most pressing problems in them may help direct the focus of the interventions. ***Aim****:* Was to discover the most worrying disturbances pertaining to diabetes and their relationship with depression in the lives of people living with diabetes mellitus type 2. ***Method****:* It was a cross-sectional study of consecutive attendees of diabetes mellitus patients who came for their routine check-up at the out-patient department of Enugu State University Teaching Hospital Enugu, Nigeria. Data were obtained from a clinical and sociodemographic questionnaire; the patient`s folder; General Health Questionnaire-9 (GHQ-9) to assess for depression; and response to an open-ended question: `What worries you most since you have been suffering diabetes mellitus`? Chi-square test was used to assess for association between depression and different disturbances of diabetes mellitus. ***Result****:* The rate of occurrence of depression among the participants was 28(16.7%). Most expressed worries about Diabetes were: somatic symptoms 72 (42.9%); treatment related problems (26.2%); poor health status (25.6%); poor finances (19.1%), but only the presence of somatic symptoms (P = 0.021) and poor health status (P = 0.001) have statistically significant association with depression. ***Conclusion****:* More attention should be paid to diabetic patients complaining about somatic symptoms and deteriorating poor health status, and it may be necessary to screen them for depression.

Keywords: Type 2 diabetes mellitus, Depression, Somatic symptoms, Quality of life, Mental health, Patient concerns.

INTRODUCTION

Diabetes is a serious and disabling endocrine disorder with the prevalence reaching endemic magnitude over the past few decades. According to the International Diabetes Federation, there are 382 million people worldwide affected by diabetes, and it is expected to reach 592 million by 2035. [1] Diabetes has been linked to reduction in life expectancy, high morbidity due to specific complications associated with micro vascular (retinopathy, nephropathy and neuropathy), and increased risk of macro vascular (ischaemic heart disease, stroke and peripheral vascular disease) diseases and low quality of life [2]. Most of the guidelines on diabetes care concentrate on the medical aspects of initial treatment without considering the psychological needs of the patient [3]. Although some diabetic patients could adjust well and live healthy lives, many researches like The Diabetes Attitudes, Wishes, and Needs study, highlighted that psychosocial support in this group of people is under-resourced and deficient, resulting in poor quality of life (QoL) and reduced general well-being. [4-9, 2]

Evidence indicates that diabetes [10,11] and its complications are strongly associated with psychological and psychiatric problems including depression [12-14]. Patients with type 2 diabetes mellitus (T2DM) have a

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two-fold greater risk for comorbid depression compared to healthy controls, hampering the QoL of patients [15,16]. A study by Lustman *et al.,* evaluated the relationship between depression and diabetes symptoms and concluded that diabetes symptoms are more likely to be associated with depression than to conventional markers of glucose control [17]. A longitudinal study by Gonzalez *et al.,* (2008b) demonstrated positive correlation between depressive features and poor medication adherence and diabetes self-care after 9 months period. [18] Similarly, another study has shown that persistent depressive symptoms were correlated with poor self-management in terms of diet and exercise over the subsequent 5 years period [19]. In contrast to these findings, reduction in depressive complaints was associated with improved glycemic control. [10] Depression and anxiety have also been shown to be associated with increased hyperglycemia. [10,20]

Research also indicates that patients with diabetes experience high levels of diabetes-specific emotional stress. [21,22] This is associated with functional impairment, poor adherence to exercise, diet and medications, and inadequate glucose control. [10,23-25] Psychological factors such as stressful life events, [26] daily environmental stressors, [27] and diabetes-related distress [28] were associated with poor glucose control and nonadherence to treatment. Other studies have also shown that psychological factors may contribute to metabolic, [29] gastrointestinal, [30] and sexual dysfunction [31] along with neuropathic [32] symptoms in patients with diabetes. Another study revealed that each group of gastrointestinal symptoms was significantly associated with psychiatric illness ($P < 0.01$) than with peripheral neuropathy ($P > 0.2$) [30]. Furthermore, Lustman and Clouse demonstrated that psychiatric illness (generalized anxiety disorder and depression) was significantly ($P < 0.01$) associated with sexual dysfunction, irrespective of the effects of neuropathy [31]. The patient's perception about the seriousness of diabetes will affect the way they cope with the disease [33]. Several psychological factors contribute to affect the emotional and psychological well-being of a person with diabetes. These include degree to which an individual accepts his/her diagnosis, how the individual adjusts to the demands of self-care routine, and finally how he/she copes with progression of the condition, which potentially includes the development of diabetes-related complications [34]. However, considering that diabetes is an incurable condition, and that one has to battle with it for life, patients have demonstrated different forms of responses when they were diagnosed to have diabetes like shock, denial, guilt, anger and anxiety. Sanjay *et al.,* 2018 showed that patients have a variety of fears and needs associated with the diagnosis, treatment, expected consequences, prognosis and everyday life in the management of the disease. [35] The fears/worries include: fear for life itself (According to researches, mortality is higher among people with diabetes, and the rate varies with age, sex, time and cause of death [36,37]; fear for complications (Randomized clinical trials and prospective epidemiological studies have shown that lifestyle changes, such as healthy eating patterns, weight loss, quitting smoking, increased physical activity and patient education can help delay or prevent diabetes complications [38]; fears for work/finances (Research done, indeed, shows that drivers with diabetes are vulnerable to face unfortunate incidents while driving. These can be linked to hypoglycemia [39]; fears for family; fears for stigmatization; fears for deprivation especially food.

Not many studies have investigated the major worries of people living with diabetes mellitus. Hence we aim at demonstrating the distressing aspects of the illness that are of major concern to the patient which will go a long way influencing responses to treatment and its general outcome.

METHODOLOGY

It was a cross-sectional study of consented consecutive attendees of patients suffering from Type 2 diabetes mellitus, who came for their routine follow-up visit, at the out-patient department of Enugu State Teaching Hospital Enugu, Nigeria. They were recruited between December 2023 to May 2024. Information about age, occupation, employment status, age of onset of illness, duration of illness, presence of complication from diabetes and co-mordidty were obtained from a clinical and socio-demographic questionnaire and the patient`s folder. The GHQ-9 was used to investigate for depression, after which an open-ended question about what worries the participant most pertaining to the duration he/she has suffered diabetes mellitus. We grouped the disturbances participants may encounter into: Poor health status (feeling unwell, weakness, inability to carry out routine activities); Erectile dysfunction; Poor finances; Treatment related problems (needle pricks, frequent injections, blood glucose control problems, taking many tablets daily); Dietary restrictions; Somatic symptoms (hot/burning sensations on the body, body pains/pains on the extremities, numbness/abnormal sensations on the legs and hands); and frequent hospital visitations.

Data obtained were entered and analysed in the Statistical Package for Social Sciences (SPSS) version 20. The variables were expressed in means, percentages and standard deviations using descriptive statistics. Chi square was used to determine for association between depression and different problem areas as described by the participants. A p-value of ≤ 0.05 was considered to be statistically significant, while the confidence interval was set at 95%.

RESULTS

Majority of the participants were females (69%), and also retired civil servants (40.9%). They were aged between 23-82years with a mean of 59.4 ± 11.64

years. Co-morbidities and complications of illness were also prevalent among them (73.7% and 89.5% respectively). Participants identified poor health status, poor finances, treatment related problems, somatic symptoms as most common and most worried about as it concerned diabetes mellitus.

Table 1: Clinical and sociodemographic characteristics of the participants.

Variables	Frequency (%)
Gender	
Male	53 (31)
Female	118 (69)
Occupation	
Civil servant	30 (17.5)
Trading	32 (18.7)
Farming	13 (7.6)
Artisan	6 (3.5)
Retired Civil servant	70 (40.9)
Others	20 (11.7)
Employment	
Yes	75 (43.9)
No	96 (56.1)
Comorbidity	
Yes	126 (73.7)
No	45 (26.3)
Complications	
Yes	153 (89.5)
No	17 (9.9)
Depression	
Yes	28 (16.7)
No	140 (83.3)

Age (years): Mean ± SD = 59.40 ± 11.64, Range = 23-82.
Age at diagnosis (years): Mean ± SD = 51.36 ± 12.26, Range = 16-79.
Duration of illness (years): Mean ± SD = 8 ± 6.51, Range = 0.1 – 37.

Table 2: Expressed worries about Diabetes Mellitus

Variables	Frequency (N)	Percentage (%)
Poor Health Status	43	25.6
Erectile Dysfunction	4	2.4
Poor Finances	32	19.1
Treatment Related Problems	44	26.2
Dietary Restrictions	17	10.1
Somatic Symptoms	72	42.9
Frequent Hospital Visits	2	1.2

Table 3: Relationship of worries about diabetes mellitus and depression.

Variables		Not Depressed	Depressed	X^2	P	DF
Poor Health Status	No	117 (69.6)	8 (4.8)	34.2	0.001	1
	Yes	23 (13.7)	20 (11.9)			
Erectile Dysfunction	No	137 (81.5)	27 (16.1)	0.00	1.00	1
	Yes	3 (1.8)	1 (0.6)			
Poor Finances	No	115 (68.5)	21 (12.5)	0.38	0.54	1
	Yes	25 (14.9)	7 (4.2)			
Treatment Related Problems	No	104 ()61.9	20 (11.9)	0.006	0.94	1
	Yes	36 (21.4)	8 (4.8)			
Dietary Restrictions	No	124 (73.8)	27 (16.1)	0.84	0.36	1
	Yes	16 (9.5)	1 (0.6)			
Somatic Symptoms	No	86 (51.2)	10 (6.0)	5.29	0.021	1
	Yes	54 (32.1)	18 (10.7)			
Frequent Hospital Visits	No	138 (82.1)	28 (16.7)	0.00	1.00	1
	Yes	2 (1.2)	0 (0.0)			

DISCUSSION

Similar to the index study, type 2 diabetes mellitus has previously been documented to show a strong association with clinical depression [40, 41] with a 25 - 35% prevalence of depression in diabetes internationally. [42] Additionally, this association has been reported to be two-directional with depression a stronger causative factor of diabetes than the reverse [43] while diabetes almost doubles the risk of development of depression especially in females. [44]

End organ damage and other co-morbidities with resultant poor health status have also been identified as a cause of depression in diabetes, [45,46] an observation equally made in this study.

Mekhtiev TV [47] found that of 293 male patients aged 17-60 years with type I and II diabetes, 32.1 % had anxiety and depression which were accompanied by erectile dysfunction (ED). These complications were observed among the de-compensated diabetics and those with longer diabetes duration. The value is in contrast with our much smaller ED prevalence of 1.8% despite the comparable age bracket studied. Noteworthy, however, our participants from a hospital-based study with probable good control and so less disposition to de-compensation and development of ED. The studies also differ in that we found no association between ED and depression. This discrepancy between their study and ours could be attributed to the inclusion of type 1 diabetes patients in their study contrary to only type 2 diabetics in ours. Their finding may thus reflect a relatively higher prevalence of co-existing diabetic complications. Similar results have earlier been reported in support of the findings by Mekhtiev TV. A meta-analysis of 5 studies [48] showed a 74.2% overall prevalence of ED in diabetic men with depressive symptoms when compared with 37.4% in diabetic men without depressive symptoms. Another study reported that diabetic men with co-morbid sexual dysfunction are often embarrassed, confused, or depressed and have lower QoL, implying there is a bi-directional relationship between ED and depressive symptoms in DM [49] These findings emphasize the need for health workers to evaluate the status of depressive symptoms and erectile dysfunction in men with DM.

Our study noted that only few of our patients had treatment related problems, among these there was no significant difference between those with depression and those without, although a larger number were depressed. Similarly, Penhan *et al.,* [50] reported no significant relationship between depression and the use of oral antidiabetic medications, except for metformin. They however observed a significant association between depression and insulin use even in patients with good glycaemic control. The implication being that the observed depression could be attributed to needle pricks or frequent injections, However, we acknowledge that we did not present detailed stratified data showing the type or route of administration of specific anti diabetic medications for our participants.

Unhealthy eating is a well-documented risk factor for type 2 diabetes while dietary restriction to a healthy diet is an effective management option. [51] However, our study revealed that dietary restriction had no association with depression. This finding is in contrast with the observation of an association between healthy dietary pattern and reduced likelihood of depressive symptoms in patients with Type 2 diabetes by Dipnall *et al.,*[51]) They did not observe such association with those on 'unhealthy' or 'sweet' diets.

Adults' diabetics with depression are more likely to experience higher total health care costs, [52] our study, however, did not collaborate the above observation as our subjects who were depressed did not significantly have poorer finances than those who were not depressed.

Earlier studies examining the association between diabetic neuropathy and depression have produced conflicting results even though a recent meta-analysis suggested that the balance of evidence supports the relationship. [53] The conflicting findings were attributed to difference in diagnostic procedures such as the use of substandard diagnostic criteria, use of predominantly painful symptoms as diagnosis of peripheral neuropath. These results were considered to have limited generalizability. In an attempt to surmount these limitations, Velikiye, *et al.,* [53] using a sample of patients whose neuropathy was diagnosed by well-established, objective tests of neurologic dysfunction investigated the association between diabetic neuropathy severity and depressive symptoms. Velikiye *et al.,* [53] observed that diabetic neuropathy–related changes in social self-perception were associated with depressive symptoms. They concluded that persons suffering from diabetic peripheral neuropathy have an increased risk for depressive symptoms. Their findings are similar to those of the index study.

In our hospital-based study, none of the few (1.2%) with history of frequent hospital visits were depressed. Contrary to this, Tardif *et al.,* [54] in a community-based study identified that depression increased the risk of all-cause hospitalizations among patients treated for diabetes thus concluded that depression in diabetic patients had an impact on their use of health care resources.

CONCLUSION

Appropriate assessment of depression with subsequent psychiatric support should be provided to enhance quality of life in those suffering diabetes with concomitant poor health status and / or somatic symptoms.

REFERENCES

1. International Diabetes Federation. Diabetes Atlas. 6th ed. Brussels: International Diabetes Federation; 2013.
2. Nicolucci A, Kovacs Burns K, Holt RI, Comaschi M, Hermanns N, Ishii H, *et al.,* Diabetes attitudes, wishes and needs second study (DAWN2™): Cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. Diabet Med. 2013;30:767–77. doi: 10.1111/dme.12245.
3. Kalra S, Sridhar GR, Balhara YP, Sahay RK, Bantwal G, Baruah MP, *et al.,* National recommendations: Psychosocial management of diabetes in India. Indian J Endocrinol Metab. 2013a;17:376–95. doi: 10.4103/2230-8210.111608.
4. Peyrot M, Rubin RR, Lauritzen T, Snoek FJ, Matthews DR, Skovlund SE, *et al.,*Psychosocial problems and barriers to improved diabetes management: Results of the cross-national diabetes attitudes, wishes and needs (DAWN) study. Diabet Med. 2005;22:1379–85. doi: 10.1111/j.1464-5491.2005.01644.x.
5. Koopmanschap M CODE-2 Advisory Board. Coping with type II diabetes: The patient's perspective. Diabetologia. 2002;45:S18–22. doi: 10.1007/s00125-002-0861-2.
6. Quality of life in type 2 diabetic patients is affected by complications but not by intensive policies to improve blood glucose or blood pressure control (UKPDS 37). U.K. Prospective Diabetes Study Group. Diabetes Care. 1999;22:1125–36. doi: 10.2337/diacare.22.7.1125.
7. Vileikyte L. Diabetic foot ulcers: A quality of life issue. Diabetes Metab Res Rev. 2001;17:246–9. doi: 10.1002/dmrr.216.
8. Holt RI, Kalra S. A new DAWN: Improving the psychosocial management of diabetes. Indian J Endocrinol Metab. 2013;17:S95–9. doi: 10.4103/2230-8210.119515.
9. Kalra B, Kalra S, Balhara YP. Psychological assessment and management in diabetes. J Pak Med Assoc. 2013;63:1555–7.
10. Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE, *et al.,*Depression and poor glycemic control: A meta-analytic review of the literature. Diabetes Care. 2000;23:934–42. doi: 10.2337/diacare.23.7.934.
11. Snoek FJ, Skinner TC. Psychological counselling in problematic diabetes: Does it help? Diabet Med. 2002;19:265–73. doi: 10.1046/j.1464-5491.2002.00678.x.
12. Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: A meta-analysis. Diabetes Care. 2001;24:1069–78. doi: 10.2337/diacare.24.6.1069.
13. Sridhar GR. Psychiatric co-morbidity & diabetes. Indian J Med Res. 2007;125:311–20.
14. Ghosh S, Chatterjee S. Should depressive patients undergo a regular diabetes screening test? Indian J Endocrinol Metab. 2013;17:537–8. doi: 10.4103/2230-8210.111692.
15. Pouwer F, Beekman AT, Nijpels G, Dekker JM, Snoek FJ, Kostense PJ, *et al.,*Rates and risks for co-morbid depression in patients with type 2 diabetes mellitus: Results from a community-based study. Diabetologia. 2003;46:892–8. doi: 10.1007/s00125-003-1124-6.
16. Schram MT, Baan CA, Pouwer F. Depression and quality of life in patients with diabetes: A systematic review from the European depression in diabetes (EDID) research consortium. Curr Diabetes Rev. 2009;5:112–9. doi: 10.2174/157339909788166828.
17. Lustman PJ, Clouse RE, Carney RM. Depression and the reporting of diabetes symptoms. Int J Psychiatry Med. 1988;18:295–303. doi: 10.2190/lw52-jfkm-jchv-j67x.
18. Gonzalez JS, Safren SA, Delahanty LM, Cagliero E, Wexler DJ, Meigs JB, *et al.,*Symptoms of depression prospectively predict poorer self-care in patients with type 2 diabetes. Diabet Med. 2008a;25:1102–7. doi: 10.1111/j.1464-5491.2008.02535.x.
19. Katon WJ, Russo JE, Heckbert SR, Lin EH, Ciechanowski P, Ludman E, *et al.,*The relationship between changes in depression symptoms and changes in health risk behaviors in patients with diabetes. Int J Geriatr Psychiatry. 2010b;25:466–75. doi: 10.1002/gps.2363.
20. Anderson RJ, Grigsby AB, Freedland KE, de Groot M, McGill JB, Clouse RE, *et al.,*Anxiety and poor glycemic control: A meta-analytic review of the literature. Int J Psychiatry Med. 2002;32:235–47. doi: 10.2190/KLGD-4H8D-4RYL-TWQ8.
21. Pouwer F, Skinner TC, Pibernik-Okanovic M, Beekman AT, Cradock S, Szabo S, *et al.,*Serious diabetes-specific emotional problems and depression in a Croatian-Dutch-English Survey from the European depression in diabetes [EDID] research consortium. Diabetes Res Clin Pract. 2005;70:166–73. doi: 10.1016/j.diabres.2005.03.031.
22. Kokoszka A, Pouwer F, Jodko A, Radzio R, Mućko P, Bieńkowska J, *et al.,*Serious diabetes-specific emotional problems in patients with type 2 diabetes who have different levels of comorbid depression: A Polish study from the European depression in diabetes (EDID) research consortium. Eur Psychiatry. 2009;24:425–30. doi: 10.1016/j.eurpsy.2009.04.002.
23. Ciechanowski PS, Katon WJ, Russo JE. Depression and diabetes: Impact of depressive symptoms on adherence, function, and costs. Arch Intern Med. 2000;160:3278–85. doi: 10.1001/archinte.160.21.3278.
24. Ciechanowski PS, Katon WJ, Russo JE, Hirsch IB. The relationship of depressive symptoms to symptom reporting, self-care and glucose control in

diabetes. Gen Hosp Psychiatry. 2003;25:246–52. doi: 10.1016/s0163-8343(03)00055-0.
25. Bhutani G, Kalra S, Verma P, Kaushal J. Bibliometric analysis of Journal of Social Health and Diabetes (JOSH Diabetes) J Soc Health Diabetes. 2014;2:37–9.
26. Aikens JE, Mayes R. Elevated glycosylated albumin in NIDDM is a function of recent everyday environmental stress. Diabetes Care. 1997;20:1111–3. doi: 10.2337/diacare.20.7.1111.
27. Toobert DJ, Glasgow RE. Problem solving and diabetes self-care. J Behav Med. 1991;14:71–86. doi: 10.1007/BF00844769.
28. Nicolucci A, Kovacs Burns K, Holt RI, Comaschi M, Hermanns N, Ishii H, *et al.,*Diabetes attitudes, wishes and needs second study (DAWN2™): Cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. Diabet Med. 2013;30:767–77. doi: 10.1111/dme.12245.
29. Lustman PJ, Clouse RE, Carney RM. Depression and the reporting of diabetes symptoms. Int J Psychiatry Med. 1988;18:295–303. doi: 10.2190/lw52-jfkm-jchv-j67x.
30. 66.Clouse RE, Lustman PJ. Gastrointestinal symptoms in diabetic patients: Lack of association with neuropathy. Am J Gastroenterol. 1989;84:868–72.
31. 67.Lustman PJ, Clouse RE. Relationship of psychiatric illness to impotence in men with diabetes. Diabetes Care. 1990;13:893–5. doi: 10.2337/diacare.13.8.893.
32. 68.Turkington RW. Depression masquerading as diabetic neuropathy. JAMA. 1980;243:1147–50.
33. MacLean D, Lo R. The non-insulin-dependent diabetic: Success and failure in compliance. Aust J Adv Nurs. 1998;15:33–42.
34. Garratt AM, Schmidt L, Fitzpatrick R. Patient-assessed health outcome measures for diabetes: A structured review. Diabet Med. 2002;19:1–1. doi: 10.1046/j.1464-5491.2002.00650.
35. Sanjay K, Biranchi NJ, Rajiv Y. Emotional and psychological needs of people with diabetes. Indian J Endocrinol Metab. 2018; 22(5): 696-704.
36. Hansen MB, Jensen ML, Carstensen B. Causes of death among diabetic patients in Denmark. Diabetologia. 2012;55:294–302. doi: 10.1007/s00125-011-2383-2. DOI: 10.1007/s00125-011-2383-2.
37. Khowaja S, Khowaja LA. Quality of care for diabetics in Karachi Pakistan. Value in Health. 2010;13(3):A67. DOI: http://dx.doi.org/10.1016/S1098-3015(10)72315-9.
38. Intas DG, Stergiannis I, *et al.,*Development and validation of a Diabetes Self-Care Activities Questionnaire. Rostrum of Asclepius. 2011;10(1):76–93. Available at: http://www.vima-asklipiou.gr/volumes/2011/VOLUME%2001_11/VA_OP_1_10_01_11.pdf .
39. Cox DJ, Kovatchev PB, Stacey M, Anderson MS. Type 1 diabetic drivers with and without a history of recurrent hypoglycemia–related driving mishaps: physiological and performance differences during euglycemia and the induction of hypoglycemia. Diabetes Care. 2010;33:2430–2435. doi: 10.2337/dc09-2130.
40. Bayani MA, Shakiba N, Bijani A, Moudi S. Depression and quality of life in patients with type 2 diabetes mellitus. Caspian J Intern Med. 2022 Spring;13(2):335-342. doi: 10.22088/cjim.13.2.3. PMID: 35919653; PMCID: PMC9301220.
41. Snoek FJ, Bremmer MA, Hermanns N. Constructs of depression and distress in diabetes: time for an appraisalLancet Diabetes Endocrinol. 2015;3:450–460. doi: 10.1016/S2213-8587(15)00135-7. [DOI]
42. Zhao W, Chen Y, Lin M, Sigal RJ. Association between diabetes and depression: sex and age differences. Public Health. 2006;120:696–704. doi: 10.1016/j.puhe.2006.04.012. [DOI]
43. De Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ. Association of depression and diabetes complications: a meta-analysis. https://insights.ovid.com/pubmed?pmid=11485116. Psychosom Med. 2001;63:619–630. doi: 10.1097/00006842-200107000-00015. [DOI]
44. Pan A, Lucas M, Sun Q, *et al.,*Bidirectional association between depression and type 2 diabetes mellitus in women. Arch Intern Med. 2010;170:1884–1891. doi: 10.1001/archinternmed.2010.356. [DOI]
45. Mezuk B, Eaton WW, Albrecht S, Golden SH. Diabetes Care. Depression and type 2 diabetes over the lifespan: a meta-analysis. 2008;31:2383–2390. doi: 10.2337/dc08-0985.
46. Sharif S, Raza MT, Mushtaq S, Afreen B, Hashmi BA, Ali MH. Frequency of Depression in Patients with Type 2 Diabetes Mellitus and its Relationship with Glycemic Control and Diabetic Microvascular Complications. Cureus. 2019 Jul 16;11(7):e5145. doi: 10.7759/cureus.5145. PMID: 31523573; PMCID: PMC6741377.
47. Mekhtiev TV. [Stress, anxiety, depression and erectile dysfunction in patients with diabetes mellitus]. Georgian Med News. 2013 Jul-Aug;(220-221):77-81. Russian. PMID: 24013155.
48. Wang X, Yang X, Cai Y, *et al.,*High Prevalence of Erectile Dysfunction in Diabetic Men With Depressive Symptoms: A Meta-Analysis. J Sex Med 2018;15:935–941.
49. A. Dan *et al.,*Erectile dysfunction in patients with diabetes mellitus: its magnitude, predictors and their bio-psycho-social interaction: a study from a developing country. Asian J Psychiatr (2014).
50. Perihan Ozkan Gumuskaya, Ozgur Altun, Emine Yildirim, Nur Karakutuk Yuztas, Neslihan Ozsoy et al The Association Between Depression and Antidiabetic Treatments in Type 2 Diabetes Patients with Both Good and Poor Glycemic Control..*J. Clin.*

Med. 2025, *14*(10), 3460; https://doi.org/10.3390/jcm14103460

51. Joanna F. Dipnall, Julie A. Pasco, Denny Meyer, Michael Berk, Lana J. Williams et al The association between dietary patterns, diabetes and depression *Journal of Affective Disorders*. 174, 15:2015, 215-224
52. Ciechanowski PS, Katon WJ, Russo JE. Depression and diabetes: impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med* 2000160: 3278 –3285
53. Loretta Vileikyte, Howard Leventhal, Jeffrey S. Gonzalez, Mark Peyrot, Richard R. Rubin *et al.,*Diabetic Peripheral Neuropathy and Depressive Symptoms: The association revisited. *Diabetes Care* 1 October 2005; 28 (10): 2378 - 2383. https://doi.org/10.2337/diacare.28.10.2378
54. Tardif I, Guénette L, Zongo A, Demers É, Lunghi C. Depression and the risk of hospitalization in type 2 diabetes patients: A nested case-control study accounting for non-persistence to antidiabetic treatment. Diabetes Metab. 2022 Jul;48(4):101334. doi: 10.1016/j.diabet.2022.101334. Epub 2022 Feb 26. PMID: 35231612.

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