

# Prevalence of Depression and Associated Factors among Adults on Antiretroviral Therapy In Public Hospitals of Kembata Tembaro Zone, South Ethiopia

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## Research

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# Abstract

## Background

Currently, people living with Human Immunodeficiency Virus have longer life expectancies with the use of antiretroviral therapy. However, depression is the most common in these patients, which has markedly resulted to poor health outcomes due to reduced adherence to treatment and deterioration of medical outcomes, including treatment resistance, increase the demand for the utilization of medical resources and increase the morbidity and mortality. The aim of this study was to assess the prevalence and associated factors of depression among adult people living with HIV attending antiretroviral therapy clinic in public hospitals at Kembata Tembaro Zone, South Ethiopia, 2020.

## Method

An institution based cross sectional study was conducted in public Hospitals of Kembata Tembaro Zone from March 1/2020-April 30/2020. Systematic random sampling technique was used to select the study participants. Data were collected using a pretested and structured questionnaire. Multivariable Logistic regression was performed to assess factors associated with depression using odds ratio at 95% confidence interval and P-value < 0.05.

## Results

The prevalence of depression was 44.3% (95% CI: 39.4% – 49.2). Being female (AOR = 2.03, 95% CI: 1.21, 3.40), living alone (AOR = 3.09, 95% CI: 1.68, 5.68), Having HIV related stigma (AOR = 2.85, 95% CI: 1.73, 4.71), poor social support (AOR = 2.55, 95% CI: 1.48, 4.78), CD4 count less than 350 cell/ul (AOR = 2.66, 95% CI: 1.48, 4.58) and Poor medication adherence (AOR = 2.19, 95% CI: 1.32, 3.65) were factors significantly associated with depression.

## Conclusion

The prevalence of depression was high. Being female, living alone, having HIV related stigma, Poor social support, CD4 count less than 350 cell/ul and poor medication adherence were associated with depression. Depression should be included as part of the routine consultation of HIV patients to ensure early detection and treatment.

## Background

Depression is a common mental disorder which is manifested by the sign and symptoms of poor appetite, sadness, sleep disturbance, poor concentration and feelings of exhaustion. It has become an important public health problem. Globally, the total number of people with depression was estimated to exceed 300 million in 2015, which is equivalent to 4.4% of the world's population (1). Depression is a major cause of disability; it contributed to almost 7.5% of all disabilities (2). Currently, the burden of depression has been rising and it was the third leading cause of disability in 2015 (3). Globally by 2030, it has been projected that depression will be the leading cause of diseases burden (4).

Human Immunodeficiency Virus (HIV) continues to be a major global public health concern. Globally it is estimated that 37.9 million people were living with HIV/Acquired immune deficiency syndrome (AIDS) ; of which 36.2 million were adults, 1.7 million people became newly infected with HIV, 770 000 people died with AIDS related illnesses and 23.3 million people with HIV (62%) were accessing antiretroviral therapy (ART) in 2018 (5).

In the context of HIV/AIDS, depression is the most prevalent among People living with (HIV /AIDS) than people without HIV/AIDS. Despite the inconsistency, meta-analysis has revealed that co morbid depression is almost twice common in people living with HIV (PLWH) than the general population (6).

The co-existence of depression and HIV/AIDS would have resulted to poor health outcomes due to obstacles to treatment and deterioration of medical outcomes, including treatment resistance, more chance for recurrence and increase the demand for the utilization of medical resources and increase the morbidity and mortality of PLWH (7).

Across low, middle, and high-income countries prevalence of depression among adult HIV/AIDS patients on ART approximately ranged from 13–78% (8).

PLWH suffer from depression as they adapt to life with a chronic condition, experience or anticipate stigma, or manage ongoing life stressors (9). Different studies have identified factors that were associated with depression, such as, female sex, older age, unemployment, negative life events, great number of HIV-related physical symptoms, low CD4 counts, impaired function, stigma and poor social support (9, 10, 11).

The development of the national mental health strategy for Ethiopia represents the federal ministry of Health's (FMOH) commitment to address Ethiopia's needs for accessible, effective, sustainable, and affordable mental health services (7). However, depression among PLWH still did not receive adequate attention in HIV care service.

Despite its association with poor health outcome, limited studies have been conducted on magnitude and associated factors of depression among adults on ART in Ethiopia in general and no study has been conducted in the study area in particular. Therefore, this study was aimed to assess prevalence and associated factors of depression among adults on ART in public Hospital of Kembata Tembaro zone, South Ethiopia. This provides evidences used for futures planning, priority setting and resource allocation for intervention among PLWH.

## **Materials And Methods**

### **Study Area**

The study was conducted in public hospitals at Kembata Tembaro Zone, Southern Nations, Nationalities and Peoples' Region (SNNPR). It is located about 340 km south west of the capital city of Ethiopia, Addis Ababa, and 130 km from the regional capital city, Hawassa. According to 2019 zonal report, the estimated total population is around 941,313 of which 498,896 are men and 442,417 are women. The average elevation of the zone is 2101 meters above sea level. Kembata Tembaro zone had four governmental Hospitals; one General Hospital and three primary Hospitals. There were 976 adult HIV/AIDS patients who have treatment follow up at

the zone and among those 787 of them were adult HIV AIDS patients.. In all of the public Hospitals, the ART clinics provide comprehensive HIV prevention, care and treatment.

### **Study design and period**

Institution based cross-sectional study was conducted from March, 1 to April, 30/ 2020

### **Study participants**

The source population was all adult (age>18) HIV positive patients who had treatment follow up during the study period in public Hospitals at Kembata Tembaro zone. The study population was the randomly selected adult HIV positive patients who had treatment follow up during the study period in public Hospital at Kembata Tembaro zone. People who were unable to communicate or severely ill at the time of data collection were excluded from the study.

### **Sample size estimation and Sampling technique**

The sample size was determined by using single population proportion formula using EPI Info version 7.2 with an assumption of 95% level of confidence, 5% marginal error and 48.6% proportion of depression among PLWHA from similar a study conducted in Hawassa University Comprehensive Specialized Hospital (12). Using a correction formula, and 5% non-response rate, the final sample size was 271. The sample size was allocated proportionally to each four hospitals in Kembata Tembaro zone. A systematic sampling technique was used to select study subjects.

## **Data collection and measurement**

Pretested structured questionnaire was used to collect data from each study participant. The questions were adopted from related literature with slight modification made in line with the objective of this particular study and to fit to the local context. Data collected on the socio-demographic factors like characteristics age, sex, residence, ethnicity religion, marital status, educational level, monthly income and occupation. On psychosocial factors HIV related stigma, social support, living condition and lost jobs were sought. HIV/AIDS related factors included were CD4 count, WHO HIV/AIDS stages, medication adherence, ART regimen, adverse drug reaction and duration on ART.

The questionnaire was first prepared in English, translated into Kambatissa and then re-translated back to English to check for its consistency.

Four nurses and two public health masters were recruited as data collectors and supervisors respectively. Data collectors were trained for 2 days on interviewing techniques, purpose of the study and ethical aspects. Pre-test was carried out on one hospital which was not included in the actual study. Based on the result, data collectors were reoriented and the questionnaire was modified as necessary. The principal investigators and supervisors made a day to day on site supervision during the whole period of data collection.

Depression was assessed by using Patient Health Questionnaire-9 (PHQ-9) that has total sum score of 27 from 9 items; those respondents who score 5 and above from total sum were considered as depressed while

respondents who score below 5 were considered as non-depressed. Social support was assessed by using social support questionnaire (SSQ) that has total sum score of 6 from 6 items; those respondents who score higher than the mean considered as having good social support while respondents who score lower than the mean considered as having poor social support. HIV related stigma was assessed by using HIV related Stigma scale that has total sum score of 50 from 10 items; those respondents who score higher than the mean from total considered have stigma while respondents who score lower than the mean considered as have no stigma. adherence was assessed by using a Morisky Medication Adherence Scale questions that has total sum score of 4 from 4 items; those respondents who score 0 considered as non-adherent while respondents who score one and above considered as Adherent.

## Data processing and analysis

Data were entered into Epi Data version 3.1 and exported to SPSS version 20 for analysis. Descriptive statistics like, mean, frequency were computed and presented by using text, tables and graph. Colinearity diagnostic test was conducted to check for colinearity between independent variables. The tolerance values for all of the independent variables were larger than 0.10. Model fitness was also checked by using Hosmer–Lemeshow Goodness-of-Fit Test ( $p = 0.260$ ). Binary logistic regression was undertaken to see association between dependent and independent variables. Variables having a  $p$ -value of  $<0.25$  in binary logistic regression transferred to multivariable logistic regression. Odds ratios at 95 % CI were computed to measure the strength of the association between the outcome and the explanatory variables.  $P$ -values less than 0.05 were considered as statistical significant in the multivariate analysis.

## Results

### Socio – demographic characteristics of respondents

A total of 386 study participants out of 393 were included in the study providing an overall response rate of 98%. The mean age of the respondents was 36.0 (with SD of  $\pm 8.4$  years). Among the study participants, 217 (56.2%) were female, 230 (59.6%) were married, 190 (49.2%) were between the ages of 29–39 years. Out of all respondents, more than half, 198 (51.3%) were attended primary education, 281 (72.8%) were protestant religion followers, 276 (71.5%) were Kembata by ethnicity. Regarding occupation, 135 (35.0%) were house wife and 201 (52.1%) were rural residents. Among respondents, 135 (35.0%) earned  $\leq 500$  ETB per month (Table 1).

Table 1  
Socio demographic characteristics of respondents in public Hospitals,  
Kembata Tembaro zone, SNNPR, Ethiopia, 2020 (n = 386).

Variable	Category	Frequency	Percent
Sex	Male	169	43.8
	Female	217	56.2
Age in years	18–28	67	17.4
	29–39	190	49.2
	40–50	98	25.4
	> 50	31	8.0
Residence	Urban	185	47.9
	Rural	201	52.1
Educational status	No education	61	15.8
	Elementary school (1–8)	198	51.3
	High school (9–12)	88	22.8
	College diploma and above	39	10.1
Marital status	Single	60	15.5
	Married	230	59.6
	Divorced	61	15.8
	Widowed	35	9.1
Occupational status	Student	21	5.4
	Housewife	135	35.0
	Farmer	105	27.2
	Merchant	66	14.5
	Government employees	59	14.0
Monthly income(ETB)	≤ 500	135	35.0
	501–1000	130	33.7
	1001–1500	41	10.6
	> 1500	80	20.7

## 5.2. Psychosocial and Clinical related characteristics of respondents

Among the study participants 277(71.8%) were living with their family, 343 (88.9%) were not lost job due to HIV /AIDS related illness. More than half of (51.6%) study participants have HIV related stigma and 217(56.2%) have good social support from their families or other supportive bodies. Two hundred sixty six of respondents (68.9%) were at WHO clinical stag I and 18.9% were at WHO clinical stage II. More than two third (69.4%) of respondents were with CD4 count greater than 350 cells/ $\mu$ L. Nearly two third of respondents (63.2%) had good adherence. From all study participants, 335(86.8%) had no HAART related side effect, 345(89.4%) were in the first line of drug and 359 (93.0%) were on HAART for more than twenty five month (Table 2).

Table 2  
 Psychosocial, clinical and medication adherence related characteristics of respondents in public Hospitals, Kembata Tembaro zone, SNNPR, Ethiopia, 2020 (n = 386).

Variable	Category	Frequency	Percent
Living condition	Alone	109	28.2
	with family	277	71.8
Lost jobs due to HIV illness	Yes	43	11.1
	No	343	88.9
HIV related stigma	Yes	199	51.6
	No	187	48.4
Social support	Good	169	43.8
	Poor	217	56.2
WHO Clinical stage	I	266	68.9
	II	73	18.9
	III	25	6.5
	IV	12	5.7
CD4 count (current) in cells/ul	≤ 350	118	30.6
	> 350	268	69.4
Adherence to medication	Poor	142	36.8
	good	244	63.2
Drug side effect (current)	Yes	51	13.2
	No	335	86.8
Drug regimen	first line	345	89.4
	second line	41	10.6
Duration on HAART(in month)	6–12	18	4.7
	13–24	14	3.6
	≥ 25	354	91.7

### 5.3. Prevalence of depression among PLWH

The prevalence of depression among adult PLWH was 44.3% (95% CI: 39.4% – 49.2%). This was assessed by using patient health questionnaire (PHQ-9). The scale constitutes a total score of 27. A score 0–4 was considered as no depression and the score  $\geq 5$  was considered as having depression. Based on the cut of point  $\geq 5$ , out of the total of 386 respondent, 171 (44.3%) had depression (Fig. 1).



## 5.4. Factors associated with depression among PLWH

In bivariate logistic regression analysis, sex, marital status, living condition, lost job, HIV related stigma, social support, CD4 count, WHO HIV/AIDS clinical stage, drug regimen and medication adherence were showed association with depression at P-value less than 0.25. These variables were candidate for further multivariable logistic regression model (Table 3).

In multivariable logistic regression analysis; sex (AOR = 2.03, 95% CI: 1.21, 3.40), living condition (AOR = 3.09, 95% CI: 1.68, 5.68), HIV/AIDS related stigma (AOR = 2.85, 95% CI: 1.73, 4.71), social support (AOR = 2.55, 95% CI: 1.48, 4.78), CD4 count (AOR = 2.66, 95% CI: 1.48, 4.58) and medication adherence (AOR = 2.19, 95% CI: 1.32, 3.65) were significantly associated with depression among PLWH at P-value less than 0.05 (Table 3).

Table 3  
Factors associated with depression among PLWH in public Hospitals,  
Kembata Tembaro zone, SNNPR, 2020 (n = 386).

Variable	Depression		COR(95%CI)	AOR(95%CI)
	Yes	No		
Sex	115	102	2.27 (1.50,3.451)	2.03 (1.21, 3.40)*
Female	56	113	1	1
Male				
Marital status	24	36	1	1
Single	82	148	0.83 (0.46, 1.48)	0.94 (0.46, 1.88)
Married	42	19	3.31 (1.56, 7.01)	1.26 (0.49, 3.20)
Divorced	23	12	2.87 (1.20, 6.85)	1.58 (0.54, 4.57)
Widowed				
Living condition	82	27	6.41 (3.88,10.60)	3.09 (1.68, 5.68)*
Alone	89	188	1	1
With family				
Lost job	23	20	1.51 (0.80, 2.86)	0.88 (0.39, 1.98)
Yes	148	195	1	1
No				
HIV/AIDS related stigma	112	87	2.79 (1.84, 4.23)	2.85 (1.73, 4.71)*
Yes	59	128	1	1
No				
Social support	129	88	4.43 (2.85, 6.89)	2.55 (1.48, 4.78)*
Poor	42	127	1	1
Good				
CD4 count	76	42	3.29 (2.09, 5.18)	2.66 (1.48, 4.58)*
≤ 350	95	173	1	1
> 350				

Note: P-value for Hosmer and lemeshew test = (0. 260).

Variable	Depression		COR(95%CI)	AOR(95%CI)
	Yes	No		
WHO HIV clinical stage	100	166	1	1
Stage I	45	28	2.66 (1.56, 4.54)	1.54 (0.79, 2.99)
Stage II	14	11	2.11 (0.92, 4.83)	1.08 (0.40, 2.94)
Stage III	12	10	1.99 (0.83,4.77)	1.04 (0.36, 3.00)
Stage IV				
Drug regimen	149	196	1	1
First line	22	19	1.52 (0.79,2.91)	1.05 (0.45, 2.48)
Second line				
HAART adherence	85	57	2.74 (1.78, 4.19)	2.19 (1.32, 3.65)*
Poor	86	158	1	1
Good				
Note: P-value for Hosmer and lemeshew test = (0. 260).				

Significant association (\* = p- value < 0.05)

## Discussion

Findings of the study provide valuable information about depression among HIV/AIDS patients. We found that about nearly half of participants had depression. Participants who had; a lower CD4 cell count, poor drug adherence and poor social support were more likely to suffer from depression. In addition, having HIV related stigma, living alone and being female were also positively associated with depression.

In this study, the prevalence of depression among adult HIV/AIDS patients on ART was 44.3% (95% CI: 39.4% – 49.2%). This figure was in line with studies conducted in Ethiopia Gimbi general Hospital, south west Ethiopia (13), Harar town, eastern Ethiopia (14), Alert Hospital, Addis Ababa (15) and Tigray region (16) with the prevalence of 41.7%, 45.8%,41.2% and 43.9% respectively.

However, the result of this study was lower than what was reported from Brazil (17), India (18) and Sudan (19) and with the prevalence of 53.5%,58.7%and 63.1% % respectively. The difference could be attributed to the socio demographic factors, study setting and sample size differences. Compared to our study, small sample size used for studies conducted in India and Brazil.

In contrast, the finding of this study was higher than what was obtained in previous studies at Cameron (20), Nigeria (21), Uganda (22), East Africa (23) and Debrebirhan Referral Hospital, North Showa, Ethiopia (24) with the prevalence of 26.7%,39.6%, 8.1%, 38.9% and 38% respectively. The discrepancy might be due to variation in socio demographic factors; sample size, study time, study population and study design. Compared to our study, the study population was recruited age of 21 years and above, and large sample size was used for study conducted in Cameron and Uganda respectively. We used cross sectional study design, whereas study reported from East Africa used a systematic review and meta-analysis.

The present study revealed that female respondents were significantly associated with depression. Female conferred twofold increased odds for depression relative to the male which was supported with the studies done at Zimbabwe (AOR = 2.32, 95% CI:1.07–5.05) (25), Entebbe district in Uganda (AOR = 2.04, 95% CI: 1.88, 4.75) (26) and Debirebirhan Referral Hospital in Ethiopia (AOR = 2.07, 95% CI: 1.07, 3.98) (19).The possible gender discrepancy found in this study could be due to the biological, psychological and socio cultural factors.

Our study results also suggest that living condition of the study participants was significantly associated with depression among HIV/AIDS patients on ART. Those respondents who were living alone were 3 times more likely to have depression when compared to those respondents who were living with family which was in agreement with studies conducted at Hawassa University Comprehensive Specialized Hospital and Yirgalem General Hospital, south Ethiopia (AOR = 1.94, 95% CI: 1.06, 3.56) (27).This might be happened that lack of interpersonal relationship between family, friends and other community members with HIV patients can leads to depression.

Concerning the HIV related stigma status of the study participants, that HIV related stigma was significantly associated with depression. The odds of depression among respondents with HIV related stigma about 3 times more likely as compared to the odds of depression among respondents who had no HIV related stigma. This was consistent with studies conducted in Ethiopia at Alert Hospital, Addis Ababa (AOR = 3.60, 95% CI 2.23, 5.80) (20) and at Hawassa University Comprehensive Specialized Hospital, Hawassa (AOR = 2.83, 95% CI 1.78, 4.48) (12).This might be having HIV related stigma might be associated with Self isolation which can increase a sense of depression and complicate relation with family, friend and other community members.

The result of this study also indicated there was a statistically significant association found between social support and depression. This shows that participants who had poor support 2.55 times tend to have depression than those without social support. This result is in agreement with a study conducted in Ethiopia ,at Alert Hospital, Addis Ababa (AOR = 2.02, 95% CI: 1.25, 3.27) (20) and at Hawassa University Comprehensive specialized Hospital, Hawassa (AOR = 2.53, (95% CI 1.70, 9.13) (18). This might be due to worry about telling about their status and some might choose to withdraw due to pressure from the stigma and hopelessness that can limit social support, which in turn leads to depression.

For clinical-related variables in this study, high depression scores were significantly associated with low CD4 count. This finding is supported with studies reported in Cameroon (AOR = 3.70, 95% CI: 1.45–9.09) (28) and in Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia (AOR = 2.317, 95% CI: (1.10, 4.84) (12). This might be due to patients with lower CD4 count are probably having more symptoms of HIV infection and consequently more emotional and physical disability.

Respondents who had poor medication adherence were 2 times more likely to develop depression as compared with those who had good medication adherence. Our finding consistent with studies done in Cameron (AOR = 5.04, 95% CI 2.84–8.97) (20) and in Alert Hospital, Addis Ababa, Ethiopia (AOR = 1.61, 95% CI: 1.02, 2.55) (20). The possible explanation might be poor medication adherence has been brought in emergence of drug resistance strains of HIV, that results in increase in viral load which leads to immune suppression and poor health outcome. This can be explained by the fact that patients with a more severe and progressive illness would be more likely to be depressed.

## Conclusion

Overall the results of this study provide evidence that the prevalence of depression among PLWH receiving HAART was high. Being female, living alone, having HIV related stigma, poor social support, CD4 count less than 350 cells/ul and poor medication adherence were significantly associated with depression among PLWH. We recommend integration of multi sectors and civil society, including Partners, faith-based and community-based organizations to create awareness and prevention programs that targeted at improving women health, reducing HIV related stigma and strengthen social support among PLWH. Within clinical setting, depression should be included and promoted as part of the routine consultation of HIV/AIDS patients in order to ensure early detection and treatment. Referrals to psychiatric clinic and to support groups should be considered for further depression management. Moreover, assessing living condition, HIV related stigma and Poor social support among PLWH should be strengthened. Finally, further studies on risk factors of depression among PLWH should be conducted to strengthen and broaden the current findings.

## Limitation Of The Study

Because of the self-reported information, the data potentially was susceptible to the interviewers and social desirability bias. Since the entire sample was taken from Hospitals in the Zone, the findings of this study might not be generalized to other irrelevant settings. In other words, the study did not include PLWHA who were attending at health centers, private health institutions and who did not visit any health institutions.

## Abbreviations

AIDS, Acquired Immune deficiency Syndrome; AOR, Adjusted Odds Ratio; APA, American Psychiatric Association; ART, Anti-Retroviral Therapy; CI, Confidence Interval; COR, Crude Odds Ratio; DSM- IV TR, Diagnostic and Statistical Manual for the Diagnosis of Psychiatric, Disorders, Fourth Edition, Text Revised; EPHI, Ethiopian Public Health Institute; ETB, Ethiopian Birr; FMOH, Federal Ministry of Health; HAART, Highly Active Antiretroviral Therapy; HIV, Human Immunodeficiency Virus; PHQ, Patient Health Questionnaire; PLWH, People Living with HIV; SNNPR, South Nations, Nationalities and Peoples' Region; SPSS, Statistical Package for Social Science; SSQ, Social Support Questionnaire; UNAIDS, United Nations Program on Human Immune Deficiency Virus; WHO, World Health Organization

## Declarations

### Ethics approval and consent to participate

The study was reviewed and approved by Hawassa University College Medicine and Health sciences, school of public health. The ethical clearance was obtained from Hawassa University Institution Review Board. Permission was obtained from Kembata-Tembero Zonal health department and Hospital administration to conduct the study. Prior to interview, all participants enrolled to the study were received written informed consent about the study. Respondents were insured about the confidentiality of information obtained and they were not being asked to tell their names. They were also told that they have the right to withdraw from the study at any time during the interview.

### **Consent for publication**

Not applicable

### **Availability of data and materials**

The authors do not have full mandate to share the data since they are the property of the funding institution

### **Competing interests**

The authors declare that they have no competing interests.

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### **Authors' contribution**

AG wrote the proposal, participated in data collection, analyzed the data and drafted the paper. TY and WT approved the proposal, participated in data analysis and revised subsequent draft of the paper. All authors read and approved the final manuscript.

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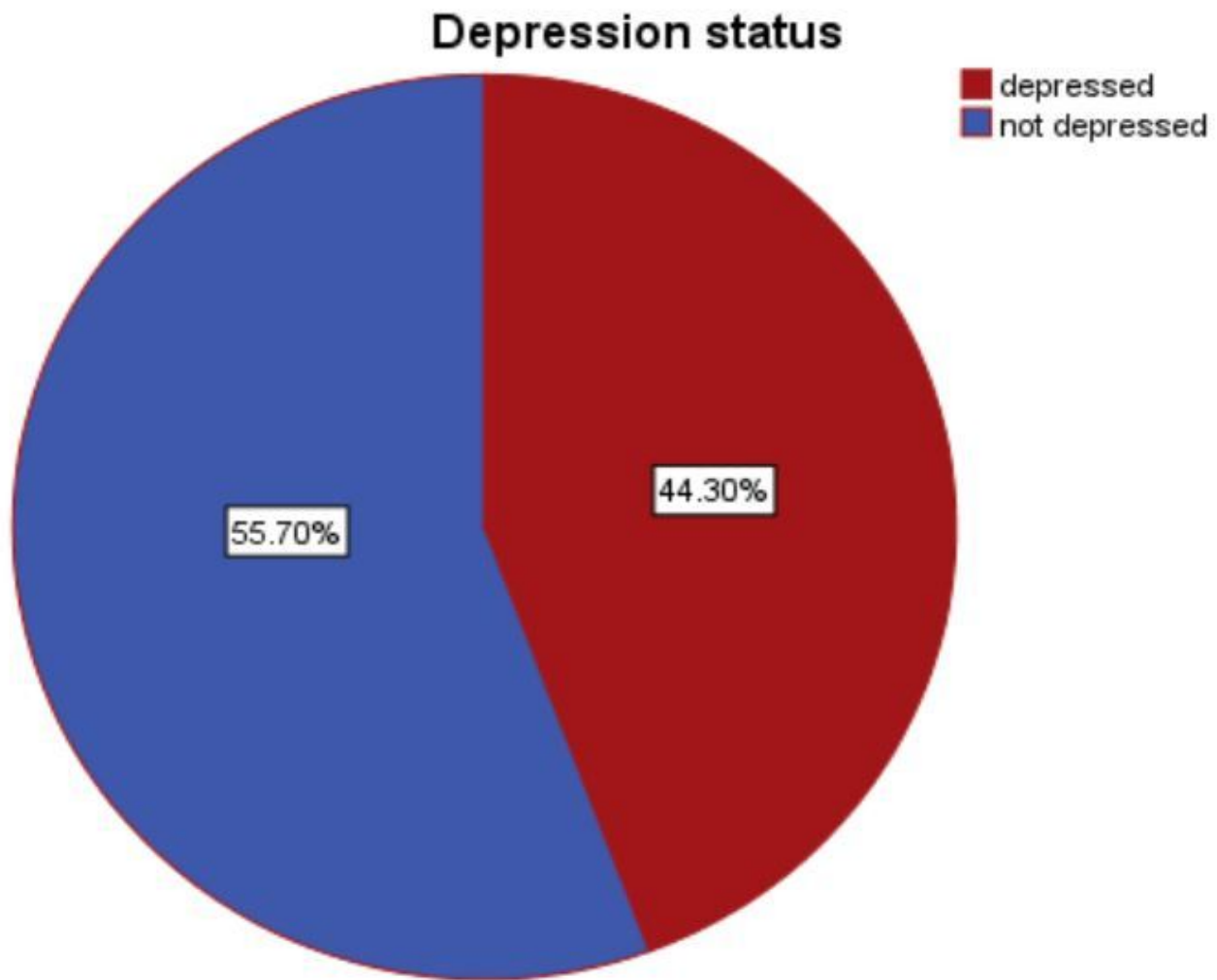
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## Figures





**Figure 1**

Prevalence of depression among PLWH attending ART clinic in public Hospitals, Kembata Tembaro Zone, SNNPR, Ethiopia, 2020 (n=386).