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Prevalence and Predictors of Depression in Diabetic Patients - An Institution Based Screening in West Bengal

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ABSTRACT

Background: Depression is a highly prevalent and common cause of disabilities among the diabetic population. The presence of depression affects self-management behaviors and glycemic control leading to an increase morbidity and mortality rate but remains undiagnosed in many cases.
Aims: This study aims to assess the prevalence and predictors of depression in diabetic patients at a selected tertiary health care centre, Kolkata, West Bengal.
Methods: A cross-sectional survey was carried out with 290 diabetic patients attending endocrinological OPD in July - September 2021 at selected Govt. Hospital, Kolkata. Depression was screened through Patient Health Questionnaire (PHQ9). The sociodemographic and clinical characteristics of the participants were assessed through validated semi-structured interview schedule. Binary logistic regression was computed to assess the predictors of depression. Statistical significance was detected at $p < 0.05$.
Result: Total 290 adult diabetic patients were screened for depression. The prevalence of depression was 56.9% (mild – 56.83%, moderate – 26.43% and severe – 16.74%). Marital status (AOR: 2.243, 95% CI=1.063, 4.734), family support (AOR: 2.073, 95% CI=1.257, 3.419) and poor glycemic control, PPBS level > 180 mg/dl (AOR: 1.665, 95% CI=1.018 – 2.722) were proved as the independent predictors of depression in this study population
Conclusion: Depression was present in more than half of the diabetic patients. Early detection of depression and family involvement would be helpful in glycemic control and better outcome.

Keywords: Prevalence, Predictors, Depression**,** Diabetes mellitus.

INTRODUCTION

Depression is a common mental disorder that affects the well-being of an individual. More than 264 million people of different ages are suffering from depression worldwide.[1] An individual can develop depression due to multifactorial etiology; however, the risk is higher in type 2 diabetes mellitus in comparison to general population.[2] It is estimated that 15%-20% of people with diabetes are struggling with depression worldwide, more likely moderate to severe form of depression.[3] According to the NIDDK International Conference Report, diabetes and depression are the two manifestations of a common set of psychological, lifestyle, and biological

distress, and both are major health problems in the world.[4]

Depression is a state of mood disorder and disliking of activity which can affect a person's thoughts, feelings, behaviors, and sense of wellbeing. Depression can substantially inhibit an individual's proficiency in maintaining their activity of daily living and the people diagnosed with both diabetes and depression are less likely to follow the required lifestyle changes resulting in inadequate glycemic control, increased diabetes related complications, increased mortality rate and became a major economic burden worldwide.[5]

Coexistence of depression in diabetes is a major clinical challenge in today's healthcare scenario as the outcomes of both conditions are getting worsened by the presence of the other.[6] As per CDC depression is diagnosed and treated only for 25% - 50% diabetic patients.[7] Though depression is very common in diabetic 6patients but remains undiagnosed in many cases, hence combination of depression in diabetes is a complicated public health concern. This study aims to assess the prevalence and predictors of depression in diabetic patients attending outpatient department (OPD) at selected Govt. hospital, Kolkata.

MATERIALS & METHODS

This study is a cross-sectional exploratory survey where 290 diabetic patients were interviewed and screened for depression at endocrinology OPD in selected Govt. hospital, Kolkata, from July 2021 to September 2021. The study was ethically permitted by the institutional ethics committee. Sample size was determined 290 by single population proportion formula considering Indian prevalence of depression 22.1% based on previous study report[8], selecting 95% confidence interval, precision of 5% and 10% non-response rate.

Data was collected through systematic random sampling technique. Patients above the age of 18 years and confirmed diagnosis of DM for at least 6 months were included in the study and patients already diagnosed with any mental disorder and under any psychiatry treatment were excluded from the study. The patients were explained about the purpose of the study and data were collected after obtaining the informed consent from each participant.

Patient Health Questionnaire-9 (PHQ9) was used to screen depression, and scores were categorized as without depression ≤7 and with depression ≥7 based on previous study report.[9] Participants who were depressed, their level of depression was further categorized as mild ≤9, moderate 10–14, moderately severe 15–19, and severe depression ≥20. Participants socio-demographic and clinical characteristics were assessed through validated semi structure interview schedule. The reliability of the tools (PHQ9 and Interview schedule) was checked by principal component analysis and interrater method respectively. Obtained r for PHQ9 was 0.76 and for interview schedule item wise varies from 0.8 to 0.9.

STATISTICAL ANALYSIS

Data were organized and statistically analyzed by using PSPP software version 1.6.2-g78a33a. Sample characteristics were compared and presented as frequencies and percentages based on depression status. Association between depression and risk factors were assessed through chi-square test. Significantly associated factors with depression were further analyzed with binary logistic regression to determine the predictors of depression.

RESULT

Table 1: Prevalence of Depression according to PHQ9 Score n = 290

Depression	Frequency	Percentage	95% Confidence Interval	
			Lower	Upper
With Depression	172	59.3	.534	.650
Without Depression (None – Minimal)	118	40.7	.350	.466

Among 290 diabetic patients 172 (59.3%) participants were having depression. Prevalence of depression was 59.3% with 95% CI (.534 -.650).

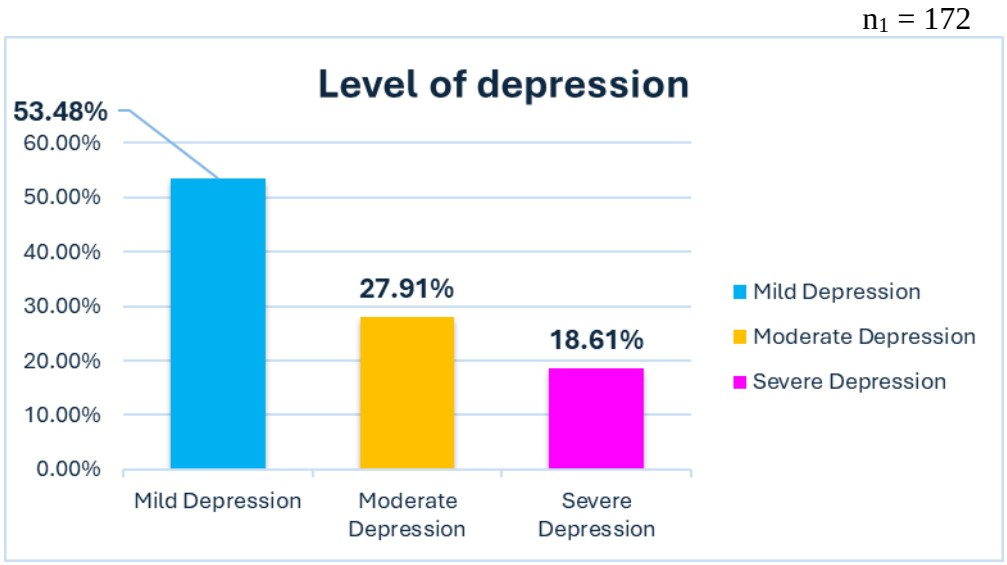

Figure 1: Bar diagram showing level of depression in diabetic patients

172 participants who were depressed, having varied level of depression - 53.48%-mild, 27.91%-moderate and 18.61% moderately severe-depression.

Out of the 290 diabetic patients 182(62.8%) were middle aged with the mean age 51.74±9.8SD and 158(54.5%) were male. 246(84.8%) were married, 179(61.7%) resided at rural community and 169(58.3%) belongs to the nuclear family. 197(67.9%) participants education were up to secondary level, 123(42.4%) were unemployed and 139(47.9%) belongs to lower economic class as per BG Prasad scale. The findings of the present study showed that out of 290 diabetic patients 71(24.5%) were smokers and 19(6.6%) were alcoholic. 151(52%) were satisfied with their family support whereas 172(59.3) were not satisfied with social support.

Around half of the study population 150(51.7%) were having normal body mass index with a mean of 25.32±3.6SD. 159(54.8%) participants were suffering from DM more than 10 years and 164(56.6%) participants were having family history of DM. The majority 223(76.9%) of the population had comorbidities other than DM either or combination of hypertension, thyroid disorder, kidney disease, cardiac disease, Joint or body pain, eye disease and neurological disorder. 173(59.7%) of the diabetic patients were treated with oral hypoglycaemic agent (OHA). For 153(52.7%) participants FBS level was satisfactory (< 130 mg/dl) whereas for 159(54.8%) participants PPBS level was unsatisfactory (>180 mg/dl).

Table 2: Association of Socio-demographic profile of diabetic patients with depression n = 290

Variables		With Depression f (%)	Without Depression f (%)	X^2	df	p value
Age	Young Adults	23(63.9)	13(36.1)	5.198	2	0.074
	Middle Aged	99(54.4)	83(45.6)			
	Older Adults	50(69.4)	22(30.6)			
Gender	Male	89 (56.3)	69(43.7)	1.278	1	0.258
	Female	83(62.9)	49(37.1)			
Residence	Rural	106(59.2)	73(40.8)	.002	1	0.968
	Urban	66(59.5)	45(40.5)			
Marital Status	Married	139(56.5)	107(43.5)	5.291*	1	0.021
	Single/widow/divorced	33(75.0)	11(25.0)			
Family Type	Nuclear	100 (59.2)	69(40.8)	.003	1	0.955
	Joint	72(59.5)	49(40.5)			
Education	No Formal Education	26(61.9)	16(38.1)	.556	2	0.757
	Up to Secondary	118(59.9)	79(40.1)			
	≥Higher Secondary	28(54.9)	23(45.1)			
Occupation	Unemployed	76(61.8)	47(38.2)	3.967	2	0.138
	Employed	25(47.2)	28(52.8)			
	Self Employed	71(62.3)	43(37.7)			
Economic Class	Lower Class	88(63.3)	51(36.7)	2.243	3	.523
	Lower Middle Class	50(53.8)	43(46.2)			
	Middle Class	20(60.6)	13(39.4)			
	Upper Middle Class	14(56.0)	11(44.0)			
Smoking History	Smoker	37(52.1)	34(47.9)	2.018	1	.155
	Non-Smoker	135(61.6)	84(38.4)			
Alcohol History	Alcoholic	14(73.7)	5(26.3)	1.741	1	.187
	Non-Alcoholic	158(58.3)	113(41.7)			
Family Support	Satisfied	78(51.7)	73(48.3)	7.649*	1	.006
	Not Satisfied	94(67.6)	45(32.4)			
Social Support	Satisfied	67(56.8)	51(43.2)	.528	1	.467
	Not Satisfied	105(61.1)	67(38.9)			

75% of the Single, widow or divorced participants were depressed, marital status was significantly associated with depression (X^2_{1-} 5.29, p-0.021). 67.6% of participants, not satisfied with family support were depressed and family support was significantly associated with depression (X^2_{1-} 7.649, p-.006).

Table 3: Comparison of Clinical profile of diabetic patients with or without depression n= 290

Variables		With Depression f (%)	Without Depression f (%)	X^2	df	p value
BMI	Normal	85(56.7)	65(43.3)	1.504	2	0.471
	Overweight	66(64.1)	37(35.9)			
	Obese	21(56.8)	16(43.2)			
Duration of DM	< 10 Years	69(52.7)	62(47.3)	4.363	1	0.037
	> 10 Years	103(64.8)	56(35.2)			
Family History of DM	Yes	92(56.1)	72(43.9)	1.614	1	0.204
	No	80(63.5)	46(36.5)			
Comorbidities	Yes	135(60.5)	88(39.5)	.603	1	.437
	No	37(55.2)	30(44.8)			
Current Medication	OHA	104(60.1)	69(39.9)	.115	1	.734
	OHA +	68(58.1)	49(41.9)			

	Insulin					
FBS	Satisfactory	84(54.9)	69(45.1)	2.608	1	.106
	Unsatisfactory	88(64.2)	49(35.8)			
PPBS	Satisfactory	68(51.9)	63(48.1)	5.424	1	.020
	Unsatisfactory	104(65.4)	55(34.6)			

64.8% of the participants suffering> 10 Years were depressed. There was significant association between depression and duration of DM (X^2_1 – 4.363, p- 0.037). 65.4% of participants with poor glycemic control (unsatisfactory PPBS level) were depressed and depression was significantly associated with poor glycemic control (X^2_1- 5.424, p-.020).

Table 4: Regression analysis between depression and predicted variables. n=290

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Marital Status	.808	.381	4.493	1	.034	2.243	1.063	4.734
Family Support	.729	.255	8.152	1	.004	2.073	1.257	3.419
Duration of DM	.455	.252	3.270	1	.071	1.576	.963	2.581
Glycemic control	.510	.251	4.125	1	.042	1.665	1.018	2.722

Binary logistic regression analysis was conducted with all associated factors to determine the relative strength of each individual predictor of depression. Single /widow or divorced are 2.2 times more prone to develop depression than the married person (AOR: 2.243, 95% CI=1.063, 4.734). The chance of developing depression is two times higher for those who are not satisfied in family support (AOR: 2.073, 95% CI=1.257, 3.419). Participants who are suffering >10 years with DM are 1.5 times more prone to develop depression (AOR: 1.576, 95% CI=.963, 2.581) though not proven statistically significant in this model. The participants who are having unsatisfactory PPBS level (> 180mg/dl) are 1.6 times higher chance to develop depression (AOR: 1.665, 95% CI=1.018 – 2.722).

DISCUSSION

Depression is highly prevalent among the diabetic population. Different studies reported a bidirectional relationship between depression and diabetes. This study aims to estimate the prevalence and predictors of depression in diabetic population. Hussain S in a meta-analysis with 43 studies, including 10270 participants of Indian population reported 38% (95% CI: 31%-45%) pooled prevalence of depression in diabetes.[10] whereas present study estimated 59.3% prevalence of depression in diabetic patients, among them (53.48%) were suffering from mild depression. In a comprehensive systematic review Naskar S reported that in Indian diabetic population prevalence of depression varies between 8% - 84%.[11] In Southern India Madhu Mathew reported 49% prevalence of depression in diabetic population out of which 53.1% had minor depression.[12]

Mean age of the participants in this study was 51.74 years and 69.4% older adults were depressed reflecting almost same findings that depression is highly prevalent among middle age and elderly diabetes patients.[13] In this study out of 132 female diabetic participants 62.9% are depressed generalizing the other study report that female are more prone to have depression in diabetic population.[14]

The findings of this study showed that 75% single / divorced or widow diabetic patients had depression and marital status is considered as independent predictor of depression(AOR: 2.243, 95% CI=1.063, 4.734) In a study with diabetic population of Kashmir, Hussain A reported significant association (X^2_1 – 10.54, p-0.05) between depression and marital status.[15] Similarly Kankana K also reported significant association of marital status (OR:7.334,

CI:1.339–40.156, p = 0.022) with depression in diabetic population in Eastern India.[16] Depression is associated with single marital status (AOR=7.72, 95% CI: 3.6-16.53) in other part of world also. [17]

The risk of depression increased with the duration of illness probably because of the need of adhering strict diabetic control regimen. As the disease progresses there is a chance of developing diabetic related complications. In this study mean age of duration of DM was 10.41 years with ±7.2 SD and an independent predictor of depression (AOR:1.576, 95% CI=.963, 2.581), Adane A also reported significant association between duration of diabetes mellitus 5 years and more with depression (AOR:2.00, 95% CI: 1.21-3.5) [18]

Family support acts as a life stress buffer.[19] Present study population due the nature of progressive chronic disease of DM, need to maintain diet control, physical activity, blood glucose monitoring and follow up which requires family involvement. Study report showed the importance of good family function in inhibiting depression in diabetic patient and better glycemic control.[20] Findings of the present study revealed that family support is significantly associated with depression (AOR:2.073, 95% CI=1.257, 3.419). 47.2% participants of our study reported FBS >130 mg/dl and for 54.8% participants PPBS was >180 mg/dl reflecting poor glycemic control. Almost 65% of the participants with poor glycemic control were depressed, significantly associated (X^2_1 – 5.424, p-0.020) and independent predictor of depression (AOR:1.665, 95% CI: 1.018 - 2.722).

Because of multifactorial etiology in different study age, gender, residence, BMI, FBS were determined as predictors of depression [14, 21] though in our study marital status, duration of DM, family support and poor glycemic control were acts as an predictor of depression.

The study was conducted in one setting with 290 participants which limits the generalizations. Glycemic control was assessed through recent FBS and PPBS value due to unavailability of HbA1C report. Depression was measured from self-reported data that was not validated from the other source.

CONCLUSION

Almost 60% of the study population had varied levels of depression. Depression is linked with the marital status, family support and poor glycemic control.

Declaration by Authors

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