Research Article

Study of depression in type 2 diabetes mellitus patients

Akash Rajender[1], Krishna Kanwal[2], Deepa Chaudhary[3], RS Chaudhri[4], Gaurav Rajender[5], Priyanka Choudhary[1]

[1]Department of General Medicine, Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan, India.
[2]Department of Psychiatry, Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan, India.
[3]Department of Obstetrics and Gynecology, JLN Medical College, Ajmer, Rajasthan, India.
[4]Department of Anesthesia, National Institute of Medical Sciences, Jaipur, Rajasthan, India.
[5]Department of Psychiatry, SMS Medical College, Jaipur, Rajasthan, India.
Correspondence to: Akash Rajender, E-mail: drakash5@gmail.com

Received January 17, 2016. Accepted February 2, 2016

Abstract

Background: The World Health Organization estimates the population with diabetes to increase to 366 million by 2030 worldwide, with a maximum of 79.4 million Indians. Depression is an undiagnosed comorbidity leading to significant disability, noncompliance, and postulated to cause poorer glycemic control.

Objective: To detect depression and its associated cofactors among type 2 diabetes mellitus (T2DM) patients.

Materials and Methods: In an observational study, 312 randomly selected T2DM patients were evaluated at a tertiary care center in Northern India. Sociodemographic, clinical, and laboratory data were collected. Montgomery Asberg Depression Rating Scale was used to detect depression. Groups with and without major depression were compared for various diabetes variables. Statistical analysis was carried out using the SPSS version 14.0.

Result: One-third patients with T2DM (32.05%) suffered from major depression. Female sex, lower education level, lower monthly household income, unmarried or divorced/widowed individuals, and unemployment were the significant risk factors for major depression in patients with T2DM.

Conclusion: Depression is a common under-recognized, underdiagnosed, and undertreated comorbidity associated with diabetes. Identification and management of depression and its associated risk factors form an essential integral part of holistic management of diabetes.

KEY WORDS: Depression, diabetes, risk factors

Introduction

Diabetes mellitus is a growing epidemic in the last 30 years. The World Health Organization (WHO) has estimated a worldwide rise from 2.8% to 4.4% in all age groups in the prevalence of diabetes by 2030. The WHO estimates 366 million patients with diabetes worldwide and 79.4 million in India by 2030.[1] Depression is estimated to be 5.7% of the total global burden of disease, and would be second leading cause of disability-adjusted life years by 2020. According to the WHO, depression is responsible for the greatest proportion of burden associated with nonfatal health outcomes and account for approximately 12% of total years lived with disability.[2]

Research shows that depression is associated with poor compliance to treatment.[3–5] In particular, depressed mood in patients with diabetes might lead to pessimism regarding perceived benefits and lowered self-efficacy, and could result in poor self-care and compliance.[6] Furthermore, it was clearly indicated that depression in patients with type 2 diabetes could severely impact management of diabetes through a higher symptom burden,[7] increased functional impairment,[7] poorer glycemic control,[8] and more diabetic complications.[9,10]

Access this article online	
Website: http://www.ijmsph.com	Quick Response Code:
DOI: 10.5455/ijmsph.2016.17012016367	

India being the projected diabetic capital by 2030 and depression being poorly identified in this population, there is a need for research on the impact of depression among persons with diabetes.

Materials and Methods

Patient Selection

The study sample consisted of 312 patients with type 2 diabetes mellitus (T2DM), presenting at OPD or IPD from April 2013 to September 2014 at the Department of Medicine, Mahatma Gandhi Medical College and Hospital (MGMCH), Jaipur, Rajasthan.

General Protocol

In a cross-sectional observational study, an informed consent was taken from 312 randomly selected patients with T2DM, after excluding those who had received any form of psychiatric treatment (pharmacological or nonpharmacological), or those with significant unstable physical illness (e.g., acute myocardial infarction, diabetes ketoacidosis, hyperglycemic hyperosmolar state, or stroke). Sociodemographic, clinical, and laboratory profiling were done.

Assessment of Major Depression

Montgomery Asberg Depression Rating Scale (MADRS), developed from Asberg's comprehensive psychopathological rating scale, was used to assess the severity of depression. The 10 ratings use 0–6 severity scales, with higher scores reflecting more severe symptoms.

Statistical Analysis

Statistical analysis was carried out using the SPSS version 14.0.

Result

One-third (32.05%) of the subjects with T2DM had major depressive disorder; score of MADRS ≥7. Of this, 56% were women and 44% were men.

The prevalence of depression increases progressively after 60 years to peak at 17.8% in the age group of >80 year ($p = 0.439$, odds ratio = 1.48, confidence interval: 0.58–4.11). Overall age ($p = 0.591$) and all the studied age groups failed to show any significant association with depression [Table 1].

The overall prevalence of depression in the studied sample was 32.05%. Prevalence of depression was further studied in various selected sociodemographic, clinical, and other characteristics of sample population, using binary logistic regression. Depression was found to be significantly associated with female sex ($p = 0.032$), educational level: $p = 0.006$ (especially illiteracy, $p = 0.001$), monthly household income ($p = 0.006$), especially with monthly income of Rupees 0–18,000 ($p = 0.001$ and $p = 0.023$). Depression was found to be significantly higher in unmarried ($p = 0.001$), divorced/widowed/separated ($p = 0.001$), and unemployed ($p = 0.004$).

Five variables, that is, sex, education level, monthly household income, marital status, and current employment status were found to be predictors of depression in patients with diabetes.

Discussion

In this study, 312 subjects with T2DM were studied. Of which, 52.88% were women (165) and 47.12% (147) were men. The mean age was 57.3 ± 7.4 years. Nearly half (49.68% [155]) of the sample was between the age group of 46 and 60 years and one-third (33.33% [104]) subjects were aged more than 60 years.

The prevalence of depression among the participants in this study was found to be 32.05%. Similar findings were replicated in various other studies where it ranged between 33% and 41%.[11–15] However, few studies found the prevalence of depression among patients with T2DM to be slightly more than 70% in Trivandrum, India and in US-based separate studies.[16]

A number of risk factors in this study were found to be associated with depression. Age of the subjects with diabetes was not found to be significantly associated with depression ($p = 0.591$) [Table 1]. Several other studies have reported no association between age and prevalence of depression among patients with T2DM,[11,13,17–20] whereas there are very few studies that have reported a significant association between age and depression in subjects with diabetes.[22]

In this study, depression was significantly ($p = 0.032$) higher among female patients (33.94% vs. 29.93%) as shown in Table 2, which has also been reported by various other studies.[11,13–15] In a meta-analysis,[20] it was found that diabetes doubles the risk of depression and it is especially more among women (28.2%) compared with men (18%); this finding has been replicated in several recent studies.[2,9,10] Fewer Indian studies by Guruprasad et al.,[17] Raval et al.,[12] and Poongothai et al.[21] have not supported this correlation.

Marital status was significantly associated [Table 2] with depression in this study ($p = 0.001$). Depression was significantly high among single individuals, whether unmarried ($p = 0.001$) or divorced/widowed/separated ($p = 0.001$), which is similar to several other studies.[11,15,21,25] Our study suggests a protective role of family support against depression in patients with T2DM requiring lifelong care.

In this study, educational level was found to be significantly associated [Table 2] with depression in patients with T2DM ($p = 0.006$). Low education levels, especially illiteracy was significantly associated with higher prevalence of depression ($p = 0.001$). Similar association was found in many other studies.[11,25–28] It is postulated that patients with diabetes with lower educational level are probably less aware about the disease severity, need for regular medication, and dietary restriction and hence makes the patient more prone to complications.

In this study, current job status was also found to be a risk factor ($p = 0.013$). Depression was found to be more among

Table 1: Distribution of depression in various age groups

Variables	Depression		*p*-Value	Odds ratio	95% CI	
	No (%)	Yes (%)			Lower	Upper
Age (years)			0.591			
30–39*	87.6	12.4	—	—	—	—
40–49	86.8	13.2	0.74	1.101	0.64	2.01
50–59	89.5	10.5	0.422	0.812	0.44	1.31
60–69	88.8	11.2	0.644	0.88	0.5	1.52
70–79	88.5	11.5	0.749	0.92	0.57	1.59
≥80	82.2	17.8	0.439	1.481	0.58	4.11

CI, confidence interval.

Table 2: Distribution by depression status and sociodemographic characteristics

Variable	No depression		Depression		*p*-Value	OR	95% CI	
	No	(%)	Yes	(%)			Lower	Upper
Sex								
Male#	103	70.06	44	29.93	—	—	—	—
Female	109	66.06	56	33.94	**0.032***	1.47	1.16	1.93
Educational level					**0.006****			
Illiterate	54	62.79	32	37.2	**0.001****	2.22	1.3	3.72
Primary	39	66.07	17	35.93	0.419	1.21	0.74	1.82
Secondary	27	65.85	14	34.15	0.658	1.16	0.75	1.78
Graduate and postgraduate#	92	71.31	37	28.69	—	—	—	—
Monthly household income					**0.006****			
0–8,000	47	65.28	25	34.72	**0.001****	1.89	1.26	2.78
8,001–18,000	87	66.41	44	33.59	**0.023***	1.57	1.1	2.18
>18,000#	78	71.56	31	28.44	—	—	—	—
Marital status					**0.001****			
Unmarried	14	63.64	8	36.36	**0.001****	2.75	1.55	4.81
Divorced/widowed/separated	26	56.52	20	43.48	**0.001****	2.21	1.62	2.9
Married#	172	70.49	72	29.51	—	—	—	—
Current job					**0.013***			
Unemployed	12	54.56	10	45.45	**0.004****	1.6	1.17	2.24
Housewife	47	69.12	21	30.88	1.042	1.33	1.02	1.82
Retired	22	75.86	7	24.14	0.85	0.92	0.62	1.43
Employed#	131	67.88	62	32.12	—	—	—	—

CI, confidence interval; OR, odds ratio.

patients who were unemployed (p = 0.004) than those who were employed [Table 2]. Almost half (45.45%) of the unemployed patients with diabetes were suffering from depression. This could be probably because of financial burden imposed by the disease on this group.

Lower socioeconomic status in this study [Table 2] was found to be significantly associated with depression (p = 0.006) in patients with diabetes, which is consistent with the findings of other studies.[27,29,30] DM is a chronic physical disorder that cannot be cured but can only be managed. It thus requires lifestyle alterations, lifelong medication, and adherence for its successful treatment. Therefore, in India, individuals with low earning or socioeconomic status face the twin burdens of paying for health care and meeting the needs of their family.[31,32]

Our study furthers the understanding of the under-recognized complex interrelationship between diabetes and depression. Several markedly significant correlations are seen, but still being a cross-sectional study with limited sample size at a tertiary care center, further prospective population-based studies are needed.

Conclusion

Depression is very common in patients with diabetes. This correlation is governed by several sociodemographic patterns endemic to the Indian subcontinent. Treating depression in patients with diabetes is emerging as an integral part of holistic diabetic care worldwide.

References

1. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care 2004;27(5):1047–53.
2. Egede LE, Ellis C. Diabetes and depression: global perspectives. Diabetes Res Clin Pract 2010;87(3):302–12.
3. DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. Arch Intern Med 2000;160(14):2101–7.
4. Taj R, Khan S. Study of reasons of non-compliance to psychiatric treatment. J Ayub Med Coll Abottabad 2005;17(2):26–8.
5. Lin EHB, Katon W, Von Korff M, Rutter C, Simon GE, Oliver M, et al. Relationship of depression and diabetes self-care, medication adherence, and preventive care. Diabetes Care 2004; 27(9):2154–60.
6. Doherty Y, James P, Roberts S. Stage of change counselling. In: *Psychology in Diabetes Care*, Snoek FJ, Skinner TC (Eds.). West Sussex, United Kingdom: John Wiley, 2000. pp. 112–3.
7. Peyrot M, Rubin RR. Levels and risks of depression and anxiety symptomatology among diabetic adults. Diabetes Care. 1997; 20(4):585–90.
8. Lustman PJ, Clouse RE. Depression in diabetic patients: the relationship between mood and glycemic control. J Diabetes Complications 2005;19(2):113–22.
9. Black SA, Markides KS, Ray LA. Depression predicts increased incidence of adverse health outcomes in older Mexican Americans with type 2 diabetes. Diabetes Care 2003;26(10):2822–8.
10. de Groot M, Anderson R, Freedland K, Clouse RE, Lustman PJ. Association of depression and diabetes complications: meta-analysis. Psychosom Med 2001;63(4):619–30.
11. Rahman M, Rahman MA, Flora MS, Rakibuz-Zaman M. Depression and associated factors in diabetic patients attending an urban hospital of Bangladesh. Int J Collaborat Res Intern Med Public Health 2011;3(1):65–76.
12. Raval A, Dhanaraj E, Bhansali A, Grover S, Tiwari P. Prevalence & determinants of depression in type 2 diabetes patients in a tertiary care centre. Indian J Med Res 2010;132:195–200.
13. Nasser J, Habib F, Hasan M, Khalil N. Prevalence of depression among people with diabetes attending diabetes clinics at primary health settings. Bahrain Med Bull 2009;31:1–7.
14. Sotiropoulos A, Papazafiropoulou A, Apostolou O, Kokolaki A, Gikas A, Pappas S. Prevalence of depressive symptoms among non insulin treated Greek Type 2 diabetic subjects. BMC Res Notes 2008;1(1):101.
15. Téllez-Zenteno JF, Cardiel MH. Risk factors associated with depression in patients with type 2 diabetes mellitus. Arch Med Res 2002;33(1):53–60.
16. Iype T, Shaji SK, Balakrishnan A, Charles D, Varghese A, Antony TP. Cognition in type 2 diabetes: association with vascular risk factors, complications of diabetes and depression. Ann Indian Acad Neurol 2009;12(1):25–7.
17. Guruprasad KJ, Niranjan MR, Ashwin S. A study of association of depressive symptoms among the type 2 diabetic outpatients presenting to a tertiary care hospital. Indian J Psychol Med 2012;34(1):30–3.
18. Lloyd CE, Dyer PH, Barnett AH. Prevalence of symptoms of depression and anxiety in a diabetic clinic population. Diabet Med 2000;17(3):198–202.
19. Larijani B, Bayat M, Gorgani MK, Bandarian F, Akhondzadeh S, Sadjadi SA. Association between depression and diabetes. German J Psychiatry 2004;7(4):62–5.
20. Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: a meta-analysis. Diabetes Care 2001;24(6):1069–78.
21. Poongothai S, Pradeepa R, Ganesan A, Mohan V. Prevalence of depression in a large urban South Indian population—the Chennai Urban Rural Epidemiology Study (CURES-70). PLoS One 2009; 4(9):e7185.
22. Sweileh WM, Abu-Hadeed HM, Al-Jabi SW, Zyoud SH. Prevalence of depression among people with type 2 diabetes mellitus: a cross sectional study in Palestine. BMC Public Health 2014;14:163.
23. Stankoviü Ž, Jašoviü-Gašiü M, Leþiü-Toševski D. Psychological problems in patients with type 2 diabetes—clinical considerations. Vojnosanit Pregl 2013;70(12):1138–44.
24. Miyaoka Y, Miyaoka H, Motomiya T, Kitamura S, Asai M. Impact of sociodemographic and diabetes related characteristics on depressive state among non-insulin-dependent diabetic patients. Psychiatry Clin Neurosci 1997;51(4):203–6.
25. Al-Amer RM, Sobeh MM, Zayed AA, Al-Domi HA. Depression among adults with diabetes in Jordan: Risk factors and relationship to blood sugar control. J Diabetes Complications 2011; 25(4):247–52.
26. Fisher L, Mullan JT, Arean P, Glasgow RE, Hessler D, Masharani U. Diabetes distress but not clinical depression or depressive symptoms is associated with glycemic control in both cross-sectional and longitudinal analyses. Diabetes Care 2010;33(1):23–8.
27. Collins MM, Corcoran P, Perry IJ. Anxiety and depression symptoms in patients with diabetes. Diabet Med 2009;26(2):153–61.
28. Pouwer F, Beekman ATF, Nijpels G, Dekker J, Snoek F, Kostense P, 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(7):892–8.
29. Everson SA, Maty SC, Lynch JW, Kaplan GA. Epidemiologic evidence for the relation between socioeconomic status and depression, obesity and diabetes. J Psychosom Res 2002;53(4):891–5.
30. Thomas J, Jones G, Scarinci I, Brantley P. A descriptive and comparative study of the prevalence of depressive and anxiety disorders in low-income adults with type 2 diabetes and other chronic illnesses. Diabetes Care 2003;26(8):2311–7.
31. Balhara YPS, Sagar R. Correlates of anxiety and depression among patients with type 2 diabetes mellitus. Indian J Endocrinol Metab 2011;15(Suppl 1):S50–4.
32. Mathew CS, Dominic M, Isaac R, Jacob JJ. 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 2012;16(5):764–8.

How to cite this article: Rajender A, Kanwal K, Chaudhary D, Chaudhri RS, Rajender G, Choudhary P. Study of depression in type 2 diabetes mellitus patients. Int J Med Sci Public Health 2016;5:1874-1877

Source of Support: Nil, **Conflict of Interest:** None declared.