Original article

Depression and its association with glycemic control in Nepalese adults with diabetes mellitus

Pant SB, Ojha SP, Chapagai M, Tulachan P, Dhungana S

Department of Psychiatry and Mental Health, Maharajgunj Medical Campus, Tribhuvan University Teaching Hospital, Kathmandu, Nepal

Correspondence: Dr. Sagun Ballav Pant

Email: sagun055@gmail.com

Abstract

Introduction: Depression is reported more common among people with diabetes mellitus which if not addressed, may lead to poor diabetes outcomes. The purpose of the study was to explore depression among people with diabetes mellitus attending endocrinology outpatient department of Tribhuvan University Teaching Hospital and to find its association with glycemic control.

Methods: Patients with diabetes mellitus (n=158) attending endocrinology OPD of Tribhuvan University Teaching Hospital were chosen by simple random sampling technique.A self- designed semi structured proforma was devised to obtain the socio- demographic characteristics of the study population. 'General health questionnaire -12' was applied and those with a score of three or more considered as achieving 'psychiatric caseness'and among them depression was diagnosed with ICD-10 DCR criteria and HAM-D scale was used to verify it objectively.

Results: Among the patients, 122(77.2%) belonged to type 2 diabetes and 36 (22.8%) belonged to type 1 diabetes. Estimate of depression was found to be 29.11% (n=46) which was almost similar in both types of diabetes. The duration of diabetes were less than 5 years in 38% of patients. Level of depression showed significant associationand a positive correlation with glycemic control.

Conclusion: This study concluded that depression is common in both type 1 and type 2 diabetes patients and calls the need for screening of depression for comprehensive diabetes management.

Keywords: Depression, diabete smellitus,General Health Questionnaire-12,glycemic control, HAM-D, ICD-10 DCR,

Introduction

Depression and diabetes are both common chronic condition and confer a noteworthy burden on individual and community level. A bidirectional relationshipbetweendepression and diabetesis welle stablished.Evidence from prospective and cross-sectional studies demonstrates that the presence of diabetes doubles the risk of comorbid depression.[1] Depression is common in both type 1(T1DM) and type 2 diabetes mellitus (T2DM) and has significant effects on the course and outcome of diabetes. In a meta-analysis of 42 published studies, the prevalence of major depression in people with diabetes was 11% using standardized diagnostic interviews while31% using self-report questionnaire.[2] Ina hospital based study in Nepal,the prevalence of depression in type 2 diabetes was found 40.3%.[3] Depression complicates diabetes by promoting poor glycemic control and increasing risk of other complications.4In Nepal, recognition of depression among individuals with diabetes is suboptimal, therefore the current study is an attempt to shed light into the estimate of depression in cases of diabetes mellitus and find out its association with glycemic control in Nepali setting.

Methods

This was a cross- sectional study conducted within a period of six months from January to July 2014, at endocrinology OPD in Tribhuvan University Teaching Hospital (TUTH). The study was initiated after the approval of Institutional Review Board, Institute of Medicine. The number of sample size required was obtained by using formula for sample size estimation. The study population comprised of 158 patients aged 18-65 with diabetes mellitus selected by simple random sampling technique who attended endocrinology OPD

of TUTH. Informed consent was taken from the patient. Exclusion criteria included newly diagnosed diabetes (<1 month), subjects with family history of depression, and those with co-morbid medical illness. A self- designed semi structured proforma was devised to obtain the socio-demographic characteristics and diabetes history of the study population.Each respondents were administered the Nepali version of General health questionnaire-12 (GHQ-12).[5] Scoring was done using 'binary scoring' method (with the two least symptomatic answers scoring 0 and the two most symptomatic answers scoring 1 i.e. 0-0-1-1). Those achieving the score of 3 or greater was considered 'psychiatric caseness'. Such respondents are more likely than not (0.51) to be diagnosed with psychiatric or mental problem, illness or disorder upon independent psychiatric assessment.[6] Among those with psychiatric caseness, depression was diagnosed with ICD-10 DCR criteriaas developed by the division of Mental Health of the World Health Organization (WHO, 1992).Hamilton Rating Scale for Depression (HAM-D) scale was used to verify it objectively and also to grade the degree of depression. Glycated hemoglobin (HbA1c) were obtained from the subject's medical record and used as a marker for glycemic control. Value within three months from time of interview and only from TUTH laboratory were included to avoid bias.HbA1c < 7% was considered good glycemic control and ≥7 considered as poor glycemic control.[7]

Data were analyzed using SPSS version 16 (Chicago, Illinois, USA). Descriptive analysis was performed, and mean, median, range were calculated. The data were explained as mean± standard deviation (SD) wherever suitable. Pearson's rank correlation was performed for ordinal dataset; this was utilized to find out the correlation between glycemic control and severity of depression. Chi- square tests were applied for categorical data. Independent sample t test, ANOVA tests were applied wherever applicable. p- value of <0.05 was considered significant.

Results

Demography: Subjects were commonly from the age group 51-60, (32.3%) and 55.7% (n=88) of the total sample were males. Among all respondents, 27.2% (n=43) were educated up to secondary level, 10.1% (n=16) could read and write and only 7.6% (n=12) were illiterate. More than half i.e. 55.7% (n=88) of respondents were from outside Kathmandu valley and 72.8% (n=115) were married. On the basis of religion, 59.5% (n=94) were Hindus and caste wise, 27.8% (n=44) were Brahmins. Regarding occupation, 20.9% (n=330 were involved in business followed by equal number of respondents involved in farming and service, 16.5% (n=26). Among respondents, 51.3% (n=81) lived in a joint family and on the basis of income, 51.3% (n=81) had a monthly income greater than 10,000 rupees. (US $1= Rs 100 Nepali rupiyaa).On the basis of duration of diabetes mellitus, 38% (n=60) had duration less than 5 years followed by, 31% (n=49) where the duration was 5-9 years. The respondents using insulin, oral hypoglycemic agent and combination of both were 19.6%, 60.1% and 20.3% respectively. Out of the 158 respondents, majority were cases of T2DM, 77.2% (n=122) followed by 22.78% (n=36) of them with T1DM.

Table 1: Comparison of socio-demographic variables among group with no depression and depression.

	No depression (112) n (%)	Depression (46) n (%)	P value
Mean age ± SD in years	47.50±13.09	49.87±14.24	0.316
Sex			
Male	63 (39.87)	25 (15.82)	0.827
Female	49 (31.01)	21 (13.29)	
Marital status			
Single	21 (13.29)	7 (4.43)	0.145
Married	84 (53.16)	31 (19.62)	
Separated	3 (1.89)	2 (1.26)	
Widowed	4 (2.53)	6 (3.79)	
Educational status			
Illiterate	7 (4.43)	5 (3.16)	0.05
Can read and write	9 (5.69)	7 (4.43)	
Primary	10 (6.32)	9 (5.69)	
Secondary	33 (20.88)	10 (6.32)	
Higher secondary	24 (15.18)	11 (6.96)	
University	29 (18.35)	4 (2.53)	

Religion			
Hindu	66 (41.77)	28 (17.72)	0.636
Buddhist	36 (22.78)	17 (10.75)	
Christian	7 (4.43)	1 (0.63)	
Muslim	1 (0.63)	0	
Others	2 (1.26)	0	
Address			
Valley	51 (32.27)	19 (12.02)	0.627
Outside valley	61 (38.6)	27(17.08)	
Type of family			
Nuclear	57 (36.07)	18 (11.39)	0.05
Joint	55 (34.81)	26 (16.45)	
Broken	0	2 (1.26)	
Income			
Rs 3000-5000	5 (3.16)	5 (3.16)	0.319
Rs 5000-10000	48 (30.37)	19 (12.02)	
>10000	59 (37.34)	22 (13.92)	
Type of Medication			
Insulin	24 (15.18)	7 (4.43)	0.001
Oral hypoglycemic	74 (46.83)	21 (13.29)	
Combination of both	14 (8.86)	18 (11.39)	
Prescription missed (per week)			
0	50 (31.64)	7 (4.43)	<.001
1	14 (8.86)	1 (0.63)	
2	27 (17.08)	5 (3.16)	
3	10 (6.3)	14 (8.86)	
4	5 (3.16)	6 (3.79)	
5	6 (3.79)	5 (3.16)	
>6	0	8(100)	

(Table 1) shows socio-demographic variables between diabetes patients with and without depression. A statistically significant association was found between depression and type of medication (p=0.001) and depression and number of prescription missed per week (p<0.01).

Estimate of depression in patients with diabetes mellitus

Table 2: Distribution on the basis of depression among patients with diabetes mellitus

ICD classification	T1DM	T2DM	N (%)
No depression	26	86	112 (70.9)
Mild depressive episode	6	17	23 (14.6)
Moderate depressive episode without somatic syndrome	2	3	5 (3.2)
Moderate depressive episode with somatic syndrome	2	7	9 (5.7)
Severe depressive episode without psychotic symptoms	0	7	7 (4.4)
Severe depressive episode with psychotic symptoms	0	2	2 (1.3)
Total	**36**	**122**	**158 (100)**

(Table 2) shows that depression was observed on 29.11% (n=46), which is the estimate of depression in patients with both types of diabetes combined. Among T1DM 27.77% (n=10) were observed to have depression while among T2DM 29.50% (n=36) which were almost similar. Half (n=23) of the patients with depression were having mild depressive episode. Only 4.43% (n=2) among depressedwere observed to have severe depression with psychotic symptoms and both were from T2DM group.

Table 3. Relationship between Depression and glycemic control

	Poor glycemic controlN (%)	Good glycemic control N (%)	p value
Mild depressive episode	20(43.47)	3(6.52)	
Moderate depressive episode without somatic syndrome	5(10.86)	0	
Moderate depressive episode with somatic syndrome	8(17.39)	1(2.17)	p<0.001
Severe depressive episode without psychotic symptoms	7(15.21)	0	
Severe depressive episode with psychotic symptoms	2(4.34)	0	

(Table 3) shows that91.30% (n=42) among those with depression were observed to have poor glycemic control and only 8.69% (n=4) were observed to have good glycemic control. This relationship was found to be statistically significant at a p value <0.001. Level of depression was observed to be positively co-related with HbA1c (r=0.670, p<0.01) It was also observed that the mean HAM-D score in poor glycemic control group was 15.17±5.967 whereas among respondents of good glycemic control was 10.75±3.862, but the difference was not found statistically significant.

Level of depression on the basis of HAM-D
Among those with depression mean value of HAM-D score was 14.78 ± 5.918. (Range: 8-30).

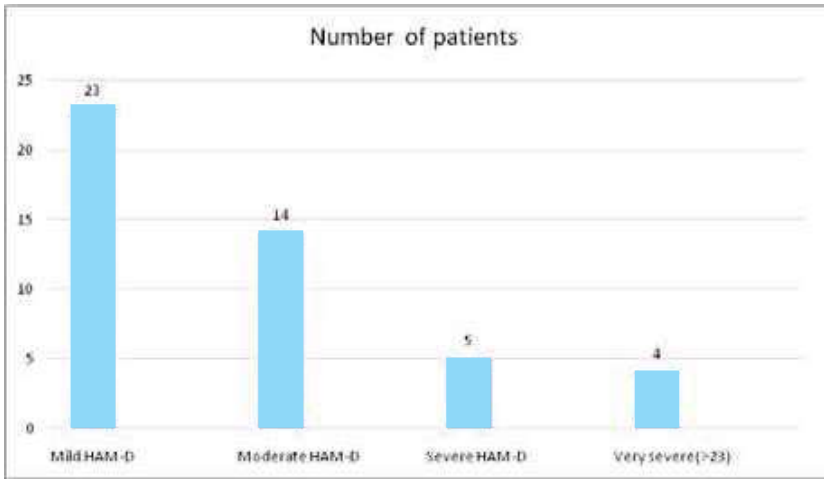

Figure 1: Severity of depression based on HDRS score.

(Figure 1) shows that majority of the respondents with depression had mild depression on HAM-D. The percentage of patients having mild, moderate, severe, and very severe depression was 23(50%), 14(30.4%), 5(10.9%), 4(8.7%) respectively.

Lab value of Glycated hemoglobin (HbA1c) and it relationship with depression.
The mean HbA1c among those without depression was observed to be 6.86±0.71 while the mean HBA1c value among those with depression was 8.367±1.33 which was found to be statistically significant at p<0.01.

Table 4: Mean HbA1c and its relationship with level of depression

HAM-D	Mean HbA1c	P value
Mild(8-13)	7.83±0.98	0.008
Moderate(14-18)	8.50±1.58	
Severe(19-22)	9.24±1.01	
Very severe(>23)	9.85±0.99	

shows that mean HbA1c increased as the level of depression increased (p=0.008) which was statistically significant at p<0.01.

Discussion:

The study sample majority i.e. 77.2% were T2DMand only 22.78% of them were T1DM. Being a tertiary referral center a substantial number of case of T1DM was also obtained which actually accounts for only around 5% among all diabetes patient.8About one third of the cases were from the age group 51-60 which may be due to more T2DM cases which typically develops with increasing age. The mean age among respondents with depression was higher than those without depression (Table 1), which may be due to progressive rise in depression with increase in age. In our study, in the depression group male and female were nearly equal in number even though there are evidence from epidemiological, family and clinical studies that the rates of major depression are about twofold higher among women than men.9 The observation may be due to the assumption that there is little or no sex bias within either TIDM or T2DM.10There was statistically significant association between depression and type of medication used.(p=0.001). More respondents with combination of oral hypoglycemic and insulin was seen in the depression group than in non-depressed group.(Table 1) Reason for the observation may be explained by poorer behavioral management due to comorbid depression leading to and poorer glycemic control which lead to the use of combination of drugs. (Table 1) shows that71.73% among depression group (n=33) missed three or more prescription per week, whereasonly 18.75% (n=21) of the respondents without depression missed more than three prescriptions per week. This association was found to be statistically significant at p<0.001. Similar observations has been observed in previous studies where diabetic patient with major depression has showed less adherence than diabetic patients without major depression.11 The occurrence of depression with diabetes in this study (29.11 %) was similar toprevalence in a meta-analysis where clinically relevant depression among people with diabetes was 31%.[2] In the study there was statistically significant association between depression and glycemic control. Previous studies have also revealed as ignificant association of depression and hyper glycemia in both type1and 2 diabetes.[12]

In our study, mean HbA1c was higher in those with depression than those without depression, and also HbA1c showed increment with increase in level of depression. Even in previous studies, diabetic with good blood glucose control were observed to less likely to be depressed than patients with poor glycemic control as assessed by HbA1c.[13]

This study has shown that depression is common psychiatric disorder among patients with both types of diabetes. This highlights the need for screening such patients for early detection and timely management of depression as the study has shown that the presence of depression can have significant impact the glycemic control in patients with diabetes mellitus.

The major limitation of the study is the choice of the site of the study, as TUTH being a tertiary referral center, mostly complicated cases reach our center, and also it was a single hospital based cross sectional study focused on out patients, hence the sample cannot be representative of the general population.

Conclusion:

The estimate of depression among participants with depression was 29.11% which was similar in both T1DM and T2DM. There was statistically significant association between depression and type of medication used and depression and number of prescriptions missed per week. Also, there was significant association between depression and glycemic control and also a positive co-relation between level of depression and HbA1c. This study has highlighted the need for screening for depression in patients with diabetes, which could add to the burden of uncontrolled diabetes.

Conflict of interest: None declared

References:

1. Lustman PJ, Clouse RE. Depression in diabetic patients: The relationship between mood and glycemic control. Journal of Diabetes and Its Complications. 2005; 19(2): 113-122.
2. 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.
3. Niraula K, Kohrt BA, Flora MS, Thapa N, Mumu SJ, Pathak R et al. Prevalence of depression and associated risk factors among persons with type-2 diabetes mellitus without a prior psychiatric history: a cross-sectional study in clinical settings in urban Nepal. BMC Psychiatry. 2013; 13:309.
4. Chowdhury S. Depression and diabetes: a risky comorbidity. Journal of Indian Medical Association. 2004; 102(10): 554-6.
5. Koirala NR, Regmi SK, Sharma VD et al. Sensitivity and validity of the General Health Questionnare-12 (GHQ-12) in a rural community setting in Nepal. Nepalese Journal of Psychiatry. 1999; 1:34-40.
6. Shakya DR.,Maskey R, Sharma SK., Karki, P. Psychiatric problems in patients with diabetes mellitus attending a diabetes clinic at a tertiary care hospital in Eastern Nepal. Journal of Diabetology. 2012: 2(4)
7. American Diabetes Association. Standards of Medical Care in Diabetes- 2011. Diabetes Care. Jan 2011; 34(Suppl 1): S11–S61.
8. Centers for Disease Control and Prevention. National diabetes statistics report: estimates of diabetes and its burden in the United States, 2014. Atlanta: US Department of Health and human Services; 2014
9. Weissman MM, Klerman GL. Gender and depression. Trends in Neuroscience. 1985, 8(9):416–420
10. Gale EA, Gillespie KM. Diabetes and gender. Diabetologia. 2001: 44 (1), 3-15
11. Lin EH, Katon W, Von Korff M, Rutter C, Simon GE et. al. Relationship of depression and diabetes self-care, medication adherence, and preventive care. Diabetes Care. 2004; 27(9): 2154-60.
12. Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE. Depression and poor glycemic control: a meta-analytic review of the literature. Diabetes Care. 2000; 23(7): 934-42.
13. Larijani B, Bayat MKS, Gorgani MK, Bandarian F, AkhondzadehS,Sadjadi SA. Association between depression and diabetes. German Journal of Psychiatry. 2004; 7(4): 62-65.