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PREVALENCE OF DEPRESSION AND ASSOCIATED FACTORS AMONG PEOPLE LIVING WITH HIV/AIDS IN TIGRAY, NORTH ETHIOPIA: A CROSS SECTIONAL HOSPITAL BASED STUDY

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ABSTRACT

Objective: The aim of this study was to determine the prevalence of depression and associated factors among people attending ART clinics in Tigray, Ethiopia.

Method: Institution based cross-sectional study was conducted on patients attending ART clinics for persons living with HIV/AIDS (PLWHA) at Adigrat, Mekelle and Maichew Hospitals in Tigray region. Sample size was calculated using Epi info statcalc and 269 PLWHA were included in the study. The patients were interviewed by psychiatric nurses using the 21 item Hamilton's depression scale Questionnaire. Data was analyzed using the Statistical Package for the Social Sciences (SPSS, version 19.0). Levels of depression were calculated among various subgroups of patients, according to the Hamilton's depression scale questionnaire. The possible associations of the presence and severity of depression with socio-demographic variables was explored using appropriate parametric and non-parametric tests. Specifically, the odds square and logistic regression was used in the exploration of associations; ethical clearance was obtained from Mekelle University College of health sciences.

Result: Out of 269 total participants, 142(52%) were females, 213 (79.2%) were from urban area and 56(20.8) were from rural. One hundred nine (40%) of the study subjects' age range was 35-44 and 129 (48%) were married. Orthodox religion constituted 80% followed by Muslim (11.5%) and Catholic (0.4%). Sixty (22.3%) were unemployed and majority, 229(85.2%) had a minimum of primary education. Among 269 participants 43.9 % were depressed. Depression was associated with urban dwellers, with lower socio-economic class, unemployed and government employees, with OR of 3.19(1.5, 6.65), 4.43(1.35, 14.58), 2.74(1.34, 5.57), and 3.56(1.73, 7.30) respectively.

Conclusion: In summary, the magnitude of depression in PLWHA on ART was found to be high and was positively associated with urban dwellers, with lower socio-economic class, unemployed, and government employees. Hence, depression among PLWHA on ART is still under diagnosed and under treated; there is a need to incorporate mental health service as an integral component of HIV care.

INTRODUCTION: In 2010, HIV/AIDS killed 1.8 million people, 1.2 million of whom were living in sub-Saharan Africa. Major progress has been made in delivering life-saving treatment for people living with HIV/AIDS - there are now 6.6 million people globally on treatment of which more than 5 million are in Africa. However, nearly 8 million more people are in need of treatment and HIV infection rates are far outpacing the number of people added to treatment each day ¹. Because individuals in their most productive years (15-49 years old) are most commonly infected with HIV/AIDS, the disease has a wide socioeconomic impact that threatens development progress in many poor countries, especially those in sub-Saharan Africa.

14.8 million Children in the region have already lost one or more parents to the disease. In South Africa alone, nearly one in five children are projected to be orphans by 2010, exacerbating a social dynamic that is already deeply challenged by crime, violence and unemployment. HIV/AIDS targets people during their most productive years, making economic progress in many sub-Saharan African countries even more of a challenge. Some estimates suggest that annual GDP growth in highly affected countries can be 2-4% lower than in countries with the absence of AIDS. HIV/AIDS is also a major constraint on the provision of quality education. For example, Tanzania needs around 45,000 additional teachers to make up for those who have died or left the system because of AIDS - many were their most experienced teachers ¹.

In 2005, world leaders at the G8 summit in Gleneagles and at the U.N. World Summit in New York pledged to reach near universal access to prevention, care and treatment by 2010. UNAIDS estimates that \$25.1 billion will be required for the global AIDS response in 2010 to achieve universal access - treatment that reaches at least 80% of patients in need - for HIV prevention, treatment care and support in low and middle-income countries, a figure \$9.2 billion higher than what was invested in the AIDS response in 2009.

Delivering these essential services will require a strengthening of health systems, especially in Africa, which is home to two-thirds of those requiring antiretroviral (ARV) treatment, but only 3% of the global health care workers to provide it.

Progress must also continue in expanding prevention efforts, making treatment less expensive and more available, and including resources for second-line regimens, pediatric formulations and diagnostic tests and equipment ².

Dramatic increases in global resources have helped many countries make significant progress in combating HIV/AIDS in recent years. HIV/AIDS medication per patient now costs as little as \$140 per year, down from nearly \$10,000 less than ten years ago. Lower prices have helped support a rapid scale-up of access to life-saving antiretroviral (ARV) treatment, especially in sub-Saharan Africa.

More than 5 million Africans are receiving antiretroviral treatment, up from only 50,000 in 2002. Some countries have achieved even more dramatic results. Botswana, Rwanda, and Namibia have achieved universal access and Benin, Ethiopia, Mali, Senegal, Swaziland, and Zambia had coverage rates between 50 to 80% and are making progress toward universal access. These results demonstrate that expansion of vital services can be rapidly scaled up even in developing countries ³.

Depression is the most frequently observed psychiatric disorder among HIV/AIDS patients. Its specific prevalence is difficult to identify as a result of the wide variations across the globe, ranging from 20 to above 70%. Depression has been associated with increased risky behaviors, non compliance to treatment, higher risk for co-morbid disorders and shortened survival. Failure to recognize and treat depression endangers not only the patient but the community as well ^{4,5,6}.

Depressive tendencies are reduced if the patient's condition is known and accepted by the patient's family and when he involves himself in gratifying activities which could be professional, social or otherwise. On the other hand, risks for depression among HIV/AIDS patients increase when recent affective losses occur (death or rejection of all sorts), an accelerated evolution of opportunistic infections, increasing rate of hospitalizations; its duration as well as physical deterioration. Furthermore, in patients with HIV disease, severity of depression correlates with rapidity of decline in CD4 count, suggesting that failure to treat depression may accelerate HIV disease

progression and impact on survival⁷. In addition, depressed HIV patients treated with antidepressants are more likely to adhere to antiretroviral treatment than those not⁸. Recent findings have shown that persons with depressed mood are more likely to engage in high-risk sexual behavior⁹.

Mental disorders associated with HIV/AIDS can result from the psychological impact of having a fatal disease, or stem from the effects of psychosocial stressors associated with the illness like stigma and discrimination. They can also result from actual neurological changes in the physical and chemical structures of the central nervous system that occur as a result of the HIV virus, opportunistic infections, or related treatments. Most HIV positive psychiatric patients actually suffer from multiple disorders. HIV/AIDS infected individuals face a number of the same stressors confronted by other patients with chronic illness, such as long-term discomfort, physical deterioration, physical and financial dependence and eventual death. HIV/AIDS may also lead to mood disorders.

However, the magnitude of depression and associated factors among PLWHA was not adequately addressed in our context. Therefore, this study was intended to fill the research gap thereby help clinicians and other stake holders be aware of and plan appropriate strategies and prevent the high suicidal rate as a result of depression related to HIV/AIDS^{10,11}.

A study conducted to determine the prevalence of depression among persons attending HIV/AIDS clinic in Kingston, Jamaica, and to explore the possible role of patient-specific clinical and social issues as intermediary factors in the relationship between HIV/AIDS and depression.. Depression prevalence rates were calculated and the association between depression and age, gender, antiretroviral treatment, CD4 count, living arrangement, marital status and major stressors explored. Sixty-three patients participated in the study and 43% (n = 36) of them were depressed. No significant differences in depression rates were found with respect to any of the socio-demographic or clinical factors explored (p > 0.05).The relatively high prevalence of depression among attendees at the HIV/AIDS clinic underscores the need for depression screening in these patients¹².

Considerable evidence suggests that people with HIV disease are significantly more distressed than the general population, yet psychiatric disorders are commonly under-detected in HIV care settings. This study examines the prevalence of three stress-related psychiatric diagnoses--depression, posttraumatic stress disorder (PTSD), and acute stress disorder (ASD), among a vulnerable population of HIV-infected patients. Among approximately 350 patients attending two county-based HIV primary care clinics, 210 participants were screened for diagnostic symptom criteria for depression, PTSD, and ASD.

Standardized screening measures used to assess for these disorders included the Beck Depression Inventory, the Posttraumatic Stress Checklist, and the Stanford Acute Stress Questionnaire. High percentages of HIV-infected patients met screening criteria for depression (38 per cent), PTSD (34 per cent), and ASD (43 per cent). Thirty eight percent screened positively for two or more disorders. Women were more likely to meet symptom criteria for ASD than men (55 per cent vs. 38 per cent, OR=1.94, CI95 per cent=1.1-3.5). ASD was detected more commonly among African-American and white participants (51 per cent and 50 per cent respectively), compared with other ethnic groups. Latinos were least likely to express symptoms of ASD (OR=0.52, CI95 per cent=0.29-0.96).

Of the 118 patients with at least one of these disorders, 51 (43 per cent) reported receiving no concurrent mental health treatment. Patients with HIV/AIDS who receive public healthcare are likely to have high rates of acute and posttraumatic stress disorders and depression. These data suggest that current clinical practices could be improved with the use of appropriate tools and procedures to screen and diagnose mental health disorders in populations with HIV/AIDS¹³.

HIV/AIDS related disorders have a negative impact on the assumption of responsibility of other Co-morbidities and could lead to a highest lethality rate. The goal was to evaluate the prevalence of the psychiatric disorders during HIV/AIDS at infectious diseases service of "hopital du Point G". We carried out an exploratory study and descriptive energy of July 1, 2004 to bearing 31 October 2005 out of 166 patients.

The cases of HIV were defined on the basis of positivity of serology HIV by at least 2 fast tests associated or not with clinical signs with the AIDS according to CDC. Any disturbance of the higher functions was regarded as psychiatric demonstrations. The female sex was in a majority with a sex- ratio of 0.9. The ages bracket the most touched lay between 36 and 41ans. The housewives were 36.7%. The grooms accounted for 64.5%. The prevalence of the psychiatric disorders was 58.9%. The disorders were dominated by the depression (45.8%) followed confusional syndrome 31.9% and epilepsy 7.8%. All the patients with psychiatric antecedents developed a confusional syndrome. The subjects having presented a psychiatric disorder were infected by the HIV-1 in 93.4% of the cases. Occurred of the psychiatric disorders was inversely proportional to the rate of CD4. Lethality was very high is 56%¹⁴.

Similar research conducted to determine the impact of depressive symptoms on mortality among HIV/AIDS patients first initiating HAART and the potential role of patient adherence as a confounder and effect modifier in this association. The study comprised HIV-positive individuals who were first prescribed HAART between August 1996 and June 2002. Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale. Cox proportional hazards models were used to determine the association between depressive symptoms, adherence and all-cause mortality while controlling for several baseline confounding factors. A total of 563 participants met the study inclusion criteria. Of these subjects, 51% had depressive symptoms at baseline and 23% of participants were less than 95% adherent in the first year of follow-up.

The overall all-cause mortality rate was 10%. Multivariate analysis showed that individuals with depressive symptoms and adherence < 95% were 5.90 times (95% confidence interval, 2.55-13.68) more likely to die than adherent patients with no depressive symptoms. The estimated median model-based survival probabilities stratified by adherence and depressive symptoms levels ranged from 81% (interquartile range, 72-89%) for depressive symptoms and adherence < 95% to 97% (interquartile range, 94-98%) for no depressive symptoms and adherence > or = 95%.

The results indicate that both depressive symptoms and adherence were associated with shorter survival among individuals with HIV accessing HAART. Given the high prevalence of depressive symptoms in HIV-positive patients and a strong association with adherence, the findings support improvement in the diagnosis and treatment of depression as well as adherence in order to maximize the effectiveness of HAART¹⁵.

Further more, a study conducted to explore the relationship between psychological distress and T lymphocyte counts in HIV/AIDS patients. A total of 102 HIV/AIDS patients were measured by symptom check list (SCL-90), self-rating depressive scale (SDS) and self-rating anxiety scale (SAS). Patients were divided into 2 groups based on CD4+ T lymphocyte counts < 0.2 x 10(9)/L (group A) and > or = 0.2 x 10(9)/L(group B). 77 cases (75.49%) had psychological problems, including depression, relationship problems, psychosis, force etc. The prevalence of depression and anxiety were 67.65% (69/102) and 43.13% (44/102) respectively.

The symptom of depression and anxiety of patients in group A were severer than those in group B (P < 0.05). The CD4+ T lymphocyte counts were significantly negatively correlated with the total score, depression score, paranoid score and psychosis score of SCL-90 (all P < 0.05). Most of the HIV/AIDS patients were in an obviously abnormal psychological status. The psychological distress symptom of HIV/AIDS patients might have negative effects on the number of CD4+ T lymphocyte¹⁶.

A cross-sectional study was carried out with 386 patients who received their first anti-retroviral prescription between May 2001 and May 2002 in public AIDS referral centers in Belo Horizonte (Brazil). The main objective was to assess the prevalence and factors associated with anxiety and depression among HIV-infected patients initiating antiretroviral treatment using the Hospital Anxiety and Depression Scale.

Clinical, behavioural and demographic data were collected from interviews and medical charts. Multivariate analysis was carried out by logistic regression. Prevalence of moderate to severe anxiety and depression were 35.8% and 21.8%, respectively.

Female gender, low schooling, lack of health insurance, attendance to psychotherapy, difficulty in accessing health services and exposure category were independently associated with anxiety. On the other hand, female gender, lack of health insurance, low income, living alone, and lacking a sexual partner in the last month were independently associated with depression. This study highlights the importance of detecting psychological distress by simple screening methods in the HIV/AIDS setting, where the prevalence of anxiety and depression is considerably high, so proper intervention can be established soon in the treatment course¹⁷.

To determine the prevalence of depressive disorder in patients with HIV/AIDS receiving HAART; to determine the effect of depressive disorder on adherence to antiretroviral therapy; and to determine the significance of the association, a study was conducted amongst outpatients of Ahmadu Bello University Teaching Hospital, Zaria. A socio-demographic and drug adherence questionnaire was administered. The Centre for Epidemiological Studies Depression Scale (CES-D) was used to screen for depressive symptoms while the Schedule for Clinical Assessment in Neuropsychiatry (SCAN) was used to confirm the diagnosis of depressive disorder.

Overall, 73% of participants had good adherence to HAART. 63.6% of participants with depressive disorder had poor adherence to HAART compared to 21.1% of participants without depressive disorder ($p < 0.05$). Conclusion: Depressive disorder in patients with HIV/AIDS is associated with poor adherence to antiretroviral medication. Early identification and treatment of depression in such patients may improve antiretroviral medication adherence and treatment outcomes¹⁸.

Although there is growing literature on the psychological responses to and the psychopathology associated with HIV/AIDS, few investigations have focused on the role of gender. This study compared psychiatric morbidity, coping responses, and disability in male and female outpatients recently diagnosed with HIV/AIDS. One hundred and forty-nine patients (44 male, 105 female) with HIV/AIDS (mean \pm standard deviation (SD) months since diagnosis 5.8 \pm 4.1) attending an infectious diseases clinic at Tygerberg

Hospital, Cape Town, were evaluated. Subjects were assessed using the MINI International Neuropsychiatric Interview (MINI), the Carver Brief COPE, and the Sheehan Disability Scale. In addition, negative life events and risk behaviours were evaluated. Fifty-six per cent of patients were diagnosed with a psychiatric disorder, most commonly major depression (34.9%), dysthymic disorder (21.5%), post-traumatic stress disorder (14.8%), and alcohol dependence (10.1%). There were no significant gender differences in the prevalence of mood disorders in the sample.

Men, however, were more likely than women to meet diagnostic criteria for alcohol abuse or dependence, and to engage in certain risky sexual behaviours. Women were more likely to suffer from post-traumatic stress disorder, and to use coping strategies of planning and religion to deal with the illness. There were no significant gender differences in disability. Psychiatric disorders are common in recently diagnosed HIV/AIDS patients in South Africa. Clinicians should be aware of the high prevalence of mood disorders in both men and women, and of gender-different responses such as increased alcohol and substance use and more risky sexual behaviour in men¹⁹.

Mood and anxiety disorders, particularly depression, and substance abuse (SA) commonly co-occur with HIV infection. Appropriate policy and program planning require accurate prevalence estimates. Yet most estimates are based on screening instruments, which are likely to overstate true prevalence. A total of 1,125 patients, representing 80% of HIV-positive patients seen over a 2.5-year period, completed the Substance Abuse-Mental Illness Symptoms Screener, a brief screening instrument for probable mood, anxiety, and SA disorders.

Separately, 148 participants in a validation study completed the Substance Abuse-Mental Illness Symptoms Screener and a reference standard diagnostic tool, the Structured Clinical Interview for DSM-IV. Using the validation study sample, we developed logistic regression models to predict any Structured Clinical Interview for DSM-IV mood/anxiety disorder, any SA, and certain specific diagnoses. Explanatory variables included socio-demographic and clinical information and responses to Substance Abuse-

Mental Illness Symptoms Screener questions. We applied coefficients from these models to the full clinic sample to obtain 12-month clinic-wide diagnosis prevalence estimates. We estimate that in the preceding year, 39% of clinic patients had a mood/anxiety diagnosis and 21% had an SA diagnosis, including 8% with both.

Of patients with a mood/anxiety diagnosis, 76% had clinically relevant depression and 11% had posttraumatic stress disorder. The burden of psychiatric disorders in this mixed urban and rural clinic population in the southeastern United States is comparable to that reported from other HIV-positive populations and significantly exceeds general population estimates. Because psychiatric disorders have important implications for clinical management of HIV/AIDS, these results suggest the potential benefit of routine integration of mental health identification and treatment into HIV service sites²⁰.

Depression has been linked to immune function and mortality in patients with chronic illnesses. Factors such as poorer spiritual well-being have been linked to increased risk for depression and other mood disorders in patients with HIV. The study sought to determine how specific dimensions of religion, spirituality, and other factors relate to depressive symptoms in a contemporary, multi-center cohort of patients with HIV/AIDS. Patients were recruited from 4 medical centers in 3 cities in 2002 to 2003, and trained interviewers administered the questionnaires. The level of depressive symptoms was measured with the 10-item Center for Epidemiologic Studies Depression (CESD-10) Scale.

Independent variables included socio-demographics, clinical information, 8 dimensions of health status and concerns, symptoms, social support, risk attitudes, self-esteem, spirituality, religious affiliation, religiosity, and religious coping. We examined the bivariate and multivariable associations of religiosity, spirituality, and depressive symptoms. We collected data from 450 subjects. Their mean (SD) age was 43.8 (8.4) years; 387 (86.0%) were male; 204 (45.3%) were white; and their mean CD4 count was 420.5 (301.0). Two hundred forty-one (53.6%) fit the criteria for significant depressive symptoms (CESD-10 score \geq 10).

In multivariable analyses, having greater health worries, less comfort with how one contracted HIV, more HIV-related symptoms, less social support, and lower spiritual well-being was associated with significant depressive symptoms ($P < .05$). A majority of patients with HIV reported having significant depressive symptoms. Poorer health status and perceptions, less social support, and lower spiritual well-being were related to significant depressive symptoms, while personal religiosity and having a religious affiliation was not associated when controlling for other factors. Helping to address the spiritual needs of patients in the medical or community setting may be one way to decrease depressive symptoms in patients with HIV/AIDS²¹.

The objective of this study was to assess the prevalence of depression and associated factors among people living with HIV/AIDS in Tigray, Ethiopia.

METHODS AND MATERIALS:

Study Design and Study Area: Institution based cross-sectional study was conducted on patients attending HIV/AIDS clinics for persons living with HIV/AIDS (PLWHA) at selected zonal Hospitals in Tigray region. The study was conducted in three randomly selected zonal hospitals of Tigray region from November, 2011 up to July, 2012. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), the Tigray Region has an estimated total population of 4,314,456, of whom 2,124,853 are men and 2,189,603 women; urban inhabitants number 842,723 or 19.53% of the population.

With an estimated area of 50,078.64 square kilometers, this region has an estimated density of 86.15 people per square kilometer. For the entire region 985,654 households were counted, which results in an average for the Region of 4.4 persons to a household, with urban households having on average 3.4 and rural households 4.6 people. The Region is predominantly Tigray-Tigrinya people at 96.55% of the population; other ethnic groups include Amhara people (1.63%), Irob or Saho (0.71%), Afar people (0.29%) Agaw Kamyir (0.19%), Oromo people (0.17%), and Kunama people (0.07%). 95.6% of the population were Ethiopian Orthodox Christianity 4.0% Islam in Ethiopia 0.4% Roman Catholic and 0.1% P'ent'ay.

There are 12 Governmental hospitals and many other health centers are providing service to the community. Currently, one additional specialized hospital has emerged to serve for all referral cases. All the six zonal hospitals now offer screening and testing services, as well as pre and post-test counseling and provision of ART service ²².

Source and Study Population: People living with HIV/AIDS attending in the six zonal hospitals were the source and people living with HIV/AIDS who had been attending the HIV/AIDS clinics in the selected zonal hospitals were the study population. Considering 95% confidence interval, prevalence of depression 20%, and 5% precision with 10 % contingency the sample size was calculated to be 269 using the following single proportion formula.

$$N = \frac{z^2 p(1-p)}{d^2}$$

Totally 269 respondents were needed for this study. This number was proportionally distributed to the three zonal hospitals. All HIV/AIDS patients who attended the HIV clinic in the selected zonal hospitals for at least six-month period and volunteered to participate were included. Eligible patients were those 18 years and older, HIV-positive and stable enough to complete the study interview. Patients with a major problem of cognition and/or insurmountable communication difficulties (e.g. hearing loss not adequately improved with a hearing aid) were automatically excluded. Ethical clearance was secured from the Tigray region health bureau.

Patients were interviewed by psychiatric nurses using the 21 item Hamilton's depression scale Questionnaire. This instrument allowed the diagnosis of depression. It was developed primarily for use in non-psychiatric primary care clinical populations and has been utilized in various studies on depression in different cultural contexts around the world. It has demonstrated sensitivity for depression ranging from 87%-98% and specificity between 80% and 88%.

Data collectors and supervisors were psychiatric nurses. A total of six data collectors and three supervisors were enrolled. Intensive training was given for the data collectors and supervisors for three days and two days consecutively on the data collection

check lists and questionnaires to ensure consistency of interviewing and high-quality data.

Data related to patients' demographic features, clinical status and social situation was retrieved from the systematic database which routinely stores this information on all clinic attendees. Data from all sources was then analyzed using the Statistical Package for the Social Sciences (SPSS, version 19.0). Levels of depression were calculated among various subgroups of patients, according to the Hamilton's depression scale questionnaire. The possible associations of the presence and severity of depression with socio-demographic variables was explored using appropriate parametric and non-parametric tests. Specifically, the odds ratio and logistic regression was used in the exploration of associations.

Hamilton Depression Rating Scale (HAM-D): The Hamilton Depression Rating Scale (HAM-D) has proven useful for many years as a way of determining a patient's level of depression before, during, and after treatment. HAM-D Scoring was done as follows:

Sum the scores from the first 17 items ²².

0-7 = Normal

8-13 = Mild Depression

14-18 = Moderate Depression

19-22 = Severe Depression

≥23 = Very Severe Depression

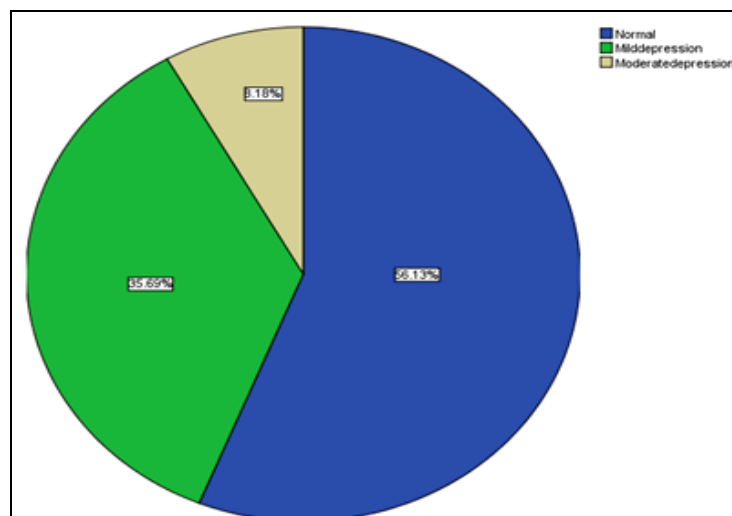
The independent variables were socio-demographic variables, CD 4 status, co-morbidity, duration of illness etc, where as the dependent variable was depression.

RESULT: This study included 269 subjects .Out of this, 142(52%) were females, 213 (79.2%) were from urban area and 56(20.8) were from rural. One hundred nine (40%) of the study subjects' age range was 35-44 and 129 (48%) were married. Orthodox religion constituted 80% followed by Muslim (11.5%) and Catholic (0.4%). Eighty eight (32%) had an income of >1000Ethio.Birr (57 USD) per month while 60(22.3%) were unemployed. Majority, 229(85.2%) had a minimum of primary education (**Table 1**).

TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS AMONG PLWHA IN ZONAL HOSPITALS, TIGRAY, ETHIOPIA, 2012, (N=269)

Characteristics	Number	Percent
Age (n=269)		
18-24	11	4.1
25-34	79	29.4
35-44	109	40.5
45-54	51	19.0
55-64	19	7.0
Sex (n=269)		
Male	127	47.2
Female	142	52.8
Marital status (n=269)		
Single	53	19.7
Married	129	48.0
Separated	17	6.3
Divorced	37	13.8
Widowed	33	12.3
Address(n=269)		
Urban	213	79.2
Rural	56	20.8
Income (n=269)		
<200ETB	21	7.8
200-400ETB	25	9.3
401-600ETB	62	23
600-1000ETB	73	27.1
>1000ETB	88	32.7
Educational status (n=280)		
Illiterate	30	11.2
Literate (Basic)	10	3.7
Primary	86	32.0
Secondary	61	22.7
Diploma	32	11.9
Bachelors'	50	18.6
Occupational status(n=269)		
Unemployed	60	22.3
Employed by governmental	74	27.5
Employed by private sector	14	5.2
Self employed	121	45.0
Religion (n=280)		
Orthodox	238	88.5
Islam	31	11.5

Of the total study participant's majority, 56.13% were normal and 35.69% had mild level of depression (**Fig. 1**).

**FIGURE 1: FREQUENCY DISTRIBUTION OF ALL TYPES OF DEPRESSION AMONG PLWHA IN ZONAL HOSPITALS OF TIGRAY, 2012, (N=269)**

Depression status versus socio-demographic characteristics of the respondents was computed. Accordingly out of 109 respondents, whose age range was b/n 35-44, 59 were normal while 42 and 8 had mild and moderate status of depression respectively. In addition from the total 142 female respondents, 47 had mild depression and 49 male respondents out of 127 were also found to have mild depression (**Table 2**).

Furthermore, logistic binary regression was done. Accordingly living in urban area, having monthly income of <200Ethio.Birr (11.4USD), being unemployed and governmental employed were strongly associated with Depression with the adjusted OR of 3.19(1.5, 6.65), 4.43(1.35, 14.58), 2.74(1.34, 5.57) and 3.56(1.73, 7.30) respectively (**Table 3**).

DISCUSSION: In this study, 269 subjects were participated. Out of this, 142(52%) were females, 213 (79.2%) were from urban area and 56(20.8) were from rural. One hundred nine (40%) of the study subjects' age range was 35-44 and 129 (48%) were married. Orthodox religion constituted 80.4% followed by Muslim (11.5%). Eighty eight (32%) had an income of >1000Ethio.Birr (57 USD) per month while 60(22.3%) were unemployed. Majority, 229 (85.2%) had a minimum of primary education.

Depression status versus socio-demographic characteristics of the respondents was also computed. Accordingly out of 109 respondents whose age range was b/n 35-44: 59 were normal while 42 and 8 had mild and moderate status of depression respectively.

In addition from the total 142 female respondents, 47 had mild depression and 49 male respondents out of 127 were also found to have mild depression.

In this study the prevalence of depression was 0.04 and 118 (43.9%) of the total respondents were depressed. This is in line with studies from Jamaica (43%), Mali (45.8%), and India (51.1%),^{12, 18 and 23}. In addition, a statistical significant association was found between depression and residence in this study, that is, urban participants were found to be more depressed than

rural. This is in contrast with a study conducted in Coastal South India²³. This could be b/c of the difference in living standard and cultural view of the society. Lower class participants were found to be depressed. And this is in line with a study from India²³. Furthermore; we found that those who were unemployed and governmental employed had depression than the self employed ones. This might be b/c of worrying of insecurity by the unemployed ones and stigma and discrimination from the working environment for the governmental employees.

TABLE 2: DEPRESSION STATUS VERSUS SOCIO-DEMOGRAPHIC CHARACTERISTICS AMONG PLWHA IN ZONAL HOSPITALS, TIGRAY, ETHIOPIA, 2012, (N=269)

Variables	Depression		
	Normal	Mild	Moderate
Age (n=269)			
18-24	7	2	2
25-34	50	22	7
35-44	59	42	8
45-54	27	21	3
55-64	8	9	2
Sex (n=269)			
Male	66	49	12
Female	85	47	10
Marital status (n=269)			
Single	35	14	4
Married	82	43	4
Separated	5	11	1
Divorced	14	15	8
Widowed	15	13	5
Address (n=269)			
Urban	108	86	19
Rural	43	10	3
Income (n=269)			
<200ETB	6	11	4
200-400ETB	19	5	1
401-600ETB	40	18	4
600-1000ETB	37	28	8
>1000ETB	49	34	5
Educational status (n=269)			
Illiterate	20	8	2
Literate (Basic)	7	2	1
Primary	49	30	7
Secondary	37	19	5
Diploma	11	17	4
Bachelors'	27	20	30
Occupational status(n=269)			
Unemployed	26	23	11
Employed by governmental	32	38	4
Employed by private sector	9	3	2
Self employed	84	32	5
Religion (n=269)			
Orthodox	137	84	17
Islam	14	12	5

TABLE 3: BINARY LOGISTIC REGRESSION ANALYSIS RESULT OF DEPRESSION STATUS AMONG PLWHA IN GOVERNMENTAL HOSPITALS, TIGRAY, ETHIOPIA, 2012. (N=269)

Variable	Depression		Crude OR (95%C.I)	Adjusted OR (95%C.I)
	Normal	Depression		
Age (n=269)				
18-24	7	4	0.57(0.28,11.85)	
25-34	50	29	0.58(0.035,9.627)	
35-44	59	50	0.085(0.052,13.89)	
45-54	27	24	0.89(0.053,15.0)	
55-64	8	11	1.00	
Sex (n=269)				
Male	66	61	1.38(0.85,2.24)	
Female	85	57	1.00	
Address (n=269)				
Urban	108	105	3.2(1.6,6.32)*	3.19(1.5,6.65)*
Rural	43	13	1.00	
Marital status n = 269				
Single	35	18	0.43(0.18,1.04)	
Married	82	47	0.48(0.22,1.04)	
Separated	5	12	2.0(0.57,6.96)	
Divorced	14	23	1.37(0.53,3.55)	
Widowed	15	18	1.00	
Income (n=269)				
<200ETB	6	15	3.14(1.12,8.85)*	4.43(1.35,14.58)*
200-400ETB	19	6	0.397(0.15,1.089)	0.96(0.299,3.06)
401-600ETB	40	22	0.69(0.35,1.35)	1.40(0.63,3.12)
600-1000ETB	36	36	1.26(0.67,2.35)	2.40(1.14,5.05)
>1000ETB	49	39	1.00	
Education status (n=269)				
Illiterate	20	10	0.59(0.23,1.50)	
Literate (Basic)	7	3	0.50(0.12,2.17)	
Primary	49	37	0.89(0.44,1.78)	
Secondary	37	24	0.76(0.36,1.62)	
Diploma	11	21	2.24(0.89,5.61)	
Bachelor	27	23	1.00	
Occupation (n=269)				
Unemployed	26	34	2.97(1.56,5.63)*	2.74(1.34,5.57)*
Gove Employed	32	42	2.98(1.63,5.43)*	3.56(1.73,7.30)*
Private .Employed	9	5	1.26(0.39,4.02)	1.49(0.44,5.00)
Self employed	84	37	1.00	

CONCLUSION: In summary, our study attempted to elicit information of depression among PLWHA. The magnitude of depression in PLWHA on ART was found to be 43.9%. It was positively associated with urban dwellers, with lower socio-economic class, un-employed, and government employees. Hence, depression is highly prevalent among PLWHA on ART which is still under diagnosed and under treated and there is a need to incorporate mental health service as an integral component of HIV care.

Limitations of the Study: As this was a cross-sectional study, we couldn't determine causal links between depression and social support.

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