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Research Article

Prevalence of Depression and its Impact in Diabetes Management – A Pilot Study

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Abstract

Introduction: Global prevalence of diabetes and depression is increasing remarkably. Depression is 2–3 times more in diabetic population than non-diabetic people. Appropriate management mainly – diet, physical activity, medication, and regular screening and treatment can control, prevent, and delay diabetic complications.

Aim: This study aims to assess the prevalence and impact of depression in diabetes self-management.

Materials and Methods: This cross-sectional descriptive survey included 50 diabetic patients in the endocrinology outpatient department at selected medical college and hospital, Kolkata, from February 2021 to March2021. Depression and diabetic self-management were assessed through Patient Health Questionnaire-9 (PHQ-9) and Diabetes Self-Management Questionnaire (DSMQ), respectively. Based on the WHO's five dimension of adherence, patients' background information were collected.

Results: PHQ-9 score indicates that 62% of the diabetics patients were having varied degree of depression mild (34%), minor (18%), and major depression (10%). DSMQ score indicates mean adherence in glucose management – 7.186, dietary control – 4.992, physical activity – 4.814, health-care use – 7.106, and sum scale – 6.12. About 60% of diabetic patients were having suboptimal adherence in diabetes self-management. There is a significant negative correlation (r = –0.382) between depression (PHQ-9) score and DSMQ score (P = 0.006).

Conclusion: Depression is highly prevalent in diabetic population. Negative correlation between depression and diabetes self-management adherence indicates more the depression less the diabetes self-management.

Keywords: Depression, diabetes self-management, diabetes, impact, prevalence

Introduction

Diabetes mellitus (DM) is a frequently encountered chronic metabolic disease with various complications throughout its course.[1] The WHO projected that India had 69.2 million people living with diabetes in 2015 but may have 98 million people with type 2 diabetes by 2030.[2] An estimation of 1.6 million deaths was directly caused by diabetes – the seventh leading cause of death in 2016 as reported by the WHO.[3] Almost half of all deaths due to high blood glucose occurs before the age of 70 years of age. Diabetes can be treated and its consequences can be avoided or delayed with diet, physical activity, medication, and regular screening and treatment for complications.[4]

Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings, and sense of well-being. Globally, depression is the second-leading cause of disability,[5] and diabetic patients have been reported to be more

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likely to develop depression than non-diabetes people. About 15–20% of diabetic patients are suffering with moderate-to-severe form of depression with a serious impact on a person's well-being, their ability, and motivation to self-manage their condition[6] and are a major contributor to the overall global burden of disease.[5]

Synergistic effect of depression in diabetic patient's increases the risk for complications of both micro- and macro-vascular nature, leading to greater mortality.[7] The coexistence of depression in diabetes patient is associated with poor adherence to treatment, poor metabolic control, higher complication rates, decreased quality of life, increased health-care use and cost, increased disability and loss of productivity, and increased risk of death.[8]

India faces an epidemic of Type 2 DM and is referred to as a diabetic capital of Asia (WHO-2010).[4] Worldwide 300 million people of all ages suffer from depression and the occurrence is 2–3 times higher in people with DM though the majority of the cases depression remain underdiagnosed.[7] Compliance to therapeutic regimen in T2DM is a public health problem.[9] Since diabetes is a chronic disease and the patients with diabetes are ultimately responsible for managing his or her own care and to prevent complications, the study aims to assess the prevalence of depression among diabetic patients and its impact in diabetic management. This study attempts to find out answer of the following issues –

i. Prevalence rate of depression among diabetic population in selected tertiary health care center of Kolkata, West Bengal
ii. Extent of patient adherence in diabetes self-management
iii. Relation between depression level and diabetes self-management adherence
iv. Factors associated with depression level and diabetes self-management adherence.

Materials and Methods

In this non-experimental cross-sectional research, 50 diabetic patients were interviewed in endocrinology outpatient department (OPD) at selected medical college and hospital, Kolkata, from February 2021 to March 2021. Depression was measured through Patient Health Questionnaire-9 (PHQ-9) and scores were categorized as no ≤4, mild 5–9, minor 10–14, major 15–19, and severe ≥20 depression. Diabetes self-management adherence measured by Diabetes Self-Management Questionnaire (DSMQ), score ≤6.0 indicates suboptimal diabetes self-management adherence. Based on the WHO five dimensions of adherence, patients' background information, clinical condition, therapy-related information, socioeconomic information, and health-care system-related information's were assessed through a semi structure interview schedule. Content validity of the tools was established from five experts. Linguistic validation (English to Bengali and reverse) was done by the experts. There was no significant difference between original tools and converted tools. Reliability of the tools was checked by intrarater methods with 20 samples by the two investigators simultaneously and independently on the same day and same time. Intraobserver reliability of PHQ-9 is 90%. Obtained r from Spearman's rank order correlation is 0.99. For DSMQ, obtained r from Spearman's rank order correlation varies in different subscales – glucose management – 0.98, dietary control – 0.99, physical activity - 0.97, health-care use – 0.94, and sum scale – 0.97. For semi-structure interview schedule, intraobserver reliability by percentage of agreement of different sections varies from 90% to 100%. Obtained Cohen's kappa value varies from 0.76–1. Hence, the tools were considered as reliable. All statistical analyses were performed using SPSS version 28.0.0.0.

Results

Out of 50 participants, 68% belongs to the age group of 40–60 years among those 36% were having depression. About 32% depressed diabetic patients were female, 52% resided in rural area, and 32% were having depression. About 50% of married participants were depressed and 32% were from nuclear family. About 20% of the depressed participants were studied up to secondary level and 32% were unemployed, 28% belongs to lower-middle economic class, and 24% were economically independent [Table 1]. About 38% of depressed participants were suffering with diabetes since the past 6–15 years and 32% were having family history of diabetes. The diabetic patients were having depression among those, 24% – overweight, 16% having systolic blood pressure >140 mm of Hg, 12% having diastolic blood pressure >90 mm of Hg, 16% of the participant's fasting blood sugar (FBS) >180 mg/dl, 22% of the participants postprandial blood sugar (PPBS) 180–250 mg/dl and 36% of the participants taking oral hypoglycemic agent, 22% taking both oral hypoglycemic agent and insulin, and 2% taking only insulin in treatment [Table 2]. About 60% of participants having vision problem, 4% having hearing problem using hearing aids, 44% having hypertension, and 28% teeth or gum problem. Hypothyroidism and retinopathy were present in 16%, heart disease and hyperlipidemia in 12%, 6% of the participants were suffered from stroke and arthritis, and 2% from kidney disease [Table 3]. In psychosocial well-being, 28% of the participants were feeling nervous or anxious and 22% remain afraid. About 20% of the participants were confused to take decision. About 32% of the participants remain upset and feeling sad. About 30% of the participants were not satisfied in family support and 60% were not satisfied in social support [Table 4]. Out of 50, 62% of diabetic patients were having depression (34% – mild, 18% – minor, and 10% – major depression [Table 5]. In DSMQ scale, 60% of participant's adherence in diabetes self-management was at suboptimal level, mean adherence are in glucose management – 7.186, dietary control – 4.992, physical activity – 4.814, health-care use – 7.106, and sum scale – 6.12 [Table 6 and Figure 1]. Significant negative correlation (r = –0.382) exists between depression score and diabetes self-management adherence

Table 1: Sociodemographic characteristics of the participants (*n*=50)

Variables	Without depression		With depression		Total	
	Frequency	%	Frequency	%	Frequency	%
Age (year)						
<40 years	2	4	10	20	12	24
40–60 years	16	32	18	36	34	68
>60 years	2	4	2	4	4	8
Gender						
Male	13	26	14	28	27	54
Female	7	14	16	32	23	46
Residence						
Rural	10	20	16	32	26	52
Urban	10	20	14	28	24	48
Marital status						
Single	1	2	2	4	3	6
Married	19	38	25	50	44	88
Widow	0	0	2	4	2	4
Divorced	0	0	1	2	1	2
Family type						
Nuclear	13	26	16	32	29	58
Joint	6	12	13	26	19	38
Single parent	1	2	1	2	2	4
Education level						
No formal education	3	6	9	18	12	24
Up to primary level	6	12	3	6	9	18
Up to secondary	5	10	10	20	15	30
Up to higher secondary	4	8	2	4	6	12
Graduate	2	4	6	12	8	16
Occupation						
Unemployed	10	20	16	32	26	52
Employed	1	2	3	6	4	8
Unskilled worker	6	12	5	10	11	22
Business	3	6	6	12	9	18
Economic class						
Lower	4	8	8	16	12	24
Upper-lower	4	8	4	8	8	16
Lower-middle	5	10	14	28	19	38
Upper-middle	7	14	4	8	11	22
Economic status						
Dependent	6	12	11	22	17	34
Partially Dependent	7	14	7	14	14	28
Independent	7	14	12	24	19	38

score (P =0.006) [Table 7]. No significant association exists between depression and diabetic self-management adherence with selected variables.

Discussion

This pilot study was done to assess the prevalence of depression in diabetic patient and also to determine the impact of depression in diabetic self-management in a tertiary health care center, Kolkata, West Bengal. Identification of associated factors related to the level of depression and diabetes self-management was also a secondary objective of this study.

The result indicated that 62% of diabetic patients were having varied level of depression (34% – mild, 18% – minor, and 10% – major level of depression). Different recent studies[10-13] in Indian population showed varied degree of prevalence of depression (25.6–57%) among diabetic patients. DM is a global public health problem in ≥60–65 years[14] but in the developing countries, majority are in between 45 and 64 years.[15] In this study, majority of the diabetes patients belong to 41–60 years of age. Participants are mostly unemployed/homemaker (52%) and belongs to lower (40%) socioeconomic group (monthly per capita income <Rs.1050/-; B G Prasad socioeconomic scale 2019) reflecting warning of the WHO[16] that the prevalence of DM in low- and middle-income countries has been rising more rapidly than in high-income countries.

Meta-analysis of Blasco *et al*.[17] reported bidirectional relationship between depression and obesity, and in this study, 24% of the diabetic patients having depression were overweight and 6% were obese. Different studies[18-20] emphasized that comorbid depression worsened glycemic control in diabetic patients, and in this study, 24% of the participant's FBS were >140 mg/dl (8–140–180 mg/dl and16–>180 mg/dl) and 34% of the participants PPBS were >180 mg/dl (22–180–250 mg/dl and 12% >250 mg/dl).

Depression is significantly associated with a variety of diabetes complications.[21] Elizabeth *et al*.[22] showed that there is 36% higher risk of developing advanced microvascular complications, and 25% higher risk of developing advanced macrovascular complications in patients with major depression

Table 2: Illness profile of the participants (*n*=50)

Characteristics	Without depression		With depression		Total	
	Frequency	%	Frequency	%	Frequency	%
Duration of diabetes						
5 years and below	2	4	6	12	8	16
6–15 years	13	26	19	38	32	64
>15 years	4	8	6	12	10	20
Family history of diabetes						
Yes	9	18	16	32	25	50
No	11	22	14	28	25	50
BMI						
Normal	11	22	15	30	26	52
Overweight	5	10	12	24	17	34
Obese	4	8	3	6	7	14
Systolic BP						
≤140 mm of Hg	16	32	22	44	38	76
>140 mm of Hg	4	8	8	16	12	24
Diastolic BP						
≤90 mm of Hg	19	38	24	48	43	86
>90 mm of Hg	1	2	6	12	7	14
FBS						
<140 mg/dl	11	22	18	36	29	58
140–180 mg/dl	4	8	4	8	8	16
>180 mg/dl	5	10	8	16	13	26
PPBS						
<180 mg/dl	6	12	13	26	19	38
180–250 mg/dl	6	12	11	22	17	34
>250 mg/dl	8	16	6	12	14	28
Medication						
OHA	10	20	18	36	28	56
OHA+Insulin	9	18	11	22	20	40
Insulin	1	2	1	2	2	4

PPBS: Postprandial blood sugar, FBS: Fasting blood sugar, BMI: Body mass index, BP: Blood pressure

Table 3: Comorbidities and complications of the participants (*n=50)**

Conditions	Frequency	%
Vision problem	30	60
Hearing problem	2	4
Hypertension	22	44
Heart disease	6	12
Hyperlipidemia	6	12
Stroke	3	6
Hypothyroidism	8	16
Arthritis	3	6
Kidney problem	1	2
Retinopathy	8	16
Neuropathy	6	12
Teeth or gum problem	14	28

**n* is not mutually exclusive

Table 4: Psychosocial-related information of the participants (*n=50)**

Conditions	Frequency	%
Feeling nervous or anxious	14	28
Remain afraid	11	22
Confused to take decision	10	20
Remain upset	16	32
Feeling sad	16	32
Family support not satisfied	15	30
Social support not satisfied	30	60

**n* is not mutually exclusive

Table 5: Prevalence of depression according to PHQ-9 score (*n*=50)

Depression	Frequency	Percentage	Estimate	95% confidence interval	
				Lower	Upper
With depression	31	62	0.620	0.472	0.753
Mild depression	17	34			
Moderate depression	9	18			
Severe depression	5	10			
Without depression	19	38	0.380	0.247	0.528

PHQ: Patient Health Questionnaire

and diabetes over a 5 years of period. In this study, 60% of participants having vision problem – retinopathy (16%), 44% having hypertension, 12% heart disease and hyperlipidemia, 6% stroke, 28% teeth or gum problem, and hypothyroidism in 16%. About 6% of the participants were suffered from stroke and arthritis, and 2% from kidney disease.

Kalra *et al*.[23] highlighted emotional and psychological needs of people with diabetes and emphasized the needs of identification and support the patients with psychosocial problems early

Table 6: Participant's adherence in diabetes self-management according to DSMQ score (*n*=50)

Adherence in diabetes self-management	Frequency	Percentage
Optimal diabetes self-management adherence	20	40
Suboptimal diabetes self-management adherence	30	60

DSMQ: Diabetes Self-management Questionnaire

Table 7: Correlation between the level of depression and diabetes self-management adherence (*n*=50)

Variables	Mean	r	*P*
Diabetic self-management adherence score	6.12	–0.382**	0.006
PHQ-9 score	7.18		

r (50)=0.2732 at $P>0.05$, r (50)=0.3541 at $P>0.01$, PHQ: Patient Health Questionnaire

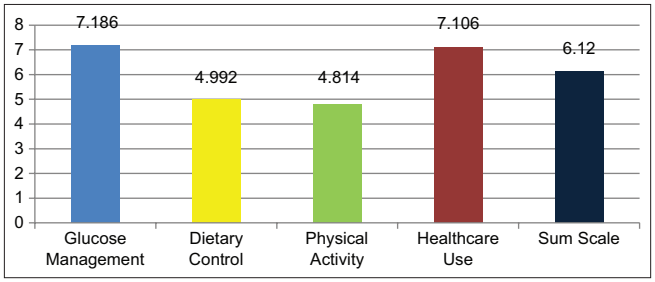

Figure 1: Mean adherence in diabetes self-management of the participants

in the course of diabetes which may enhance diabetes self-management. In this study, 28% of the participants were feeling nervous or anxious, 22% remain afraid, 20% were confused to take decision, 32% remain upset and feeling sad, 30% were not satisfied in family support, and 60% were not satisfied in social support.

Azami *et al*., 2019,[24] found that depression directly and negatively affects self-efficacy and indirectly affects self-management behaviors, as depressive symptoms increased, self-efficacy decreased.[25] In this study, 60% of participants adherence in diabetes self-management were at suboptimal level, mean adherence in glucose management – 7.186, dietary control – 4.992, physical activity – 4.814, health-care use – 7.106, and sum scale – 6.12. Devarajooh and Chinna[26] found a positive correlation between self-efficacy and diabetes self-care practice (path coefficient = 0.438, $P < 0.001$) and established a negative correlation between self-care and depression (path coefficient = –0.115, $P < 0.01$) and diabetes distress (path coefficient = -0.122, $P < 0.001$). This study findings also revealed negative correlation (r = –0.382) between depression and diabetes self-management adherence.

No significant association was established among depression and diabetes self-management adherence with selected variables may be due to limited number of sample. Data are collected in one setting through purposive sampling; hence, the sample may not be representative of the entire diabetic population.

Conclusion

Prevalence of depression is high in diabetic population. There is a negative correlation between depression and diabetes self-management adherence indicates, more the depression less the diabetes self-management adherence.

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Conflicts of Interest

This research study has been done as a pilot project to assess the feasibility of the main study for PhD.

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