ORIGINAL ARTICLE

Depression in Patients with Diabetes Mellitus: Prevalence & Factors Associated

Subedi S[1], Adhikari A[2], Paudel K[3], Shrestha L[4], Shrestha S[3], Sharma N[5]

1. Associate Professor, Department of Psychiatry, UCMS, Bhairahawa, Nepal 2. BPH 4th Year student, UCMS, Bhairahawa, Nepal 3. Lecturer, MMIHS, Kathmandu, Nepal 4. Lecturer, Dept. Of Pharmacology, UCMS, Bhairahawa, Nepal 5. Lecturer, Dept. Of Anatomy, UCMS, Bhairahawa, Nepal

E-mail *Corresponding author : sandipsubedi@hotmail.com

Abstract

Introduction: *Both diabetes and depression are major public health problems. Depression is a frequent comorbidity associated with diabetes. This study was aimed to find the prevalence of depression among patients with diabetes and to identify various factors associated with it.*

Material And Method: *This is a cross-sectional study of diabetic patients visiting Internal medicine OPD of Universal College Of Medical Sciences, Bhairahawa, Nepal and referred for psychiatric evaluation. Sample size of 137 was included in 6 months period. Face to Face interview was conducted to gather socio-demographic and clinical profile of patients. Patient Health Questionnaire-9 was used to identify and classify depression. Frequency, Percentage, Chi-square test, Multivariate regression were applied.*

Results: *The overall prevalence of depression was 27%. Depression was found to be significantly higher among female patients (p=0.009), patients suffering from diabetes mellitus for more than 15 years (p=0.054), patients under insulin therapy (p=0.034) and patients whose blood sugar level was uncontrolled(p=0.020) even with treatment. On regression analysis, treatment modality, blood sugar level, gender and treatment modality were found to be independent predictors of depression among diabetic patients. Patients on insulin therapy were four times more likely to have depression (OR=4.344, CI: 2.129 – 8.865, p<0.001). Female patients were two times more likely to have depression (OR=1.825, CI: 0.221 - 2.855, p<0.052).*

Conclusion*: Almost one-fourth patients with diabetes also have depression. Factors like female sex, longer duration of diabetes, use of insulin therapy, uncontrolled diabetes increases the risk of developing depression in diabetic patients. Hence, routine screening of depression is necessary in patients with diabetes.*

Keywords: Depression, Diabetes Mellitus, Prevalence, Nepal

INTRODUCTION

Current literature shows that around 8–9% of adult population world-wide are suffering from type 2 diabetes mellitus (T2DM), and it has been observed that the number is significantly increasing with time.[1] A study reported that there were 7,00,700 cases of diabetes mellitus in Nepal in 2014. The estimated prevalence of diabetes for age group (20–79 years) was 4.6% with more than 14,778 deaths that year.[2] Depression is a common psychiatric disorder affecting more than 264 million people worldwide.[3] The Prevalence of depression in Nepal is about 11.7%.[4] Though the etiology of depression is not clear, it is thought to result from a complex interaction of biological, psychological and social factors. Though diabetes and depression are separate illnesses, both of them are major health problems in the world and they have some interrelationships. There are evidences which suggests that these two illnesses (diabetes and depression) could mutually exacerbate, with each condition acting as a risk factor in the development of the other.[5-7] Presence of depression is associated with a 60% increase in the risk of developing type 2 diabetes.[8] Similarly, prevalence of depression was significantly higher among patients with

type 2 diabetes (17.6%) compared to those without diabetes (9.8%).[9] The coexistence of depression in people with diabetes might lead to lots of complications like poor compliance to treatment, poor control of diabetes, higher complication rates, poor quality of life, increased healthcare cost, increased disability, and increased risk of death.[10] Though, periodic assessment of depression is recommended in patients with diabetes by International Diabetes Foundation (IDF)[10] depression remains under-diagnosed and untreated in diabetic patients.[11]

To our knowledge, research on depression in patients with diabetes mellitus is scarce in Nepal. Study by Pahari DP et al. [12] revealed that the prevalence of depression among diabetic patients was 34% and another study by Sunny AK et al.[13] revealed the prevalence of depression to be 22.7%. The aims of the present study were to estimate the prevalence of depression in patients diagnosed with T2DM, and to identify various socio-demographic and clinical factors associated with it.

MATERIAL AND METHOD

This is a cross sectional study conducted in the psychiatry out-patient department (OPD) of Universal College of Medical Sciences Teaching Hospital from 17th September 2019 to 16th March 2020. All consecutive T2DM patients visiting internal medicine OPD were referred to psychiatry OPD for evaluation of depression. Sample size was calculated to be 137. The inclusion criteria for the study were all patients with more than 18 years of age, either sex, diagnosed with T2DM for at least one year, able to understand and respond to the questionnaire items and willing to participate in the study. Patients who did not give written informed consent, having history of prior psychiatric illness and/ or prior treatment with psychiatric medicines were excluded from the study. Patients referred to psychiatry OPD was evaluated by a consultant psychiatrist. Patient health questionnaire (PHQ-9) was used for assessing and measuring severity of depressive symptoms. The PHQ-9 scores and cases were categorized into no depression (0-4), mild depression (5-9), moderate depression (10-14) moderately severe depression (15-19) and severe depression (20-27) . PHQ-9 score ≥10 had a sensitivity of 88% and a specificity of 88% for major depression.

A separate semi-structured proforma designed for the study was used to record the socio-demographic and clinical data**.** Data thus collected were analyzed using SPSS software. Ethical clearance for the study was obtained from the Institutional review committee. Confidentiality of the data was maintained and the data was used for research purpose only.

RESULT

A total of 137 patients were included in the study. More than half of the patients (58.4%) were from 40-59 years age group. The mean age of the subjects was 51.9 ±2.19 years. Majority of the subjects were females (51.8%) and significant majority (96.4%) were married. About 44.5% of the subjects were educated up to primary level and 40.1% were homemaker. More than three-fourth (81.0%) of patients were from middle socioeconomic class and majority (89.1) of the patients were Hindu. (Table 1)

Nearly two third (62%) of patients suffered from DM since 1-5 years. More than half (51.1%) of the patients were on mono-therapy. Out of the total 137 subjects, high majority (79.6%) were taking oral Hypoglycemic drugs. Nearly 61.3% of the patients had some other physical comorbidity apart from Diabetes. More than two third (69.3%) of the subjects' diabetes was not controlled. (Table 2)

The overall prevalence of depression was 27%. Among them, 14.6% subjects had mild depression, 10.9% had moderate depression, moderately severe and severe depression was seen in 0.7% each. (Table 3)

Table 1: Demographic Characteristisc of the Study Population (N=137)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
20 to 39	17	12.4
40 to 59	80	58.4
60 and above	40	29.2
Mean age ± SD = 51.9 ±2.19		
Sex		
Male	66	48.2
Female	71	51.8
Marital status		
Married	132	96.4
Unmarried	5	3.6
Education		
Illiterate	52	38.0
Primary	61	44.5
Secondary	16	11.7
Undergraduate	5	3.6
postgraduate	3	2.2
Occupation		
Farmer	30	21.9
Homemaker	55	40.1
Service	20	14.6
Business	10	7.3
Other specific	22	16.1
Economic status		
High	13	9.5
Middle	111	81.0
Low	13	9.5
Religion		
Hindu	122	89.1
Muslim	11	8.0
Christian	2	1.5
Buddhist	2	1.5

Table 2 : Clinical Characteristics Of the Study Population (N=137)

Variable	Frequency	Percentage (%)
Duration Of DM (Years)		
1-5	85	62.0
6-10	24	17.5
11-15	13	9.5
Above 15	15	10.9
Treatment for DM		
Single versus multiple		
Single medicine	70	51.1
Multiple medicine	67	48.9
Route of medicine		
Oral Hypoglycemic Drugs	109	79.6
Injection Insulin	28	20.4
Co-morbid condition		
Yes	84	61.3
No	53	38.7
Distribution of co morbid condition	**(N=84)**	
Hypertension	52	38.0
Chronic kidney disease	5	3.6
Diabetic foot	5	3.6
Thyroid	9	6.6
Others	13	9.5
No any illness	53	38.7
Blood sugar level		
Controlled DM	42	30.7
Uncontrolled DM	95	69.3

Table 3: Depression Among Patients with Diabetes Mellitus

Depression among diabetic patients	Frequency	Percentage
Prevalence of Depression		
Depression (PHQ-9 Score ≥5)	37	27.0
No depression (PHQ-9 Score 0-4)	100	73.0
Severity of depression		
Mild depression (5-9)	20	14.6
Moderate depression (10-14)	15	10.9
Moderately Severe depression (14-19)	1	0.7
Severe Depression (20-27)	1	0.7

Table 4: Association between Depression and Socio-demographic Characteristics

Characteristics	Depression N (%)	No depression N (%)	P value
Age group (years)			0.870
20-39	4(23.5)	13(76.5)	
40-59	27(33.8)	53(66.3)	
60 and above	6(15.0)	34(85.0)	
Sex			0.009*
Male	11(16.7)	55(83.3)	
Female	26(36.6)	45(63.4)	
Marital status			0.505
Married	35(26.5)	97(73.5)	
Unmarried	2(40.0)	3(60.0)	
Education level			0.085
No schooling	19(36.5)	33(63.5)	
Primary	13(21.3)	48(78.7)	
Secondary	3(18.8)	13(81.3)	
Undergraduate	1(20.0)	4(80.0)	
Post graduate	2(66.7)	1(33.3)	
Occupation status			0.110
Farmer	5(16.7)	25(83.3)	
Housewife	21(38.2)	34(61.8)	
Service	6(30.0)	14(70.0)	
Business	1(10.0)	9(90.0)	
Other specific	4(18.2)	18(81.8)	
Economic status			0.554
High level	2(15.4)	11(84.6)	
Middle level	32(28.8)	79(71.2)	
Low level	3(23.1)	10(76.9)	
Religion			0.579
Hindu	33(27.0)	89(73.0)	
Muslim	4(36.4)	7(63.6)	
Christian	1(50.0)	1(50.0)	
Buddhist	1(50.0)	1(50.0)	

Table 5: Association between Depression and clinical characteristics

Characteristics	Depression N (%)	No depression N (%)	P value
Duration of disease			
1-5	18(21.2)	67(78.8)	0.054*
6-10	7(29.2)	17(70.8)	
11-15	7(53.8)	6(46.2)	
Above 15	5(33.3)	10(66.7)	
Presence of other Physical co-morbidity			0.901
Yes	14(26.4)	39(73.6)	
No	23(27.4)	61(72.6)	
Single VS multiple medicine			0.263
Single	16(22.9)	54(77.1)	
Multiple	21(31.3)	46(68.7)	
Treatment modality			0.034*
Injection insulin	12(42.9)	16(57.1)	
Oral antiglycemic	25(22.9)	84(77.1)	
Blood sugar level			0.020*
Controlled	11(26.2)	31(73.8)	
Uncontrolled	26(27.4)	69(72.6)	

Table 6: Multivariate analysis for contributing factors of depression among diabetic patients.

Characteristics	AOR	95% CI	P - value
Treatment modality			
Oral antiglycemic	1		
Injection insulin	4.344	2.129 – 8.865	0.001*
Blood sugar level			
Controlled	1		
Uncontrolled	1.825	0.855 – 3.819	0.315
Gender			
Male	1		
Female	1.825	0.221 - 2.855	0.052*
Duration of DM			
Below 15 years	1		
Above 15 years	1.872	0.541 – 6.475	0.912

Depression was found to be significantly higher among female patients (p=0.009). There was no statistically significant relation between depression and marital status, educational level, occupation, economic status and religion. (Table 4)

Depression was found to be significantly higher in patients suffering from DM for more than 15 years (p=0.054), who are under insulin therapy (p=0.034) and patients whose blood sugar level was uncontrolled(p=0.020) even with treatment. (Table 5)

On multivariate analysis, treatment modality & gender were found to be independent predictors of depression among diabetic patients. Patients on insulin therapy were four times more likely to have depression (OR=4.344, CI: 2.129 – 8.865, p<0.001). Female patients were two times more likely to have depression (OR=1.825, CI: 0.221 - 2.855, p<0.052). (Table 6)

DISCUSSION:

Prevalence of depression is two to three times more common in people with diabetes mellitus. However, majority of the cases remains undiagnosed.[14] Our study showed that the prevalence of depression among patients with T2DM is 27% which is similar to the findings reported in primary care settings and a hospital endocrinology department in Mallorca (Spain) i.e. 27.2%.[15] Similar studies reported slightly higher prevalence in a cross-sectional study of diabetic patients visiting a diabetes center in Kathmandu, Nepal (34%), South India (37.5%), North India (41%) and Saudi Arabia (49.6%) respectively.[12,16,17] These studies indicate that the prevalence of depression in diabetes is high as compared to non-diabetic population. This can give rise to a number adverse impact on natural history of T2DM including poor metabolic control, poor compliance to treatment and increased risk of vascular complications. There is not only single factor contributing to depression among diabetic patients. The predominance of depression among female, as reported by the majority of studies[18,19] was observed consistent with this study. The reasons for these differences are unclear and should be further examined in the future.

For many of the reasons, duration of diabetes influences depressive symptoms, contributing to a "J-shaped" curve over time in T2DM. Depressive symptoms increases immediately following diagnosis and later decreases over time. However, the depressive symptoms again increases after longer duration. Initial increment in depressive symptoms immediately after diagnosis of diabetes might be due to distress associated with a diagnosis and newly imposed management regimes (eg, additional medications, checking blood sugar, dieting, and exercise).[20] The increment in depression after longer durations of diabetes might be due to other chronic comorbidities, resulting in increased frailty, which is characterized by decreased physical capability, increased exhaustion, and poorer weight loss outcomes.[21]

Long duration of illness and uncontrolled condition of DM were determined as contributing factors for depression among diabetic patients in our study which is also supported by several other studies.[17,22]

This study finding on the association of treatment modality with depression is supported by previous studies which showed oral hypoglycemic therapy is potentially safer and cater less risk of depression in comparison to intensive management using daily injections.[12,23]

Various studies have confirmed that the use of insulin in treatment of diabetes was associated with increased risk of developing depression. Patients on insulin therapy had less endogenous insulin and were therefore more susceptible to metabolic dysregulation than patients who

might have some residual insulin secretory activity. Especially, patients who are more metabolically labile are more vulnerable to depression.[24]

This study at multivariate analysis found that patient under insulin therapy were four times as likely to have depression than oral hypoglycemic therapy which is supported by the study conducted in a diabetic center in Kathmandu, Nepal.[12] Similarly, female were nearly twice likely to have depression than male diabetic patients it is also supported by the study conducted in community based study in South India.[16]

This study is a hospital based study so the result may not represent the total diabetic population in Nepal. So, it will be difficult to generalize the finding of the study. However, major findings from this study can be an eye-opener and can be useful in overall management of diabetic patients.

CONCLUSION:

Depression is very common among patients with T2DM and is associated with several key diabetes-related outcomes. More than one fourth of the diabetic patients had depression. Depression was more common in female diabetic patients, patients with longer duration of diabetes, insulin use and patients having poor diabetic control.

Similar studies can be conducted in the community settings to know the actual prevalence of depression. Patients, their family members and health care workers should be educated about the risk of depression in patients with diabetes. All patients diagnosed with diabetes should be routinely screened for depression so as to decrease various future complications.

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CONFLICT OF INTEREST: None

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