ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF BURDEN OF COMMON MENTAL DISORDERS AMONG HIV POSITIVE ADOLESCENTS IN ADDIS ABABA, ETHIOPIA: DOES HIV STATUS DISCLOSURE MATTER?

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Assessment of burden common mental disorders among HIV positive adolescents in Addis Ababa, Ethiopia: Does HIV status disclosure matter?

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List of abbreviations

AAU…….Addis Ababa University

ADHD……attention deficit hyperactivity disorder

AIDS……..acquired Immune deficiency syndrome

ALWHIV……Adolescents living with Human Immune Deficiency virus

ARV……antiretroviral

ART……antiretroviral therapy

AZT.....…….. Zidovudine

3TC……Lamivudine

d4T…….Stavudine

CDC ……..Centers for Disease Control and Prevention

CD……..conduct disorder

CD4 …….. cluster for differentiation 4

CMD ……..common mental disorder

CNS……Central nervous system

CSA…….central statistical agency

DALYs… ……disability adjusted life years

DHS……..demographic and health survey

EFV……Efavirenz

Epi Info……...epidemiological information

HCT……..HIV testing and counseling

HIV……..human Immune virus

LMICs …….. Low and middle-income countries

MPH ……..master of public health

NCD……. non-communicable diseases

NVP……....nevirapine

PICT…… provider-initiated HIV Testing and Counseling

PMTCT…….prevention of mother to child transmission

PLWHIV …….People Living with Human Immune Deficiency virus

SSA…….Sub-Saharan Africa

SDQ…….Strength and difficulty questions

SPH……School of public health

SPSS……Statistical package for social sciences

UNICEF……..United Nations children‘s fund

WHO……..World health organization

Abstract

Background: Since the first evidence of HIV was detected in 1981, AIDS has claimed the lives of millions and left behind a huge number as orphans. Trend analysis (2001-2013) in Ethiopia showed the number of Adolescents living with HIV in Ethiopia raised from 35,000 to 140,000. Evidences from both developed and developing countries showed that HIV and mental disorders are intertwined; and the prevalence of CMD in people living with HIV is significantly higher than prevalence in general population.

Method: Cross-sectional study conducted to assess the magnitude of Common mental disorder among HIV positive adolescents and its relation with HIV status disclosure in four public hospitals in Addis Ababa. Purposive and Simple random sampling techniques employed to select hospitals and recruit restudy participants respectively. Four hundred forty one adolescents included in the sample.

Result: The prevalence of common mental disorder is 22.45% among HIV positive Adolescents in Addis Ababa, Ethiopia. We investigated HIV status disclosure is not significantly associated CMDs in adolescents, except one domain (peer relation disorder, AOR 1.88 [1.06, 3.34]. Age AOR 2.12[1.27, 3.54], Female sex AOR 2.06 [1.24, 3.42], unknown parental marital status AOR 5.12 [1.18, 22.27], parental occupation of house wives AOR 4.28 [1.92, 9.54], daily labor AOR 2.59 [1.10, 6.15], and merchants/self-employed were significantly associated with common mental disorders in adolescents.

Furthermore, perceived feeling of Stigma AOR 5.08[2.94, 8.80] and Perceived medium AOR 2.15[1.13, 4.10] and poor health status AOR 5.15[2.05, 13.08] were also significantly associated with common mental disorder in adolescents.

Conclusion: The study showed High prevalence of CMD in adolescents; which is disproportionally prevalent in females. Age, Female sex, parental occupation, and marital status, perceived feeling of stigma, and perceived medium and poor health status are independent predictors.

Recommendation: To improve the mental health status of the Adolescents with HIV infection; early diagnosis, screening mechanism and treatment of mental disorder is necessary in primary health care settings and need to be integrated into comprehensive HIV care and treatment settings.

Furthermore, prospective longitudinal investigations are necessary to elucidate causal factors associated with resilience, onset, and severity of mental disorders in adolescents with HIV infection with similar comparative group.

1. Introduction

1.1. Background

Since the first evidence of HIV detected in 1981, AIDS has claimed the lives of millions and left behind a huge number as orphans. According to latest estimates of UNAIDS, there were 36.9 million people living with HIV (PLWHIV) in 2014 and 1.2 million AIDS deaths in similar year. Two million people newly infected by the virus in the year 2015, about 38% of which are among those in productive years; specifically the age below 25 years. The sub-Saharan Africa (SSA) is the hardest hit region, home to 70% of PLWHIV, but only about 13% of global population [1].

Globally, more than three million children are infected with HIV; 90% of who live in (SSA). As antiretroviral therapy (ART) is improving and scaled up, this make large numbers of children reach adolescence and growing population of adolescents with HIV infection presents exceptional challenges to the regional health system and economic development in general[2].

According to Kasedde et al. 2013, nearly 2.1 million adolescents were living with HIV (ALWHIV) worldwide by the end of 2011, the vast majorities (85-86%) of which are in SSA, and new infections are also dramatically increasing in this region. Thirteen years (2001-2013) trends of adolescent HIV in Ethiopia showed the number of ALWHIV raised from 35,000 to 140,000 while the number of new infection by HIV decreased from 6,000 down to 1,500. However, the number of decreases in new infection is not uniform in both sex; it is fast in boys and slow in girl adolescents [3].

Concerning the relation between HIV and mental disorders, evidences from both developed and developing countries showed that HIV and mental disorders are intertwined; and the prevalence of common mental disorder (CMD) in people living with HIV is significantly higher than prevalence in general population. Common mental disorders such as depression, generalized anxiety disorder, and social anxiety disorder, may affect up to 15% of the population at any one time.

There is considerable variation in the severity of specific disorders, but all can be associated with significant long-term disability. For example, depression is estimated to be the second greatest contributor to disability-adjusted life years (DALYs) throughout the developed world. Adolescence is a period of life marked by dramatic biological, psychological, and emotional changes [4]. Globally 20% of adolescents in any given year, experience a mental health problem, most commonly depression or anxiety in many settings. Many factors have an impact on adolescents' mental ability to achieve and sustain a state of mental well-being [4]. The stigma, sexual abuse, and poverty are among those factors that worsen burden of mental health in adolescents with HIV, and puts this group at increased risk for poor adherence to ART and may also be a risk factor for HIV infection [5].

1.2. Statement of the problem and rationale

Currently mental health disorders are one of the complex challenges of both health sector and the general global economic development. According to WHO, mental health consequences of AIDS are —substantial"; and PLWHIV are about twice more likely to experience mental health disorders especially CMD than the general population, which in turn impair their immune function, reduce their quality of life, adherence to treatment and significantly contribute to their premature deaths. Mental and neurological disorders have an intertwined relationship with HIV, yet are often overlooked when AIDS interventions are planned and implemented [6].

Besides HIV-related issues that are common to any age group, HIV-infected adolescents are likely to face recurrent and cumulative psychological stressors, such as illness and death of their parents and siblings, responsibility for welfare of younger siblings or other ill family members, stigma and discrimination, and fear of death. Evidences from high-income countries revealed the emotional effects of coping with HIV infection are severe, and results in higher rates of psychiatric admissions among HIV-infected adolescents compared with that in the general population [2].

The situation of HIV in Africa occurs in the context of social factors such as being orphaned, poverty, and inconsistent guardianship, which results in augmented risk of behavioral problems and psychiatric disorders among adolescents. However, health-care staff shortages, inadequate provisions of integrated services and other constraints make mental health care inaccessible for adolescents in SSA [6-8].

Therefore, addressing the mental health issues and psychosocial wellbeing for ALWHIV is central to a comprehensive approach to care and support and; this should be taken as a major concern for health-care providers and policy maker [9].

In Ethiopia, mental illness is the leading non-communicable disorder in terms of disease burden. The study conducted in general population of rural Ethiopia indicated that, mental illness comprised 11% of the total burden of disease, with depression and schizophrenia included in the top ten lists; which out-ranks HIV/AIDS [10]. Another study conducted in Debre Markos Referral Hospital among HIV Infected Individuals at Comprehensive HIV Care and Treatment Clinic showed 24.3% of CMD [11]. In addition to these study done on HIV and TB/HIV co-infected patients has showed even more prevalence of CMD in both TB/HIV co-infected and non co-infected HIV patients (63.7% and 46.7% respectively) [12].

Despite the fact that developing countries carry more than 90% of the burden of HIV/AIDS and high prevalence of mental health disorders related to HIV, there is little information about the relation between HIV/AIDS and mental health from LMICs. Besides, in Ethiopia there is no evidence about burden of CMD among HIV positive adolescents in particular. Thus mental illnesses have been overlooked as a major health priority in Ethiopia and other LMICs [10].

1.3. Significance of the study

The preliminary evidence suggests significant importance of integrating mental health care into HIV services to improve mental health of ALWHIV. Thus the investigators and policy makers are in position to develop and validate true task-shifting interventions for the mental health care of adolescents with HIV especially in LMICs with high shortages of mental health professionals [12].

As to our knowledge, there was no study conducted to assess CMD among HIV positive adolescents in Ethiopian. Therefore, this study provides significant evidence about the magnitude of CMD among HIV positive adolescents and the relation between CMD and HIV/AIDS. Furthermore, the study highlights evidence for integration of adolescent mental health services to HIV programs.

2. Literature review

2.1. Common mental disorders

Common mental disorder (CMD) is a term used to describe a group of mental disorders that frequently occur in primary care patients. They include depression, anxiety and somatisation (medically unexplained somatic symptoms such as headaches and backache), that is often indicated by repeated visits to health care practitioners without resolution of the problem [13].

Evidences show that globally, nearly 450 million people suffer from mental and neurological disorders. Neuropsychiatric disorder contributes 14% of the global burden of disease– and three quarters of which occurs in developing countries [14-15].

According to systematic review and meta-analysis of studies conducted at 34 countries over the world, pooling across all studies approximately 1 in 5 respondents 17.6%, (16.3–18.9%) were identified as meeting criteria for a CMD during the 12-months preceding assessment; while 29.2% (25.9–32.6%) of respondents were identified as having experienced a CMD at some time during their lifetimes. A consistent gender effect in the prevalence of CMD was evident; women having higher rates of mood (7.3%) compared with men (4.0%) and anxiety disorders of (8.7%) in women compared with (4.3%) in men. On the other hand, men having higher rates of substance use disorders (7.5%) compared with women (2.0%), in both previous 12 months and lifetime prevalence. The review showed there was also evidence of consistent regional variation in the prevalence of CMD [16].

Study conducted in general population of Urban Tanzania showed the six-month prevalence of CMD 41 per 1,000 and 23 per 1,000 in the respective study communities; and CMD was independently associated with recently experiencing one or more stressful life events. In this study, there was a strong and significant relationship between any CMD and number of recent life events. Common mental disorder was highest among those who reported three or more stressful experiences in the preceding six months and relationship difficulties and death of a loved one [17].

Among the non-communicable diseases, psychiatric illnesses especially CMD are the most prevalent and most important cause of disability in LICs accounting for 12% of the global burden of disease-and this figure is also expected to rise to 15% by the year 2020 [4, 19].

For LMICs, mental disorders comprise 10 percent of the DALYs lost due to non-communicable diseases. According to Lancet mental health and substance use report 2013, depression and anxiety alone contribute 56% of the DALYs caused by mental disorder and substance use, in case of HIV/AIDS the burden is even more than expected [15].

Despite high burden, mental health care services in resource-poor countries are underdeveloped and largely restricted to urban areas, to hospital-based care and to people with severe mental disorders. Common mental disorders such as depression and anxiety, which account for by far the highest proportion of the prevalence and burden of mental disorders, receive little (if any) attention in health care [14].

When we look at the situation in Ethiopia, the prevalence, and incidence of the common mental illnesses and its impact in terms of attempted and completed suicide is increasing. As indicated in ”mental health strategy of ministry of health” (MOH), depression (5%), Suicide attempt (3.2%), and Alcohol dependence (1.5%) and Cannabis abuse (1.5%) accounts for higher shares among others [10].

The study conducted in working Adults of Addis Ababa showed higher prevalence of mental distress (17.7%); the prevalence was two times higher in women (25.9%) compared to men (12.4%). Younger participants (age ≤24 years) had the highest prevalence of mental distress (35.5% in women and 16.7% in men). In this study participants with excellent health status had a 50% reduced odds of mental distress (OR=0.47; 95%CI: 0.38-0.59); and moderate alcohol consumption was associated with a slight increased odds of mental distress (OR=1.26; 95%CI: 1.00-1.67) [20]. Another study conducted in admitted patients of Gondar University Hospital showed higher prevalence of CMD (58.9%) by using self-reporting questionnaire (SRQ-25). In this study patients previously admitted to hospital and being female sex have higher odds of having CMD compared to first time admission and male sex [21].

In addition to increase in CMD, the disability associated with mental illness is also increasing and inadequate mental health services and lack of any kind of financial support for families with a mentally ill member is the biggest factors causing burden to patients and their families in Ethiopia. Besides these problems; Stigma, discrimination and human rights abuses are part of the daily lived experience of the mentally ill and their families in Ethiopia [10].

2.2. HIV and common mental disorders

There is an interdependence and —vicious circularity" between mental health and HIV/AIDS. Studies in both developing and developed countries show that just under half of all PLWHIV have a diagnosable mental disorder and in some instances a threefold higher rate of mental disorder. Even with the greater availability of ART, PLWHIV still often experience high levels of psychological distress and mental disorder. Where mental illness and HIV co-occur, there is increasing evidence that the progression of the virus is greater. Mental disorder also affects adherence to medication and increases the rate AIDS progression and mortality [14].

According to a study conducted in US showed among individuals receiving care for HIV infection, 48% screened positive for one or more psychiatric disorders in the past year (36% major depression, 27% dysthymia, 16% generalized anxiety, and 11% panic)—rates far higher than those in the general US population.

HIV/AIDS imposes a significant psychological burden; and PLWHIV often suffer from major CMD (depression and anxiety); as they adjust to the impact of the diagnosis of being infected and face the difficulties of living with a chronic life-threatening illness like shortened life expectancy, complicated therapeutic regimens, stigmatization, and loss of social support, family or friends. Apart from these psychological impacts, HIV infection has direct effects on the central nervous system (CNS), and causes neuropsychiatric complications [5].

According to WHO report, AIDS has significant consequences on mental health [5]. HIV/AIDS can cause a number of psychological conditions due to circumstances surrounding the disease, and psychiatric conditions resulting from HIV-related neurological changes. Conversely, Cognitive disorders, substance abuse, and disorders of personality can influence behavior in ways that lead to greater risk of HIV infection.

These disorders can adversely influence the progression of the disease, lead to noncompliance with prescribed medical treatment, and increase the likelihood that PLWHIV will act in high-risk ways; that increases the chance of HIV transmission. Furthermore, due to new treatments and increasing life expectancies, mental disorders are becoming progressively more relevant for HIV/AIDS management [5].

Despite the above-mentioned burden of HIV infection on mental health, very few examples of mental health interventions for PLWHIV have been documented in developing countries and in health facilities providing health care to PLWHIV, mental health conditions are under-diagnosed and undertreated (WHO 2001). As a group at risk for mental disorder, it has been recommended that screening for CMD be done routinely among PLWHIV. With regard to interventions, a range of studies has shown ART has significantly improved mental health, implying that access to ART is itself a key mental health intervention. However, for a number of people this is inadequate and more focused mental health interventions are needed [11]. It therefore, makes sense that addressing the relationship between HIV and mental health will serve the dual purpose of reducing the disease burden associated with HIV and mental disorders [11].

2.3. HIV infection in Adolescents

A generation of children has grown up living with HIV and entering adolescence without continuity of treatment and care for a number of possible reasons. They may not have benefited from prevention of mother to child transmission (PMTCT) and therefore become ‗lost to follow-up' or they may have fallen in and out of care throughout their childhood. Stigma and ignorance about HIV, along with policy and legal barriers such as age of consent or punitive laws, make accessing treatment and prevention services difficult or impossible for many adolescents. Identifying these adolescents and giving them access to life saving treatment before they fall ill, as well as providing them with care and support is crucial. Therefore, more focused interventions that work for adolescents most at-risk and vulnerable to HIV is needed [20].

There are 1.2 billion adolescents in the world today; the largest generation in history and estimated number of adolescent population in Ethiopia is around 23, 591,001 accounts 25% of total population in the year 2013. Among these, globally 2.1 million adolescents were living with HIV in 2013, more than 80% of who live in SSA, and many of whom still do not know their HIV status. Thirteen years (2001-2013) adolescent HIV trends in Ethiopia showed the number of ALWHIV raised from 35,000 to 140,000 while the number of new infection by HIV decreased from 6000 down to 1500. However, the number of decreases in new infection is not uniform in both sexes; it is fast in boys and slow in girl adolescents [201-22].

When we look at the distribution of AIDS-related deaths among adolescents, AIDS is the number one killer of adolescents in Africa and second killer worldwide. Globally in the year 2013, nearly 120,000 died due to AIDS and the estimated number of deaths in Ethiopia at the same year is around 12,000, which is higher than AIDS-related deaths in any of African countries. Globally, AIDS-related deaths fell by almost 40% between 2005 and 2013 for all age groups except adolescents, where evidences about AIDS-related deaths among this age group is increasing, that indicates adolescents being left behind**.** Though gaps in available empirical data make it difficult to explain this with confidence, there is concern that a lack of access to testing and treatment could explain, in part, why AIDS-related deaths among adolescents are not decreasing along the same trajectory as all other age groups [20-21].

Regarding the adherence, successful clinical, immunological, and virological outcomes on ART are dependent on at least 95% adherence to the regimen. Self-reported adherence in Perinatally HIV-infected adolescents may be anywhere between 40 and 84% in resource-rich countries, a rate lower than reported for adults. In a SSA cohort, the numbers of adolescents achieving 100% adherence estimated by pharmacy refills, was lower than that for adults, with 20.7% at 6 months, 14.3% at 12 months, 6.6% at 24 months compared to 100% adherence in adults in 40.5%, 27.9%, and 20.6% at each time point, respectively [22].

Non-adherence is the single most significant challenge to successful management of HIV-infected individuals, especially adolescents. This may be due to any combination of structural, patient-related, provider-related, medication-related, disease-related, and psychological barriers. In resource-rich settings, psychological factors related to non-adherence such as depression and anxiety more commonly reported. In resource-limited settings, adolescents who experience structural problems such as lack of medical insurance, problems with work or school, concerns about dealing with family and looking after children, housing instability, lack of transportation to clinic visits or to obtain medications, may have lower adherence [22].

Additionally, the higher prevalence of co-morbidities in resource-limited settings such as tuberculosis (drug sensitive and resistant), malaria, malnutrition, and the consequent poly pharmacy and drug-drug interactions resulting from treatment may, also affect adherence. Lastly, the relative lack of healthcare professionals (medical care providers, support staff, psychologists, social workers, and counselors) experienced in adolescent healthcare management may further affect the adherence counseling and support needed for ALWHIV in resource-limited settings [22].

With increased survival of children to Adolescents, one of the greatest psychosocial challenges that parents and caregivers of perinatally HIV-infected adolescents is HIV status disclosure to their infected children. As highlighted in different Study findings, caregivers face contextual challenges in disclosing the HIV status to their child and adolescents [28]. Because of these challenges, HIV-infected children and adolescents under medical care are seldom informed of their HIV-status, despite some evidence from industrialized countries indicating that disclosure might have positive psychosocial and clinical outcomes [8].

A handful of studies have examined the psychological impact of both non-disclosure and disclosure with mixed results. A study conducted by New and colleagues found increased problems among disclosed children and significantly higher scores (more behavior problems) on the Internalizing Behavior Problem Scale (e.g., anxiety, depression, withdrawal) of the Child Behavior Checklist (CBCL) for children (N=57) who knew their HIV status versus those who did not know. Conversely, in a sample of 61 HIV-infected children with a mean age of 8.9 (range 6–11) Riekert and colleagues found children who knew their diagnosis reported significantly lower scores on depression and anxiety measures than children who did not know their diagnosis [8].

Few studies investigated the psychosocial impact of disclosure in resource-limited settings; where higher rates of experiences of HIV-related stigma and depression symptoms among disclosed children, although only depression symptoms were significantly associated in final model. There are some findings from the US and Zambia which have contradicting result that suggest non disclosed children have increased levels of psychological distress, including anxiety and depression compared with those who know their status [23].

2.4. Common mental disorders in adolescents

A study conducted on lifetime prevalence of mental disorders in US Adolescents: Anxiety disorders were the most common condition (31.9%), followed by behavior disorders (19.1%), mood disorders (14.3%), and substance use disorders (11.4%), with approximately 40% of those with one class of disorder also meeting criteria for another class of lifetime disorder. The overall prevalence of disorders with severe impairment and/or distress was 22.2%; (11.2% with mood disorders; 8.3% with anxiety disorders; 9.6% behavior disorders). The median age of onset for disorder classes was earliest for anxiety (6 years), followed by 11 years for behavior, 13 years for mood, and 15 years for substance use disorders [32].

Another study conducted on adolescents‘ mental disorder showed, internalizing mental disorders (depression, social anxiety, and eating disorders) are more common in girls than boys. Their prevalence ranges from 12% to 23%, depending on the particular diagnostic instruments and criteria that are applied. Disruptive disorders, e.g., disorders of social behavior, are more common in boys, with a worldwide prevalence of approximately 5% to 10%. Marked differences between the sexes appear during puberty. Where as one-year prevalence of self-injurious behavior is about 14% in boys and 25% in girls [25].

Study conducted to assess the prevalence of mental health disorders among low-income African American adolescents by using Diagnostic Interview Schedule for Children (C-DISC), Youth Self-Report (YSR), and Child Behavior Checklist (CBCL) identified participants meeting diagnostic criteria on the C-DISC in the prior 12 months for conduct disorder (7.7 %), followed by post traumatic stress disorder (PTSD 5.1%) and major depression (3.7 %). In this study females were nearly three times more likely than males to meet diagnostic criteria for PTSD [odds ratio (OR) = 2.87], but were less likely than males to meet diagnosis criteria for conduct disorder (OR = 0.57) [26].

2.5. Conceptual framework

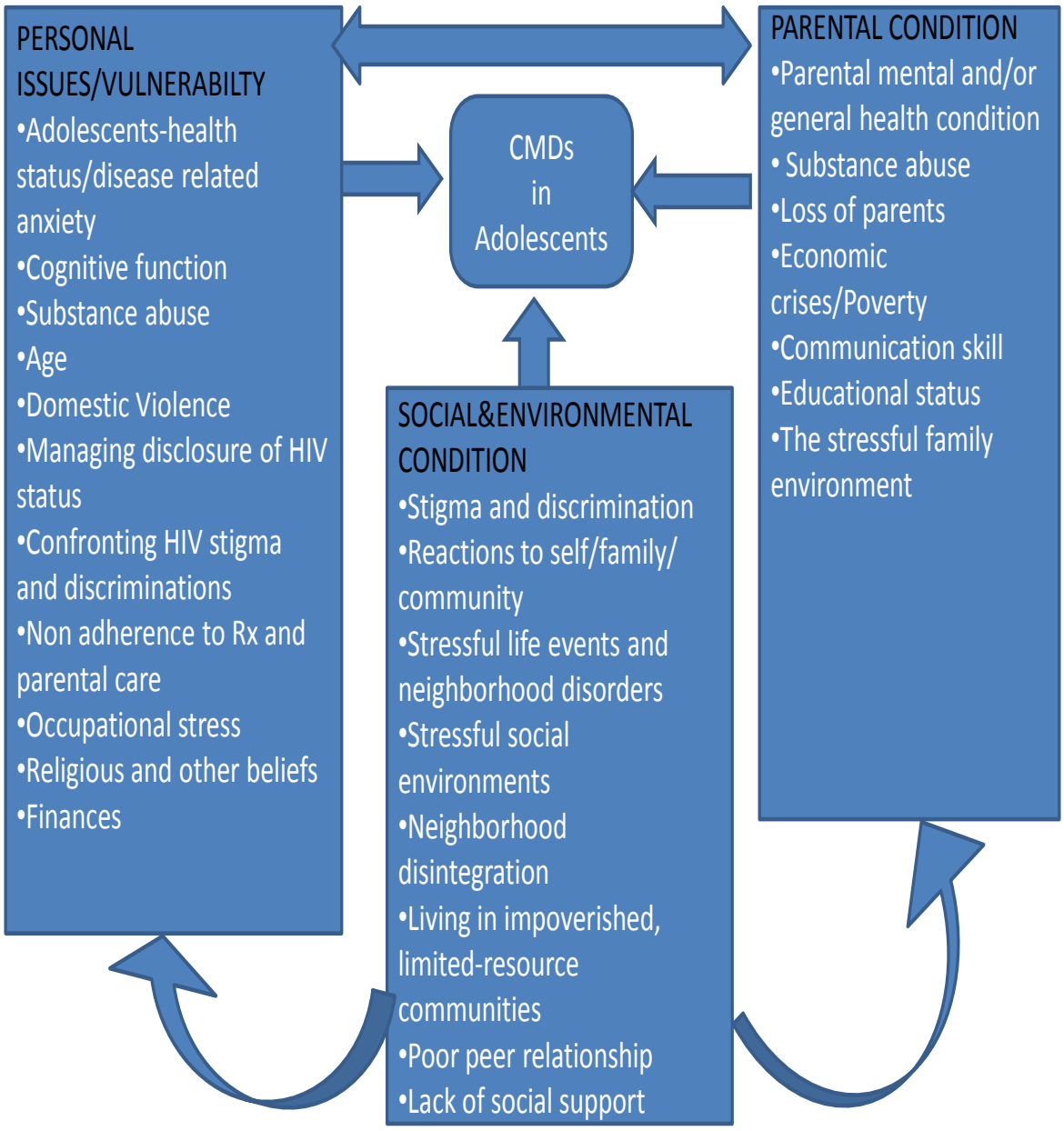


Fig.1: Conceptual framework adapted from literature to show the effect of HIV infection on CMDs in Adolescent.

Research question

1. How prevalent are Common mental disorder among HIV infected adolescents of Addis Ababa, Ethiopia?
2. Is there a relationship between adolescents HIV disclosure and Common mental disorder?
3. What factors determine the Common mental disorder in adolescents with HIV infection?

3. Objectives

3.1. General objective

- To assess the magnitude of Common mental disorder among adolescents with HIV infection and association of HIV disclosure to Common mental disorder in Adolescents Addis Ababa, Ethiopia

3.2. Specific objectives

- To assess prevalence of Common mental disorder among HIV infected adolescents
- To assess the association between Adolescents HIV disclosure and Common mental disorder in HIV positive adolescents
- To identify factors determining the occurrences of common mental disorders in HIV positive adolescents

4. Methods and materials

4.1. Study setting and period

The study was conducted in public hospitals of Addis Ababa, Ethiopia. Addis Ababa is the Federal Capital of Ethiopia and a Chartered City, having three layers of Government: City Government at the top, 10 Sub City Administrations in the Middle, and 116 woreda/Kebele Administrations at the bottom. The city has a total area of 54,000 hectares and an estimated total population of 3,195,000 with annual growth rate of 2.1 in 2004 E.C. There have been 3434 adolescents on ARV treatment in health institutions of Addis Ababa (2012 annual report of Addis Ababa health bureau).

There are a total of 11 governmental and 36 Private hospitals and 56 health centers within the city administration. The study was conducted from August 2015 up to June 2016.

4.2. Study design

Institutions based cross-sectional study design employed in public hospitals of Addis Ababa, Ethiopia.

4.3. Source and study populations

The source population is all HIV positive adolescents on treatments and follows up in public hospitals of Addis Ababa, Ethiopia. The study population is HIV positive adolescents aged 10 to 19 years who were in follow up and care at selected public hospitals in Addis Ababa, and who are included in sample.

4.4. Inclusion and exclusion criteria

1. Inclusion criteria

Adolescents aged 10-19 infected with HIV and in follow up program that present in selected hospitals during data collection period.

2. Exclusion criteria

Adolescents who come to health facility with serious illness (those who are unable to respond to the interviewer) at the time of data collection will not be included as the study participant. Adolescents with age below 12 who come to hospital alone (without their caregivers) at the time of data collection will not be included.

4.5. Sample size determination

Sample size for this study calculated by using double population proportion formula with the following assumptions:

$$n = \frac{(Z\alpha/2 + Z\beta)^2 * (P_1(1-P_1) + P_2(1-P_2))}{(P_1 - P_2)^2}$$

Where,

P_1= 4% (Prevalence of CMD among children and Adolescents who do not know their HIV status in Western Kenya as unexposed) [23].

P_2= 12% (Prevalence of CMD among children and Adolescents who know their HIV status in Western Kenya as exposed) [23].

Zβ= corresponds to power (the probability of detecting a significant difference in the two prevalence

Zα/2 - significance level

Assuming OR = 3.25 (from literature OR =2.6 with 95%CI 1.1-6.2).

Power of test = 80%

The desired precision 5%

Ratio (unexposed: Exposed) = 1:1, n = 414, considering 10% non response rate,

The final sample size for the study was 456

4.6. Sampling procedure

All Public hospitals in Addis Ababa that provide HIV care and treatment services are eligible for the study. However, purposive sampling procedure employed to select a total of four hospitals (ALERT, ZEWUDITU, YEKATIT 12, and TIKURANBESA) which provide HIV/AIDS care and treatment services based on adequate number of adolescents with HIV infection.

Simple random sampling technique used to recruit study participants from selected hospitals by referring the clients' registration book using their unique ID number prior to data collection time, average number of clients who visit the hospital per month was determined to select clients interviewed throughout data collection period. Gender issue was not considered during sampling. The final sample for the study is 456 and proportionally allocated to selected hospital as shown in the figure below,

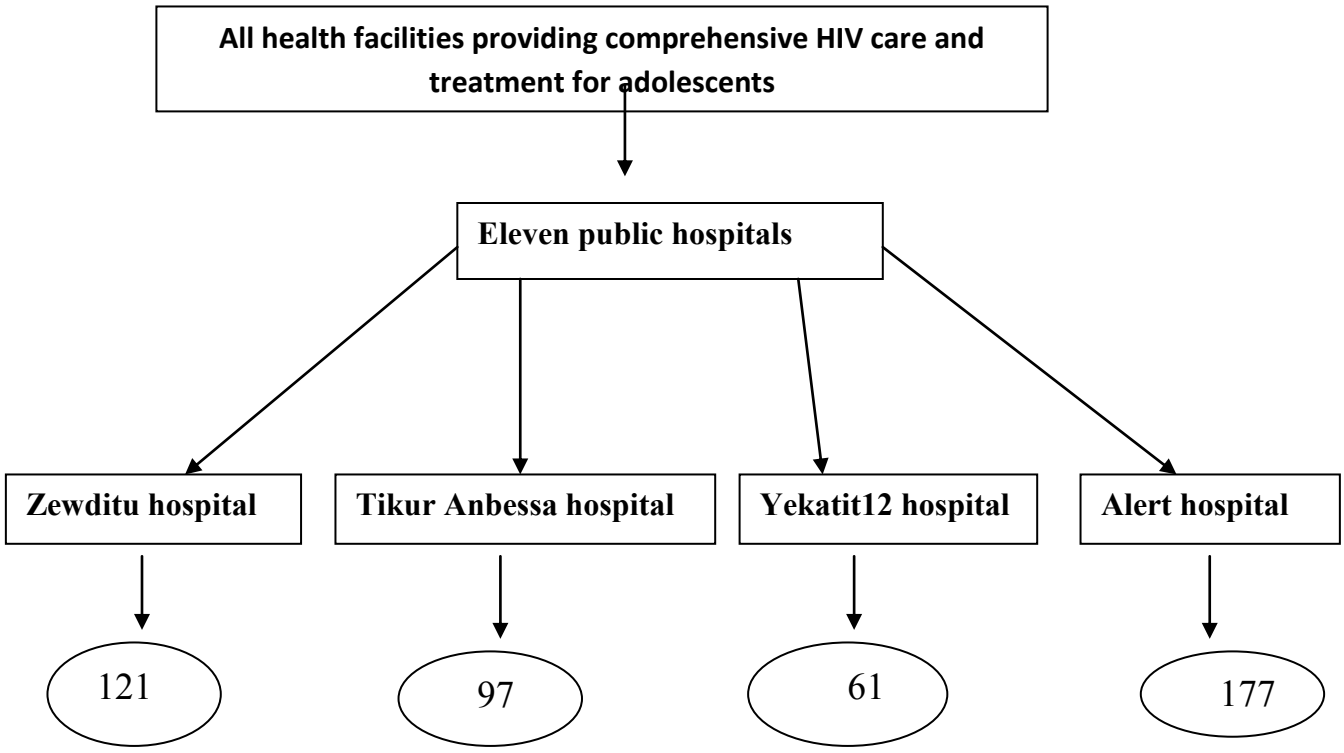


Fig 2: Schematic presentation of the sampling procedure used in the study, Addis Ababa, Ethiopia, Feb-April 2016.

4.7. Operational definitions

1. **Adolescents:** Adolescents are those young people ages between 10 and 19 years.

2. **Non-adherence:** Refers to the condition when adolescent self-reports about discomfort related with drug, not taking the drug as scheduled and sometimes miss hospital appointments.

3. **Disorder:** A term, used to imply the existence of a clinically recognizable set of symptoms or behavior associated in most cases with distress and with interference with personal functions.

4. **Common mental disorder (CMD):** is a term used to describe a group of mental disorders that frequently occur in primary care patients. Our study focused on mental disorders that mostly occur in adolescent age as listed below;

5. **Emotional disorder:** Emotional disorder in adolescents can be enlighten if they are often unhappy or downhearted, nervous or clingy in new situations, often complains of headaches, have many fears & easily scared, and many worries.

6. **Conduct disorder:** Adolescents who often have temper tantrums or hot tempers/very angry, generally non-obedient/ usually do not do as they are told, often fights with other children, often lies or cheats or often accused of lying or cheating and steals from school, home or elsewhere or take things that are not their own.

7. **Hyperactivity (Attention deficit hyperactivity) disorder (ADHD):** Adolescents, who are restless or overactive, constantly fidget or squirming, easily distracted or concentration wanders, do not thinks things out before acting and do not see tasks through to the end.

8. **Peer relation disorder:** Adolescents, who show rather solitary or tends to play alone, do not have at least one good friend, generally do not liked by other adolescents or other people of same age, picked on, or bullied by other children and gets on better with adults than with other adolescents.
9. **Total difficulty score:** score generated by responses of four domains in SDQ that measures CMDs in adolescents & ranges from 0-40.
10. **Normal score:** Individuals who score 0-13 points in total difficulty scores
11. **Borderline:** Individuals who score 14-16 points in total difficulty scores
12. **Abnormal:** Individuals who score 17-40 points in total difficulty scores
13. **Disclosure:** The process of declaring the HIV status to adolescents who are infected prenatally and/or other means of transmission by their caregivers and/or health care workers.
14. **Non-disclosure:** Where the caregiver says the adolescent does not know his/her HIV status.
15. **Caregiver:** Individual who takes care of adolescent age below 18 years considered as caregiver.

4.8. Variables

Dependent variable

We measured CMDs as independent variable. The total difficulty score is generated by summarizing the scores of four domains of CMDs (Emotional, Conduct, Hyperactivity and Peer relation disorder), and taken as main outcome.

Independent variables

Socio demographic factors include age, sex, religion, and educational status of adolescents, occupation of parents or caregiver, adolescent-caregiver relation, caregiver marital status and external monetary support. Furthermore the following Adolescents clinical characteristics are included', HIV status disclosure, ART status, duration of years on ART, non-adherence to ART, Recent CD4 count, WHO clinical staging, type of Regimen and Perceived feeling of Stigma, perceived general health condition of adolescent.

4.9. Measurement instrument

The data collection instruments for participants' socio-demographic and clinical conditions accessed from similar studies in literature and modified. Both English and Amharic version of strength and difficulty questionnaire (SDQ) accessed and adapted from the web page. The strength and difficulty questionnaire (SDQ) is the standard instrument widely used by different researchers for screening of common mental disorder in children and adolescents. The instrument contains five domains; each containing five questions, total of 25 questions.

In addition to these, eight questions about the impact assessment that supplement the tool are included. These extended versions of the SDQ ask whether the respondent thinks the adolescent has a problem, and if so, enquire further about Chronicity, distress, impairment in everyday activities, and burden to others.

This provides useful additional information for clinicians and researchers with an interest in psychiatric caseness and the determinants of service use. Questions regarding adolescents below 12 years are assisted by their caregivers/family and adolescents above 12 years self reported the questionnaire as recommended by different researchers who used SDQ [28].

4.10. Data collection and quality assurance

The data collectors selected from health workers engaged in comprehensive HIV care and treatment activities in respective hospitals. Three of them are females among four data collectors engaged and four of them are BSC degree nurse professionals. One day orientation training was given to data collectors recruited from each selected hospital. Face to face, data collection procedure used to interview the study participants about their socio demographic characteristics and SDQ prepared in structured way. Clinical conditions of adolescents reviewed from their follow up cards. The data collection procedure was supervised by Principal investigator and Two supervisors assigned.

Interviews carried out privately in a separate room in each hospital where participants recruited. In order to ensure participants‘ confidentiality, no names or personal identifiers were included in the written questionnaires and identification of an informant was done using individual numerical ID. The completeness of the questionnaires reviewed and checked by principal investigator and supervisors and important feedbacks given to data collectors.

4.11. Data processing and analysis

After ensuring the completeness and consistency of the questionnaire filled, data was entered into SPSS version 21 and analysis was done using STATA Version 12 statistical software.

Outcome generated by scoring responses of SDQ and based on the score, the outcomes are dichotomized into positive and negative for CMDs. The results in certainly true responses are counted as positive (disorder) and somewhat true and not true are counted as negative (normal and borderline) for CMDs [34]. Moreover, binary Logistic Regression used to assess explanatory variables significantly associated with outcome variable.

Finally, the explanatory variables with P-value < 0.2 in bivariate analysis included in multivariable analysis to control possible confounders, P-value < 0.05 taken as significance to identify variables associated with study outcome. The main findings described using frequencies, percentages, and Graphs.

4.12. Ethical considerations

Multi-institutions based comparative cross sectional study design employed in four selected public hospitals in Addis Ababa. Hospitals selected purposively for this study based on the adequate number of adolescents with HIV infections and participants recruited to the study by using simple random sampling technique.

Before the data collection started, Ethical clearance obtained from Research and Ethics committee of the School of Public Health of Addis Ababa University. Permissions letters also obtained from Addis Ababa University, Federal ministry of health and Addis Ababa City administration health bureau. The ethical clearance obtained from university and permission letters with research proposal submitted to the research and ethics committee of each participating hospitals and evaluated by the hospital ethics committee.

After obtaining Ethical clearance and permission letters from responsible authorities and permission from respective hospitals; the objective, benefits and risk (if any) of participating in the study was clearly explained to study participants.

Participation in the study was voluntary and the participants fully informed that they have right Participate, not to participate and terminate from participation any time during the interview if they feel any inconvenience.

Participants invited to take part in the study after they accomplish their primary purpose of visit to hospital in that particular day in order to guarantee their right to informed consent.

The written consent and assent obtained from adolescents and their caregivers who have willingness to participate.

5. Result

5.1. Response rate

Four hundred forty one adolescents included in this study giving the response rate of 96.7%, out of 456 samples determined to the study. Fifteen (3.3%) of clients were not interviewed since nine of them did not visit the hospital in their follow up appointments during the study period, four of the clients were unwilling to participate in the study, and the rest 2 clients did not meet the inclusion criteria of the study.

5.2. Socio-demographic characteristics of HIV-positive adolescents

Among randomly selected 441 study participants 193 (43.76%) were boys. Regarding the Age of study participants 170 (38.55%) were between 10-14 years and 271 (61.45%) were 15-19 years and the mean age was 14.92 with SD 2.9. Out of total participants almost half 228 (51.7%) has followed primary education, 127 (28.8%) secondary education, 45 (10.2%) college and above level and 41 (9.3%) has never attended any education. Most of the study participants 260 (58.96%), are orthodox religion followers, while 56 (12.7%) are Islam, 88 (19.95%) are Protestant Christians and the rest 37 (8.39%) are Catholic and other religion followers.

Concerning marital status of adolescents‘ parents/caregivers, 143 (32.43%) are single 217(49.21%) married, 33 (7.48%) are divorced or separated, 37(8.39%) are widowed or either of their parents died and the rest 11(2.49%) participants do not know their current caregivers marital status. The occupation of Adolescent‘s parent/caregiver 102(23.13%) are governments employed, 79 (17.91%) are housewives, 116(26.3%) self employed/ merchants, 32 (7.26%) are employed by NGO‘s, 59 (13.38%) are daily laborer, and the rest 53(12.02%) reported their have no known occupation and some of them are leading their life by support from their relatives.

When we look at caregivers relationship to adolescents, majority 273(61.9%) are living with their biological parents. Out of which 140(31.75%) are living with both father and mother, 94(21.32%) with mother only and 39 (8.84%) lives with father only. The remaining 114(25.62%) are living with non-biological parents or relatives, 25(5.67%) are adopted and the rest 30(6.9%) adolescents are living alone. Most 263(59.64%) adolescents have family members 1-4 and the rest 178(40.36%) have five and more family members.

Regarding external monetary support to the Adolescents/parents, majority of them 330(74.83%) has no external monetary support. Out of those who have support 72 (16.33%), gets support from NGO‘s, 24 (5.44%) gets support from Government and 15 (3.40%) either from relatives or religious organizations. The kind of supports to these adolescents are mentioned as financial (9.52%), food aid 20 (4.54%), educational materials 43(9.75%) and six (1.36%) reported as they get more than one kind support mentioned.

Table 1: Socio-demographic characteristics of HIV-positive adolescents in Addis Ababa, Ethiopia Feb-April 2016; (n = 441)

Socio-demographic characteristics		**Frequency**	**Percentage**
Age of adolescent Mean Age 14.95 Std. Dev. 2.86	10-14years	170	38.55%
	15-19years	271	61.45%
Sex of adolescent	Male	193	43.76%
	Female	248	56.24%
Religion of adolescent	Orthodox Christian	260	58.96%
	Islam	56	12.70%
	Protestant Christian	88	19.95%
	Catholic	14	3.17%
	Others/unknown	23	5.22%
Marital status of parents/caregiver	Single	143	32.43 %
	Married	217	49.21%
	Divorced	33	7.48 %
	Widowed	37	8.39 %
	Others/unknown	11	2.49%
Education status of adolescent	Illiterate	41	9.30%
	Primary school (1-8)	228	51.70 %
	Secondary school	127	28.80 %
	College and Above	45	10.20 %
Occupation of parents/caregiver	Gov't employee	102	23.13 %
	Housewife	79	17.91 %
	Merchant/self employed	116	26.30%
	NGO employee	32	7.26%
	Daily labor	59	13.38%
	Others/unknown	53	12.02 %
Caregiver relation to the adolescents	Biological	273	61.90%
	Non-biological	114	25.85%
	Adopted	24	5.44 %
	No care giver	30	6.80 %

Table 1: (continued)

Adolescent currently lives with	Both father & Mother	140	31.75%
	Mother only	94	21.32%
	Father only	39	8.84 %
	Others	168	38.09 %
Family size	One to four	263	59.64 %
	Five and above	178	40.36 %
External monetary support	Supported	111	25.17 %
	No support	330	74.83 %

5.3. Clinical Characteristics of HIV positive Adolescents

The study result showed out of 441 HIV positive adolescents, majority 361 (81.86%) of them know their HIV status and the rest 80 (18.14%) are not disclosed. With regard to ART status majority 415 (94.10%) of them are on ART and few 26 (5.90%) of them are on pre ART. Most of the adolescents 265 (60. 09%) are ever enrolled on ART regimen for the last five years and more, one hundred forty-nine (33.79%) of them are on their ART more than six months to five years and the remaining 27(6.12%) were less than six months. Out of 415 participants on ART regimen, 163 (36.96%) of them use a combination of AZT-3TC-NVP, 122 (27.66%) use AZT-3TC-EFV, 96 (21.77%) use d4T-3TC-NVP and remaining 33 (7.45%) were on d4T-3TC-EFV.

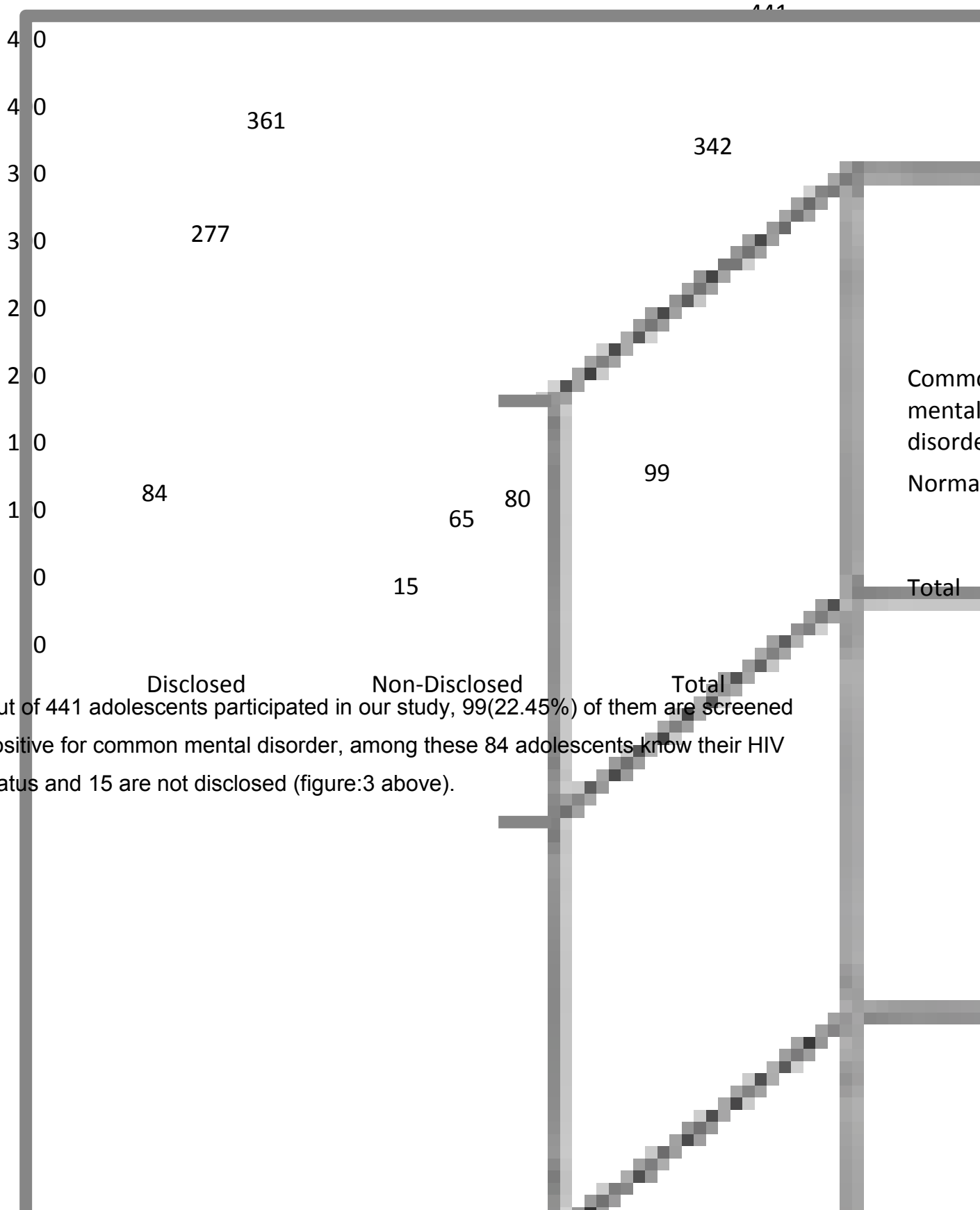
Concerning WHO clinical staging, 85 (19.27%) are on stage-I, 157(35.60%), are on stage-II, 142 (32.20%) are on stage-III, and 57 (12.93%) are on stage-IV. Two hundred fifty-two (57.14%) of the adolescents have recent CD4 count of less than 500 cells/mm3 while one hundred eighty-nine (42.86%) have recent CD4 count of 500 and above cells/mm3.

Regrinding the perceived feeling of stigma, majority 314 (71.2%) of them have no feeling of stigma and 127 (28.8%) have perceived feeling of being stigmatized. When we describe the general health condition, most 276 (62.59%) of them are in good health, 128 (29.02%) are in medium health condition and 37 (8.39%) are in poor health.

Table2: Clinical characteristics of HIV-positive adolescents in Addis Ababa, Ethiopia Feb-April 2016; (n = 441)

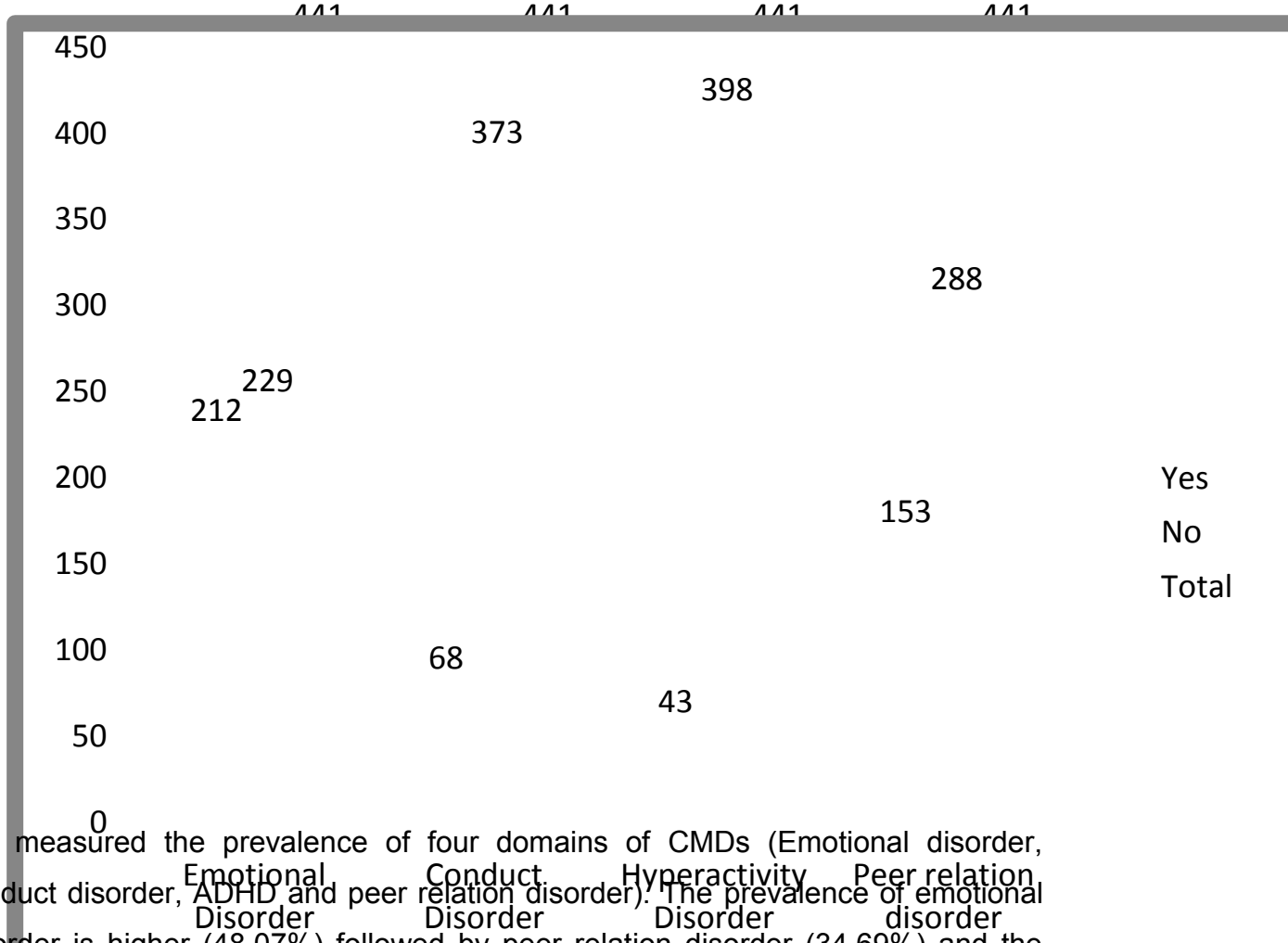
Clinical characteristics		Frequency	Percentage
Adolescent HIV status Disclosure	Not disclosed	80	18.14%
	Disclosed	361	81.86%
ART status	Pre ART	26	5.90%
	On ART	415	94.10%
Duration on ART	Less than six months	27	6.12%
	6 Months to 5 years	149	33.79%
	More than 5 years	265	60.09%
Non-adherence	Pre ART	26	5.90%
	No	340	77.10%
	Yes	75	17.01%
Recent CD4 cells count	<500	189	42.86%
	>=500	252	57.14%
Perceived stigma	Yes	127	28.80%
	No	314	71.20%
Perceived general health condition	Good	276	62.59%
	Medium	128	29.02%
	Poor	37	8.39%
WHO staging	Stage I	85	19.27%
	Stage II	157	35.60%
	Stage III	142	32.20%
	Stage IV	57	12.93%
Regimen	Pre ART	27	6.12%
	AZT-3TC-NVP	163	36.96%
	AZT-3TC-EFV	122	27.66%
	d4T-3TC -NVP	96	21.77%
	d4T-3TC -EFV	33	7.45%

Figure 3: Description of CMDs among disclosed and non-disclosed HIV positive adolescents in Addis Ababa, Ethiopia: Feb-April 2016 (n=441)



Out of 441 adolescents participated in our study, 99(22.45%) of them are screened positive for common mental disorder, among these 84 adolescents know their HIV status and 15 are not disclosed (figure:3 above).

Figure 4: Description of four domains of CMDs in HIV positive Adolescents in Addis Ababa, Ethiopia: Feb-April 2016 (n = 441)



We measured the prevalence of four domains of CMDs (Emotional disorder, conduct disorder, ADHD and peer relation disorder). The prevalence of emotional disorder is higher (48.07%) followed by peer relation disorder (34.69%) and the prevalence of conduct disorder and ADHD is 15.42% and 9.75% respectively (figure: 4 above)

5.4. Common mental disorders in adolescents

5.4.1. Analysis of socio-demographic determinants of CMDs in HIV positive adolescents

Prevalence of CMDs in our study is 22.45%. Out of 99 adolescents with positive symptoms to common mental disorder, sixty-six (14.97%) are girls and 33 (7.48%) are boys. The prevalence of four domains of CMDs measured in this study Emotional disorder 212(48.07%), Conduct disorder 68(15.42), Attention deficit hyperactivity disorder (ADHD) 43(9.7%) and Peer relation disorder 153 (34.69%).

As shown in the table 3 below Age of adolescents was found to be associated with CMDs. The significance observed in the first Age category (10-14) and the Adolescents in this Age category have two times higher odds of having CMDs compared with adolescents in higher age category (15-19) in adjusted analysis, AOR 2.12[1.27, 3.54]. In this study female Sex, has significant association with study outcome in both adjusted and unadjusted analysis. The odd of having CMDs is two times higher in female compared with male adolescents, AOR 2.06 [1.24, 3.42].

Educational status of the study participants (Adolescents) has strong association with study outcome in general and the adolescents who are not-educated/illiterate have more than four times higher odds of having CMDs compared with those adolescents with educational level college and above, COR 4.60[1.60, 13.27]. Nevertheless, when multivariable analysis conducted this association becomes non-significant.

Religion of adolescent has significant association with study out come in unadjusted analysis. Adolescents with unknown religion have 2.77 times higher odds of having CMDs compared with others, COR 2.77 [1.13, 6.79]. However, this becomes non-significant in adjusted analysis.

Caregiver/parental marital status is associated with CMDs in adolescents in both adjusted and unadjusted analysis. Adolescents with unknown parental marital status have AOR 6.80 [1.42, 32.58] times higher odds of having CMDs compared with adolescents whose parents are currently married.

Parental occupation in general has significant association with CMDs in Adolescents with both Adjusted and unadjusted analysis. Adolescents of parental occupation of housewives, private employed/merchant, and daily labor times have AOR 4.28 [1.92, 9.54], AOR 3.55[1.60, 7.86] and AOR 2.60[1.10, 6.15] times higher odds of having common mental disorder respectively compared with adolescents from government employed parents in adjusted analysis.

Caregiver relation to Adolescents (biological or not), current living condition of adolescent (both father & mother or not) and family size has no significant association with development of common mental problems in adolescents.
Regarding External monetary support, source and kinds of supports to the Adolescents; presence, or absence and sources of support are not significantly associated with CMDs in adolescents.

As we can see from table 3 below explanatory variables with p-value<0.2 in bivariate analysis were included into multivariable analysis. Accordingly, Age and Sex of adolescent, Parental marital status and occupation, become significantly associated with CMDs in adolescents in adjusted analysis and Religion, family size and Educational status of adolescent become non-significant.

See table 3 below;

Table 3: Association of socio-demographic characteristics and CMDs in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Socio-demographic characteristics		CMD		COR 95% CI	#AOR 95%CI	P–value
		yes	No			
Age of adolescent	10-14years	52	118	2.10 [1.33, 3.31]	2.12[1.27, 3.54]*	0.004
	15-19years	47	224	Ref		
Sex of adolescent	Male	33	160	Ref		
	Female	66	182	1.76 [1.10, 2.80]	2.06 [1.24, 3.42]*	0.005
Religion of adolescent	Orthodox Christian	49	211	Ref		
	Islam	16	40	1.72 [0.89, 3.34]		0.179
	Protestant Christian	24	64	1.61 [0.92, 2.84]		0.283
	Catholic	1	13	0.33 [0.04, 2.61]		0.181
	Others/Unknown	9	14	2.77 [1.13, 6.79]	2.12 [0 .62, 5.42]	0.065
Marital status of family /caregiver	Married	44	173	Ref		
	Unmarried	39	104	1.50 [0.90, 2.43]	1.65 [0.95, 2.86]	0.126
	Divorced	6	27	0.59 [0.23, 1.56]	0.46[0.16, 1.36]	0.287
	Widowed	5	32	0.42 [0.15, 1.15]	0.37[0.13,1.01]	0.091
	Others/Unknown	6	5	3.28 [0.95, 11.33]	5.12 [1.18, 22.27]*	0.030
Education status of adolescent	Illiterate	24	19	4.60[1.60, 13.27]	2.91 [0 .88, 9.59]	0.079
	Primary school (1-8)	49	179	1.78[0.71, 4.45]	1.52[0.52, 4.42]	0.218
	Secondary school	27	100	1.76[0.67, 4.60]	1.80[0.59, 5.51]	0.252
	College and Above	6	39	Ref		

#adjusted for selected socio-demographic characteristics *($p<0.05$)

Table 3: (Continued)

Occupation of parent /caregiver	Gov't employee	12	90	Ref		
	Housewife	24	55	3.95 [1.86, 8.41]	4.28 [1.92, 9.54]*	0.000
	Merchant/self employed	34	82	2.68 [1.29, 5.60]	3.55 [1.60, 7.86]*	0.002
	NGO employee	6	26	1.73 [0.59, 5.08]	1.76 [0.52, 5.90]	0.910
	Daily labor	14	45	2.61 [1.13, 5.99]	2.59 [1.10, 6.15]*	0.024
	Others	9	44	1.19 [0.44, 3.23]	0.94 [0.33, 2.67]	0.904
Caregiver relation to adolescent	Biological	54	219	Ref		
	Non-biological	27	87	1.26[0.74, 2.13]		0.390
	Adopted	8	16	2.08[0.82, 5.00]		0.125
	Organization	5	7	2.90 [0.88, 9.56]		0.081
	Alone	5	13	1.56[0.53, 4.60]		0.419
Adolescent currently lives with	Both father & Mother	27	113	Ref		
	Mother only	19	75	1.06 [0.55, 2.04]		0.861
	Father only	8	30	1.12[0.46, 2.72]		0.809
	Others	45	124	1.52 [0.88, 2.62]		0.132
Family size	1-4	52	211	Ref		
	>=5	47	131	1.46 [0.93, 2.28]	1.46[0.85, 2.51]	0.101
External monetary support	Supported	21	92	Ref		
	Not supported	78	250	1.37[0.80, 2.34]		0.253

#adjusted for selected socio-demographic characteristics *($p<0.05$)

5.4.2. Analysis of clinical determinants of Common mental disorder in HIV positive adolescents

The study result showed there is no significant difference between the adolescents who know their HIV sero-status and those who do not know their status. Concerning, being On ART regimen and Duration of years on ART, no significant difference observed between those who are currently on Pre ART and on ART. Moreover, duration of years on ART has no association with study outcome. Being on ART for duration of five years and more related to less likely developing CMDs in our adolescents and protects by 57.6% compared with those who stayed for duration less than six months COR 0.42[0.18, 0.99].

Non-adherence to the drug or missing the hospital visits on their appointment showed no association with CMDs in adolescents, however, Adherence or not missing the hospital visits on their appointment showed of being prevented from developing CMDs in adolescents in unadjusted analysis, COR 0.399[0.172, 0.926].

With regard to current CD4 counts of adolescents, significant difference found between those who have currently CD4 less than 500 cells per mm3 and 500 cells and above per mm3. Adolescents with CD4 counts less than 500 cells per mm3 have 1.65 odds of having CMDs compared with those who have 500 and more CD4 cells per mm3 in unadjusted analysis, COR 1.65 [1.053, 2.602]; however, this became non-significant in multivariable analysis.

This study investigated strong association between perceived feeling stigma and CMDs in adolescents both in adjusted and unadjusted analysis. Adolescents who have perceived feeling of stigma have 5.08 times higher odds of having CMDs compared with those do not have feeling of stigma about themselves, AOR 5.08[2.94, 8.77].

Concerning, adolescents perceived health condition is strongly associated with study outcome in bivariate and multivariable analysis. Participants who have medium health condition have 2.15 times higher odds of having CMDs in adolescents; AOR 2.15 [1.13, 4.10] and adolescents who have poor health condition have 5.15 times higher odds of CMDs disorder in adolescents compared with those who are in good health status; AOR 5.15[2.03,13.08].

WHO clinical staging and type ART regimen currently used by adolescents are not associated with CMDs in adolescents although adolescents who are currently on AZT-3TC -NVP are less likely to have CMDs compared with others by unadjusted analysis, COR 0.32[0.13, 0.79]. See table 4 below;

Table 4: Association of clinical characteristics and CMDs in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Clinical characteristics		CMD		COR 95% CI	#AOR 95% CI	P–value
		Yes	No			
Adolescent HIV status Disclosure	Non-disclosed	15	65	Ref		
	Disclosed	84	276	0.76[0.41, 1.41]		0.383
ART status	Pre ART	10	16	Ref		
	ART	89	326	2.29[0.99, 5.25]		0.050
Duration on ART	<6 months	10	17	Ref		
	6 months to 5 yrs	36	113	0.54[0.23,1.30]		0.168
	>=5 years	53	212	0.42[0.18, 0.99]		0.047
Non-adherence	Pre ART	10	16	Ref		
	No	68	272	0.40 [0.17, 0.93]		0.030
	Yes	21	54	0.62 [0.24, 1.59		0.320
Recent CD4 cells count	< 500 cells/mm3	52	137	1.65[1.05, 2.60]		0.029
	>=500cells/mm3	47	205	0.60[0.38, 0.95]		0.029
Perceived feeling of Stigma	Yes	59	68	5.94[3.66, 9.64]	5.08[2.94, 8.77]*	0.000
	No	40	274	Ref		
Perceived General Health condition	Good	41	235	Ref		
	Medium	38	90	2.42 [1.47, 3.98]	2.15 [1.13, 4.10]*	0.020
	Poor	20	17	6.74[3.26, 13.95]	5.15[2.03,13.08]*	0.001
WHO clinical staging	I	20	65	Ref		
	II	28	129	0.71[0.37, 1.34]		0.288
	III	35	107	1.06[0.57, 2.00]		0.849
	IV	16	41	1.27[0.59, 2.73]		0.543
Regimen	Pre ART	10	17	Ref		
	AZT-3TC-NVP	26	137	0.32[0.13, 0.79]		0.013
	AZT-3TC-EFV	27	95	0.48[0.20, 1.19]		0.112
	d4T-3TC -NVP	26	70	0.63 [0.26, .56]		0.318
	d4T-3TC -EFV	10	23	0.74[0.25, 2.19]		0.584

#adjusted for selected Clinical conditions *($p<0.05$)

5.5. Emotional disorder in Adolescents

5.5.1. Analysis of socio-demographic determinants Emotional disorder in HIV positive adolescents

Out of 441 study participants, 212(48.07%) screened to have emotional disorder, of which 82(18.59%) are boys and 130(29.48%) are girls.

Age and Educational status of Adolescent, marital status of parents/ caregiver, caregiver relation to Adolescent, Family size, source of external monetary support and kind of support to adolescents found to have no significant association with occurrence of emotional disorder in adolescents.

The sex of study participants has significant association with our study outcome both in unadjusted and multivariable analysis; Female adolescents have higher odds of having emotional disorder compared with male. The odd of having emotional disorder in female is 1.60 times higher than male AOR 1.60 [1.06, 2.41].

Parental occupation found to have significant association with emotion disorder in adolescents. Adolescents from the parental occupation of housewives, merchant/self employed and daily labor has significantly associated with study outcome both in bivariate and multivariable analysis. Those Adolescents from parental occupation of housewives has 2.12 times higher odd of having emotional disorder compared with Adolescents from government employed families AOR 2.12 [1.13, 4.00]. Adolescents whose parents/caregiver is a merchant or self employed has 2.53 times higher odd of having emotional disorder AOR 2.53[1.40, 4.54] and from parents of daily labor has 2.27 times higher odds of having emotional disorder compared with adolescents from government-employed parents AOR 2.27[1.15, 4.47].

Regarding Current living condition of adolescents, there is significant association with the study outcome. Adolescents who currently lives with their fathers only/ mother either died or separated has 2.20 times higher odds of having emotional disorder compared with those who lives with both parents (Mother & Father) AOR 2.20 [1.03, 4.73]. Concerning external monetary support to adolescents‘ it has significant association with occurrences of emotional disorder in adolescents in unadjusted analysis, COR 2.00[1.11, 3.59], however it become non-significant in multivariable analysis by adjusting for other confounders.

See the results in the table 5 below.

Table 5: Association of socio-demographic characteristics and emotional disorder in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Socio-demographic characteristics		Emotional Disorder		COR 95% CI	#AOR 95%CI	P–value
		Yes	No			
Age of adolescent	10-14years	89	81	Ref		
	15-19years	123	148	0.76[0.51,1.11]	0.83[0.54, 1.28]	0.157
Sex of adolescent	Male	82	111	Ref		
	Female	130	118	1.49[1.02, 2.18]	1.60[1.06, 2.41]*	0.025
Religion of adolescent	Orthodox Christian	111	149	Ref		
	Islam	30	26	1.55[0.87, 2.77]	1.47[0.78, 2.79]	0.140
	Protestant Christian	47	41	1.54[0.95, 2.50]	1.38 [0.83, 2.31]	0.082
	Catholic	10	4	3.36[1.02, 11.01]	3.62[0.95, 12.35]	0.051
	Others	14	9	2.09[0.87, 5.03]	2.18[0.95 5.03]	0.100
Marital status of family /caregiver	Married	94	123	Ref		
	Single	73	70	1.36[0.89, 2.09]		0.152
	Divorced	16	17	0.90[0.42, 1.93]		0.791
	Widowed	22	15	1.41[0.67, 2.94]		0.365
	Others	7	4	1.68[0.47 , 6.03]		0.427
Educational status of adolescent	Illiterate	25	16	2.34[0.98, 5.59]	1.92[0.75, 4.94]	0.055
	Primary school (1-8)	114	114	1.50[0.78, 2.89]	1.25 [0.60, 2.60]	0.224
	Secondary school	55	72	1.15[0.57, 2.30]	1.08[0.50, 2.30]	0.701
	College and Above	18	27	Ref		

#adjusted for selected socio-demographic characteristics *($p<0.05$)

Table 5 (continued)

Occupation of family /caregiver	Gov't employee	41	38	Ref		
	Housewife	64	52	2.07[1.13, 3.78]	2.12 [1.13, 4.00]*	0.020
	Merchant/self employed	35	67	2.36[1.36, 4.09]	2.53[1.40, 4.54]*	0.002
	NGO employee	16	16	1.91[0.85, 4.29]	2.05[0.90, 4.69]	0.114
	Daily labor	32	27	2.27[1.18, 4.37]	2.27[1.15, 4.47]*	0.018
	Others	24	29	1.58[0 .80 , 3.13]	1.47[0.72, 3.01]	0.184
Caregiver relation to adolescent	Biological	54	219	Ref		
	Non-biological	27	87	1.43[0.92, 2.22]		0.110
	Adopted	8	16	0 .87[0.37, 2.00]		0.723
	Organization	5	7	1.68[0.52, 5.47]		0.387
	Alone	5	13	1.20[0.46 , 3.13]		0.706
Adolescent currently lives with	Both father & Mother	58	82	Ref		
	Mother only	43	51	1.19[0.70, 2.02]	1.19[0.6, 2.11]	0.513
	Father only	22	16	1.94 [0.94, 4.02]	2.20[1.03, 4.73]*	0.043
	Others	89	80	1.57[1.00, 2.47]	1.60[0.98, 2.621]	0.049
Family size	1-4	118	145			
	>=5	94	84	1.38[0.94, 2.02]	1.44[0.94, 2.20]	0.103
External monetary Support	Supported	54	57	Ref		
	Not supported	158	172	2.00[1.11, 3.59]	[0.97[0.61, 1.55]	0.021

#adjusted for selected socio-demographic characteristics *($p<0.05$)

5.5.2. Analysis of Clinical determinants Emotional disorder in HIV positive adolescents

Analysis of adolescents‘ emotional disorder with regard to their specific clinical conditions, HIV status disclosure, being on ART, and Duration of stay on ART have no statistically significant association with emotional disorder in study participants.

The study result showed that adolescents Non-Adherence to a drug, recent CD4 counts less than 500 cells per mm3, WHO clinical staging III & IV and being on regimen d4T-3TC -EFV, adolescents perceived Medium and Poor Health condition has significant association with emotional disorder in adolescents in unadjusted analysis. However, after adjusting for confounders by multivariable analysis, these variables became non-significant

Among all clinical conditions included in this study, only adolescents perceived feeling of Stigma found to have statistically significant association occurrence of emotional disorder adolescents in multivariable analysis. Adolescents who feel stigma have 2.84 times higher odds of having emotional disorder compared with those adolescents who do not have perceived feeling of stigma AOR 2.84[1.74, 4.64].

Table 6: Association of clinical characteristics and emotional disorder in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Clinical characteristics		Emotional disorder		COR 95% CI	#AOR 95% CI	P–value
		Yes	No			
Adolescent HIV status Disclosure	Non-disclosed	37	43	Ref		
	Disclosed	175	186	0.91 [0.56, 1.49		0.718
ART status	Pre ART	15	11	Ref		
	ART	197	218	1.51[0.68, 3.37]		0.314
Duration on ART	<6 months	15	12	Ref		
	6 months to 5 years	77	72	0.86[0.37,1.95]		0.710
	>=5 years	120	14	0.66[0.30, 1.47]		0.311
Non-adherence	No	149	191	Ref		
	Yes	48	27	2.28[1.36, 3.82]	1.71 [0.93, 3.15]	0.002
	Pre ART	15	11	1.75[0.78, 3.93]	4.62[0.89, 24.06]	0.176
Recent CD4 cells count	< 500 cells/mm3	106	83	1.76[1.20, 2.58]	1.24 [0.76, 0.03]	0.004
	>=500cells/mm3	106	146	Ref		
Perceived Stigma	No	122	192	Ref		
	Yes	90	37	3.83[2.45, 5.99]	2.84[1.74, 4.64]*	0.000
Perceived General Health condition	Good	107	169	Ref		
	Medium	78	50	2.46[1.600, 3.79]	1.67[0.97, 2.87]	0.000
	Poor	27	10	4.26[1.98, 9.19]	1.86 [0.75, 4.58]	0.000
WHO clinical staging	I	34	51	Ref		
	II	64	93	1.03[0.60, 1.77]	1.041[0.56, 1.95]	0.908
	III	78	64	1.83[1.06, 3.16]	1.16[0 .51, 2.65]	0.030
	IV	36	21	2.57[1.28, 5.15]	1.14 [0.40, 3.21]	0.008
Regimen	Pre ART	14	13	Ref		
	AZT-3TC-NVP	56	107	0.49[0.21, 1.11]	1.86[0.36, 9.57]	0.087
	AZT-3TC-EFV	63	59	0.99[0.43, 2.30]	2.62[0.47, 14.55]	0.984
	d4T-3TC -NVP	53	43	1.14[0 .49, 2.70]	2.01[0.35, 11.72]	0.757
	d4T-3TC -EFV	26	7	3.45[1.11, 10.69]	4.80[0.67, 34.51]	0.032

#adjusted for selected clinical conditions *($p<0.05$)

5.6. Conduct disorder in Adolescents

5.6.1. Analysis of Socio-demographic determinants of Conduct disorder in HIV positive adolescents

In our study, the prevalence of conduct disorder 68 (15.42%), Out of which 25 are boys. Conduct disorder in Adolescents is not associated with Sex, Religion, and Educational status of Adolescent, Marital status of parents/caregivers, Caregiver relation to adolescents, Current living condition of adolescents, external monetary support, source and kind of support to adolescents.

Among socio-demographic factors, age of Adolescents, parental occupation and family size has found to have association with occurrences of conduct disorder in adolescents in unadjusted analysis, and furthermore all the three variables finally became statistically significant in multivariable analysis.

Adolescents at their younger age category (10-14) are more likely to have conduct disorder compared with age category of 15-19 years old. The odd of having conduct disorder in younger age category is 2.47 times higher than older age group (15-19 years), AOR 2.47 [1.42, 4.29]. Regarding parental occupations, Adolescents whose parents occupation is housewives have 3.19 times higher odds of having conduct disorder compared with adolescents from government employed parents, AOR 3.19 [1.27, 7.99].

The family size of adolescents has significant association with conduct disorder in Adolescents. An adolescent from family size of five and above has 1.86 times higher odds of having conduct disorder compared with adolescents with family size of less than five, AOR 1.86 [1.05, 3.30]. The results described are shown in the table 7 below.

Table 7: Association of socio-demographic characteristics and Conduct disorder in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Socio-demographic characteristics		CD		COR 95% CI	#AOR 95%CI	P–value
		Yes	No			
Age of adolescent	10-14years	40	130	2.67[1.57, 4.54]	2.47 [1.42, 4.29]*	0.001
	15-19years	28	243	Ref		
Sex of adolescent	Male	25	168	Ref		
	Female	43	205	1.41 [0.83, 2.41]		0.208
Religion of adolescent	Orthodox Christian	38	222	Ref		
	Islam	14	42	1.95[0.97, 3.92]		0.062
	Protestant	13	75	1.01[0.51, 2.01]		0.971
	Catholic Christian	1	13	0.45[0.06, 3.57]		0.448
	Others	2	21	0.56[0.127, 2.49]		0.442
Marital status of family /caregiver	Married	36	181	Ref		
	Single	22	121	0.91 [0.51, 1.63]		0.762
	Divorced	5	28	0.98 [0.34, 2.84]		0.973
	Widowed	2	35	0.31 [0.07 1.41]		0.130
	Others	3	8	2.06[0.50, 8.47]		0.314
Educational status of adolescent	Illiterate	7	34	0.95[0 .31, 2.91]		0.931
	Primary school (1-8)	35	193	0.88[0.36, 2.16]		0.781
	Secondary school	18	109	0.80[0.31, 2.10]		0.652
	College and Above	8	37	Ref		0.931

#adjusted for selected socio-demographic characteristics *($p<0.05$)

Table 7 (continued)

Occupation of family /caregiver	Gov't employee	9	93	Ref		
	Housewife	17	62	2.83[1.183, 6.78]	3.19[1.27, 7.99]*	0.014
	Merchant/self employed	19	97	2.02[0.87, 4.72]	2.23[0.95, 5.20]	0.064
	NGO employee	3	29	1.07[0.27, 4.23]	1.25[0.29, 5.43]	0.768
	Daily labor	10	49	2.11[0 .80, 5.55]	1.93[0.72, 5.16]	0.188
	Others	10	43	2.40[0.91, 6.34	2.55[0.94, 6.86]	0.065
Caregiver relation to adolescent	Biological	46	227	Ref		
	Non-biological	12	102	0.58[0.29, 1.15]		0.117
	Adopted	6	18	1.64[0 .62 ,4.39]		0.319
	Organization	3	9	1.64[0.42, 6.37]		0.471
	Alone	1	17	0.29[0.04, 2.26]		0.237
Adolescent currently lives with	Both father & Mother	26	114	Ref		
	Mother only	11	83	0.58 [0 .27, 1.24]	0.64[0.28, 1.47]	0.298
	Father only	9	29	1.36 [0.57, 3.23]	1.71[0.67, 4.34]	0.262
	Others	22	147	0.66 [0.351.2, 2]	0.71[0.37, 1.36]	0.305
Family size	1-4	30	233	Ref		
	>=5	38	140	2.11[1.25, 3.56]	1.86 [1.05 3.30]*	0.034
External monetary Support	Supported	16	95	Ref		
	No support	52	278	1.10 [0.60, 2.04]		0.735

#adjusted for selected socio-demographic characteristics *($p<0.05$)

5.6.2. Analysis of Clinical determinants of Conduct disorder in HIV positive adolescents

The result in the table 8 below shows Clinical conditions/characteristics in relation to Conduct disorder in the study participants. All clinical conditions except Perceived feeling of stigma by Adolescents have no association with conduct disorder in adolescents.

Adolescents‘ recent CD4 counts, perceived health status, and perceived feeling of stigma were included in multivariable analysis and finally perceived feeling of stigma, by Adolescents become statistically significant. Those adolescents with feeling of stigma have 2.20 times higher odds of having Conduct disorder compared with those who do not have perceived feeling of stigma, AOR 2.20 [1.26, 3.87].

Table 8: Association of clinical characteristics and Conduct disorder in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Clinical characteristics		CD		COR 95% CI	#AOR 95% CI	P–value
		Yes	No			
Adolescent HIV status Disclosure	Non- disclosed	53	308	Ref		
	Disclosed	15	65	0.75 [0 .40, 1.41]		0.365
ART status	Pre ART	2	24	Ref		
	ART	66	349	0.44[0.10, 1.93]		0.275
Duration on ART	<6 months	2	25	Ref		
	6 months to 5 years	27	122	2.77 [0.6, 12.48]		0.185
	>=5 years	39	226	2.16[0.49, 9.56]		0.311
Non-adherence	Pre ART	2	24	Ref		
	No	53	287	2.22[0.50, 9.74]		0.291
	Yes	13	62	2.52 [0.52, 12.10]		0.249
Recent CD4 cells count	< 500 cells/mm3	35	154	1.51[0.90, 2.54]	1.32 [0.77, 2.26]	0.311
	>=500cells/mm3	33	219	Ref		
Perceived feeling of Stigma	No	37	277	Ref		
	Yes	31	96	2.42 [1.42, 4.12]	2.20 [1.26, 3.87]*	0.006
Perceived General Health condition	Good	37	239	Ref		
	Medium	21	107	1.27[0.71, 2.27]	0.97[0.52, 1.80]	0.920
	Poor	10	27	2.40[1.07, 5.37]	1.54[0.66,3.62]	0.319
WHO clinical staging	I	12	73	Ref		
	II	29	128	1.38 [0.66, 2.88]		0.393
	III	20	122	0.99 [0.46, 2.17]		0.994
	IV	7	50	0.85[0.31, 2.32]		0.753
Regimen	Pre ART	2	25	Ref		
	AZT-3TC-NVP	27	136	2.48[0.55,11.18]		0.236
	AZT-3TC-EFV	20	102	2.45[0.53,11.27]		0.249
	d4T-3TC -NVP	13	83	1.96 [0.41, 9.36]		0.399
	d4T-3TC -EFV	6	27	2.78[0.51, 15.19]		0.238

#adjusted for selected Conditions *($p<0.05$)

5.7. Attention deficit Hyperactivity Disorder (ADHD) in adolescents

5.7.1. Analysis of Socio-demographic determinants of ADHD in HIV positive adolescents

The prevalence of Attention deficit Hyperactivity Disorder in our study is 9.75%. Analysis of socio-demographic determinants of ADHD in adolescents Age, Sex and religion of adolescent, marital status of parents/caregivers, family size, caregiver relation to adolescent, external monetary support, source, and kind of support have no association with occurrences of ADHD in adolescents.

On the other hand, Parental occupation, and current living condition of adolescents have statistically significant association with the outcome. Adolescents whose parents/caregivers occupation is housewives and daily labor have 3.51 and 3.48 times higher odds of having attention deficit hyperactivity disorder compared with adolescents from parents employed in government organizations; AOR 3.51[1.09, 11.33] and 3.48[1.03, 11.74] respectively.

Besides, current living condition adolescents have strong association with development of Hyperactivity disorder in these adolescents. Adolescents who currently live only with their fathers have 3.76 times higher odds of having hyperactivity disorder compared with those who live with both parents (Mother and father), AOR 3.76 [1.22, 11.61]*. The figures discussed are in the table 9 below.

Table 9: Association of socio-demographic characteristics and ADHD in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Socio-demographic Characteristics		ADHD		COR 95% CI	#AOR 95%CI	P–value
		Yes	No			
Age of adolescent	10-14years	20	150	Ref		
	15-19years	23	248	0.70[0 .37, 1.31]	0.79[0.40, 1.55]	0.494
Sex of adolescent	Male	14	179	Ref		
	Female	29	219	1.69[0.87, 3.30]	1.94[0.95, 3.93]	0.068
Religion of adolescent	Orthodox Christian	21	239	Ref		
	Islam	6	50	1.37 [0.52, 3.58]		0.526
	Protestant Christian	11	77	1.63 [0.75 3.52]		0.216
	Catholic	1	13	0.88[0.11, 7.06		0.900
	Others/unknown	4	19	2.39 [0.74 7.74]		0.144
Marital status of family /caregiver	Married	18	199	Ref		
	Single	15	128	1.30[0 .63, 2.67]		0.481
	Divorced	5	28	1.52[0.51, 4.56]		0.450
	Widowed	4	33	1.03 [0.32, 3.33		0.955
	Others/unknown	1	10	0.85 [0.10 7.15]		0.884
Educational status of adolescent	Illiterate	9	32	2.25[0.68, 7.41]		0.182
	Primary school (1-8)	19	209	0.73 [0.25, 2.07]		0.550
	Secondary school	10	117	0.68[0.22, 2.13]		0.511
	College and Above	5	40	Ref		

#adjusted for selected socio-demographic characteristics *($p<0.05$)

Table 9: (continued)

Occupation of parent /caregiver	Gov't employee	12	97	Ref		
	Housewife	12	67	3.47[1.16, 10.38]	3.51[1.09, 11.33]*	0.035
	Merchant/self employed	5	104	2.24[0.76, 6.59]	2.18[0.72 6.56]	0.166
	NGO employee	1	50	0 .63[0.70, 5.61]	0.54[0 .06, 5.04]	0.588
	Daily labor	10	31	3.96[1.27, 12.29]	3.48[1.03, 11.74]*	0.045
	Others	3	49	1.164 [0.26 5.11]	0.98 [0.23, .21]	0.975
Caregiver relation to adolescent	Biological	26	247	Ref		
	Non-biological	11	103	1.01[0 .49 2.12]		0.969
	Adopted	3	21	1.363[0.38, 4.89]		0.640
	Organization	1	11	0.86 [0.11, 6.99]		0.890
	Alone	2	16	1.19 [0 .26, 5.51]		0.826
Adolescent currently lives with	Both father & Mother	9	131	Ref		
	Mother only	10	84	1.73[0.68, 4.45]	1.41[0 .51, 3.88]	0.502
	Father only	7	31	3.29[1.13, 9.57]	3.76[1.22, 11.61]*	0.021
	Others	17	152	1.63 [0.70, 3.78]	1.63[0.68, 3.90]	0.270
Family size	1-4	25	238	Ref		
	>=5	18	160	1.07[0.57, 2.02]		0.831
External monetary Support	Supported	12	99	Ref		
	Not supported	32	299	0.86[0.427, 1.73]		0.664

#adjusted for selected socio-demographic characteristics *($p<0.05$)

5.7.2. **Analysis of Clinical determinants of ADHD in HIV positive adolescents**

Analysis of adolescents‘ clinical characteristics in association with Attention deficit hyperactivity disorder showed that almost all clinical factors have no association with the study outcome. Only one factor is significantly associated with Attention deficit hyperactivity disorder in Adolescents.

All Clinical factors with p-value <0.2 are included in multivariable analysis and Adolescents who feel being stigmatized have significant association to have Attention deficit hyperactivity disorder.

Adolescents who respond they have a perceived feeling stigma have 2.41 times higher odds of having Attention deficit hyperactivity disorder compared with those who have no perceived feeling of stigma; AOR 2.41[1.27, 4.64]. The results described here are from table 9 below,

Table10: Association of Clinical characteristics and ADHD in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Clinical characteristics		ADHD		COR 95% CI	#AOR 95% CI	P–value
		Yes	No			
Adolescent HIV status Disclosure	Non-disclosed	3	77	Ref		
	Disclosed	40	321	3.20 [0.96,10.61]		0.057
ART status	Pre ART	39	376	Ref		
	ART	4	22	1.75 [0.57, 5.35]		0.324
Duration on ART	<6 months	4	23	Ref		
	6 months to 5 yrs	14	135	0.59 [0.18 1.97]		0.396
	>=5 years	25	240	0.59 [0.19 1.87]		0.378
Non-adherence	Pre ART	4	22	Ref		
	No	30	310	0.53 [0 .17 1.65]		0.274
	Yes	9	66	0.75 [0 .21 2.68]		0.657
Recent CD4 count	< 500	20	169	1.18[0 .63, 2.22]		0.611
	>=500	23	229	Ref		
Perceived feeling of Stigma	No	22	292	Ref		
	Yes	21	106	2.63[1.39, 4.97]	2.41[1.27, 4.64]*	0.007
Perceived General Health	Good	25	251	Ref		
	Medium	12	116	1.04[0 .51, 2.13]		0.917
	Poor	6	31	1.94 [0.74, 5.11]		0.178
WHO clinical staging	I	8	77	Ref		
	II	14	143	0.94 [0.38, 2.32]		0.897
	III	3	129	0.97 [0.38, 2.45]		0.948
	IV	8	49	1.57 [0.55, 4.47]		0.396
Regimen	Pre ART	4	23	Ref		
	AZT-3TC-NVP	9	146	0.67[0.21, 2.18]		0.504
	AZT-3TC-EFV	9	113	0.46 [0.13, 0.62]		0.225
	d4T-3TC -NVP	17	87	0.59 [0.17, 2.12]		0.422
	d4T-3TC -EFV	4	29	0.79 [0.18, 3.54]		0.761

#adjusted for selected Clinical Conditions*($p<0.05$)

5.8. peer relation disorder in Adolescents

5.8.1. Analysis of Socio-demographic determinants of peer relation disorder in ALWHIV

Out of 441 study participants, 153(34.69%) have peer relation disorder. Out of 153 participants with this problem 63(14.29%) are male and 90 (20.41%) are female. Analysis of socio-demographic characteristics in relation with peer relation disorder in adolescents with HIV infection showed, most socio-demographic factors (Age, Sex, Religion, education, family size, external monetary Support, source, and kind of support) are not associated with the study outcome.

On the other hand, marital status and Occupation of parents/caregivers, caregiver relation to Adolescents, current living condition of adolescent are significantly associated with peer relation disorder in adolescents using bivariate analysis. Adolescents with parents/caregiver marital status of single and unknown COR 1.87[1.20, 2.92] and 4.28[1.20, 15.26], parental occupation of housewives COR 1.20[1.087, 3.69], non biological caregiver relation to adolescent COR 1.79 [1.13, 2.82] and adolescents currently living with non biological parents COR 2.39[1.47, 3.91], however these variables became non-significant after adjusting for confounders in multivariable analysis.

All variables with p-vale<0.2 in unadjusted analysis were included in multivariable analysis and finally parental/caregivers‘ occupation of housewives is significantly associated with the outcome. The odds of having peer relation disorder in Adolescents whose parents/caregivers are housewives is 2.12 times higher compared with Adolescents from government employed parents/caregivers; AOR 2.12 [1.11, 4.03]. See table 11 below,

Table11: Association of socio-demographic characteristics and Peer relation disorder in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Socio-demographic Characteristics		Peer relation disorder		COR 95% CI	#AOR 95%CI	P–value
		Yes	No			
Age of adolescent	10-14years	60	110	Ref		
	15-19years	93	178	0.96[0.64, 1.44]		0.834
Sex of adolescent	Male	63	130	Ref		
	Female	90	158	1.18[0 .79, 1.74]		0.420
Religion adolescent	Orthodox Christian	84	176	Ref		
	Islam	20	36	1.16 [0.63, 2.14]		0.625
	Protestant Christian	35	53	1.38[0.84, 2.28]		0.204
	Catholic	4	10	0.84 [0.25, 2.76]		0.771
	Others/unknown	10	13	1.61[0.68, 3.84]		0.280
Marital status of family /caregiver	Married	63	154	Ref		
	Single	62	81	1.87[1.20, 2.92]	1.22 [0.64, 2.36]	0.540
	Divorced	14	19	1.80 [0.85, 3.83]	1.74[0.70, 4.32]	0. 0.23
	Widowed	7	30	0 .57 [0.24, 1.37]	0 .47[0.18, 1.23]	0.123
	Others/unknown	7	4	4.28[1.20, 15.26]	1.28 [0.81, 5.36]	0.075
Educational status of adolescent	Illiterate	16	25	1.42 [0.58, 3.45]		0.442
	Primary school (1-8)	76	152	0.78 [0.39, 1.55]		0.480
	Secondary school	47	80	0.92 [0.44 1.89]		0.817
	College and Above	14	31	Ref		

#adjusted for selected socio-demographic characteristics *($p<0.05$)

Table 11 (continued)

Occupation of parent /caregiver	Gov't employee	28	74	Ref		
	Housewife	34	45	1.20[1.087, 3.69]	2.12[1.11, 4.03]*	0.022
	Merchant/self employed	42	74	1.50[0.84, 2.67]	1.76[0.96, 3.22]	0.065
	NGO employee	11	21	1.38[0.59, 3.24]	1.38[0 .56, 3.37]	0.482
	Daily labor	21	38	1.46 [0.73, 2.91]	1.54 [0.75, 3.15]	0.239
	Others	17	36	1.25 [0.60, 2.58]	1.27 [0.59, 2.71]	0.549
Caregiver relation to adolescent	Biological	77	196	Ref		
	Non-biological	47	67	1.79 [1.13, 2.82]	1.20[0.63, 2.12]	0.521
	Adopted	13	11	3.01 [1.29, 7.03]	2.60 [0.87, 5.11]	0.062
	Organization	7	5	3.56[1.09, 11.67]	0.89 [0.07,10.71]	0.927
	Alone	9	9	2.55 [0.97, 6.69]	1.9 [0.74, 4.42]	0.091
Adolescent currently lives with	Both father & Mother	35	105	Ref		
	Mother only	32	62	1.55 [0.87, 2.76]	1.28[0.63, 2.58]	0.494
	Father only	11	27	1.22 [0.55, 2.73]	1.32[0 .53, 3.27]	0.547
	Others	75	94	2.39[1.47, 3.91]	1.80[0.65, 3.51]	0.085
Family size	1-4	88	175	Ref		
	>=5	65	113	1.14[0 .77, 1.70]		0.504
External monetary Support	Supported	37	74	Ref		
	Not supported	116	214	1.08 [0.69, 1.71]		0.729

#adjusted for selected socio-demographic characteristics *($p<0.05$)

5.8.2. Analysis of Clinical determinants of peer relation disorder in HIV positive adolescents

The adolescents‘ clinical conditions and its association with peer relation disorder shown in the table 12 below. Among variables included in these analysis adolescents ART status, duration of years on ART and non-adherence to the drug does not show any association with peer relation disorder in adolescents. On the other hand peer relation disorder in adolescents is associated with HIV status disclosure, recent CD4 counts of adolescents, Perceived feeling of stigma by adolescents, their perceived medium and poor health status, WHO clinical staging and Type of regimen by bivariate analysis.

Multivariable analysis was done for all variables with p-value<0.2 and three of them become statistically significant with p-value<0.05. Adolescents who know their HIV status have more peer relation disorder compared with those who do not know their status. The odds of having peer relation disorder in disclosed Adolescents 1.88 times higher compared with non-disclosed adolescents; AOR 1.88 [1.06, 3.34].

Perceived feeling of stigma and perceived poor health status of Adolescents is also strongly associated with occurrences of peer relation disorder in adolescents with AOR 2.15 [1.33, 3.47] and AOR 4.55 [1.75, 11.81] respectively. Adolescents with perceived feeling of stigma have 2.15 times higher odds of having peer relation disorder compared with those who have no feeling of stigma. Adolescents with perceived poor health status have 4.55 times higher odds of having peer relation disorder in Adolescents compared with those Adolescents who have good health status.

Table 12: Association of clinical characteristics and Peer relation disorder in HIV positive Adolescents in Addis Ababa, Ethiopia, Feb-April 2016 (n=441)

Clinical characteristics		Peer relation disorder		COR 95% CI	#AOR 95% CI	P–value
		Yes	No			
Adolescent HIV status Disclosure	Non- disclosed	19	61	Ref		
	Disclosed	134	227	1.90 [1.08, 3.31]	1.88[1.06, 3.34]*	0.032
ART status	Pre ART	12	14	Ref		
	ART	141	274	1.67[0.746, 3.72]		0.212
Duration on ART	<6 months	12	15	Ref		
	6 months to 5 yrs	53	96	0 .69[0.30, 1.59]		0.384
	>=5 years	88	177	0.62 [0.28, 1.39]		0.247
Non-adherence	Pre ART	12	14	Ref		
	No	106	234	0.53 [0.24, 1.19]	0.55 [0.09, 3.56]	0.532
	Yes	35	40	1.02 [0.42, 2.50]	0.73 [0.10, 5.10]	0.749
Recent CD4 count	< 500 cells/mm3	83	106	2.04 [1.37, 3.03]	1.43[0 .89, 2.31]	0.139
	>=500cells/mm3	70	182	Ref		
Perceived feeling of Stigma	No	84	230	Ref		
	Yes	69	58	3.26[2.12, 5.00]	2.15[1.33, 3.47]*	0.002
Perceived General Health condition	Good	72	204	Ref		
	Medium	54	74	2.07[1.33, 3.21]	1.50[0 .86 2.61]	0.152
	Poor	27	10	7.65[3.52, 6.63]	4.55 [1.75,1.81]*	0.002
WHO clinical staging	I	22	63	Ref		
	II	43	114	1.08 [0.59, 1.97]	1.35[0 .63, 2.87]	0.439
	III	59	83	2.04 [1.13, 3.68]	1.53[0.61, 3.82]	0.362
	IV	29	28	2.97[1.46, 6.02]	1.69[0.57, 5.01]	0.347
Regimen	Pre ART	13	14	3.66[1.56, 8.57]	2.34[0 .33,16.57]	0.394
	AZT-3TC-NVP	33	130	Ref		
	AZT-3TC-EFV	47	75	2.47[1.45, 4.20]	1.50 [0.73, 3.08]	0.271
	d4T-3TC -NVP	42	54	3.06[1.76, 5.34]	1.12[0 .47, 2.70]	0.795
	d4T-3TC -EFV	18	15	4.73[2.15, 10.40]	1.23[0 .39, 3.89]	0.729

#adjusted for selected Clinical Conditions *($p<0.05$)

5.9. Impact (burden) on adolescents and their families

Out of the 441 study participants, 209 (47.39%) adolescents or their caregivers responded they had difficulties in one or more of the following areas: emotions, concentration, behavior, or being able to get on with other people.

One hundred twenty (27.21%) participants responded these difficulties upset or distress the adolescents. The difficulties interfere with child‘s everyday activities in the area of home life, friendship, and classroom learning, leisure activities, and these difficulties put a burden on adolescents and their family as a whole.

6. Discussions

To the best of our knowledge, this is the first multi-institutions based study to assess the burden of common mental disorder in HIV positive adolescents and the relation between HIV status disclosure and occurrences of CMDs among adolescents in Ethiopia.

The result of our study showed there more HIV positive female adolescents with male to female ratio of 1:1.3 and mean age of adolescents in our study was 14.92 with SD 2.9. Concerning the issue of disclosure, majority of adolescents 361 (81.86%) knows about their HIV status and the rest 80 (18.14%) are not disclosed.

The main finding of the study is CMDs in adolescents and its prevalence is 99(22.45%), out of these 66 (14.97%) are females and the rest 33(7.48%) male.

The prevalence showed in this study is, relatively lower compared to 51.2% prevalence of psychological distress in HIV sero-positive adolescents of Urban Uganda and the 68.7% prevalence of any psychiatric disorder in HIV+ youth in United States of America. Another study in Kombolcha town, Ethiopia reported comparative prevalence (32.4%) of CMD among Adults, and the prevalence of CMDs among HIV Infected Individuals at Debre Markos, Ethiopia was 24.3%, which is similar to our result. Furthermore, study from three hospitals in Oromia region, Ethiopia documented 46.7% prevalence of CMDs. The reason for this inconsistency in prevalence may be due to different tools used with different cut of point to measure the outcome and differences in study participants [1-4].

In the current study, the most reported CMDs in the HIV-positive adolescents are Emotional disorder (48.07%), peer relation disorder (34.69%), Conduct, or behavioral disorder (15.42%), and Attention deficit hyperactivity disorder (ADHD) (9.75%). These results are consistent with report from Scharko et, al. a meta-analysis of papers on psychiatric disorders in the context of HIV/AIDS that showed most commonly reported psychiatric disorders, ADHD (28.6%), anxiety (24.3%), and depression (25%).

In addition to this, review of epidemiology of CMDs documented the twelve month prevalence of ADHD in age 4-17 years old children was between 2% and 8.7% and conduct disorder was 5% to 14%; and in this review both ADHD and CD are more prevalent in boys than girls. The differences in prevalence could be explained by nature of survey (different researchers use different time duration) to assess the prevalence of CMD in adolescents [24].

Social determinants of CMDs in Adolescents

In our study, the prevalence of CMDs was higher among female adolescents with significant differences; this is consistent with reports from studies in Tanzania and Nigeria that showed higher prevalence in women although it is statistically not significant. In addition to this, the same result documented in study conducted on adult population in Ethiopia with higher odds of CMDs among female participants. Besides, similar result was documented in Malee et al. prenatally HIV infected female adolescents were more likely than males to have elevated scores for emotional problem (18% versus 5.9%, $p < 0.01$) [17].

In our study, adolescents in older age category are less likely to have CMDs, and the younger age category is significantly associated with CMDs. Similar study from Tanzania reported the less odds of having psychological disorder compared with younger age group [17].

Unlike reports from other African countries, marital status of adolescent‘s parents/caregiver is significantly associated with CMDs in our sample. Adolescents whose parents are currently married have less odds of having CMDs. Adolescents with unknown parental/caregiver marital status have higher odds of having CMDs.

Regarding educational status of our study participants, adolescents with no education or illiteracy is associated with more odds of having CMDs in Adolescents in unadjusted analysis. Nevertheless, this association becomes non-significant in multivariable analysis. The same result was reported from study conducted in adult population in Ethiopia, participants with no formal education has much higher odds of having CMDs and there was a trend of decrease in CMDs from low to high level of education with significant association [19].

Another study conducted on low-income African American adolescents revealed similar result; participants not in a regular school program were more likely to meet diagnostic criteria for conduct disorder compared with adolescents in school or who had completed school [26].

Different results obtained in study conducted at Urban Tanzania; those participants who stayed more years on education had higher odds of having CMDs. Although statistically not significant, a trend of decrease was seen in CMDs in adolescents with increase in educational status [17].

Our study investigated the same in occupation of parents or caregiver is also significantly associated with CMDs in adolescents from specific family. Parental occupation of daily labor, merchant/self employed, and house wives are strongly associated with occurrences of CMDs in adolescents.

A literature review by Ray Lazarus and Melvyn freeman indicated poverty, low education, unemployment and genders all tend to be associated with higher rates of CMDs, and may be seen as risk factors for the development of common mental disorder. Study from Ethiopia documented individuals who had no source of income [OR = 1.7, (95%CI: 1.1, 2.8)], and day laborers [OR = 2.4, 95%CI: 1.2, 5.1)] were more likely to have CMDs as compared to individuals who had a source of income and government employees respectively [12, 24].

Another study conducted on low-income African American adolescents revealed similar result; adolescents who had a non-working caregiver were more likely (OR = 2.55) to have major depression [26].

Caregiver relation to adolescents, and current living condition of adolescents (live with biological parents or not), are not significantly associated with the study outcome.

In our study sample, we investigated there was no significant association between lack of external monetary support and CMDs in adolescents, even though preventive relation between having external monetary support and CMDs is observed in some domains of CMDs in unadjusted analysis.

Similarly, Zimbabwean study found crisis support from family members to be protective from CMD. Different result observed from UK; those with no social support were significantly more likely to have CMDs. On the other hand, study conducted in Urban Tanzania showed no clear relationship between social support and occurrences of CMDs in study participants and direction of the association was opposite; with the rate of CMD increasing with increasing amount of perceived support and size of support group [17].

Clinical conditions and common mental disorder

Our study result showed HIV status disclosure, being on ART and duration of years since on ART were not significantly associated with CMDs in adolescents; although HIV status disclosure is associated with one domain of CMDs (peer relation problem) in Adjusted analysis.

Consistent with study result documented elsewhere; youths who had been told their HIV status were no other differences in psychological functioning as well as they did not show an increase of Psychological problems, although there were significant less anxious than those who had not been told.

Different studies have examined the psychological impact of both non-disclosure and disclosure with mixed results. A study conducted by New and colleagues found increased problems among disclosed children and significantly higher scores of behavior problems on children who knew their HIV status versus those who did not know. Conversely, in a sample of 61 HIV-infected children Riekert and colleagues found children who knew their diagnosis reported significantly lower scores on depression and anxiety measures than children who did not know their diagnosis.

There are some findings from the US and Zambia which have contradicting result that suggest non disclosed children have increased levels of psychological distress, including anxiety and depression compared with those who know their status [23].

Furthermore, in contrast with our investigation one study in Ethiopia showed; PLHIV who disclosed their HIV status have reduced risk of CMD by 0.16 times than who are not disclosed (AOR=0.16, 95 % CI (0.03, 0.73)) [11].

We investigated Non-adherence to Drug has no association with CMDs; but Adherence to the drug or taking a drug as scheduled and not missing the hospital visits on their appointment showed the likely preventive association from developing CMDs in adolescents.

With regard to interventions, a range of studies has shown ART has significantly improved mental health condition of PLHIV, implying that access to ART is itself a key mental health intervention [14]. In our study adolescents on ART has showed less likely to have CMDs compared with those who are not on ART.

With regard to recent CD4 counts of adolescents, significant difference found between those who have currently CD4 less than 500 cells per mm3 and 500 cells and above per mm3 in unadjusted analysis. Adolescents with CD4 counts less than 500 cells per mm3 had higher odds of having CMDs compared with those who have 500 and more CD4 cells per mm3, similar report observed from studies conducted in TB/HIV co-infected Adults in Ethiopia. Nevertheless, inconsistent with our study result documented in Mellins et al; which showed CD4 count and HIV RNA Viral Load were not associated with presence or absence of disorder in the study participants [12, 30, 33].

In our study, adolescents perceived feeling of stigma, and adolescents perceived poor health status were strongly associated with CMDs in adolescents. We investigated in our sample participants who have perceived feeling of stigma had much higher odds of having CMDs compared with those who have no feeling of stigma.

The same result was reported from study conducted on CMDs of TB/HIV co infected adults in Ethiopia; patients who rate their general health as "poor" [OR = 10.0, 95%CI: 2.8, 35.1)] had significantly greater risk of CMDs compared with those who perceived their general health to be "good. Patients who perceived stigma [OR = 2.2, 95%CI: 1.5, 3.2)] had the same higher odds than individual who did not perceive stigma. Similar result documented in another studies; those individuals who perceived stigma due to their HIV/AIDS status were 4.5 times more likely to suffer from CMDs than who did not perceived (AOR=10.1, 95% CI (5.91, 17.5)). Besides, study conducted on working adults in Addis Ababa, Ethiopia documented, Participants reporting excellent health status had a 50% reduced odds of mental distress (OR=0.47; 95%CI: 0.38-0.59) [11, 12, 20].

Adolescent‘s recent WHO clinical stage and type of regimen on which they currently using are not significantly associated with occurrences of CMDs, this result is similar with result from study conducted on CMDs of TB/HIV co-infected adults in Ethiopia. Another study showed when compared to patients taking AZT-3TC-NVP ART drugs, those who was taking ART regimen TDF-3TC- EFV reduced risk of getting CMDs by 0.05 with adjusted ratio of (0.05 95%CI (0.01, 0.24)) [11].

7. Strengths and Limitations of the study

7.5. Strengths

1. This study is one among the few studies in SSA and the first in Ethiopia, which assess CMD among HIV positive adolescents.
2. One health worker per selected hospitals carried out data collection throughout data collection period, which improves data quality and increased response rate.

7.6. Limitations

1. There are a number of limitations in the study, including the cross-sectional design since the analysis relied on baseline data. In this regard, one cannot determine the temporal relationship between study outcome and determinants.
2. Part of our data was collected by self-reporting of adolescents; subject to issues of social desirability bias.
3. Lack of adequate literatures on the CMD among HIV positive adolescents prevents further elaborating the discussion.

8. Conclusions and recommendations

Conclusions

1. The study showed high prevalence of common mental disorder in adolescents with HIV infection, and it is disproportionally prevalent in females.
2. Majority of adolescents know their HIV status and HIV status disclosure has no significant association with occurrences of common mental disorders among HIV positive adolescents except one domain of CMD (peer relation disorder).
3. Age, Female sex, parental occupation of housewives, merchant/self employment and daily labor, perceived feeling of stigma, and perceived poor health status are independent predictors of common mental disorders HIV positive adolescents.
4. Common mental disorder impose high burden on adolescents with HIV infection and their families.

Recommendations

1. Government and relevant stakeholders are expected to give due attention to mental health program and implement in priority.
2. To improve the mental health status of the Adolescents with HIV infection; early diagnosis, screening mechanism and treatment of mental disorder in primary health care settings and mental health activities should be integrated into comprehensive HIV care and treatment settings.
3. Adherence counseling and peer group education is essential for HIV positive adolescents in order to avoid stigma and discrimination and to improve the general health status.

4. Collaboration with schools and different stakeholders is essential so that Adolescents receive the educational and social supports that foster coping HIV related stresses in the school and home environments.
5. Further prospective longitudinal investigations are necessary to elucidate causal factors associated with resilience, the onset, and severity of common mental disorder among HIV positive adolescents by comparative control group.

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10. Annexes

10.1. Participant Information sheet

Hello, I am _____ Working with research team of AAU, SPH College of health sciences department of preventive medicine. This study is to be conducted to assess the burden of CMD in ALWHIV infection and understand the relationship between HIV status disclosure and CMDs in Addis Ababa, Ethiopia and would recommend better intervention programs in HIV care and treatment.

Your participation is voluntary and you are not forced to take part in this study. The choice of whether to participate or not, is yours' alone. If you choose not to take part, you will not be affected in any way whatsoever. If you agree to participate, you may stop participating in the research during our interview time. If you do this, there will also be no penalties and you will not be prejudiced in any way.

You should also know that the purpose of this research is not for current medical treatment of your child. You and your child chosen randomly (by chance) to participate in the study and if you agree to be in this study, you or your child will be asked to answer some questions that may take you 30-45 minutes. There are no known risks to you or your child. You and your child do not have to discuss any topics or take part in any activities that make you uncomfortable.

Your participation helps the researchers to understand the burden of CMD and its relationship with adolescents HIV disclosure in order to design appropriate intervention. What you and your child say and do is private, confidential, and used only for the purpose of research. Your name or that of your child will not appear on any of the files that we use.

If there is anything about the study or your participation that is unclear or that you do not understand, you may contact Mr. Markos Goban, AAU, SPH or Federal Ministry of Health.

Address; Telephone; +251 115536302,

Cell phone; +251917823634

10.2. Consent form

Adolescent's/Caregiver's Consent for Self

I hereby agree to participate in research being conducted by Addis Ababa University on Adolescents with HIV to assess the burden of CMD and the relationship between HIV disclosure and CMD. I understand that I am participating freely and without being forced in any way to do so. I also understand that, I can stop participating at any point should I not want to continue and that, this decision will not in any way affect me negatively.

I understand that this is a research project whose purpose is not necessarily to benefit me personally in the immediate or short term.

I understand that my participation will remain confidential.

_____Signature of participant

Date: _____I consent to participate

Printed Name: _____

If you have any questions, further you can contact the investigator (Markos Gobana), from Addis Ababa university school of Public Health College of health sciences or federal ministry of health on the address below;

Telephone; +251 115536302
Cell phone; +251917823634
P.O.B: 1234 ministry of health

Mail; mariye2002@gmail.com

Caregiver's consent for Child

I understand that the participation of my child is voluntary. My child has a right to withdraw his/her consent to participate at any time without penalty and also have a right not to answer any question that makes him/her feel uncomfortable.

I understand that confidentiality will be maintained at all times. The person asking my child questions will never tell anyone what my child has said. My child's name will not be written down or recorded in any way and that no one will be able to link my child's name to the answers written down. I understand that you will interview me/my child once that will take approximately 30-45 minutes. I understand that you will ask my child some personal questions that he/she might find difficult to answer. My child's privacy will be maintained in all published and written data resulting from this study.I understand that you will obtain any medical information from his or her medical records and that this information will be kept confidential.

I understand that there might be no direct benefit to my child as an individual and that one possible limitation of participating in the interview is that my child may experience intense emotions due to recalling difficult experiences in his/her life. In the event that this should happen, you will refer my child to an organization that can give him/her assistance and support. In my opinion, my child understands the nature of the study and is willing to participate. I agree that my child participate in this study.

Signature of parent/caregiver _____ I consent to my child's participation

Date: _____

You have received a copy of this consent document to keep.

If you have any questions, further you can contact Markos Gobana from Addis Ababa university school of Public Health College of health sciences or federal ministry of health on the address below,

Telephone; +251 115536302, Cell phone; +251917823634
P.O.B: 1234 ministry of health, Mail; mariye2002@gmail.com

10.3. Questionnaires (English Version)

01. Code of health facility_____

02. Code of questionnaire _____

Section I: Questionnaire for adolescents /caregivers socio-demographic factors			
S.NO	QUESTIONS	CHOICE/ANSWER	Remarks
101.	Age of adolescent	1. _____in years	
102.	Sex of adolescent	1. Male 2. Female	
103.	Religion of adolescent	1. Orthodox Christian 2. Islam 3. Protestant Christian 4. Others (specify_____	
104.	Marital status of Parents/caregiver	1. Single 2. Married 3. Divorced 4. Widowed	
105.	Educational status of adolescent	1. Unable to read and write 2. Primary (1-8) 3. Secondary school (9-12) 4. College and above	
106.	Occupation of parents/caregiver	1. Housewife 2. Merchant /self employed 3. Government employed 4. NGO employed 5. Daily labor 6. Others (specify_____	
107	Caregiver elation to adolescent	1. Mother/Father 2. Grandmother/father 3. Uncle/aunt 4. Others	
108	Current living condition of adolescent	1. Both with mother and father 2. Only with mother 3. Only with father 4. with other caregivers	Should be obtained from care giver
109	How many people are living in your home?	1. _____ in number	
110	External monetary support	1. Supported 2. Not supported	Should be obtained from caregiver

111	If your answer is YES From whom do you get the support	1. NGO 2. Government 3. Others	
112	What kind of support do you get?	1. Financial 2. food aid 3. educational materials 4. More than one kind	
Section II: Questionnaire for adolescents clinical conditions/review of charts			
201	HIV status disclosure	1. Disclosed 2. Not disclosed	Taken from care giver
202	Antiretroviral therapy	1. Yes 2. No	
203	Duration on ART	1. _____months/years	Obtained from follow up card
204	Have you regularly attend your follow up appointment?/adherence to ART/	1. Yes 2. NO	Obtained from follow up card
205	What is your previous CD4	1. _____	Taken from follow up card
206	Perceived feeling of stigma	1. Yes 2. No	
207	Perceived general health condition	1. Good 2. Medium 3. Poor	
208	WHO Clinical stage	1. I 2. II 3. III 4. IV	
209	Type of Regimen	1. Pre ART 2. AZT-3TC-NVP 3. AZT-3TC-EFV 4. d4T-3TC-NVP 5. d4T-3TC-EFV	

Section III: Strengths and Difficulties Questionnaire (SDQ)				
Instructions: For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the idea sounds daft! Please give your answers on the basis of the child's behavior **over the last six months.**				
Strengths And Difficulties Questionnaire		**Not True**	**Somewhat True**	**Certainly True**
301	Considerate of other people's feelings	○	○	○
302	Restless, overactive, cannot stay still for long	○	○	○
303	Often complains of headaches, stomach-aches or sickness	○	○	○
304	Shares readily with other children, for example toys, treats, pencils	○	○	○
305	Often has temper tantrums or hot tempers	○	○	○
306	Rather solitary, tends to play alone	○	○	○
307	Generally obedient, usually does what adults request	○	○	○
308	Many worries or often seems worried	○	○	○
309	Helpful if someone is hurt, upset or feeling ill	○	○	○
310	Constantly fidgeting or squirming	○	○	○
311	Has at least one good friend	○	○	○
312	Often fights with other children or bullies them	○	○	○
313	Often unhappy, down-hearted or tearful	○	○	○
314	Generally liked by other children	○	○	○
315	Easily distracted, concentration wanders	○	○	○
316	Nervous or clingy in new situations, easily loses confidence	○	○	○
317	Kind to younger children	○	○	○
318	Often lies or cheats	○	○	○
319	Picked on or bullied by other children	○	○	○
320	Often volunteers to help others (parents, teachers, other children)	○	○	○

321	Thinks things out before acting	○	○	○	
322	Steals from home, school or elsewhere	○	○	○	
323	Gets along better with adults than with other children	○	○	○	
324	Many fears, easily scared	○	○	○	
325	Good attention span, sees tasks through to the end	○	○	○	
	Impact Statement	**No**	**Yes –Minor Difficulties**	**Yes – Definite Difficulties**	**Yes – Severe Difficulties**
326	Overall, do you think that your child has difficulties in one or more of the following areas: emotions, concentration, behavior, or being able to get on with other people?	○	○	○	○
	If you have answered "Yes" to Question 26, please answer the following questions about these difficulties:	**Less Than a Month**	**1-5 Months**	**6-12 Months**	**Over a Year**
327	How long have these difficulties been present?	○	○	○	○
328	Do the difficulties upset or distress your child?	○	○	○	○
	Do the difficulties interfere with your child's everyday life in the following areas?	**Not at All**	**Only a Little**	**Quite a lot**	**A Great Deal**
329	Home life	○	○	○	○
330	Friendships	○	○	○	○
331	Classroom learning	○	○	○	○
332	Leisure activities	○	○	○	○
333	Do the difficulties put a burden on you or the family as a whole?	○	○	○	○

Do you have any other comments or concerns?

_____

_____

Name of data collector _____signature _____

Thank you for giving your time:

10.4. Ethical clearance and permission letters

ADDIS ABABA UNIVERSITY
College of Health Sciences
School of Public Health
Ethical Clearance Form

Version 01.Dec. 2016

Date: /14/_1_/__2016__/
Ref.No. SPH/ 2008

Project number /_____024_____/

Date of approval (D/M/Y) /14_/1/2016/	
Project Title: Assessment of burden of common mental disorders among adolescents with HIV infection in Addis Ababa, Ethiopia: Does HIV status disclosure matter?	
Name of PI Markos Gebana	**Phone Number:** 0917823634
Institution	**School of Public Health**
Department	**Prevent Medicine**
Decision of Research and Ethics Committee:	☑ **Approved** ☐ **Approved with Recommendation** ☐ **Resubmission** ☐ **Disapproved**
Valid until	**09 Jan. 2016 – 08 June. 2016**

Dean, School of Public Health

Signature _____

Date /__14__/__01__/__2016__/

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
DEPARTMENT OF PREVENTIVE MEDICINE

አዲስ አበባ ዩኒቨርሲቲ
ጤና ሳይንስ ኮሌጅ
የሕብረተሰብ ጤና ት/ቤት
ፕሪቬንቲቭ ሜዲሲን ትምህርት ክፍል

ጥር 16 ቀን 2008 ዓ.ም.
ቁጥር ፖፕሪቭ / 034/08

ለአዲስ አበባ ጤና ቢሮ
አዲስ አበባ

ጉዳዩ፡- ትብብር ስለመጠየቅ

በአዲስ አበባ ዩኒቨርሲቲ፣ የህብረተሰብ ጤና ት/ቤት በፕሪቬንቲቭ ሜድስን ት/ክፍል በኢፒዲሚዮሎጂ ትምህርት ዘርፍ የድህረምረቃ ትምህርታቸውን በመከታተል ላይ የሚገኙት ማርቆስ ጐበና የምርምር ስራቸውን *"Assessment of burden of common mental disorder among adolescents with HIV infection in Addis Ababa"* በሚል ርእስ ለመስራት በዝግጅት ላይ ይገኛሉ፡፡ ስለሆነም በትምህርት ክፍሉ የድጋፍ ደብዳቤ እንድንጽፍላቸው በጠየቁት መሰረት በእናንተ በኩል አስፈላጊው ትብብር እንዲደረግላቸው እንጠይቃለን፡፡

ከሠላምታ ጋር

ፍቅሬ እንቁስላሴ(ዶ/ር)
የትምህርት ክፍሉ ኃላፊ

☎ 251-11-5157701
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Email: publichealth@aau.edu.et

☎ 251-11-5157701
ፋክስ: 251-11-5517701
ኢሜል: publichealth@aau.edu.et

0917 82 3634

የኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ
ሪፐብሊክ
የጤና ጥበቃ ሚኒስቴር

Federal Democratic Republic of
Ethiopia
Ministry of Health

ቀን 18/5/08
Date
ቁጥር ህመ 5221/26/30
Ref. No.

ለመላው አፍሪካ ስጋደዋ መከላከያና ትምህርት መስጫ ማእከል

<u>አዲስ አበባ</u>

ጉዳዩ፡-<u>ትብብር ስለመጠየቅ</u>

የመስሪያቤታችን ባልደረባ የሆኑት አቶ ማርቆስ ጎበና በቀን 18/5/2008 ዓ.ም በተፃፈ ማመልከቻ በአዲስ አበባ ዩንቨርሲቲ የህብረተሰብ ጤና ት/ቤት በፐርቨንቲቭ ሜዲሲን ክፍል የድህረ ምረቃ ትምህርታቸውን በመከታተል ላይ ያሉ መሆናቸውን ገልፀው የመመረቂያ ምርምር ስራቸውን ለመስራት ይችሉ ዘንድ የድጋፍ ደብዳቤ እንድንፅፍላቸው ጠይቀውናል፣

በመሆኑም የመመረቂያ ምርምር ስራቸውን Assesssment of Common mental disoreder among Adolescents with HIV infection in Addis Ababa Ethiopia በሚል ርዕስ ለመስራት በዝግጅት ላይ መሆናቸው ታውቆ ማእከላችሁ ትብብር እንዲያደርግላቸው እንጠይቃለን፡፡

ከሰላምታ ጋር

ጌታቸው ተሴራ ኢትቻ (ዶ/ር)
የሰው ሀብት ልማትና አስተዳደር
ዳይሬክቶሬት ዳይሬክተር

ደብዳቤ የተጻፈበት ቀን 18/05/08
20/05/08
20/05/08
3497
0.048

To ...
25/05/08

251-(0)11-5517011
251-(0)11-5515425
251-(0)11-5159869
251-(0)11-5518031
Fax 251-(0)11-5519366
251-(0)11-5159657
251-(0)11-5524549
E-mail:moh@ethionet.et
Web site: www.moh.gov.et
1234
Addis Ababa,
Ethiopia

እባክዎን መልስ ሲሰጡ የእኛን ደብዳቤ ቁጥር ይጥቀሱ
In reply Please Refer to our Ref. No.

Reference 5020/227
Date 18/02/2016

To Yekatit 12 hospital
Zewditu Hospital

Addis Ababa

Subject: Request to access Health Facilities to conduct approved research

This letter is to support **Markos Gobena** to conduct research, which is entitled as **"assessment of burden of common mental disorder among adolescent with HIV infection in Addis Ababa, Ethiopia: Does HIV status disclosure matter?"** The study proposal was duly reviewed and approved by Addis Ababa Health Bureau IRB, and the principal investigator is informed with a copy of this letter to report any changes in the study procedures and submit an activity progress report to the Ethical Committee as required.

Therefore we request the Health facility and staffs to provide support to the Principal investigator.

With Regards

Mesfin Wossen
Ethical Clearance committee

Cc Markos Gobena
Addis Ababa
To Ethical Clearance Committee
Addis Ababa

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
DEPARTMENT OF PREVENTIVE MEDICINE

አዲስ አበባ ዩኒቨርሲቲ
ጤና ሳይንስ ኮሌጅ
የሕብረተሰብ ጤና ት/ቤት
ፕሪቬንቲቭ ሜዲሲን ትምህርት ክፍል

ጥር 16 ቀን 2008 ዓ.ም.
ቁጥር /ፕሪቭ / 03/08

ለጥቁር አንበሳ ስፔሻላይድ ሆስፒታል
አዲስ አበባ

ጉዳዩ፡- ትብብር ስለመጠየቅ

በአዲስ አበባ ዩኒቨርሲቲ፣ የህብረተሰብ ጤና ት/ቤት በፕሪቬንቲቭ ሜድስን ት/ክፍል በኢፒዲሚዮሎጂ ትምህርት ዘርፍ የድህረምረቃ ትምህርታቸውን በመከታተል ላይ የሚኙት ማርቆስ ጐበና የምርምር ስራቸውን *"Assessment of burden of common mental disorder among adolescents with HIV infection in Addis Ababa"* በሚል ርእስ ለመስራት በዝግጅት ላይ ይገኛሉ፡፡ ስለሆነም በትምህርት ክፍሉ የድጋፍ ደብዳቤ እንድንጽፍላቸው በጠየቁት መሰረት በእናንተ በኩል አስፈላጊው ትብብር እንዲደረግላቸው እንጠይቃለን፡፡

ከሠላምታ ጋር

ፍቅሬ እንቁስላሴ(ዶ/ር)
የትምህርት ክፍሉ ኃላፊ

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10.5. Declaration

I, the undersigned, declare this thesis is my original work and has not been presented for a degree in this or any other University, and all sources of materials used for this thesis have been fully acknowledged.

Name of Principal Investigator, _____
Signature _____
Place _____
Date of Submission _____

This thesis has been submitted with our approval as university advisor.

Name of primary advisor _____

Advisors‘ Signature_____

Addis Ababa University

School of Graduate studies

Assessment of common mental disorders among HIV positive adolescents in Addis Ababa, Ethiopia: does HIV status disclosure matter?

By: Markos Gobana

School of public health, Department of preventive medicine

Addis Ababa University

Approved by Examining board

Chairman_____

Department Graduate committee_____

Advisor_____

Examiner_____