

# Magnitude of Depression and its Associated Factors: Hospital Based Cross Sectional Study

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**ABSTRACT: Background:** Depression is a mental disorder that is pervasive in the world and affects us all. It affects up to 50.6% of patients in medical settings. While the disorder can be reliably diagnosed and treated in primary care, it's unrecognized and under managed. Therefore, the objective of this study was to assess the prevalence and associated factors of depression among adult in patients in medical and surgical outpatient departments in Dessie referral hospital, north eastern, Ethiopia.

**Methods:** A facility based cross-sectional study was conducted in March 2017 at Dessie referral hospital and comprised patients in the Medical and Surgical outpatient departments. The sample size was determined using a single population proportion formula. Participants were selected using systematic random sampling technique. The final calculated sample size was 424 adult patients. The prevalence of depression was assessed using Patient Health Questionnaire-9. Descriptive statistics, bivariate and multivariate logistic regression analyses were performed using SPSS 20.

**Results:** The prevalence of depression among the study participants was 39.1%. In this study, females were 2 times more likely to experience depression compared with males: [AOR=1.92, 95% CI: 1.15, 3.22] and Participants who were divorced and widowed were 3 times more likely to have depression as compared with participants who were married [AOR=3.07, 95% CI: 1.11, 8.49].

**Conclusion:** The prevalence of depression among patients in medical and surgical OPDs in Dessie referral hospital was relatively high (39.1%). Depression had statistically significant association with age, sex, marital status, occupational status, chronic illness, substance use and family history of mental illness. The major implication of these study findings on the health system is the importance of ensuring support to primary health care services for early detection and referral of depression.

**KEYWORDS:** Depression; Magnitude; Associated factors; Patients

## BACKGROUND

Depression is a mental disorder that is pervasive in the world and affects us all. It is a significant contributor to the global

burden of disease and affects people in all communities across the world. Today, depression is estimated to affect 350 million people. The world mental health Survey conducted in 17 countries found that on average about 1 in 20 people reported having an episode of depression in the previous year. One out of ten men and almost one out of five women suffer from this disorder during his (or her) lifetime (one-year prevalence is 10% and lifetime prevalence 17%) (WHO, 2016) who gets depression varies considerably across the populations of the world. Lifetime prevalence rates range from approximately 3% in Japan to 16.9% in

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the United States, with most countries falling somewhere between 8 to 12%. While depression is the leading cause of disability for both males and females, the burden of depression is 50% higher for females than males. It also has strong link with chronic illness (WHO, 2016).

Depression is currently the leading cause of non-fatal burden when considering all mental and physical illnesses, accounting for approximately 10% of total years lived with disability in Low and Middle Income Countries (WHO, 2016; Molla GL, et al., 2016). In Ethiopia, depression is the leading non-communicable disorder in terms of burden. Indeed, in predominantly rural areas of Ethiopia, depression is included in the top ten most burdensome conditions, out-ranking HIV/AIDS (Federal Democratic Republic of Ethiopia Ministry of Health. 2012; Chaudhry R, et al., 2016; Tilahun AB, et al., 2016).

A particular tragic potential outcome of depression is suicide. Most people who die are depressed. It is estimated that 7.7 persons/100000/year has completed suicide in Ethiopia. These startling statistics show that depression has been overlooked as a major health priority in Ethiopia and other LMICs, and underscore the need for public health programs targeting depression (Federal Democratic Republic of Ethiopia Ministry of Health. 2012).

Co-morbidity of cardio vascular diseases, surgery, stroke, Alzheimer's disease, Diabetes mellitus with depression also raise the burden of depression by hospitalization, slow recovery and disability (WHO, 2016; Federal Democratic Republic of Ethiopia Ministry of Health. 2012). Although depression is common and associated with a high burden due to disability and mortality, only a small percentage of these disorders are recognized and treated (WHO, 2016; Alemu WG, et al., 2016). Data on depression in the medical and surgical patients in Ethiopia are scarce particularly in the study area. Therefore, the aim of this study was to investigate the prevalence and factors associated with depression among adult medical and surgical outpatients.

## METHODS

### STUDY SETTING AND DESIGN

An institution-based quantitative cross sectional study was conducted from 10-25 March, 2017. It was conducted at Dessie referral hospital in Dessie city, which is the capital of South Wollo Zone of the Amhara National Regional State. Dessie referral hospital emerged in 1962 G.C during the regime of Emperor Haile Silase. It is governmental hospital, which has Medical, Surgical, Gynecology and obstetrics, emergency and psychiatric OPDs. There are 3 medical OPDs and 2 surgical OPDs. There is one psychiatry clinic which is run by four psychiatric nurses and two MSc psychiatric professionals according to data from Dessie referral hospital information desk office, 2017.

### SAMPLE SIZE DETERMINATION AND SAMPLING PROCEDURE

The sample size was determined using a single population proportion formula considering the following assumptions: standard normal distribution with confidence interval (CI) of 95% ( $Z=1.96$ ), absolute precision or tolerable margin of error ( $d=0.05$ ), and anticipated proportion of patients who experience depression =50 % ( $P$ ) and 10 % non-response rate. So, the final sample size was 424.

All medical and surgical OPDs in Dessie referral hospital were included in the study. The total number of patients who attended medical and surgical outpatient departments (3 medical and 2 surgical) was 35000 per month. In 2 weeks 1750 (1050 patients visited medical outpatient departments while 650 patients visited surgical outpatient department). The average number of patients attended each OPDs per day was 35. A systematic random sampling technique was used to select 424 study participants from 1750 patients. The study participants were invited at regular intervals (every 4th) to select 85 patients from each five OPDs.

### DATA COLLECTION TOOL AND DATA QUALITY CONTROL

Data were collected by 10 clinical nurses using pretested translated interviewer administered questionnaire. A structured questionnaire was used to collect data on socio demographic characteristics, clinical and behavioral variables. Depression was assessed using the Patient Health Questionnaire 9. PHQ-9 is a 9-item questionnaire, commonly used to screen for symptoms of depression in outpatients. It was translated to local language, Amharic and validated in Ethiopia with sensitivity of 86% and specificity of 67% (Gelaye B, et al., 2013). Symptoms of depression were rated as "0" (not at all) to "3" (nearly every day). Patients were considered as depressed when their PHQ -9 score  $\geq 5$ . PHQ-9 scores of 5, 10, 15, and 20 represent mild, moderate, moderately severe and severe depression, respectively.

### DATA PROCESSING AND ANALYSIS

Data were entered into Epidata version 3.1 and imported to SPSS version 20 software package for analysis. Descriptive statistics was done to identify the distribution of socio demographic, clinical and behavioral characteristics of the study participants. Bivariate and multivariate logistic regression and odds ratio with 95% confidence interval were used to identify predictors of depression.

## RESULTS

### SOCIO DEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

From a total of 424 participants recruited, 414 participated yielding a response rate of 97.7%. Among the study

participants, 214(51.7%) were males. The mean age of the respondents was 39.01 (SD± 16) years. More than half of the respondents, 248 (59.9%) were followers of Muslim religion. The predominant ethnic group was Amhara 403(97.3%). Majority of the respondents 264(63.8%) were married, 254(61.4%) of the study participants were unemployed (see **Table 1**).

### CLINICAL, SUBSTANCE USE AND BEHAVIORAL CHARACTERISTICS OF PARTICIPANTS

Out of the total participants, 161(38.9%) had chronic illness. Majority of the study participants 301(72.7%) had no history depression (**Table 2**).

### THE PREVALENCE OF DEPRESSION

The overall prevalence of depression among medical surgical out patients was 39.1% when a cut-off score of PHQ -9  $\geq$  5 was used. Frequency of PHQ-9 depressive symptoms and their effect on day to day activity of study participants. From the total of nine items, feelings of tiredness (65.7%) and loss of interest (56 %) were the most common symptoms reported among participants (**Table 3**).

### FACTORS ASSOCIATED WITH DEPRESSION

In this study, females were 2 times more likely to experience depression compared with males P=0.012 [AOR=1.93, 95% CI: 1.15, 3.22] and participants who were divorced

**Table 1.**

The socio-demographic characteristics of medical surgical outpatients in Dessie referral hospital in 2017/18 (n=414).

Variables	Frequency (n=414)	Percent (%)
<b>Sex</b>		
Male	214	51.7
Female	200	48.3
<b>Age</b>		
18-30	170	41.1
31-40	85	20.6
41-50	65	15.8
51-60	48	11.7
>61	44	10.7
<b>Ethnicity</b>		
Amhara	403	97.3
Oromo	8	1.9
Afar	3	0.7
<b>Religion</b>		
Muslim	248	59.9
Orthodox	160	38.6
Protestant	6	1.4
<b>Occupation</b>		
Unemployed	254	61.4
Employed	160	38.6
<b>Educational status</b>		
Unable to read and write	149	36
Able to read and write	34	8.2
Primary	53	12.8
Secondary	80	19.3
Diploma	47	11.4
Degree and above	51	12.3
<b>Marital status</b>		
Married	264	63.8
Single	124	30
Divorced	26	6.3
<b>Income</b>		
>750 ETB	167	40.3
750-1200 ETB	111	26.8
<1200 ETB	136	32.9
<b>Living alone</b>		
No	301	72.7
Yes	113	28.3

Abbreviation: ETB Ethiopian Birr

**Table 2.**  
Clinical, substance use and behavioral characteristics of participants.

Variables	Frequency(n=414)	Percent (%)
<b>OPD</b>		
Medical	252	60.90%
Surgical	162	39.10%
<b>Chronic illness</b>		
No	253	61.10%
Yes	161	38.90%
<b>Family history of mental illness</b>		
No	317	76.60%
Yes	97	24.40%
<b>Substance use history</b>		
No	297	71.70%
Yes	117	28.30%

Abbreviation: OPD outpatient department

**Table 3.**  
Symptom of depression measured by PHQ 9 among adult patients attended medical and surgical OPDs in Dessie referral hospital, north eastern Amahara, Ethiopia, 2017.

PHQ 9 Symptoms	Frequency	Percent (%)
Loss of interest	232	56
Feeling down	200	48.3
Insomnia or hypersomnia	208	50.2
Feeling tired	272	65.7
Poor appetite or over eat	227	55
Feeling bad about yourself	160	38.7
Lack of concentration	185	44.8
Restlessness	141	34.1
Suicidal thought	96	23.2

Abbreviation: PHQ 9 Patient Health Questionnaires 9

**Table 4.**  
Covariates associated with depression among adult patients attended medical and surgical OPDs in Dessie referral hospital, north eastern Amahara, Ethiopia, 2017.

Variables	Depression		OR(95% CI)	
	Yes	No	COR	AOR
<b>Sex</b>				
Female	92	108	1.75 (1.18-2.61)	1.93(1.15-3.22) **
Male	70	144	1	1
<b>Age</b>				
>54	27	17	3.71(1.86-7.39)	3.59(1.41-9.10) **
45-54	24	24	2.33(1.21-4.49)	2.75(1.14-6.66) *
35-44	25	40	1.49(0.80-2.65)	1.27(0.57-2.81)
25-34	35	50	1.63(0.95-2.81)	2.16(1.00-4.47)
18-24	51	119	1	1
<b>Marital status</b>				
Divorced/ window/ separated	19	7	4.67(1.90-11.51)	3.08(1.11-8.49) *
Single	46	78	1.06(0.65-1.58)	2.03(1.11-3.74) *
Married	97	167	1	1
<b>Educational status</b>				
Degree and above	19	32	0.64(0.33-1.22)	1.68(0.68-4.16)
Diploma	13	34	0.41(0.20-0.84)	0.92(0.35-2.45)
Secondary	19	61	0.33(0.18-0.61)	0.82(0.38-1.80)
Primary	27	26	1.11(0.59-2.08)	1.80(0.82-3.97)
Able to read and write	12	22	0.58(0.27-1.26)	1.15(0.45-2.92)
Unable to read and write	72	77	1	1

<b>Occupation</b>				
Unemployed	160	59	3.04(2.06-4.58)	4.41(2.54-7.64) ***
Employed	92	103	1	1
<b>Income</b>				
>1200 ETB	43	93	0.58(0.36-0.93)	1.49(0.78-2.82)
750-1200 ETB	45	66	0.86(0.53-1.40)	0.06 (0.60-1.93)
<750 ETB	74	93	1	1
<b>Substance use</b>				
Yes	63	54	2.33(1.51-3.61)	2.83(1.61-4.98) ***
No	99	198	1	1
<b>Family history of mental illness</b>				
Yes	69	28	1.80(1.10-2.95)	2.04(1.13-3.69)***
No	183	134	1	1
<b>Living alone</b>				
Yes	59	54	2.10(1.35-3.26)	1.24(0.70-2.19)
No	103	198	1	1
<b>Chronic illness</b>				
Present	96	65	4.185(2.745-6.38)	3.60(2.16-5.99) ***
None	66	187	1	1

and widowed were 3 times more likely to have depression as compared with participants who were married P = 0.03(AOR=3.08, 95% CI: 1.11,8.49).

A strong positive association was obtained during multivariate analysis between depression and age. Study subjects aged >54 years were 3.5 times more likely to develop depression as compared with those aged 18–24 years and patients in the age group of 45-54 had 2.7 times more odds to develop depression than patients with aged 18–24 years.

Age, sex, marital status, employment, family history of mental illness, chronic illness and substance use history, were a significant predictor of depression according to the finding of this study. There is no statically significant relationship between educational status, income, assigned OPDs (medical or surgical), and living alone (see **Table 4**).

## DISCUSSION

This study revealed that the magnitude of depression was 39.1 % ( 95% CI: 34.3%-43.7%). Similar findings were reported in many international and local studies (Teshager W, 2016; Makara-Studzińska, M et al.. 2011; Apostle, JLA, et al., 2011; Ndetei DM, et al., 2009). On the other hand, the current study finding was higher than the finding of studies done in Ethiopia (24.5%), Malawi (30.3%), Nigeria (23.1%), China (30.1%) (Tilahune AB, et al., 2016; Udedi, M. 2014; Obadeji A, et al., 2014; Yong N, et al., 2012) and lower than the studies done in Ethiopia(57.4),Saudi Arabia (49.9%), Pakistan(57.4%) and Iran(77.9%) (Worku DK., et al. 2014; Al-Qadhi W, et al., 2014; Rahman AS, et al., 2015; Noorbala AA, et al., 2010).This variation of findings across various studies might be due to cross-cultural limitations of diagnostic tools and reporting biases, differences in socio economic environments. Prevalence estimates also are likely to be influenced by stigma and discrimination.

Compared to general population, it can be assumed that patients are more likely to have depression, because of their health status. Comparing this study results with a Community based cross-sectional study done in Northwest Ethiopia, we found our rates to be higher across the board; mild cases (20% vs 10.7%), moderate (13.4 % vs 4.2%), moderate to severe cases (4.3% vs 1.9%), and severe (1.2 % vs 0.6%) (Molla GL, et al. 2016). The higher magnitude in the current study might reflect the particular psycho-social stresses experienced by this group of patients. Several factors can explain the much higher prevalence of depression among the patients in this study than in the general population. First, it was a survey among people attending medical surgical outpatient clinic, who are, by definition, less healthy than people in the general population. Furthermore, since study participants were patients in addition to having major social problems, they may have had organic diseases which may lead them to depression.

Being female was significantly associated with depression [AOR=1.93, 95% CI: 1.15, 3.22].Similar relation was reported in many studies conducted in Ethiopia and Nigeria, (Tilahune AB, et al., 2016; Alemu WG, et al., 2016; Obadeji A, et al., 2014).This might be due to low social and economic status, cultural discrimination, sexual harassment at work place, the affective nature of females response to stressful life, and hormonal changes that leads female to be more depressed than male.

This study found a strong positive association between depression and age. Study subjects aged >54 years were 3.5 times more likely to develop depression as compared with those aged 18–24 years and patients in the age group of 45-54 had 2.7 times more odds to develop depression than patients with aged 18–24 years. The finding was supported by studies done in Ethiopia, Nigeria and Pakistan (Obadeji A, et al., 2014; Worku DK., et al. 2014; Molla

GL, et al., 2016). The possible reasons may be inability to perform daily activities, loss of function and independence, sedentary life style, and occurrence of concomitant medical illness. It also due to aging leads to neurotransmitter level decline, which affects communication in nerve cells, which leads to common depression and increased the magnitude of physical co morbidity with advancing age.

Participants who were divorced and widowed were 3 times more likely to have depression as compared with participants who were married (AOR=3.076, 95% CI: 1.11,8.49). It was in line with the studies conducted in Ethiopia, Nigeria and India which showed that being divorced and widowed is a risk factor for depression (Alemu WG, et al., 2016; Obadeji A, et al., 2014; Kohli C, et al., 2013). The finding implies the unstable marital relationship and the loss of partner increase the risk of having depression episodes. This may be due to those who are married are more likely to have settled and share the burden of increasing living cost and show more positive health behaviors that may contribute to reduced depression. On the other hand, widowed subjects might have depression, when they loss the beloved one and feel insecurity and loneliness.

In agreement with reports of WHO 2016 and studies result from Ethiopia and Nigeria (WHO, 2016; Obadeji A, et al., 2014; Hailemariam S, et al., 2012), this study indicated unemployment significantly associated with depression  $P=0.000$  (AOR=4.4, 95% CI: 2.54, 7.63). The possible explanation may be that unemployment leads to depression in a number of ways. When patients become unemployed, it is a stressful event that affects their self-esteems. Employment generates income play a role on develop positive identity and improve the ability to follow healthy lifestyles, while unemployment leads to impoverishment, psychological stress and participate in health threatening coping behaviors such as Khat chewing, tobacco consumption, alcohol abuse and promiscuity.

Although causal relationships and biological mechanisms underlying associations of depression with chronic illness have yet to be clearly established, studies indicated there is significant association between depression and chronic illness (WHO, 2016; Tilahun AB, et al., 2016; Hailemariam S, et al., 2012). consistently, result of this study reflected, patients with chronic illness were 3.6 times more likely to report depression as compared with those without chronic illness (AOR=3.6, 95% CI: 2.16,5.98). The possible explanation may be that medical illness can cause tremendous life changes which may limit mobility and independency, interferes with doing enjoyable activities, and consequently decreases self-confidence that results in depressive symptoms. More ever, some medication used to treat chronic condition like DM, cardiac; Hypertension and renal dieses may cause depression.

An important behavioral predictor variable for depression episodes in this study is substance use as indicated by various

studies (Molla GL, et al., 2016; Hailemariam S, et al., 2012; Mossie A, et al., 2016). However, some authors propose that depression episodes disappeared during Substance (Khat, Alcohol and Cigarette) use sessions (Federal Democratic Republic of Ethiopia Ministry of Health, 2012). But these depressive symptoms crop up on cessation of substance use. This might be due to the fact that substances contains psychoactive chemicals that have amphetamine like action in the brain which activates the release of mono aminergic neurotransmitters such as dopamine (Federal Democratic Republic of Ethiopia Ministry of Health, 2012) in the limbic system, resulting in reward sensations but after the cessation of substance, it leads to depression.

On the other hand, other works in literature explained that depression and substance use show bidirectional relationship (Mossie A, et al., 2016). Substance use increases the risk of depression (Molla GL, et al., 2016; Mossie A, et al., 2016). Persons with depression tend to abuse substances and have difficulties when they try to stop. There are thousands of chemicals are present Khat, Alcohol and cigarette, of which one or several may affect mood in the same way as a group of antidepressant medications called monoamine oxidase inhibitors or (MAOIs) does (Federal Democratic Republic of Ethiopia Ministry of Health, 2012). These MAOIs effectively increase levels of specific neurotransmitters involved in the regulation of mood. Substance use, therefore, may be one way for depressed individuals to alleviate depressive symptoms.

Patients who had family history of mental illness were 2 times more likely to develop depression as compared to patients who had no family history of mental illness (AOR=2.04, 95% CI: 1.13, 3.68). The observed difference might be because of the presence of a family history of a range of psychiatric disorders was significantly associated with a slight reduction in general cognitive ability. Cognitive ability of a person again have link with genetics. This study speculates that genetic factors associated with a range of mental disorders.

In this study income, educational status, assigned OPDs (medical or surgical) and living alone had not statically significant association with depression as other studies found out (Alemu WG, et al., 2016; Worku DK., et al., 2014; Hailu A, et al., 2013).

## CONCLUSION

The prevalence of depression among patients in medical and surgical OPDs in Dessie referral hospital was relatively high (39.1%) in comparison with other findings. Depression is more common in patients as compared to the general population. It had statistically significant association with age, sex, marital status, occupation, chronic illness, substance use and family history of mental illness. The major implication of these study findings on the health system is the importance

of ensuring support to primary health care services for early detection and referral of depression.

#### LIST OF ABBREVIATION AND ACRONYM

AIDS- Acquired Immune Deficiency Syndrome, AOR-adjusted odds ratio, CI-Confidence Interval, ERB-Ethical Review Board, FMOH- Federal Minister of Health, HIV-Human Immune Virus, LMIC – Low and Middle Income Countries, MDG- Millennium Development Goal, OPD-Out patient department, OR-Odds ratio ,PHQ-Patient Health Questionnaires, SD-standard deviation ,SPSS-Statistical Package for Social Science, WHO-World Health Organization, YLD-Years Lived with Disability.

#### DECLARATIONS

##### ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was obtained from Addis Ababa University School of Allied Health science ethical review board. A formal letter was given and permission was obtained from Dessie referral hospital and respective OPDs. After a detail explanation of the purpose of the study, verbal and written consent was obtained from each study participants. Participants who were refused to participate in the study were not being forced and participants can withdraw from the study at any time. Those study participants who had depression based on PHQ 9 and suicidal ideation symptom was linked to the respective health care provider for further diagnosis and treatments.

#### CONSENT FOR PUBLICATION

Not applicable

#### AVAILABILITY OF DATA AND MATERIAL

All relevant data are within the manuscript

#### COMPETING INTERESTS

The authors declare that they have no competing interests

#### FUNDING

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#### AUTHORS' CONTRIBUTIONS

NE; carried out the research drafting, design, statistical analysis, interpretation and manuscript writing as well as coordinating all activities in the research, BH; participate on the research proposal and final paper development, AF; participate on the research proposal and final paper development, TA; commented and did relevant correction on the draft manuscript. All authors read and approved the final manuscript.

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