

## Prevalence and Associated Factors of Depression among Type 2 Diabetes Mellitus Patients on Follow up at Ambo General Hospital, Oromia Regional State, Ethiopia, Institutional Based Cross Sectional Study

Takele Tiki\*

Ambo General Hospital, Diabetes Clinic, Oromia Regional state, Ethiopia

### Abstract

**Background:** Both diabetes and depression are associated with premature morbidity and mortality, and when these conditions co-exist, the risk of developing co-morbidities, complications, patient suffering and associated cost, escalates.

**Objective:** To assess the prevalence and associated factors of Depression among patients with Type 2 diabetes mellitus on follow up at Ambo general hospital, Oromia Regional State, Ethiopia.

**Method:** Institutional based cross-sectional study was conducted in 2016. Systematic random sampling technique was employed to select study participants and assessed for Depression and Anxiety scale using (HADS-D). The collected data was entered into Epi-info version 7 and analysis was done after the data transported to SPSS version 20. Odds ratio with the 95% confidence interval was calculated using logistic regression analysis and the level of significance of association was determined at P- value <0.05.

**Results:** A total of 423 participants were studied, with a response rate of 100%. The overall prevalence of depression was found to be 47%. Being female (AOR=2.94 (95%CI (1.87,4.64)), no formal education (AOR=2.48 (1.28, 4.77)), current use of alcohol (AOR=3.52 (1.64, 7.55)), T1DM (AOR= 2.77 (1.69, 4.55)), greater than five years duration of diabetes mellitus illness (AOR=2.63 (1.59,4.32)), chronic complication of diabetes mellitus {AOR=2.24 (1.20,4.18)} and other additional chronic illness (AOR=2.53 (1.51, 4.24)) were significantly associated factors depression among patients with type 2 diabetes mellitus.

**Conclusion:** Developing guidelines and training of health workers in Diabetes mellitus clinics is useful to screen and treat depression among Diabetes Mellitus patients.

**Keywords:** Diabetes; Depression; Sleep; Appetite; Anxiety; Psychiatry

### Background and Introduction

The global prevalence of diabetes is continuously rising. It is estimated that almost 285 million people are currently suffering from diabetes worldwide and the number is expected to rise to 438 million by the year 2030; more than 70% of these people reside in developing countries [1]. Similarly, depression affects all populations worldwide, but more than two-thirds of the affected people live in developing countries [2]. Both diabetes and depression are associated with premature morbidity and mortality, and when these conditions co-exist, the risk of developing co-morbidities, complications, patient suffering and associated cost, escalates [3,4].

Depression is a significant contributor to the global burden of disease and affects people in all communities across the world. Depressive disorders often start at a young age; they reduce people's functioning and often are recurring. For these reasons, depression is the leading cause of disability worldwide in terms of total years lost due to disability. Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration. Moreover, depression often comes with symptoms of anxiety. These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities [5].

Studies conducted in different countries on prevalence of depression among Diabetes mellitus patients shows that 77.6% in UK [6], 48.27% in Mexican [7], 23% in North India [8], 13.6% in Qatar [9], 8.7% to 21.4% in Leiden University [10], 52.1% in Allied Hospital, Faisalabad [11], 47% in JJM Medical college in Karnataka [12], 50% in

Bardarabbas, Southern Iran [13], 70.7% in Tehran, Iran [14], 43.4% in Iran [15], 11.5% and 40.3% in Malaysia [16,17], 43.5% and 38.35% in Pakistan [18,19] and 39.5% in Nigeria [20].

Moreover, depression is independently associated with increased chronic complication among patients with type 2 diabetes mellitus. Depression has been found to be associated with a negative impact among patients with diabetes mellitus. Despite their known effect on the population, there is no data available in the study area. Therefore, this study was planned to determine the prevalence and associated factors of depression among patients with type 2 diabetes mellitus at Ambo General Hospital, Oromia Regional State, Ethiopia.

### Method

#### Study setting and population

The study was a cross sectional design, conducted from April to

\*Corresponding author: Takele Tiki, Ambo General Hospital, Diabetes Clinic, Oromia Regional state, Ethiopia, Tel: 251112363164; E-mail: [takesibirat14@gmail.com](mailto:takesibirat14@gmail.com)

Received November 21, 2016; Accepted January 05, 2017; Published January 09, 2017

**Citation:** Tiki T (2017) Prevalence and Associated Factors of Depression among Type 2 Diabetes Mellitus Patients on Follow up at Ambo General Hospital, Oromia Regional State, Ethiopia, Institutional Based Cross Sectional Study. J Depress Anxiety 6: 259. doi:10.4172/2167-1044.1000259

**Copyright:** © 2017 Tiki T. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Parameter	Variables	Frequency	Percentage
Age	<30	41	9.7
	30-39	62	14.7
	40-49	100	23.6
	50-59	74	17.5
	≥60	146	34.5
Sex	Male	179	42.3
	Female	244	57.7
Religion	Orthodox	204	48.2
	Protestant	182	43.0
	Muslim	37	8.7
	Others	12	2.8
	Oromo	361	85.3
Ethnicity	Amhara	44	10.4
	Gurage	10	2.4
	Tigre	6	1.4
	Others	2	.5
Educational Status	No formal education	94	22.2
	primary school	132	31.6
	secondary School	83	19.6
	Diploma and above	114	27.0
Marital status	Married	287	67.8
	Single	61	14.4
	Divorced	28	6.6
	Widowed	47	11.1
Occupational status	Employed	112	26.5
	Merchant	83	19.6
	Farmer	104	24.6
	House wife	80	18.9
	Others	44	10.4
Family Monthly income	≤500	105	24.8
	500-1200	95	22.5
	1201-2151	116	27.4
	>2151	107	25.3

**Table 1:** Distribution of type 2 DM patients at Ambo General Hospital, Oromia Regional State, Ethiopia, 2016.

May, 2016 in Ambo General Hospital, Oromia regional state, western Ethiopia. All adult patients (age ≥ 18) with type 2 diabetes mellitus who had regular follow were included in the sample. Critically ill patients were excluded from the study. Among 993 DM patients who had regular follow-up at diabetes clinics, 423 type 2 DM patients were recruited for the study. Study participants were included using systematic random sampling technique. No patients refused to participate in the study.

### Inclusion criteria

All persons with type 2 diabetes mellitus 18 years and above attending this hospital for follow-up visit.

### Exclusion criteria

- Persons suffering from type 1 and gestational diabetes mellitus.
- Type 2 diabetes mellitus Patients who are severely ill were excluded.

### Data collection

Data were collected by trained psychiatry nurses using pretested interviewer administered questionnaire. The data collection instrument had different components. The first part includes socio-demographic characteristics (age, sex, education, occupation, marital

status and others). The instrument was adopted and translated to Afan Oromo language and back to English and highly reliable in the study (Cronbach's  $\alpha=0.89$ ). An outcome variable (presence of depression) was collected by Hospital Anxiety & Depression scale (HADS-D). HADS-D is a 7-item questionnaire, commonly used to screen for symptoms of anxiety and depression 7-item sub-scales for depression. It was validated in Ethiopia and its internal consistency was 0.76 for depression subscales and 0.87 for full scale. The scales use a cut off score for depression of greater than or equal to 8 [21].

### Data processing and analyses

Data were analyzed using SPSS version 20. Bivariate analysis was done to see the association of each independent variable with the outcome variable. Potential confounders (important) variables were entered into binary logistic regression model to identify the effect of each independent variable with the outcome variables. A p-value of less than 0.05 was considered statistically significant, and adjusted odds ratio with 95% CI was calculated to determine association.

### Ethical considerations

Ethical clearance was obtained from the Research and Ethics Review Committee of the Institute of Public Health (University of Gondar) and Amanuel Mental Specialized Hospital. Permission letter was obtained

Characteristics	Variables	Frequency	Percentage
Duration of illness	≤5 years	289	68.3
	>5 years	134	31.7
Chronic Complication of diabetes (retinopathy, nephropathy, and neuropathy)	Yes	98	23.2
	No	325	76.8
Additional chronic disease	Yes	74	17.5
	No	349	82.5
History of substance users (Alcohol, Khat and cigarette)	Yes	243	57.4
	No	180	42.6
Currently substance users (Alcohol, Khat and cigarette)	Yes	55	13
	No	368	87

**Table 2:** Description of clinical, psychosocial and substance use factors among patients with type 2 diabetes mellitus at Ambo General Hospital, Oromia Regional State, Ethiopia, 2016.

Variables	Depression		Crud OR 95% CI	Adjusted OR
	Yes (%)	No (%)		
<b>Sex</b>				
Male	57	122	1.00	1.00
Female	142	102	2.98 (1.99, 4.47)***	2.94 (1.87, 4.64)***
<b>Age groups</b>				
<30	11	30	1	1
30-39	28	34	2.25 (0.96, 5.23)	2.13 (0.89, 4.33)
40-49	45	55	2.23 (0.99, 4.94)	2.77 (.78, 6.94)
50-59	35	39	2.44 (0.69, 3.60)	1.55 (0.66, 4.45)
>=60	80	66	3.31 (1.54, 7.09)	3.24 (0.98, 5.46)
<b>Marital status</b>				
Married	109	178	1	1
Single	33	28	1.93 (0.93, 3.36)	1.93 (0.93, 3.36)
Divorced	20	8	4.08 (0.74, 9.59)	4.08 (0.74, 9.59)
Widowed	37	10	6.04 (0.89, 12.64)	6.04 (0.89, 12.64)
Educational status Diploma and above	44	70	1	1
Secondary school	33	50	1.05 (0.491, 1.584)	1.35 (0.69, 2.63)
Primary school	65	67	1.54 (0.906, 2.483)	2.09 (0.16, 2.76)
No formal education	57	37	2.45 (1.29, 3.97)**	2.48 (1.28, 4.77)**
<b>Occupational status</b>				
Employed	42	70	1	1
Merchant	37	46	1.34 (0.75, 2.39)	1.34 (0.75, 2.39)
Farmer	46	58	1.32 (0.77, 2.28)	1.32 (0.77, 2.28)
House wife	48	32	2.50 (0.39, 4.50)	2.50 (0.39, 4.50)
Others	26	18	2.41 (0.18, 4.91)	2.41 (0.18, 4.91)
<b>Income</b>				
<500	50	55	0.93 (0.55, 1.57)	0.93 (0.55, 1.57)
500-1200	42	53	1.12 (0.65, 1.92)	1.12 (0.65, 1.92)
1201-2151	54	53	0.87 (0.49, 1.52)	0.87 (0.49, 1.52)
>2151	53	63	1	1
<b>Current use of Cigarette</b>				
Yes	2	4	0.56 (0.10, 3.08)	0.56 (0.10, 3.08)
No	197	220	1	1
<b>Current alcohol use</b>				
Yes	29	14	2.56 (1.31, 4.99)**	3.52 (1.64, 7.55)**
No	170	210	1	1
<b>Current use of khat</b>				
Yes	4	2	2.23 (0.41, 12.57)	2.23 (0.41, 12.57)
No	195	222	1	1
<b>Duration of illness</b>				
≤5yrs	110	179	1.00	1.00
>5yrs	89	45	3.22 (2.09, 4.95)***	2.63 (1.59, 4.32)***
<b>Having at least one chronic complication</b>				
Yes	66	32	2.98 (1.85, 4.80)***	2.69 (1.59, 4.68)***
No	133	192	1	1

Having at least one additional chronic disease				
Yes	50	24	2.79 (1.64, 4.76)***	2.237 (1.19, 4.18)***
No	149	200	1	1

Significant association (p-value < 0.05) \*\* significant association (p-value < 0.01) Substance use = khat, cigarette and/or alcohol use .Other chronic illness = hypertension, renal diseases, cardiovascular diseases.

**Table 3:** Factors associated with depression among patients with type 2 Diabetes mellitus at Ambo General Hospital, Oromia Regional State, Ethiopia, 2016.

from Oromia health bureau and submitted to Ambo general hospital. Written informed consent was obtained from each study participant and they were informed about their rights to interrupt the interview at any time. Confidentiality was maintained at all levels of the study. DM patients who were found to have moderate to severe depression were referred to psychiatry clinics for further investigations.

## Results

### Socio-economic and demographic characteristics

A total of 423 participants were recruited for the study which makes the response rate 100%. The mean ( $\pm$  SD) age of the respondents was 45.21 ( $\pm$  15.72) years. Among the respondents, 244 (57.7%) were female, 287 (67.8%) were married, 171 (40.4%) were farmers, 132 (31.2%) were attended primary education, and 116 (27%) the median monthly income of the participants was 2151 (Table 1).

### Clinical and psychosocial characteristics of the respondents

Two hundred eight nine (68.3%) of the respondents reported less than or equal to five years duration of diabetes diagnosis, 98 (23.2%) of the study population had at least one chronic complication of diabetes mellitus and 74 (17.5%) of the respondents had at least one other additional chronic disease and 43 (10.2%) of participants were reported history of current alcohol users (Table 2).

### Prevalence of depression among Type 2 DM patients

The prevalence of depression among Type 2 DM patients was 47%.

### Factors associated with depression among patients with type 2 diabetes mellitus

Binary logistic regression analysis revealed that being female, no formal education, greater than five years duration of diabetes mellitus diagnosis, chronic complication of diabetes mellitus, have history of alcohol use were statistically significant with depression (Table 3).

## Discussion

### Prevalence and factors associated with depression among patients with type 2 Diabetes mellitus

This study revealed that the prevalence of depression was 47%. The finding was similar with other studies carried out in Mexican (48.27%) [7], in JJM Medical College (47%) [12], in Iran (43.4%) [15], in Pakistan it (43.5%) [18], and in Nigeria (39.5%) [20]. On the other hand, the current study finding was higher than the study done in Malaysia 11.5% [16], in North India [8], in Qatar (13.6%) [9], in Pakistan (38.35%) [19] and in Malaysia (40.3%) [17] and lower than the study was done in Allied Hospital Faisalabad [11], in UK (77.6%) [6], in southern Iran 50% [13] and in Tehran, Iran (70.7%) [14]. The variation might be due to the difference in study design, data collection tool, sample size and the socioeconomically status of participant's in study.

One of the factors significantly associated with depression was being female and no formal education. The finding is similar with the study conducted in Allied Hospital Faisalabad, Tehran Iran and

Pakistan [11,14,19], Being type 2 DM diagnosed greater than five years significantly associated similar with study done in Qatar, in JJM Medical college, in Malaysia and in Pakistan [9,12,16,18]. Hence, history alcohol user's patients can be at higher risk of depression than have no history of alcohol use similar with study conduct in Qatar and Iran. This could be due to the fact that depression patients are more prone to use substances to relief themselves from the stress or depression symptoms [9,15].

This is similar with a study conducted in in Mexican, in Allied Hospital Faisalabad and in JJM Medical College [7,11,12]. Previous study has proven that presences of other complications (retinopathy, nephropathy, and neuropathy) are highly associated with depression.

## Conclusion

The prevalence of depression 47% among Type 2 DM patients was high. Depression had statistically significant association with being female sex, history of alcohol use, no formal education, chronic complication, greater than five duration of type 2 DM diagnosis and other complication. Oromia health bureau should develop guidelines to screen and treat depression among Type 2 DM patients.

Further research on risk factors of depression should be conducted to strengthen and broaden the current findings.

### Limitation of the study

This study was cross-sectional study design. It did not allow establishing a temporal relationship between depression and significant associated factors like substance (khat, cigarette and alcohol) use. Additionally, no detailed substance use related factor was not assessed by standard tool.

## References

- World Diabetes Foundation (2001) Diabetes Pandemic: World, Nations, Cultures and Cities.
- Khuwaja AK, Qureshi R, Azam SI (2004) Prevalence and factors associated with anxiety and depression among family practitioners in Karachi, Pakistan. *JPM* 54: 45-49.
- Khowaja LA, Khuwaja AK, Cosgrove P (2007) Cost of diabetes care in outpatient clinics of Karachi, Pakistan. *BMC Health Serv Res* 21: 189.
- Lin EH, Rutter CM, Katon W, Heckbert SR, Ciechanowski P, et al. (2010) Depression and advanced complications of diabetes: a prospective cohort study. *Diabetes Care* 33: 264-269.
- World Health Organization 2008, The Global Burden of Disease 2004 update. Collins MM, Corcoran P, Perry IJ (2009) Symptoms of anxiety and depression in patients with diabetes. *Diabetic Medicine* 26: 153-161.
- Tovilla ZRC, Jua' RI, Peralta JY (2012) Prevalence of anxiety and depression among outpatients with Type 2 diabetes in the Mexican population. *PLoS ONE* 7(5): e36887.
- Thour A, Nagra R, Gosal A, Sehrawat T, Das S, et al. (2016) Anxiety among patients with diabetes mellitus evaluated using generalized anxiety disorder 7-item scale. *J Soc Health Diabetes* 4: 133-6.
- Bener A, Abdulla OAA, Hamaq A, Elnour ED (2011) High prevalence of depression, anxiety and stress symptoms among diabetes mellitus patients. *The Open Psychiatry Journal* 5: 5-12.

9. Basdani MK (2016) Prevalence and comorbidity of depression and anxiety disorders in diabetic patients: a meta-analysis, *leiden Respiratory S1479784*.
10. Rehman A, Farhana SK (2015) Prevalence and level of depression, anxiety and stress among patients with Type-2 diabetes mellitus. *Inst Med Sci* 11: 81-86.
11. Taranum A, Angadi N, Shakeel MA (2016) Study of frequency and factors associated with depression among adult diabetics in urban areas of Davangere, Karnataka. *Ntl J Com-munity Med* 7: 111-115.
12. Nikibakht A, Moyayedi F, Zare S, Mahboobi H (2009) Anxiety and depression among diabetic patients in Bandarabbas, Sothern Iran. *AMJ* 1: 25-28.
13. Palizgir M, Bakhtiari M, Alireza E (2013) Association of depression and anxiety with diabetes mellitus Type 2 concerning some sociological factors. *IRCMJ* 15: 644-648.
14. Yekta Z, Pourali R, Yavarian R (2010) Behavioural and clinical factors associated with depression among individuals with diabetes. *EMHJ* 16: 286-291.
15. Gurpreet K, Guat HT, Suthahar A, Ambigga SK, Karuthan C (2013) Depression, anxiety and stress symptoms among diabetics in Malaysia: a cross sectional study in an urban primary care setting. *BMC Family Practice* 14: 1-13.
16. Ganasegeran K, Renganathan P, Manaf RA, Sami AR (2014) Factors associated with anxiety and depression among type 2 diabetes outpatients in Malaysia: a descriptive cross-sectional single-centre study. *BMJ Open* 4: e004794.
17. Raheem D, Ghazala R, Iqbal A, Saima L, Franklin W, et al. (2010) Anxiety and depression among outpatients with type 2 diabetes: A multi-centre study of prevalence and associated factors. *Diabetology & Metabolic Syndrome* 2: 1-7.
18. Arshad AR, Alvi KY (2016) Frequency of depression in type 2 diabetes mellitus and an analysis of predictive factors *JPMA* 66: 425-429.
19. James BO, Henry JD, Crawford JR (2010) Depression among patients with diabetes mellitus in a Nigerian teaching hospital, *sjap* 16: 61-64.
20. Ayalu A (2011) Reliability and validity of the Ethiopian version of the hospital anxiety and depression scale (HADS) in HIV infections patients. *PLoS One* 6: 16049.