

Prevalence of Depression and Associated Factors among Diabetic Patients at Mekelle City, North Ethiopia

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ABSTRACT

Background: Coexistence of mental health problems on diabetes mellitus can result in poor management of the illness, poor adherence to treatment, and low quality of life. Therefore, it is highly crucial to assess these problems; thus we carried out this study with the aim of determining the prevalence of depression and identifying related factors among diabetic patients at city of Mekelle, North Ethiopia. **Methods:** Hospital-based cross-sectional study was employed among 264 diabetic patients, and participants were selected through systematic random sampling technique. We used local language versions of Beck Depression Inventory-II, Beck Anxiety Inventory, and Morisky 8 Item Medication Adherence Scale to assess the levels of depression, anxiety, and medication adherence, respectively. Socio-demographic and clinical factors were also assessed. We accomplish data entry, cleaning, and analysis through Statistical Package for Social Sciences window 20; also the level of significance was determined using adjusted odds ratio (OR). **Results:** The prevalence of depression among diabetic patients is 17% (95% confidence interval [CI]: [12.9%, 21.6%]). In addition, 28% and 18.2% has low medication adherence and comorbid anxiety, respectively. We identify anxiety disorder (AOR = 10.52, 95% CI: [4.56, 24.28]), poor medication adherence (AOR = 4.38, 95%CI: [1.98, 9.64]), and coexistence of other physical illness (AOR = 3.04, 95% CI: [1.11, 8.34]) as risk factors for depression. **Conclusions:** Depression is a common mental health problem among diabetic patients which is related to poor treatment adherence coexistence of other physical illness and anxiety disorder. This emphasizes to formulate a mechanism for early detection and appropriate intervention.

Key words: Comorbidity, common mental disorder, depression, mental distress

INTRODUCTION

Diabetes is a chronic, debilitating disease that requires life-long treatment and greatly increases the risk

of serious, long-term complications. Offering the long-term monitoring and treatment needed is not

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easy for the health-care systems of Sub-Saharan Africa, which are more focused on managing acute infections.^[1]

Sub-Saharan region has been reported with a growing incidence of diabetes; in which the number of Diabetic people which was 7.1 million in 2003, raised to 12.1 million in 2010, and is projected to be 23.9 million with a prevalence of 3.7% in 2030.^[1]

In currently emerging studies comorbidity of mental health problems among diabetic patients, most commonly depression and anxiety has been reported. A person with depression might have frequent and persistent low mood, lost interest, a change in appetite, sleep, and motor activity. As well decreased energy, poor concentration/thinking capacity/decision-making, worthlessness, and sometimes death wish or attempt are common presentations.^[2]

A higher rate of depression is found among diabetic people than the general population as stated in recent studies.^[3-5] Depression among diabetic people has led to poor treatment adherence poor treatment outcome and consequently worsened quality of life.^[6-8] This coexistence of depression has a higher rate in low- and middle-income countries than high-income countries.^[9] In another way, the coexistence of diabetes complicates outcome of depression.^[10]

Across the globe distinct, prevalence rates have been reported on depression among diabetic patients; this includes higher figures of 59.8%,^[11] 50–60% in Asia,^[12,13] 54.1% in Nepal,^[7] 45.2% in Bangladesh^[14] to (25.3–35.4%) in India,^[15,16] 17% in Poland,^[17] and substantially lower rate of 11.2% in Peru.^[18]

There are a number of factors which are associated with cooccurrence of depression among diabetics; these include women, non-married, older age, low socioeconomic, and higher body mass index; besides that smoking habit, increased number of comorbidities, higher level of cholesterol, and poor glycemic control are also related with depression^[6,9,11-23]

In contrary to most studies, a survey conducted at the United States reported that a baseline diabetic control is not an independent predictor for depressive disorder;^[24] one more study from China reported that college level education and having a job were related to depression among diabetics.^[23]

Based on PubMed cited articles, in Africa, we found the following studies. In Maroc 41.2%, 27.8%, and 21.9% of major depression, persistent depressive disorder (Less form of depression for 2 or more years), and double depression (both major depression and

persistent depressive disorder) were reported among diabetic patients, respectively;^[25] whereas similar studies reported the prevalence of depression 34.4% in Guinea and 27.8% in Nigeria; besides this, anxiety and suicidal behavior were reported among 58.7% of Guinean and 6.3% of Nigerian subjects.^[26,27]

The factors associated with depression were similar with those reported from other continents that include low education, low socioeconomic status, older age, higher level of cholesterol, urban residence, being nonmarried, diabetic complications, and longer duration of follow-ups.^[25-29] Another study in Algeria found out that frequent occurrence of type-two diabetes was associated with depression.^[29]

In Ethiopia, there were over 1.33 million cases of diabetes in 2015.^[30] According to PubMed indexed reports, less prevalence of depression was reported (relative to other African nations) with about 16.3–19.2% range.^[28-31]

In general diabetes mellitus is becoming the emerging challenge to developing nations which can be complicated by the cooccurrence of depression. There are limited studies which showed the prevalence of depression and associated factors among people living with diabetes mellitus in Sub-Saharan region, particularly in Ethiopia. The aim of this study was to determine the prevalence and associated factors among diabetes mellitus. Hence, the findings might have vital to stakeholders and policy makers working in diabetic and Psychiatric areas by showing its prevalence and the factors associated with it.

METHODS

Study settings and population

A cross-sectional study was conducted at Ayder referral and Mekelle Hospitals from July to September 2015. The study was conducted at the city of Mekelle, the capital of Tigray region with a total population of more than 300,000. There are three public hospitals in the city, and^[32] the study was conducted at two of them.

The source population was all diabetic patients who have medical follow-up at Mekelle City, and diabetic patients who had follow-up at Ayder referral/Mekelle hospital during the study period was study population. Those patients with age 18 years and above with follow up for 6 months or more were included in the study. Patients with critically ill were excluded from the study.

Sample size and sampling procedures

Sample size and sampling technique was calculated with single proportion population formula, 34% level of depression,^[33] 95% confidence interval (CI), and

5% margin of error. The sample size becomes 344; as the study population is <10,000, correction formula is employed; thus with 10% nonresponse rate the final sample size is 244. Systematic random sampling was employed.

Data collection and quality control

The data were collected using a pretested structured questionnaire developed in English and translated to local language by expertise. To assess comorbid depression and anxiety, Beck Depression Inventory II (BDI) and Beck Anxiety Inventory (BAI) tool were used, respectively. In addition, sociodemographic and clinical factors were also assessed. Medication adherence was assessed using Morisky 8-Item Medication Adherence Scale (MMAS). Score of 21 or more on BDI II tool indicate depression. Mild depression is a score of 11–20 and moderate is scoring 21–30, whereas severe depression is a score of above 41.^[34]

Score of 16 or more on BAI tool indicate anxiety; mild, moderate, and severe anxiety is a score of 8–15, 16–25, and above 25, respectively.^[35] Poor adherence means a score of 2 or more on MMAS.^[36] Interviewer-administered questionnaire was employed with local language.

One day training was given to orient data collectors and supervisor on the questionnaire to be used, the purpose of the study and how to approach respondents and obtain consent. Data collectors' capability to gather consistent and appropriate data were assured before the data collection period through role plays in the training and in the pretest. In addition, pretest on 5% of the sample size was carried out in a private clinic. During the data collection time, they were supervised daily.

Data management and analysis

The data were coded, checked, cleaned, and entered into computers using software Epi Info (this software was developed by Centers for disease Control and Prevention-CDC, Atlanta, USA) and then exported into SPSS window version 20 for analysis (SPSS was developed by International Business Machines Corporation; IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp, USA). Logistic regression was performed to assess the association between binary outcomes and different explanatory variables. Bivariate analysis was first conducted for each potentially explanatory risk factor; then, multivariate logistic regression analysis was done. The strength of association was interpreted using odds ratio (OR) and CI. $P < 0.05$ was considered statistically significant in this study.

Ethical consideration

After obtaining ethical clearance from College of Health Sciences, Mekelle University, study settings were informed through official letter; and with their approval, the study was conducted. After discussing the purpose of the study, assuring informed consent, privacy, and confidentiality were kept. Those subjects who were screened to be depressed or develop anxiety were referred to psychiatry clinics.

RESULTS

Among the 264 study subjects, the mean age and standard deviation are 43.2 ± 16.6 with a range of 17–82 years; also 135 (51.1%), 180 (68.2%), 87 (33%), 242 (91.7) are women, married, have no formal education, and Orthodox Christian by religion, respectively [Table 1].

On the clinical data, from the total diabetic patients we interviewed, 146 (53%) take injection, 23.5% have other chronic medical illness, and 22% of them are taking other medication for their chronic medical problems.

The prevalence of depression is 17% (95% CI: 12.9%, 21.6%). Those with mild to moderate depression were 87 (33%), moderate to severe 39 (14.7%), severe depression 6 (2.3%). The most severe depressive symptoms reported are lost interest in sex completely by 42 (15.9%), being too tired in 34 (12.9%), and severe sleep disturbance among 18 (6.8%) [Table 2].

Table 1: Socio demographic characteristics of Diabetic patients, Mekelle, North Ethiopia, Apr 2016 (N=264)

Variables	Responses	Frequencies	Percentages
Sex	Male	129	48.9
	Female	135	51.1
Marital status	Single	56	21.2
	Married	180	68.2
	Divorced	16	6.1
	widowed	12	4.5
Educational status	Illiterate	87	33.0
	Elementary	69	26.1
	Secondary	42	15.9
	Tertiary and above	66	25
Ethnicity	Tigrian	259	98.1
	Others	5	1.9
Religion	Orthodox	242	91.7
	Muslim	20	7.6
	Catholic	2	0.8
Occupation	Government employee	58	22.0
	Merchant	28	10.6
	House wife	41	15.5
	Daily laborer	17	6.4
	Farmer	40	15.2
	Jobless	40	15.2
	Student	40	15.2

Table 2: Characteristics of depressive symptoms on BDI -II tool among Diabetic patients, Mekelle city, North Ethiopia, Apr 2016 (N=264)

Variables	Responses	Frequency	%
Sadness	I do not feel sad	211	79.9
	I feel sad much of the time	45	17.0
	I am sad all the time	5	1.9
	I am so sad or un happy that i cannot stand it	2	0.8
Pessimism	I am not discouraged about my future	217	82.2
	I feel more discouraged about my future than i used to be	41	15.5
	I don't expect things to work out of me	3	1.1
	I feel my future is hopeless and will only get worse	3	1.1
Past failure	I do not fill like a failure	232	87.9
	I have failed more than I should have	22	8.3
	as I look back I see a lot of failures	7	2.7
	I feel I am total failure as a person	3	1.1
Loss of pleasure	I get as much pleasure as i ever did from things I enjoy	195	73.9
	I don't enjoy things as much as i used to. I get very little pleasure from things i used to enjoy	57 8	21.6 3.0
	I cannot get any pleasure from the things i used to enjoy	4	1.5
Guilty feelings	I don't feel particularly guilty	226	85.6
	I feel guilty over many things I feel quite guilty most of the time	30 5	11.4 1.9
	I feel guilty all of the time	3	1.1
Punishment feelings	I don't feel i am being punished	227	86.0
	I feel i may be punished I expect to be punished I feel i am being punished	28 5 4	10.6 1.9 1.5
Self dislike	I feel the same about myself as ever	218	82.6
	I have lost confidence in my self	39	14.8
	I am disappointed in my self I dislike my self	6 1	2.3 0.4
Self criticalness	I don't criticize or blame my self	233	88.3
	I am more critical of myself than i used to be I criticize myself for all of my faults I blame myself for everything bad that happens	12 6 13	4.5 2.3 4.9
suicidal thought or wishes	I don't have any thought of killing my self I have thought of killing myself but didn't try I would like to kill my self	260 2	98.5 0.8
		2	0.8
Crying	I don't cry any more than i used to	230	87.1
	I cry more than i used to	24	9.1
	I cry over every little thing	6	2.3
	I feel like crying but i cant	4	1.5
Loss of interest	I have no lost interest in other people or activities	185	70.1
	I am less interested in other people or activities	64	24.2
	I lost most of my interest in other people or things	11	4.2
	it is hard to get interested in any thing	4	1.5
Indecisiveness	I make decisions' about as well as ever	210	79.5
	I find it difficult to make decisions than usual	35	13.3
	I have greater difficulty in making decision than i used to I have trouble making any decisions	13 6	4.9 2.3
Worthlessness	I don't feel I am worthlessness	219	83.0
	I don't consider myself as worthwhile and useful i used to	35	13.3
	I feel more worthless as compared to other people I feel utterly worthless	8 2	3.0 0.8
Loss of energy	I have as much as energy as ever	67	25.4
	I have less energy than i used to have I don't have enough energy to do very much I don't have enough energy to do any thing	167 16 14	63.3 6.1 5.3
Sleep change	No Change	92	34.8
	Less change	101	38.3
	much change	53	20.1
	Severe disturbance	18	6.8
Irritability	I am no more irritable than usual	73	27.7
	I am more irritable than usual	161	61.0
	I am much more irritable than usual	16	6.1
	I am irritable all the time	14	5.3

Contd...

Table 2: Contd...

Variables	Responses	Frequency	%
Appetite change	No	105	39.8
	Less change much change	101	38.3
	lost/craving	15	5.7
Concentration difficulty	I can concentrate as well as ever	196	74.2
	I can't concentrate as well as ever	48	18.2
	it is hard to keep my mind on anything very long	17	6.4
	I find i can't concentrate on any thing	3	1.1
Tiredness or fatigue	I am no more tired or fatigue than usual	44	16.7
	I am more tired or fatigued more easily than usual I am too tired or fatigued allot of the things i used to	186	70.5
Loss of interest in sex	I haven't noticed any recent change in my interest in sex	135	51.1
	I am less interest in sex than i used to be	64	24.2
	I am less much interested in sex now	23	8.7
sex	I lost interest in sex completely	42	15.9

Table 3: Multivariate analysis among different factors and depression among diabetic patients, Mekelle, North Ethiopia, Apr 2016 (N=264)

Factors	Depression		COR (95% CI)	AOR (95% CI)	P value
	Yes	No			
Other medical illness					
Yes	36	166	1.28 (0.58, 2.82)	3.04 (1.11, 8.34)*	0.031
No	9	53			
Means of medication admin					
Oral	16	101	0.64 (0.33, 1.25)	0.81 (0.36, 1.81)	0.81
Injection	29	118			
Treatment Duration					
1 year or less	9	96	1	1	
2-5 years	24	80	3.2 (1.41, 7.280)	1.13 (0.43, 2.95)	
6+years	12	43	2.98 (1.17, 7.59)	1.78 (0.82, 7.34)	0.10
Adherence					
Poor Good	26	48	4.88 (2.49, 9.55)	4.38 (1.98, 9.64)*	0.000
Anxiety					
Yes	26	22	12.25 (5.86, 26.62)	10.52 (4.56, 24.28)*	0.000
No	19	197			

COR= Crude odds ratio, CI= Confidence interval, AOR= Adjusted odds ratio, *significantly associated

As well the prevalence of anxiety is 18.2% (95% CI: 14%, 23.9%); mild anxiety among 82 (31%), moderate anxiety in 32 (14%), and severe anxiety among 11 (4.1%). Furthermore, from the study participants according to MMAS, 28% (95% CI: 22.7%, 33.1%) has poor medication adherence. From which 32 (12.1%), 158 (59.8%), and 74 (28%) has high, medium, and low level of adherence, respectively.

Multivariate regression shows that anxiety disorder (AOR = 10.52, 95% CI (4.56, 24.28)), poor medication adherence (AOR = 4.38, 95% CI: [1.98, 9.64]), and coexistence of other physical illness (AOR = 3.04, 95% CI: [1.11, 8.34]) are risk factors for depression [Table 3].

DISCUSSION

Our finding of depression among diabetic patients which is 17% is comparable with prior studies conducted at Black Lion Hospital (16.3%), Addis Ababa, Ethiopia (19%), and Poland (17%).^[17,28,31] Although it is higher than a study Peru (11.2%).^[18] In general, our finding is smaller than distinct discoveries from Maroc, Guinea, Nigeria, Asia, Nepal, Bangladesh, and India.^[7,12-16,25-27] These distinctions can be due to the differences in sample size, sociodemographic condition, and others.

Coexisting anxiety disorder is a risk factor for depression in our study. This is supported by an earlier study which

reported that in the primary health-care facility 50% of patients with depression have a comorbid anxiety disorder. This in turn can lead to increased medical service utilization, chronicity, worse treatment outcome, and multiple relapse of the illnesses.^[37]

Depression is related with poor medication adherence in the current study. Earlier studies in China^[21] had similar finding. Comparable prior meta-analysis declared that depressed patients across a wide array of chronic illnesses such as diabetes and heart disease had 76% greater odds of being non-adherent with their medications compared to patients who were not depressed.^[38]

Diabetic patients are more prone to other physical illnesses, and this condition is enabling factor for depression. This was also found out in prior studies at Poland, China, India, and Iran.^[6-8,12,16-18,23]

CONCLUSION

Almost one in six diabetic patients have depression which associates with coexisting anxiety, poor medication adherence, and other chronic medical illnesses. Therefore, it is better to formulate a mechanism to detect and manage depression early.

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Conflicts of interest

There are no conflicts of interest.

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