ADHERENCE TO ANTIRETROVIRAL THERAPY AND ASSOCIATED FACTORS AMONG HIV INFECTED PATIENTS IN NIGIST ELENI MOHAMMED MEMORIAL GENERAL HOSPITAL, HOSSANA, SOUTHERN ETHIOPIA.

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JIMMA, ETHIOPIA

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Abstract

Background: Adherence to antiretroviral therapy is a major predictor of the success of HIV/ AIDS treatment. Good adherence to antiretroviral therapy is necessary to achieve the best virology response, lower the risk of drug resistance and reduce morbidity and mortality.

Objective: To determine adherence rate to antiretroviral therapyand identify associated factors among HIV infected patients accessing ARTat NigistEleni Mohammed Hospital, Hosanna, Southern Ethiopia.

Methods: A cross sectional study was conducted atNigistEleniMohammed Hospitalfrom March to April 2015.Two hundred sixty five adult patients on anti-retro viral therapy who fulfill the inclusion criteria were included. Data was collected by face to face exit-interview of the patients and reviewing their respective follow up record using structured questionnaire and checklist respectively. The data was analyzed by SPSS version 20.0 software. Frequencies and percentages were calculated for categorical variables whereas mean and standard deviation were calculated for continuous variables.Chi-square test was performed for categorical variables to check adequacy of cells before performing logistic regression.Bivariate logistic regression was used primarily to check crude association of independent variables with adherence status of antiretroviral therapy; variables found to have p-value <0.25 were entered in to multivariable logistic regression using backward linear regression method for controlling the possible effect of confounding among independent variables. Adjusted odds ratio and corresponding 95% confidence intervals were used to quantify the degrees of association between dependent and independent variables. Results with p-value < 0.05 were considered as predictors of adherence. Finally the results were presented by text, tables and chart.

Results: Aresponse rate was 99.6% and total of 149 (56%) respondents reported adherence in the week prior to interview. Associated factors withadherencewere: disclosing ART use [AOR = 2.48(1.28, 4.79)], no substance abuse [AOR =8.01(2.15, 29.84)],being married [AOR=2.35(1.10,5.04)],medication schedule fit daily activity [AOR =5.05(1.79, 14.21)],following specific medication schedule [AOR = 2.41(1.11, 5.24)], absence of side-effects [AOR = 3.89(2.11, 7.19), having access to health center [AOR = 2.13(1.18, 3.86)]. Forgetfulness and being busy were the most common reasons for missing doses.

Conclusion: The ART adherence level in this study was low. Associated factors withadherenceincluding no substance use, absence of side-effects, being married,having access to health center, disclosure status, fitness of daily treatment schedule and following specific medication schedule. Appropriate adherence enhancing strategies targeted at creating awareness on side effect, substance use, disclosure status and medication fitness with daily activity is strongly recommended.

Key words: Highly Active Antiretroviral Therapy, Adherence, NEMMGH.

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List of abbreviations and acronyms

AIDS- Acquired Immunodeficiency Syndrome

ART-Anti-retroviral Therapy

ARV-Anti-retro Viral

FHAPCO -Federal HIV/AIDS Prevention and Control Office

FMoH- Federal Ministry of Health (Ethiopia)

HAART-Highly Active Anti-retroviral Therapy

HIV- Human Immunodeficiency Virus

NEMMGH-Nigist Eleni Mohammed Memorial General Hospital

PMTCT-Prevention of mother to child transmission

PEPFAR- President's Emergency Plan for AIDS Relief

PLWHA-People Living With HIV/AIDS

PITC -Provider initiated testing and counseling

SPSS- Statistical Package for Social Science

UNAIDS- The Joint United Nations Programs on HIV/AIDS

UNGASS- United Nations General Assembly Special Session

VCT-Voluntary counseling and testing

SD-Standard deviation

1. INTRODUCTION

1.1. Background

Human Immunodefiency Virus

Human Immunodeficiency Virus, the pathogen that causes Acquired Immune deficiency Syndrome has been the most significant emerging infectious agent in the last century and continually threatens to create health, social and developmental problems in this millennium(1).Globally, an estimated 35 million people were living with HIV in 2013. There were 2.1 million new HIV infections globally, showing a 33% decline in the number of new infections from 3.4 million in 2001. At the same time the number of AIDS deaths is also declining with 1.5million AIDS deaths in 2013, down from 2.3 million in 2005 having declined by 35 %(2).The highest number of people living with HIV was in sub-Saharan Africa-24.7 million people. Asia and the Pacific had the next largest population of people living with HIV, at an estimated 4.8 million people (2).

Anti-retroviral Therapy

Medical knowledge around HIV/AIDS has increased significantly over the years and good progress has been made in the treatment of HIV as a manageable life-threatening chronic condition using antiretroviral therapy (3). ART has also remained the only available option that offers the possibility of dramatically reducing HIV/AIDS-related morbidity and mortality (4).

New data analysis demonstrates that for every 10% increase in treatment coverage, there is a 1% decline in the percentage of new infections among people living with HIV in sub-Saharan Africa (2).

Adherence

Adherence is defined as the patient's ability to follow treatment plan by taking the correct dose of medications, at prescribed time and frequencies (on schedule) and following dietary instructions (5).

Adherence to HAART is one of potentially alterable factors determining outcomes for patients with HIV (6). However non-adherence to HAART is common in all groups of treated

individuals (7).To achieve goal of HAART, maximal and durable viral suppression and successful HIV therapy requires adherence of ≥ 95 % (8).

In resource-scarce settings, where second and third line ART regimens and viral load monitoring are limited, routine assessment of and interventions for patients' adherence have become one of the biggest priorities in delivering ART services (9).

1.2.Statement of the problem

Because of the wide availability and use of a free HAART service that began to operate in 2005 with the support of PEPFAR and other donor organizations, the HIV/AIDS-related morbidity and mortality has decreased significantly in Ethiopia(10).

Goldman etal. (11)state that the risk of virological failure was highly likely in those who were sub-optimal and poorly adherent patients in comparison to those who were optimally adherent to the HAART regimen of dosages.

Non-adherence is associated with repeated hospital admissions, development of opportunistic infections, poor quality of life, loss of productivity and premature mortality (3).

A major concern with scaling up of antiretroviral therapy in resource-limited settings is the emergence of drug resistant viral strains due to suboptimal adherence and the transmission of these resistant viral strains in the population (12).

The problem, however, is that if a patient requires the optimum benefits that a long-term exposure to HAART confers in terms of suppression of the HIV, then that patient needs to comply with a near-perfect adherence to the clinical requirements of the HAART regimen (13).The rate of adherence to ART in Ethiopia ranges between 74.2% (14) and 94.3% (15).

Adherence also needs economic and psychological support to the patient as they are prone to many opportunistic diseases and decreased physical fitness, study in three woreda's in Ethiopia revealed that, of the total 223 deaths in 2006-07 when ART coverage was very low-90% took place in affected households.HIV/AIDS-affected households had a higher percentage of widow-headed households, a higher dependency ratio and a much higher number of orphans. In terms of labor availability, male headed, unaffected households had two times higher number of adult labor than those affected households. Similarly female-headed, HIV/AIDS-affected households had the lowest number of working adults, reduced on average by half compared to male headed, HIV/AIDS-affected households (16).

Good adherence is crucial for maximum clinical benefit from ART. Therefore despite increasing access to ART, the long-term success of treatment programs in resource limited setting requires establishing the optimum level of adherence. Factors that make patients on ART fail to obtain good adherence had to be determined and addressed.

It is therefore vitally important to appreciate the significance of obstacles or barriers that affect adherence to the HAART regimen and it is essential, in the light of such information, to develop interventions that will improve patient adherence to HAART

Based on this information, risk-benefit evaluations are made and safety measures are taken to protect the public from unnecessary harm.

However, still little is known about what factors are related with adherence in the study area. Therefore, the aim of this study is to fill knowledge gap on the prevalence of adherence rate associated with ARV medications, the burden of non-adherence to ART in our setup and factors associated with it, with the ultimate goal of improving effectiveness of HIV treatment through adherence at NEMMGH, Hosanna, Southern Ethiopia.

2. LITERATURE REVIEW

2.1. Global overview of HIV/AIDS and PLWHA on ART

In 2013, there were around 35 million people living with HIV in the world. In the same year, 1.7 million people died of AIDS-related causes (2).

Sub-Saharan Africa remains most severely affected, with nearly 1 in every 20 adults (4.9%) living with HIV and accounting for 69% of the people living with HIV worldwide. The number of people dying from AIDS-related causes in sub-Saharan Africa declined by 32% from 2005 to 2011, although the region still accounted for 70% of all the people dying from AIDS in 2011(17).

The key goal of ART is to achieve and maintain durable viral suppression. Achieving viral suppression requires the use of ARV regimens with at least two and preferably three, active drugs from two or more drug classes (HAART).Over the years, the goal of antiretroviral treatment has expanded to include not only prevention of AIDS-related morbidity and mortality but also prevention of HIV transmission(17).

In 2013, an additional 2.3 million people gained access to the life-saving medicines. This brings the global number of people accessing ART to nearly 13 million by the end of 2013. Based on past scale-up, UNAIDS projects that as of July 2014 as many as 13,950,296 people were accessing ART (2).

Africa is leading the world in expanding access to antiretroviral therapy, with 7.6 million people across the continent receiving antiretroviral therapy including 7.5 million people in sub-Saharan Africa(2). Eastern and Southern Africa is scaling up faster, by more than doubling the number of people on treatment between 2006 and 2012.Coverage in sub-Saharan Africa is modestly higher than the global average, with 56% of eligible individuals receiving therapy(2).

2.2. National overview of HIV/AIDS and PLWHA on ART

Declines in AIDS-related deaths have been most prominent in countries with large HIV epidemics and steep increases in ART provision, including Ethiopia with 48,000 fewer deaths (53% decline).Ethiopia is among from the selected countries that had shown changes in the incidence rate of HIV infection among adults 15–49 years old, 2001–2011 by decreasing ≥50% (17).

The overall HIV prevalence in Ethiopia among adults age 15-49 is 1.5 % (17).In 2013 there were an estimated 793,700 people living with HIV including 200,300 children. There were approximately 45,200 AIDS related deaths in 2013 and about 898,400 AIDS orphans in the same year(18).

Of the estimated 593,400 adults living with HIV at the end of 2013; 298,512 were on treatment (50%).Ethiopia has now reached a symbolic milestone for curbing the spread of the epidemic (18). However, patient loss to follow-up and ensuring adherence to ART regimens remain major challenges of the ART program especially in some of the regions, as well as the inadequate capacity of some regions in the maintenance of laboratory machines (18).

2.3. Targets for adherence to HAART

A number of studies have shown that a more than 95% adherence rate is required if a patient is to receive all the benefits of ART and minimize the possibility of treatment failure(11)

According to studies, ART regimens require 70–90 per cent adherence in order to be effective. Sustaining adherence to ART over the long-term requires accurate and consistent monitoring and follow up of HIV/AIDS patients. This is a challenge particularly for countries in the sub-Saharan Africa region (19).

2.4.Adherence to HAART in developed countries

In cross sectional study of Albania undertaken by Morrison etal. (20) patient-reported adherence and pharmacy review showed adherence levels are 98.9±4.4% and 97.7±4.7% respectively. Reasons for missed doses were: forgot (20.6%) and busy (17.6%). Factors associated with non-adherence were: being partnered [OR (95%CI) = 0.29(0.09, 0.98)], history of depression [OR (95%CI) = 0.24(0.08, 0.76)], increased number of barriers to care

[OR (95%CI) = 0.80(0.66, 0.97) and increased number of current social and medical needs [OR (95%CI) = 0.72(0.58, 0.91)].

In France study of 10 year follow up, 747(2070 visits) patients were reported non-adherent behavior and non-adherence was independently associated with side effects, three times or more daily dosing regimen, being at clinical stage B/C, diagnosed as HIV-positive for <6 months, who were younger, had children, born in the European Union, had depressive symptoms, consumed alcohol daily and lack of support from their main partner(21).

2.5. Adherence to HAART in developing countries

Systemic review by Mills etal. (22) found a pooled estimate of adequate adherence by sub-Saharan Africa patients was 77 per cent whereas the figure for North American patients was 55 per cent. The same study concluded that adherence is a concern in North America.

In cross sectional survey from June to November 2011 of Lao people's democratic republics in which 346 patients were followed, in self report 60% were adhered and reasons for missing dosewere being busy (97.0%) and being forgetful (62.2%). Educational level at secondary school; illicit drug use; dislike exercise and forgetting were independently associated with non-adherence. No difference in adherence levels based on the duration of taking ART, miss appointment and WHO clinical stages were observed (23).

In cross sectional descriptive survey of 221 participants that lasted for one month at Nnamdi Azikiwe University teaching hospital in Nigeria: 85.1% of participants were non-adhered and reasons for dose non-adherence were forgetfulness (53.8%) and busy schedule (38.8%). Males, patients with no formal education and employed were more likely to attribute non-adherence(24).

Systemic review of 62 original articles in low and middle income countries by Peltzer et al.(25) found that education and occupational status were not significantly associated with the level of adherence in 35 studies (71.4%) and 22 studies (81.5%) respectively out of 49 and 27 studies reviewed(25).

In cross sectional study of Nepal in which 330 patients were followed, 85.5% respondents reported adherence in four week prior to interview. Major factors influencing adherence were; disclosure of HIV

status[OR(95%CI)=17.99(1.81,78.48)],alcoholuse[OR(95%CI)=12.89(3.97,41.85)], being female [OR(95%CI)=6.91(2.31,20.67)],being illiterate[OR(95%CI)=4.58(1.34,15.72)],side effects[OR(95%CI)=6.04(1.25,29.08)],ARTstarted≤24 months [OR(95%CI)=3.18(1.34-7.55)] and travel time to hospital >1 hour [OR(95%CI)=2.84(1.08,7.49)].Age, occupation and missing schedule visit were not influencing adherence (26).

In retrospective cohort study of 239 patients for 36 months undertaken at Jharkhand state in India, 57% of the patients registered for ART were found to be adherent to ART(27).

In descriptive cross sectional study of 201 HIV subjects from March to May 2013 in upper west region Ghana,self-reportedadherence was 62.2%. Patients who suffered otherailments[OR(95%CI)=0.3(0.1,0.81)],side effects[OR(95%CI)=0.2(0.1,0.6)] were negative predictor but regular follow up[OR(95%CI)=6.9(2.8,17) were predictor of adherence. Family support,gender, marital status, type of family,disclosure,perceived difficulty of regimen, time since diagnosis, time since HAART initiation and food restriction were not associated**(**28).

Systemic review of developed and developing nations patient by Mills etal.(29) found that important barriers reported in both economic settings included fear of disclosure, side effects, daily schedule,substance abuse, forgetfulness, suspicions of treatment, regimens that are too complicated, pill burden, decreased quality of life, work and family responsibilities, falling asleep and access to medication.

Ammasari et al. (30) found that medication side effect, family and social support, complexity of regimen were consistently associated but gender, living condition, occupation and CDC stage weren't associated with adherence.

Kardas et al. (31) found that disclosure, access to health facility, patient to health professional relationship and medication time schedule had positive effect on adherence. Side effect and alcohol consumption had negative effect on adherence but socio-demographic variables like age, gender, marital status and educational status and concomitantly used medication were not associated.

In cross sectional study of 316 patients from January to February 2012 in Nepal, adherence rate by self-report was 86.7% in week prior to interview and the reasons for dose missing

were forgot (80%) and busy schedule (19%).Age [OR (95%CI) =1.04(1.00–1.09)], travel time to ART centers [OR (95%CI) =1.38(1.12–1.71)], history of illegal drug use [OR (95%CI) =3.981.71–9.24) and side effect [OR (95%CI) = 4.88(1.09–21.8)], were all independently and negatively associated with ART adherence(32).

In cross sectional study of 198 patients from January to April 2008 in south India, 50.5% reported ≥ 95% adherence rate.An increased odds of non-adherence was found for participants with current CD4 cell counts >500 cells/µl [OR(95%CI)= 2.22 (1.04,4.75)], HAART >24 months [OR(95%CI)=3.07 (1.35,7.01)], alcohol use [AOR(95%CI=5.68 (2.10,15.32)], low general health perceptions [OR(95%CI)=3.58 (1.20-10.66)] and who had high distress [OR(95%CI)= 3.32 (1.19-9.26)](33).

In facility based cross sectional study of 416 patients from November 2008 to April 2009 in Kenya; 18% were non adhered and main reason for missing dose were being busy (38%) and forgetting (38%). Accessing to medical center [OR (95%CI) = 2.387 (1.155-4.931)] and difficult fitting therapy in own schedule [OR (95%CI) = 2.310(1.211-4.408)] predicted non-adherence(34).

In cross sectional study of 81 patients using ART from September to October 2009 in Brazil; 42% of patients were adhered .Gender, maritalstatus, residence, occupation, living condition and concomitant medication weren't associated with adherence(35).

Mbuagbaw et al. (36) in Cameroon found that adherence rate were 56.6% to 90.5% in self report of the studies conducted in 2006 and 2010 respectively. Substance abuse, advanced stage of disease, increased distance from clinic and lack of family support were reduce adherence and patient -provider relationship, use of reminder, positive perception of treatment and high CD4 count at initiation were increase adherence.

In cross sectional study of 411 patients from October to December 2011 in south- south Nigeria, the self-reported adherence rate oneweek prior to the study was 59.9%. Being busy and forgettingwas the main reasons for skipping doses. Age, sex, marital status, educational attainment and residence did not significantly affect adherence levels amongst study population(4).

A Nigerian study that assessed ART adherence among patients reported 75% of the study participants as non-adherent to their medications, patients in this study cited various reasons for their actions, ranging from ARVs side-effects and non-availability of ARVs to forgetfulness. South African study revealed that only 50% of patients on ART reported taking at least 95% of their prescribed ARVs (3).

2.6. Adherence to HAART in Ethiopia

In a study undertaken by Tadious et al. (37) at Addis Ababa, 81.2% of patients were adhered during the study period. In a study by Markos et al. (14) atYirgalem Hospital in South Ethiopia, 74.2% of patients were adhered a week before the assessment took place. In study by Amberbir et al. (15) at Jimma University specialized hospital in Southwest Ethiopia found that self-reported dose adherence was 94.3% in the week prior to the study.

In study that Tiyou et al.(7) conducted at Jimma university specialized hospital in Southwest Ethiopia, the self-reported adherence rate based on the combined indicator was 72.4 %.In study by Alagaw et al.(16) at Wolaita Soddo Hospital, 74.4% of the patients took ≥95% of their prescribed ARV medication. In study that Mitiku et al. (38) undertaken in Harari regional state in Eastern Ethiopia, 87% of the patients were adhered in week prior to interview. In a study by Ejigu et al. (39) at Nekemte Hospital, 77.9% of the patients had adherence rate ≥95%in the last one month period. In study by Hailasillassie et al. (40) at Mekelle hospital in Northern Ethiopia, 63.4% of the patients were adhered. In study that Debito et al. (41) undertaken at Tepi health center in Southwest Ethiopia, 78.6% of the patients were adhered in self report. In study by Asmare et al. (42) conducted in Debre Markos referral hospital in North West Ethiopia, 88.6% of participants were adhered in self report and pill count in week prior to study.

The data from all the studies mentioned above from both developed and developing countries show that equivalent or better adherence rates than those achieved in developed countries can also be achieved in sub-Saharan African countries.

2.7. Factors affecting level of adherence to HAART

Chesney states that factors that affect adherence to HAART can be classified into four categories: (1) patient factors such as age, gender and substance abuse; (2) treatment factors

such as, complexities surrounding the act of drug dosing, pill burdens, side effects and special food requirements; (3) the provider-patient relationship; (4) system of care(43).

Andrew et al. (44) has shown that the factors which most influenced adherence were patient-related (acceptance, disclosure and family support), disease-related and treatment-related (symptomatic illness and improvement on ARTs) and healthcare worker-related (relationships and adherence classes).

Three major categories of factors identified as positively influencing adherence were: patient-related factors, disease-related and treatment-related factors and healthcare-related factors(45).

In cross sectional study of 319 participants from January to March 2009 conducted at Jimma university specialized hospital in Southwest Ethiopia by Tiyou et al.(7) found that family support [AOR (95%CI) =2.12(1.25-3.59)] were an independent predictor of overall adherence and WHO stage, sex and average monthly income were not independent predictors.

In prospective study of 400 patients from December 2006 to April 2007 at Jimma university specialized hospital in southwest Ethiopia undertaken by Amberbir et al.(15) found that social support [OR(95%CI)=2.42(1.29,4.55)], not depressed [OR(95%CI)= 2.13(1.18,3.81)] and use of memory aids [OR(95%CI=3.29(1.44,7.51)]were independent predictors of adherence. The reasons for skipping doses were simply forgetting, feeling sick or ill, being busy and running out of medication in more than 75% of the cases.

In an unmatched case-control study of 1270 patients from January 2005 to February 2007at Jimma university specialized hospital in Southwest Ethiopia undertaken by Deribe et al.(46) found that taking hard drugs [OR(95%CI)=0.041(0.005,0.324],alcohol consumption[OR(95%CI)=3.57(1.78,7.14)],being bedridden [OR(95%CI)=7.44 (1.93,28.60)], living outside Jimma town [OR (95%CI) =2.71(1.63–4.52)] and having an HIV negativeor unknown HIV status partner wereindependently associated with defaulting ART and age, sex, employment status, educational status and marital status were not associated.

In institution based cross sectional study of 377 patients from March to May 2013 at Debre Markos referral hospital in North West Ethiopia conducted by Asmare et al.(42) found that

forgot or busy(40.3%) and change in their daily routine work (57%) were reason cited for missing dose.Income [OR(95%CI)= 0.3(0.13, 0.69)], delayed in taking ART drugs [OR(95%CI)= 0.6(0.16,0.88)], fitness of daily treatment schedule[OR(95%CI)= 9.7(4.6,28)] and consistently taking of ART drugs [OR(95%CI)= 5.7(2.6,25.3)] were significantly associated with ART adherence. Disclosurestatus, access to reliable pharmacy and side effect were not associated.

In comparative cross sectional study of 291 patient from July to August 2006 atYirgalem hospital in South Ethiopia by Markos et al.(14) found that reason for dose non adherence were being busy or forgetting (51%).Sideeffects [AOR (95%CI) =6.4(2.41- 17.08],distance of ART clinic [AOR (95%CI) = 2.48(1.24- 4.98)] and presence of dependents [AOR (95%CI) =1.95(1.06-3.57)] had significant independentassociations with adherencebut schedule fitting daily routine activity and family support were not independently associated.

In cross sectional survey undertaken by Tadious et al. (37) at Addis Ababa, reasonsfor dose non-adherence were: beingbusy or simply forgot (33.9%). Correlates of adherence includedregular follow-up, not being depressed, no side effects, a regimen that fitted the daily routine and satisfaction with the relationship with doctors.

In facility based cross sectional study of 341 patients from January to February 2012 at Tepi health center in Southwest Ethiopia by Debito et al.(41)found that positive predictors of adherence includes no alcohol drinking [AOR(95%CI)=4.36(2.03-9.35)] and a belief of ART cures HIV[AOR(95%CI)=1.95(1.21-3.13)]while HAART ≥49 months [AOR(95%CI)=0.29(0.11- 0.75)]was negative predictor but age,disclosure,family support and WHO stage weren't predictor of adherence.

In cross sectional study of 239 participants from October to December 2010 at Hiwot Fana and Jugal hospital in Harari regional state in Eastern Ethiopia by Mitiku et al. (38) found that the main reasons for missing doses were forgetting (47.2%), travelling (18.9%) and being busy (15.1%).There was not any independent predictoridentified for adherence to ART regarding socio-demographic variables and variables like support, disclosure status, substance abuse, side effect and duration on HAART.

In hospital based cross sectional study of 271 patients from January to February 2013 at Nekemte hospital in Western Ethiopia conducted by Ejigu et al. (39); the main reasons for

missing the dose were forgetting (16.1%) and being busy (11.9%). Educational status; concomitantly used medications; family and social support; belief in efficacy of HAART; following clinical appointment; using reminding aid ; access to medical care ; improvement upon taking HAART; relationship with health professionals ; history of substance useand continuing to take the medication if the disease condition is worsened were associated with medication adherence rate of the patient which is explained by $P<0.05$ but age,sex and medication fit daily activity weren't associated.

In cross sectional study of 422 patients from June to July 2012 conductedat Mekelle hospital in Northern Ethiopia by Hailasillassie et al.(40) found that HIV positive who had their own income[AOR(95%CI)=2.1(1.2,3.9)], urban residence[AOR(95%CI)=2.3(1.2,4.5)]and being diagnosed in Mekelle hospital [AOR(95%CI)=1.8(1.2,2.9)] were independently predicts HAART adherence .Age ,occupation,sex,marital status, educationalstatus, disclosure status and WHO clinical stage were not associated.

In cross sectional study of 361 patients from April to May 2012 conducted at Wolaita Soddo hospital by Alagaw et al.(16) showed that, with whom a subject lives [OR(95%CI)= 3.634 (1.835-7.195)], depression [OR(95%CI)= 2.596(1.375-4.903)] and having inadequate diet [OR(95%CI)=2.268 (1.129, 4.554)] were independent predictors of dose adherence.Sex, disclosure, support and family size were not associated.

These factors are normally grouped into the following categories: patient related factors, treatment regimens, disease characteristics, patient-provider relationship and clinical setting. There is an interrelationship among these factors (16).

2.7.1. Patient-related Factors

Socio-demographic factors such as age, gender, socio-economic status, level of education, income and ethnicity have been used in studies to understand their influence on adherence(3).

Acceptance of HIV status, disclosure, family support, belief in Anti-retroviral regimen, personal responsibility and not using alcohol and not smokingwere identified an important role in promoting good adherence to ARTs (44).

Drug abuse and alcohol consumption are factors that further threatenproper adherence; a number of studies have shown that active alcohol or substance abuse makes it more difficult

for patients to adhere to treatment. In a study conducted in Botswana, nearly 40 percent of patients surveyed, for example, admitted that they had missed a dose because of alcohol consumption (19).

Tadious et al. (37) also demonstrated that “not being depressed, no side effects, and treatment schedule that fits [in] with [the] daily routine” were patient factors that were associated with satisfactory adherence to the HAART schedules. Theyalso demonstrated that social support and access to treatment were critical factors in determining adherence to HAART.

Social support was also identified as an independent predictor of adherence in the study conducted by Amberbir et al. (15).

Patients need to be encouraged to disclose their infections so that they will feel less stress going to centre for medication refills. Patients seeking treatment come far from home to increase their level of privacy and avoid the risk of being seen by family members (19).

Health care providers should consider the circumstances of patients while prescribing ART: a potent combination therapy may not fit into a patient’s daily schedule and may therefore affect the adherence to such medication (3).

2.7.2. Treatment and Disease Related Factors

ART is a complex treatment that is characterized by pill burden, dietary and fluid restrictions andtiming of medication intake (3).

Being symptomatic and improving on antiretroviral treatment was a strong motivating factor for patients to take their ARTs. But side effect of medication leads to non-adherence (44).

CDC stage B patients and specially CDC stage C patients had higher risk of pharmacy non adherence than asymptomatic patients in Cameroon. However, HIV CDC clinical stage at the beginning of treatment significantly predicted loss to follow-up: compared with asymptomatic patients CDC stage A, CDC stage B patients and specially CDC stage C patients had greater rates of loss to follow-up (46).

Regimens with significant side-effect profiles are usually associated with poor adherence (3). The Swiss HIV cohort study revealed that long standing HIV disease and prior opportunistic infections before initiating ART were among the predictors of worsening adherence as the

patient may perceive the disease to be severe enough to require good adherence to treatment in order to achieve the desired treatment outcome (3).

2.7.3. Health professional and health care systemrelated factors

The friendly and supportive environment, non-judgmental health care providers, convenient appointment schedule and confidentiality in service provision could positively influence adherence (3).

Continuous access to health care services and medications also influences treatment adherence (3).The patient-provider relationship is another factor that has been well researched in terms of adherence to ART; a good patient-provider relationship results in patient's trust and confidence in the provider which in turn influences good adherence(3).

Patient-provider relationships, health care providers' beliefs, waiting time and opening hours , availability of counseling services and social, economic or psychological support for people living in both developing as well as developed countries can influence adherence positively or negatively(19).

Supportive relationship with health care provider, accessibility and adherence counseling were positively influenced adherence (44).

2.8.Conceptual frame work

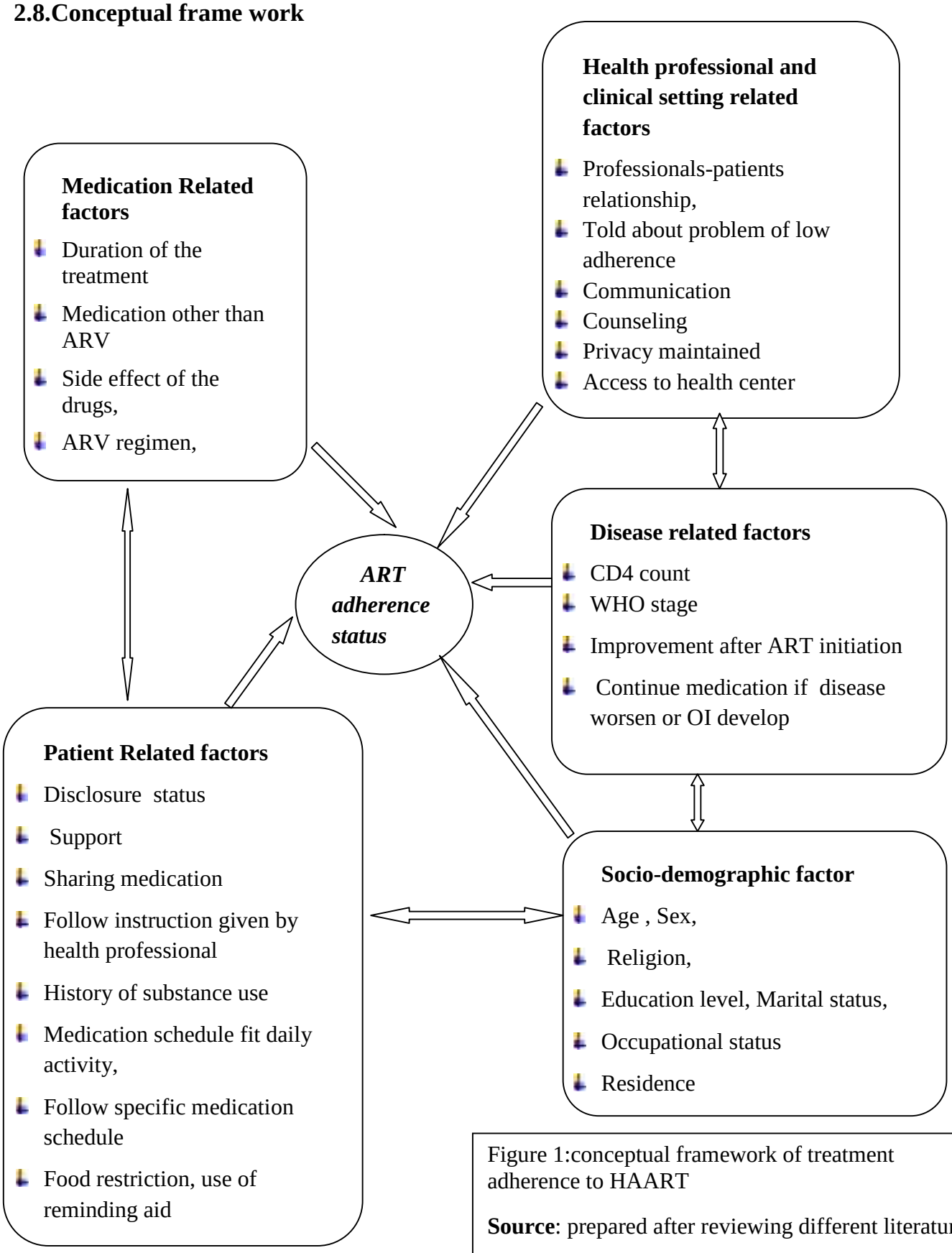

Figure 1:conceptual framework of treatment adherence to HAART

Source: prepared after reviewing different literatures

2.9. Significance of the study

Adherence to HAART has been described as the “Achilles heel” of HAART success by Amberbir et al. (15).

The current public health arena is grappling with issues of treatment adherence for chronic diseases. The challenges facing the health system in the country are likely to impact on life-long adherence for patients in the context of the rollout of ART.

The studies conducted in Addis Ababa and Jimma concluded social support from family, friends, support groups, treatment literacy as well as disclosure are critical for adherence(15).It is found that patients who were likely to be non-adherent were unmarried or lived alone, had poor social support, were reluctant to disclose and consumed alcohol(47).A study conducted in Yirgalem found that poor patient knowledge, negative perceptions of the provider-patient relationship, socio-economic barriers such as transport and lack of family support were associated with low adherence (14).

Prescribers hope that every patient completely follows their ART instructions, but the literature shows that a proportion of PLHIV do not take medications as prescribed for various reasons (26). A patient’s ability to adhere to medication is greatly influenced by both individual and environmental factors. Several studies have shed light on the factors affecting adherence, highlighting socio-demographic, cultural, economic, health-systems and treatment related factors (26). Many barriers to adherence are common to both developed and developing countries such as fear of disclosure (29). Hence, to benefit from ART, it is important to identify adherencebehavior, understand the conditions that lead to non-adherenceand develop strategies and social policies to maximize long-termadherence.

More consistent associations are found between certain psychosocial factors and adherence behavior. Common factors contributing to nonadherence include depression/psychiatric morbidity, active drug use, serostatus disclosure and lack of social support (15).

More information is required to understand what is going on in the public sector ART programs in terms of adherence to ART treatment and care requirements within near future.

The country (Ethiopia) almost accessed all the patients with anti-retroviral through almost all hospitals and most heath centers. But understanding level of adherence to antiretroviral and

factors affecting adherence are the remaining task left to researchers. In view of this, this study was designed to identify the current levels ofadherence and the factors associated with adherence in NEMMGH, as to our knowledge, there was no prior study of this kind in NEMMGH, Hosanna.

Knowledge gained from this study about factors in the population associated with adherence to anti-retroviral therapy by HIV patients will help in making recommendations regarding the development of appropriate health education strategies to empower patients about the importance of adherence to ART.

The information will also be used to develop guidelines and education materialsfor any possible intervention aimed at improving the sub-optimal adherence in Ethiopia and that can be used in adherence counseling before patients are started on ART and during follow up period after starting.

3. OBJECTIVES OF THE STUDY

3.1. General objective

- To assess adherence rate to antiretroviral therapy and associated factors among HIV infected patients in NEMMGH from March 27to April 27, 2015.

3.2. Specific objectives

- To determine the levelof adherence to antiretroviral therapy at NEMMGH.
- To determine factors associated with adherence to antiretroviral therapy at NEMMGH.

4. METHODS AND MATERIALS

4.1. Study area and study period

4.1.1. Study area

The study was conducted at NEMMGH which is one of the hospitals in SNNPR. It is one of the early established governmental hospitalsand located at 230 and 194 km from the capital city of Ethiopia (Addis Ababa) and SNNPR (Hawassa), respectively. The hospital is found in hosanna town and currently it is in transition period to be Wachemo university hospital which is serving in four major clinical fields i.e. Internal medicine, pediatrics, surgery and gynecology. There are also some minor specialized fields like dental care service, ophthalmology, dermatology services. This hospital also renders comprehensives HIV/ AIDS related services including VCT, PITC (provider initiated testing and counseling), PMTCT and ART program in separate ART clinic.

4.1.2. Study period

The study was conducted from March 27, 2015 to April 27, 2015.

4.2. Study design

Institution based cross sectional study was conducted.

4.3. Population

4.3.1. Source population

All adult PLWHA who were on ART follow up at NEMMGH.

4.3.2 Study population

All adult patients on ART who visits ART pharmacy during study period and fulfill the eligibility criteria of study subject.

4.4. Inclusion and exclusion Criteria

4.4.1. Inclusion criteria

- All adult patients who have follow up for at least 2months
- Age >15 years
- Patients giving consent

4.4.2. Exclusion criteria

- Those who had incomplete records, missing clinical records.
- Those with hearing or speaking problem, mentally unstable.

4.5. Sample size determination and sampling technique

4.5.1. Sample size determination

Sample size was determined using a single population proportion formula; considering 5% marginal error, 95% level of confidence and 74.4% proportion of adherence (16).Since total HIV/AIDS patients on ART at NEMMGH were 1405, correcting for finite population and adding 10% for possible none response rate,266HIV/AIDS patients on ART was included in study.

The sample size was calculated for the singlepopulation proportion formula considering the following assumptions:-

P = proportion of adherence, p=0.744 (18)

d = the margin of error = 5%

Z1-α/2 = Z-score at 95% confidence interval = 1.96

q Or [1- P] = proportion of non-adherence rate =0.256

n = the desired sample

$$n = \frac{\left(Z_{1-\alpha/2}\right)^2 P(1-P)}{d^2}$$

n= $(1.96)^2 \times (0.744) \times (0.256)/ (0.05)^2$=293

- For population <10,000, use finite population correction

- Where: $$\text{Corrected sample size} = \frac{\text{n x N}}{\text{n} + \text{N}}$$

– n is the non-corrected sample size i.e. 293

– N is the size of the source population i.e. 1405

By using the above formula, the calculated sample size was 242.

By considering 10% of non-response rate, final sample size becomes 266.

4.5.2 Sampling technique

Participants were selected by consecutivesampling.

4.6. Study Variables

4.6.1. Dependent variable

- Adherence status to ART

4.6.2 Independent Variable

1. Socio-demographic characteristics

- Age (in year)
- Sex
- Ethnicity
- Religion
- Residence
- Education level
- Marital status
- Monthly income (in birr)
- Occupational status

2. Patient related variables

- Disclosure status
- Family and Social support
- Medication schedule fit daily activity
- Following specific medication time schedule
- Sharing the medications
- Longer duration of therapy
- Follow-up of clinical appointment
- History of substance use
- Follow instruction given by health professionals
- Use of reminding aid

3. Medication related variables

- Duration of treatment with ARV
- Other medication
- Faced side effects
- Medication convenience to take
- ARV regimen

4. Health professionals and clinical setting related variables

- Relationship with health professional
- Told about problem of low adherence
- Communication improve treatment outcome
- Privacy maintained
- Counseling
- Access to health center regardless of place and time

5. Disease related variables

- Improvement since initiation of ART
- Continuing medication, if the disease condition would worsened or OI faced
- CD4 Cell count
- WHO Clinical stage

4.7. Data collection tool and procedure

Data collection instrument were adopted from previous similar studies(14,16,39,41) . It was adopted in English and translated to Amharic by language experts and re-translated back to English by other different language experts to check the consistency of the instrument.

Data was collected by face to face exit-interview of the patients and reviewing their respective follow up records using structured questionnaire and check list respectively. Check list contains information about some of medication related factors and disease related factors.

Data collectors and supervisor were recruited from the health facilities of the study area. The training was given for two BSc holder nurse data collectors and one B.Pharm holder supervisors for two day on data quality, data collection procedure, in ethical issue and confidentiality of information.Both data collectors and supervisors were speakers of Amharic and they had previous experience of data collection in different studies.The principal investigators strictly monitored data collectors daily to assure the completeness of filled formats.

First data was collected by patient's interview on exit from follow up room at separate room for 25-30 minutes and then their respective records were reviewed by trained data collectors.

The questionnaire was pre-tested by taking on 10 patients before 3 days of the research conducted. The result of the pre-tested data was discussed with the team (data collectors, supervisor and principal investigator) and some modification on tools were made and refined. The pre-tested data was not included in the main data analysis.

4.8. Data processing and analysis

The data was analyzed by SPSS version 20.0 software. Frequencies and percentages were calculated for categorical variables whereas mean and SD were calculated for continuous variables. Chi-square test was performed for categorical variables to check adequacy of cells before performing logistic regression. Bivariate binary logistic regression was used primarily to check crude association of independent variables with adherence status of ART; then variables found to have p -value <0.25 were entered in to multivariable binary logistic regression using backward Linear regression method for controlling the possible effect of confounding among independent variables. Before running multivariable binary logistic

regression, Multicollinearity between the independent variables was checked in linear regression by variance inflation factors (VIF). Adjusted odds ratio and corresponding 95% confidence intervals were used to quantify the degrees of association between dependent and independent variables. Results with p-value < 0.05 were considered as predictors of adherence. The model fitness for the variables was assessed by Hosmer-Lemeshow goodness of fit test. Finally the results were presented by text, tables and chart.

4.9. Data quality assurance

Data collectors and supervisor were recruited from the health facilities of the study area. The training was given for two BSc holder nurse data collectors and one B.Pharm holder supervisor for two day on data quality, data collection procedure, in ethical issue and confidentiality of information. The questionnaire was pre-tested by taking on 10 patients before 3 days of the research conducted. The result of the pre-tested data was discussed with the team (data collectors, supervisor and principal investigator) and some modification on tools were made and refined. The pre-tested data was not included in the main data analysis.

All the data for each respondent was checked for completeness and consistency by the principal investigator and supervisors in daily bases. Data was coded and entered to EpiData version 3.1 and exported to SPSS version 16.0 to further analysis. The data was verified using distribution to look into the range of values, identify missing data or possibly miscoded data in each observation after export to SPSS version 16.0

4.10. Ethical consideration

The ethical clearance was obtained from Jimma University, college of health sciences ethical review board. Formal letter was written from the Ethical review committee of Jimma university to NEMMGH medical director office to get permission. Finally written informed consent and oral consent was obtained from each study participants before conducting interview and confidentiality was secured. Confidentiality of the information was also assured and collected anonymously.

4.11. Dissemination plan

The findings of this study is presented to Jimma university, College of health sciences and also the findings will be presented to other concerned bodies by using different opportunities

like seminars and workshops. The findings will be distributed to Hadiya Zone health bureau, NEMMGH, SNNRP regional health bureau, for policy makers and stakeholders who are concerned in HIV/AIDS related activities in Hadiya Zone. Finally effort will be made for publication in national and international journal.

4.12. Operational definitions and definition of terms

Adherence to ART: was when the patients took ≥ 95% of the prescribed doses in a week prior to study.

Sub-optimal adherence (non-adherence): was when the patients took < 95% of the prescribed doses in a week prior to study.

Adherence rate: number of dose taken (number of doses prescribed minus number of dose missed) divided by number of doses prescribed multiplied by 100.

Highly active antiretroviral therapy/HAART: the treatment regimens recommended to aggressively suppressing viral replication and progress of HIV disease. The usual highly active antiretroviral therapy regimen combines three different drugs.

Side effects: the action or effect of a drug that isdesired (expected).

Substance abuse: participants using at least one social drug like alcohol drinking, cigarette smoking and chat chewing (39).

5. Results

5.1. Socio-demographic characteristics of the participants

A total of 265 HIV infected patients on antiretroviral regimen were included in this study.Majority (62.6%) were females and leading age groups were between 15-45 and 31-45 each accounting 46% with mean age (SD) of 34 (9.6).More than half of patients (55.8%) were married followed by windowed (18.9%). 54% of participants were having an educational status of primary school (1-8 grade)(Table 1).

Table 1: Socio-demographic characteristics of the respondents on HAART in NEMMGH, ART Clinic, South Ethiopia (n=265), March 27 to April 27,2015.

Socio-demographic characteristics		**Frequency**	**Percentage (%)**
Age(in years)	15-30	122	46
	31-45	122	46
	≥46	21	8
Sex	Male	99	37.4
	Female	166	62.6
Ethnicity	Amhara	45	17.0
	Gurage	23	8.7
	Hadiya	147	55.5
	Others[a]	50	18.9
Residence	Urban	157	59.2
	Rural	108	40.8
Religion	Orthodox	89	33.6
	Protestant	155	58.5
	Muslim	15	5.7
	Others[b]	6	2.3
Educational level	No formal education	30	11.3
	1-8	143	54.0
	9-12	71	26.8
	College and above	21	7.9
	Single	40	15.1
Marital status	Married	148	55.8
	Divorced	27	10.2
	Windowed	50	18.9

Living condition	with family or friends	211	79.6
	alone	54	20.4
Occupational status	Employed	29	10.9
	Unemployed	236	89.1

a: kembata, Oromo, Wolaita, and Silite b: Catholic, Apostolic

5.2. Patient related variables of the participants

Among the total study participants, 191 (72.1%) had disclosure of ART using status to their family members or friends. Of this, 187 (70.6 %) participants were helped by their family members or friends in remembering to take their medications. 238(89.8%) participants did not use memory aid to take their medication on time and 241(90.9%) participants had no exposure to substance abuse since initiation of HAART(Table 2).

Table 2: Patient related variables affecting participants' adherence in NEMMGH, ART Clinic, South Ethiopia (n=265), March 27 to April 27, 2015.

Patient related variables		**Frequency**	**Percentage (%)**
Disclosure status	Yes	191	72.1
	No	74	27.9
Family or friend support	Yes	187	70.6
	No	78	29.4
Frequency of Family or friend support	All times	53	20.0
	Some times	134	50.6
	Never	78	29.4
Frequency of following specific medication time schedule	All times	216	81.5
	Sometimes	49	18.5
Follow instruction given by health professional	Yes	264	99.6
	No	1	0.4
Medication schedule fit daily activity	Yes	238	89.8
	No	27	10.2
Sharing the medications	Yes	1	0.4
	No	264	99.6
Longer duration of therapy has negative impact on treatment	Yes	255	96.2
	No	10	3.8

Regular follow up	Yes	150	56.6
	No	115	43.4
History of substance abuse	Yes	24	9.1
	No	241	90.9
Food restriction	Yes	113	42.6
	No	152	57.4
Use of reminding aid	Yes	27	10.2
	No	238	89.8

The main reason for not following clinical appointment regularly was; 41(35.7%) transportation problem and 34(29.6) side effect respectively (figure 2).

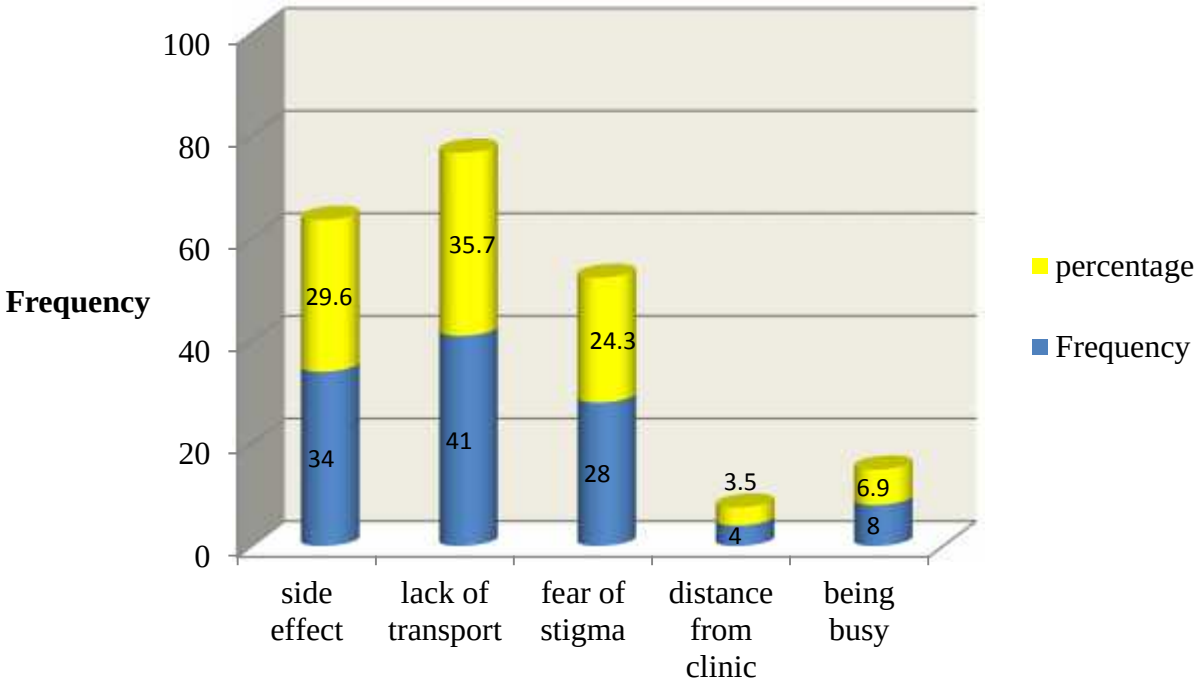

Figure 2: Reasons given for not following clinical appointment regularly among respondents in NEMMGH, SNNPR, 2015.

5.3. Medication related variables of the participant

Out of the 265 study participants, 238 (89.8%) of participants took anti-retroviral drugs for more than 1years and 4 (1.5%) of participants took the HAART less than 3 months.Concerning ARV regimen, 111 (41.9%) of the participants were started on TDF/3TC/

EFVregimen during the initiation of ART.127 (47.9%) of the participants were currently on TDF/3TC/EFV regimen.Regarding the medications other than ARV, 201 (75.8%) participants took medication other than ARV medications.Regarding the side effect, 135 (50.9%) of the participants faced side effect from HAART(Table 3).

Table 3. Medication related variables affecting the study participants' adherence to HAART in NEMMGH, ART Clinic, South Ethiopia (n=265), March 27 to April 27, 2015.

Medication related variables		**Frequency**	**Percentage (%)**
Duration with ART	<3 months	4	1.5
	3-6 months	9	3.4
	6-12 months	14	5.3
	> 12 moths	238	89.8
Other medication	Yes	201	75.8
	No	64	24.2
Type of other medication used	Anti-TB	46	22.9
	Cotrimoxazole	111	55.2
	Fluconazole	15	7.5
	Others‡	29	14.4
Side effect faced	Yes	135	50.9
	No	130	49.1
Initial ART Regimen	D4T/3TC/NVP	48	18.1
	ZDV/3TC/NVP	43	16.2
	TDF/3TC/EFV	111	41.9
	D4T/3TC/EFV	16	6.0
	TDF/3TC/NVP	19	7.2
	ZDV/3TC/EFV	25	9.4
	Others[c]	3	1.1
current	ZDV/3TC/NVP	75	28.3
	TDF/3TC/EFV	127	47.9
	TDF/3TC/NVP	18	6.8
	ZDV/3TC/EFV	36	13.6
	Others[d]	9	3.4

‡:acyclovir, amoxicillin, clarithromycin jel, miconazole oral jel, anti-HTN and anti-diabetic.

c: TDF/3TC/LPV/r

d: TDF/ 3TC/LPV/r, ZDV/3TC/LPV/r, ABC/ZDV/3TC

5.4. Health professionals and clinical setting related variables

Among 265 the study participants, 264 (99.9%) of the participants believed that interaction with care givers improves the outcome of treatment. Of all study participants, 262 (95.6%) participants privacy was maintained during treatment.Regarding health professionals' patients relationship, 227(85.7%) of the study participants had good relationship with their health professionals (Table 4).

Table 4: Health professional and clinical setting related variables affecting adherence of study participants to HAART in NEMMGH, ART Clinic, South Ethiopia(n=265), March 27 to April27, 2015.

Health professional and clinical setting related variables		Frequency	Percentage (%)
Told about the problems of low adherence	Yes	265	100
Communication with care giver improves the outcome of treatment	Yes	264	99.9
	No	1	0.4
Counseling during treatment	Yes	264	99.9
	No	1	0.4
Privacy maintained during treatment	Yes	262	98.9
	No	3	1.1
Good health professional-patient relationship	Yes	227	85.7
	No	38	14.3
Having access to medical center	Yes	144	54.3
	No	121	45.7

5.5. Disease related variables

Of the whole study participants, 265(100%) participants reported to have good improvements or prognosis of their disease up on starting of HAART; which can be explained by CD4 cell count level of the patients as 226 (86.9%) patients had a current CD4 count of greater than 200 cells/mm3.Out of 258 study subjects, 92(35.7%) of the study subjects were in WHO stage I during initiation while 29(11.2%) were on advanced stage (stage IV). 7 (2.6%) and 2(0.8%) of clients have no recorded WHO stage during initiation and recently respectively. Baseline CD4 cell count ≥200 cells/mm3 contributes for 123 (65.8 %) and a CD4 cell count <200 cells/mm3 were about 64(34.2%) with mean of 349.3 cells/mm3; 78(29%) of the clients have

no recorded baseline CD4 count. More than half, 226(86.9 %) of clients has recent CD4 count≥200 cells/mm3 and a CD4 cell count <200 cells/mm3 were about 34(13.1%) with mean of 503.6 cells/mm3; 5(1.9%) of the clients have no recorded recent CD4 count(Table 5).

Table 5: Disease related variables of the study participants on ART in NEMMGH, ART Clinic, South Ethiopia (n=265), March 27 to April27, 2015.

Disease related variable		Frequency	Percentage (%)
Improvement since initiation of ART	Yes	265	100
Tendency to continue to take medication	Yes	264	99.6
	No	1	0.4
CD4 cell countbaseline	<200	64	34.2
	≥200	123	65.8
current	<200	34	13.1
	≥200	226	86.9
WHO clinical stage	stage I	92	35.7
baseline	stage II	85	32.9
	stage III	52	20.2
	stage IV	29	11.2
	stage I	158	60.1
current	stage II	79	30.1
	stage III	23	8.7
	stage IV	3	1.1

5.6. Adherence to ART

Among the total of 265 HIV/AIDS infected respondents on anti-retroviral regimen, 149 (56.2%) patients had taken prescribed ART a week before the study period and 116 (43.8%) patients had missed some of the prescribed pills a week before the study period. Each patient was asked a number of doses missed within a week before the study period and number of doses must be taken within a month. Then adherence rate of the patients a week before the study period was calculated by the formula:

Adherence rate = (Number of doses supposed to be taken – Number of doses missed)/ Number of doses supposed to be taken x 100

Based on the above formula; the adherence rate of each patient was calculated. In this study, adherence was measured using self-report and the adherence to antiretroviral therapy was 56.2% of all prescribed doses.

Missed doses were assessed for “the day before”, “past three days” (three days recall) and “past seven days” (seven days recall). 22.3% of clients missed at least a single dose of drug the day before, 31.3 % missed at least a dose in three days recall, while 32.8 missed at least a dose in seven days recall (Table 6).

Table 6: Distribution of adherence rate and Patients who missed a dose by self-report in NEMMGH, ART clinic, South Ethiopia (n=265), March 27 to April 27, 2015.

Number of days		Frequency	Percentage (%)
Previous day	Yes	59	22.3
	No	206	77.7
Past three days	Yes	83	31.3
	No	182	68.7
Past seven days	Yes	87	32.8
	No	178	67.2
Self-reported 7 day recall dose adherence rate	≥95%	149	56.2
	<95%	116	43.8

5.7. Reason for missing of dose

Being busy 29(25%) and forgetting 24 (20.7%) are the major reasons for dose non-adherence. Also the participants reported that being away from home 23 (19.8%) and fear of stigma 21(18.1%) as reason for missing their dose (Figure 3).

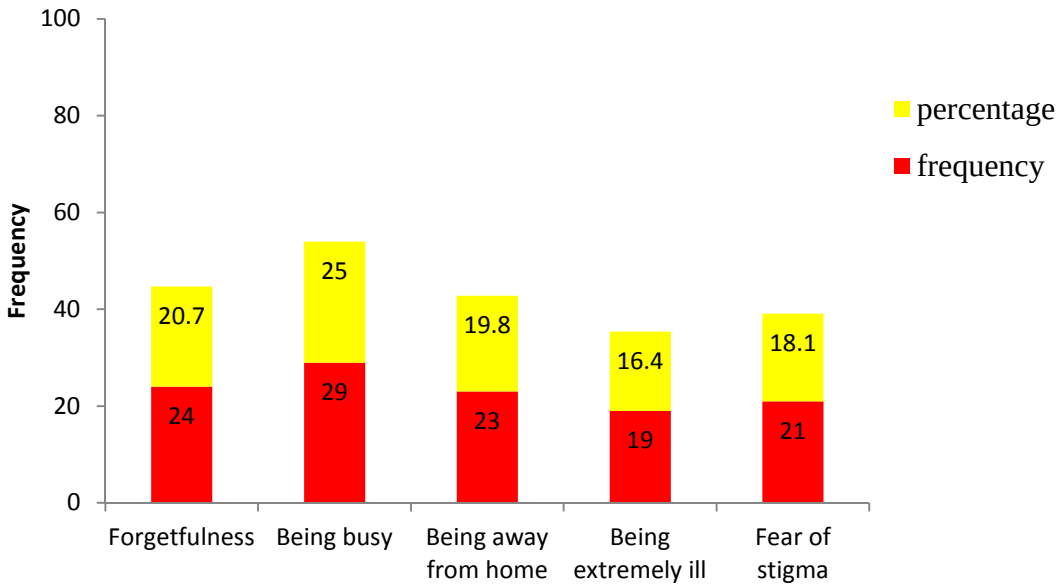

Figure 3: Reason given for dose non- adherence among respondents at NEMMGH, 2015.

5.8. Factor associated with adherence

In order to investigate the association between independent variables with adherence both bivariate and multivariate analysis were conducted.In bivariate analysis each independent variables were tested with the overall adherence for association.

Variables which showed association with outcome variables at p-value <0.25 like marital status, concomitantly used medication, drug side effect, disclosure status, family and social support, active substance use, following specific medication schedule,medication schedule fit daily activity, WHO stage, access to medical center and patient to health professional relationships were selected as candidate variables for multivariable logistic regression analysis.

When variables correlate or associate, the most relevant onein clinical practice was chosen to enter into the multivariate model. From variables, support and disclosure were correlated and we choose disclosure.

The multivariable logistic regression analysis was used by taking all ten variables into account simultaneously and seven variables remained to be significantly and independently associated with ART adherence.

Study participants who did not face side effect were 3.89 more likely adhere to regimens as compared with those participants who faced side effects [AOR(95%CI) =3.89(2.11-7.19)].Participant whomarried was likely increase adherence by odds of 2.35 times as compared with those participants who waswindowed [AOR(95%CI) =2.35(1.10-5.04)] (Table 7).

Participants who disclosed their ART use were 2.48 more likely adhere to regimens as compared with those participants who were not disclosed [AOR (95%CI) =2.48(1.28-4.79)].Participants whose daily treatment schedule fit with daily routine activities were 5.05 more likely adhere to regimens as compared with those participants whose daily treatment schedule was not fit with daily routine activities [AOR (95% CI)=5.05(1.79-14.21)].Participants who closely follow specific medication schedule were 2.41 more likely adhere to regimens as compared with those participants who were not follow specific medication schedule [AOR (95%CI)=2.41 (1.11-5.24)] (Table 7).

Participants who didn't use social drugs were 8.01 more likely adhere to regimens as compared with their counter parts [AOR (95%CI) =8.01(2.15-29.84].Participants who had access to medical center regardless of place and time were 2.13 more likely adhere as compared with those who had not access to medical center [AOR (95%CI) =2.13(1.18-3.86)] (Table 7).

Table 7: Bivariate and multivariate analysis for factors associated with ART adherence among people living with HIV/AIDS in NEMMGH, Hosanna (n=265), March to April 27, 2015.

Variables	HAART adherence		COR [95%CI]	P-value	AOR [95%CI]	P-value
	Non-adherence Frequency (%)(n=116)	Adherence Frequency (%)(n=149)				
Sex						
Male	43(43.3)	56(56.6)	1.02[0.62-1.69]	0.931		
Female	73(44)	93(56)	1			
Age						
15-30	53(43.4)	69(56.6)	1.43(0.57-3.62)	0.448		
31-45	52(42.6)	70(57.4)	1.48(0.59-3.75)	0.407		
≥46	11(52.4)	10(47.6)	1			
Marital status						
single	19(47.5)	21(52.5)	1.29(0.56-2.99)	0.540	1.09(0.42-2.81)	0.850
married	57(38.5)	91(61.5)	1.87(0.98-3.58)	**0.057**	**2.35(1.10-5.04)**	**0.027***
divorced	13(48.1)	14(51.9)	1.26((0.49-3.23)	0.624	1.33(0.46-3.85)	0.599
windowed	27(54)	23(46)	1			
Main Occupation						
Employed	12(41.4)	17(58.6)	1.12(0.51-2.44)	0.783		
Unemployed	104(44.1)	132(55.9)	1			
Residence						
Urban	65(41.4)	92(58.6)	1.27(0.77-2.07)	0.348		
Rural	51(47.2)	57(52.8)	1			
Educational status						
No formal	14(46.7)	16(53.7)	1.04(0.34-3.18)	0.947		
Primary(1-8)	68(47.6)	75(52.4)	1.0(0.40-2.51)	0.995		
Secondary(9-12)	24(33.8)	47(66.2)	1.78(0.66-4.78)	0.252		
College and above	10(47.6)	11(52.4)	1			
Living Condition						
Family or friends	93(44.1)	118(55.9)	1			
Alone	23(42.6)	31(57.4)	1.06(0.58-1.94)	0.845		
Disclosure status						
Yes	75(39.3)	116(60.7)	**1.92(1.12-3.31)**	**0.018**	**2.48(1.28-4.79)**	**0.007***
No	41(55.4)	33(44.6)	1		1	
Family and social support						
Yes	72(38.5)	115(61.5)	2.07(1.21-3.53)	**0.008**		
No	44(56.4)	34(43.6)	1			
Following specific medication time schedule						
All time	85(39.4)	131(60.6)	**2.65(1.39-5.04)**	**0.003**	**2.41(1.11-5.24)**	**0.027***
Sometime	31(63.3)	18(36.7)	1		1	

Regular follow up						
Yes	65(43.3)	85(56.7)	1.04(0.64-1.7)	0.869		
No	51(44.3)	64(55.7)	1			
Medication schedule fit daily activity						
Yes	95(39.9)	143(60.1)	**5.27(2.05-13.54)**	**0.001**	**5.05(1.79-14.21)**	**0.002***
No	21(77.8)	6(22.2)	1		1	
History of substance abuse						
Yes	20(83.3)	4(16.7)	1		1	
No	96(39.8)	145(60.2)	**7.55(2.50-22.78)**	**0.001**	**8.01(2.15-29.84)**	**0.002***
Use of reminding aid						
Yes	10(37)	17(63)	1.37(0.60-3.11)	0.458		
No	106(44.5)	132(55.5)	1			
Food restriction						
Yes	51(45.1)	62(54.9)	1	0.701		
No	65(42.8)	87(57.2)	1.10(0.67-1.79)			
Concomitantly used medication						
Yes	96(47.8)	105(52.2)	1		1	
No	20(31.2)	44(68.8)	**2.01(1.12-3.65)**	**0.022**	1.72(0.84-3.51)	0.136
Side effect						
Yes	79(58.5)	56(41.5)	1		1	
No	37(28.5)	93(71.5)	**3.55(2.13-5.92)**	**0.001**	**3.89(2.11-7.19)**	**0.001***
Patient-health professional r/ship						
Yes	93(41)	134(59)	**2.21(1.09-4.46)**	**0.027**	0.70(0.25-1.98)	0.506
No	23(60.5)	15(39.5)	1		1	
Having access to medical center						
Yes	48(33.3)	96(66.7)	**2.57(1.56-4.23)**	**0.001**	**2.13(1.18-3.86)**	**0.012***
No	68(56.2)	53(36.7)	1		1	
WHO stage						
stage 1	44(47.8)	48(52.2)	1.17(0.51-2.69)	0.714	1.21(0.44-3.37)	0.713
stage 2	25(29.4)	60(70.6)	2.57(1.08-6.12)	**0.032**	2.23(0.77-6.45)	0.139
stage 3	27(51.9)	25(48.1)	0.99(0.40-2.46)	0.986	1.14(0.39-3.36)	0.807
stage 4	15(51.7)	14(48.3)	1		1	

COR: crude odd ratioAOR: adjusted odd ratio

* Variables which are statistically significant.

6. Discussion

The present study aimed to address gap in knowledge regarding the adherence rate and factors associated with treatment adherence among a representative sample of PLHIV accessing treatment in study site.The adherence status of clients to ART was assessed using patient self-report in this study; due to its simplicity, relatively inexpensive and easy to implement in the patient's follow-up. It can also provide information about the reasons why a patient did or did not take the medication properly. This type of adherence measurement was used in many studies in Ethiopia and Africa independently without other supplementary methods (4, 15, 23, 28, 37 and 39).

In this study patient adherence to ART was 56% in the previous seven days.This finding was comparable with other studies done (4, 22, 23, 27, 28, 33, 36 and 40).However adherence level reported in this study was lower than other studies in Ethiopia (14, 15, 37, 39, 42) and higher than studies done in Nnamidi Nigeria (24) and Brazil (35).

However, the study findings should be interpreted cautiously when comparing the adherence rate and associated factors identified in this study with other study results, because the methods used (self-report vs. pill counts or medication electronic monitoring system (MEMS) and settings (free ART vs. non-free, rural vs. urban, plasma donor vs. IDU or other risk groups) where the study was conducted, are quite different across areas in Ethiopia and the world.

The probable reason for this difference may be difference in assessment methods. Current study used only self-reports which might overestimate or under estimate the measure of adherence. But multi- method adherence assessment consisting of self- report, the visual analogue scale and the pill identification test and pill count was used in other studies.

According to our study, most of the study participants took prescribed pills as per the instruction while some of them missed it.The main reason for missing doses were forgetting and being busy.This study is in support with study done in south-south Nigeria (4), Yirgalem hospital (14), Albania (20), Kenya (34)and Addis Abeba (37).

Factors which may associate with adherence were assessed using bivariate and multiple logistic regression analyses.

Most socio-demographic characteristics such as age, sex, educational status, occupation, living condition and residence did not significantlyaffect adherence levels amongst our study population.Thiscorroborates the findings of some authors (4, 31, 35, 38, 40 and 45) but refutes the findings of others (23, 24, 26, 32, and 39).This could be due to difference in sample size.

From patient related characteristics such as following clinical appointment, use of reminder and food restriction did not significantly associated with adherence amongst our study population.

This finding is in agreement with study done in Lao people democratic republic (23) and Nepal regarding clinical appointment (26) but inconsistent with study done in upper west region Ghana (28), Addis Abeba (37) and Nekemte hospital (39).This could be due to reasons reported such as side effect, lack of transport, fear of stigma and distance from clinicfor missing clinical appointment.Of thosewhoreported no regular follow up, 55.7% were adherent.

The finding is inconsistence with study done inJimma specialized hospital (15), in Cameroon (36) and Nekemte hospital (39) regarding reminding users. This difference might be due to the comparatively smallnumber of observed patients reporting to use reminding aid.

This finding is consistent with study done in upper west region Ghana (28) and inconsistent with study done in Wolaita Sodo hospital (16) regarding food restriction. Of those who reported food restrictions, 54.9% were adhered. The difference could be due to patient's taking of drugs without food as they reported.

In bivariate analysis, family support, concomitantly used medication, patient to health professional relationship and WHO stage were associated withadherence as shown in table 7.

The results of our study show an association between family and social support and adherence. Traditionally,before the infiltration ofWestern culture, Africans were identifiedby the extended family system which has its own benefitsanddemerits.

Family and social support was likely to increase adherence by odds of 2.07 times [COR(95%CI)=2.07(1.21,3.53)].This finding is consistent with other studies (14,16, 28,38,41).Studies conducted in France(21) and in Cameroon (36) showed lack of support lead to non-adherence and other studies conducted in Ethiopia and other areas witnessed clients

with family support were more likely to adhere than those who didn't get family support (7,15,30,37,39,44).

Family and social support may enhance adherence through encouragement, reassurance, reinforcement, systematic cues, bolstering of competence, and motivation, or by masking the effect of stress, anxiety, and depression (37).

Moreover concomitantly used medication is another associated factor with ART adherence per the results of our study [COR (95%CI) =2.01(1.12, 3.65)].However the result of our study show no statistically significant relationship in multivariate model. This study finding is also in support of other studies [31, 35] and inconsistent with study done in Nekemte hospital (39). Of those who reported to take other medication in addition to ARV, 52.2% were adhered. This might be due to among other medications taken in addition to ARVs, cotrimoxazole 111 (55.2%) constitute the largest part so it was not difficult to take and in pill burdenmost of time it is taken once per day.

Patient to health professional relationship is also associated with adherence in this study [COR (95%CI) =2.21(1.09, 4.46).However there is no significant difference among patient to health professional relationship. This study finding is inconsistent with numerous studies from both developed and developing countries (3, 11, 31, 36, 37, 39, 44).This might be due to the majority of patients (85.7%) in our study had good relationship with health professionals and this shows that getting much friendly and supportive environment, non-judgmental health care providers, convenient appointment schedule and confidentiality in service provision from the health professional might favor good adherence (3).

From the practice perspectives health care providers need to recognize that partnership with the participant is very important and necessary. To promote good adherence requires that the patient be involved in decision. Therefore health care providers will need to take time with their patients.

In our study disease stage/progression had been associated with adherence.Participants in stage II were 2.57 more likely to adhere than those who were in the stage IV [COR (95%CI) 2.57(1.08-6.12)]. There is no statistically significant difference in disease stage in multivariate model. Similar finding has been documented in other studies (23, 30, 40, 41) and patient with advanced stage were adhered in studies done in Jimma specialized Hospital (7). Consistence

to our finding in Cameroon, CDC stage B patients and specially CDC stage C patients had higher risk of pharmacy non-adherence than asymptomatic patients (46) and other studies(3,25,36) but one study done in South Africa showed advanced stage were adhered(44).

The current study however revealed, on the contrary, that respondents with high perception of well-being were more adherent to ART therapy. This could be due to those patients in advanced stage were that much manifest the diseases/symptomatic and might feel that their quality of life decreased as well not concerned about their illness and loss to follow up as compared to those asymptomatic stage prior to ART initiation.

Factors which were significantly associated with adherence were assessed in multivariate analysis. Accordingly marital status, side effect, disclosure status, following specific medication time schedule, medication schedule fit daily activity, substance use and having access to medical center were factors associated with drug adherence level of PLWHA.

The effect of marital status was noted in this study. Our study revealed that patients who married were more likely adhered and study done in Albania show that being partnered were associated with poor adherence (20) and were not associated in other studies(4,28,31,35,38,40,45).This difference may be due to disclosure of ART use and the support they get from their sex partner.

The effect of medication side effect was noted in this study. Our study revealed that patients who did not face sideeffects weremore likely adhering and studies have shown that no medication side effect is necessary to facilitate adherence to ART (37). PLHIV who did face medication side effect had poorer adherence in other studies(14,21,26,28,29,30,31,32) and were not associated in study conducted in Harari region(38) and Debre Markos referral hospital (42).In this study, 135 (50.9%) participants faced side effect from their HAART, which might contributed a significant amount to medication non-adherence. Among the side effects, fatigue 49 (36.3%) and headache 22(16.3%) took the upper hand. This may be due to zidovodine based ARV regimen. Studies have shown that side effects have consistentlybeen associated with decreased adherence and patientswho experience more than two aversive reactions are lesslikely to continue with the treatment (26, 28, 29). Patients may self-adjust their regimens because of side effects, toxicity or personal beliefs (30, 31, 32).Health care

providers should review possible anticipated side-effects and develop treatment plans that either prevent, or at the very least, reduce the likelihood of side-effects happening. These may be tackled by strengthening institutional support, including clinicians and other health professionals informing patients in advance what side-effects to expect and how they might be managed, as well as prescribing agents to alleviate these side-effects.

Similarly, patients who had no substance use were more likely adhered. This finding is in agreement with studies done in Tapi health center (41) and South Africa (44). A number of studies have shown that active alcohol or substance abuse makes it more difficult for patients to adhere to treatment (21, 26, 29, 31, 33, 36, 39 and 45). In a study conducted in Botswana, nearly 40 percent of patients surveyed, admitted that they had missed a dose because of alcohol consumption (19).This might be due to alcohol use negative association with adherence is mostly referred to impaired judgment and forgetfulness.

Participants following medication time schedule were showed statistically significant association with adherence. This variable had significant association in other reviewed research (3, 16, 31 and 42).

Medication schedule fit daily activity had also significant association in this study. Participants whose daily treatment schedule fit daily routine work were more likely adhered than those who did not fit the treatment schedule and daily routine work. The finding was similar with the finding of study conducted at Debre Markos hospital(42), Addis Abeba(37) and patientswho had difficult fitting therapy in own schedule had poor adherence(29,34). In other way the finding of study conducted in Yirgalem hospital (14) and Nekemte hospital (39) were not associated. Because to prevent daily dose interruption in different reasons; daily treatment and daily treatment schedule have to concise each other.

The treatment plan explained properly about the important of ART therapy such as suppression viremia, restoration and preservation of immune function, reduction of HIV-related morbidity and mortality and risk of resistance to the patients. Health care providers need to work with the patient to individualize the plan for medication taking. The health professional needs to have the patient living arrangements and the usual daily treatment schedule.

So, health professionals need to draw up the plan that considers the everyday events that occurs patients need to understand exactly what the effect of non-adherence is likely to be on their ability to reach those objectives. The patients who found the ART convenient to their daily routine activities stated the advantage to the patient.

Access to health facility regardless of distance and time is of great concern to PLHIV and one of the key factors affecting adherence in this sample.Participants stated that although patients werewilling to take ART they became non-adherent because of difficulties in reaching the treatment centers due to unexpected transport and other strikes; long travel distance; geographical difficulty including lack of transportation services in many remote areas; and the seasonal deterioration of poorer roads during the rainy season. Others have also found that travel time and access to treatment centers were barriers to ART adherence (14, 26, 29, 32, 34, 36) and that better access to care was significantly associated with optimal adherence in other studies (3, 31,37,39) and study done in Debre Markos showed no association (42). Patients who are from rural areas have difficulties in travelling long distances and finding their travel costs, and have most to gain from nearby ART facilities. Thus, any new policy will need to address this issue and improve access to medical care services by integrating ART treatment into the mainstream of health care rather than concentrating treatment in a limited number of ART centers, which may be hard to reach for many patients.

In addition, disclosure status to anyone was significantly associated with adherence in our study. Studies have shown that HIV disclosure is necessary to facilitate adherence to ART (31,44) and PLHIV who did not disclose to their family or peers had poorer adherence than those who disclosed their status (26,29) and in other studies it wasn't associated (28,38,40,41,42). Patients need to be encouraged to disclose their infections so that they will feel less stress going to center for medication refills. Patients seeking treatment come far from home to increase their level of privacy and avoid the risk of being seen by family members (19).Our findings suggest that disclosure is an important issue, which should be discussed during the counseling sessions. For those who have not disclosed, providers should explain the importance of disclosure for the success of ART.

Strengths and Limitations of the Study

The main strength of our study is that it is the first to examine adherence to ART in NEMMGH.Our study had high response rate (99.6%). No one who was asked to participaterefused to do so. Moreover, it offered an opportunity for PLHIV to talk about living with HIV in a society where this is generally problematic.

However, there are several limitations to the present study that may affect the validity and generalizability of the results.

Firstly, Mediation adherence was assessed through a self-reporting adherence questionnaire in previous week and not other more objective tools such as electronic pill caps, pills counts, and biological methods (patients' viral load and CD4 count) that should be priorities for future studies. Concerted efforts were made to reduce recall bias by limiting recall of medication to 7 days prior to the study which was in itself a limitation because of the possibility that subjects would either over- or underestimated their adherence to HAART or social desirability may occur. This was further worsened by the inability to corroborate patient self- report of adherence with viral loads and CD4 responses because of financial and logistic constraints of frequent laboratory monitoring.

Secondly, our study investigated patients' adherence to ART over a short period of time just7 days prior to the interview so judging whether a patient was ≥95% adherent or not was a matter of chance.

Thirdly, uses of non-probability sampling technique because around 15-20% of participants came from other zones and tookmedication for 3 months.

Fourthly, this study is a cross-sectional study, which measured adherence at a single time point. However, adherence is a dynamic process that may change over time; thus, it may be that multiple contacts with respondents could have provided more useful information than a single interview.

7. Conclusion and Recommendation

7.1. Conclusion

This study showed that medication adherence rate was low among PLHIV accessing treatment in NEMMGH, Hosanna. Forgetfulness and being busy are the reason for dose non-adherence.Major independently associated factor with ART adherence include no substance abuse, absence of side-effects, being married, having access to health center, disclosure status, fitness of daily treatment schedule with daily activity and following specific medication schedule.

7.2. Recommendations

Based on the findings of the study the following recommendations were forwarded to the health care providers, NEMMGH, regional health bureau, zonal health department and NGOS.

- Adherence is a process, not a single event, and adherence support must, therefore, be integrated into regular follow up. Investigations of factors related with long-term adherence would require longer follow up.
- Memory cues should be prepared and be accessed to patients to decrease non adherence related to simple forgetting and being busy.
- The findings suggest that in addition to education and counseling, comprehensive interventions should be incorporated, such as training for patients on medication self-management skills, tailoring the regimen to the patient's lifestyle, addressing issues related to side effects and substance use like alcohol drinking.
- To decrease missing doses the daily treatment schedule should fit with the daily routine work. So clients should involve in decision making on appointments and daily treatment schedule.
- This study measured adherence to the ART regimen at only one time. Therefore, longitudinal studies with a wider range of respondents and the use of a combination of adherence assessment tools are also necessary in this setting to understand adherence over time and to explore the factors that influence adherence to ART in the longer term, which could most likely reduce the risk of over or under estimation
- The counseling provided for patients should be strengthened on the following points:

- Importance of disclosing their HIV status and
- Using of family members and others as adherence supporters and encourages.

- Policy makers need to be aware of these key factors and consider social policy which encourages patients to achieve optimal adherence.
- Improving adherence monitoring and health care services should be priority approaches of NEMMGH to address the problems related with non-adherence.

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ANNEX I: DATA CLLECTION FORM

JIMMA UNIVESITY

COLLEGE OF HEALTH SCEINCE

DEPARTMENT OF PHARMACY

Clinical pharmacy course team

Data collection format for research with title"Adherence to antiretroviral therapy and associated factors among HIV infected patients in NEMMGH, Hosanna, South Ethiopia".

Principal investigator: BrukeBerhanu (B.Pharm)

Advisors: 1. Mr.GirmaMamo (B.Pharm, MSc in clinical pharmacy)

2. Mr.HabtemuJarso (BSc,MPHE)

General instruction for data collectors

- The data collection form was filled from patient information chart, by interviewing the patient.
- The interview should be done after the convincing the patient and after assuring that the patient is willing to participate on the study.
- If the patient was not able to be interviewed, attendant/ family/ parents/relative could be interviewed by convincing them and after assuring that they willing and could give full information on the behave of the patient.
- The information to be filled should be written clearly on the space provided.
- In situation when there was information that requires checking more than one option, please check all options available.
- If there was any ambiguity during data collection, please communicate with the principal investigator before filling the data.

General information

ANNEX-II. CONSENT FORM

Annex II: Structured English questionnaire designed to assess adherence to antiretroviral therapy and associated factors among HIV infected patients in NEMMGH from March 27 to April 27, 2015, Hosanna.

Consent form

Good morning/afternoon. I am working with research team from Jimma University. Here in NEMMGH we are interviewing clients in ART clinic who started ART treatment in order to assess predictors of adherence among patients on highly active antiretroviral therapy.

As the study is directly related to clients who started on ART treatment: you are one of the clients who are selected by chance to participate in this study, therefore you are kindly requested to participate in this study and provide the information required from you.

I am going to ask you questions which are important for the study, your participation in this study are completely on voluntary bases and you have the right to refuse from participation. Your response will be kept confidential and there will be no way of linking your individual responses to the final result of the study finding.

We would like to inform you that the responses that you provide for me, is not for the successful accomplishment of the study but also for producing relevant information which will be helpful in improving the ART and care service.

I expect the interview will take about 20-35 minutes. You don't need to tell your name: the information collected through this interview will not be included in your clinical record. If you prefer not to respond to all questions or to some of the questions, your right and your decision will not affect in any way the services you are receiving at the clinic and you don't have to answer any question if you don't, and you can stop the interview at any time.

Please be assured that the information gathered will be kept strictly confidential. Would you willing to participate in this study?

1. Yes_____ 2. No_____

If the answer is yes, thanks! Conduct the interview. If the answer is no, Thanks! Proceed to the next eligible client. Respondents ID_____ Date of interview _____ Time started_____ Time finished_____

ANNEX-III. DATA COLLECTION TOOLS

QUANTITATIVE DATA COLLECTION TOOL (STRUCTURED QUESTIONNAIRE)

Structured interview guide for HIV/ AIDS patients who were on ART treatment.

Basic information

1. Date of interview_____

2. Code of the interviewee_____

3. Interviewers name: _____signature_____

4. Supervisor who checked questionnaire for completeness and accuracy:

Name_____ signature_____ date_____

5. Date of collection started_____ Date ended_____

Part I: Socio demographic and Economic factors

1. How old are you? Age in years_____

2. Sex/gender of participant: 1.Male 2. Female

3. What is your Ethnic group?

1. Amhara 2. Gurage

3. Hadiyya 4. Other, specify_____

4. What is your Religion?

1. Orthodox Christian 2. Protestant Christian

3. Muslim 4. Other, specify_____

5. What is your current marital status?

1. Single 2. Married 3. Widowed/Widower 4. Divorced

6. What is/ was your main Occupation?

1. Employed2. Unemployed

7. Where are you living? 1. Urban 2.Rural

8. What is your level of Education?

1. No formal education 3. Secondary school (9-12 grade)

2. Primary school (1-8 grades) 4. Higher education

9. How many is your average monthly income? _____ In Eth birr

10. With whom do you live?

1. Living with family or friends 2. Living alone

Part II. Patient related factors

11. Did you disclose your HIV status to any one? 1. Yes 2.No

12. Did you have any family or community member who supported (encouraged) you to take medication properly and refilling your medication on time? 1. Yes 2.No

13. If yes to Q.12 how often they support you? 1. All times 2.Some times 3. Never

14. Did you go to the clinic on the time for refilling of your medication? 1. Yes 2.No

15. If no to Q.15 what is your reason?

1. Side effect 2.lack of transport

3. Fear of stigma 4.distance from clinic 5.others, specify_____

16. Did you closely follow specific medication time schedule? 1. All times 2. Some times

17. Did the medication schedule fit your daily routine activity? 1. Yes 2.No

18. Did you follow the instruction (cautions and precautions) given by health professionals?

1. Yes 2.No

19. Did you share the medications? 1. Yes 2.No

20. Did you think longer duration of the therapy has negative influence on treatment?

1. Yes 2.No

21. Many people find it hard to remember to take every single dose, did you miss your drug

1. in the previous day? 1. Yes 2.No

2. in the last three days? 1. Yes 2.No

3. in the last seven days? 1. Yes 2.No

22. If yes to Q.22, how many doses was it? _____

1. 2 dose of 30 doses 2. 4 dose of 60 doses

3. 2 doses of 30 doses and 4 doses of 60 doses

4. 2 dose of 30 doses and 8 doses of 120 doses

5. 4 doses of 60 doses and 8 doses of 120 doses

23. What is your reason for missing of your medication?

1. Forgetfulness 2.Being busy

3. Being away from home 4. Being extremely ill

5. Fear of family and community stigma 6.other, specify_____

24. Do you know any substances that can lead to non- adherence (history of substance use)?

1. Yes 2.No

25. Have you ever been used reminding aid? 1. Yes 2.No

26. Did you have food problem/scarcity to take drug as prescribed by health professionals?

1. Yes 2.No

Part III. Medication related factors

Instructions to the study participant: Now I would ask questions on how you have been taking the ARV medication in the past. Please be aware that everyone misses dose in some time. Be assured that this information will neither change the way you receive ARV medications from the treatment center nor your opportunity to participate in this study.

27. Did you take any medication with ART regimen? 1. Yes 2. No

28. Have you ever faced side effect? 1. Yes 2.No

29. Is medication convenience to take? 1. Yes 2.No

Part IV.Disease related factors

30. Did you get any improvement of your symptoms after starting ART medications?

1. Yes 2.No

31. Did you continue your medication if the disease worsened or other opportunistic conditions faced? 1. Yes 2.No

Part V. Health professional and clinical setting related factors

32. Were you told the importance of completing the full course of treatment?

1. Yes 2.No

33. Do you think communication with care givers improves the outcome of treatment?

1. Yes 2.No

34. Have you received any counseling during your treatment? 1. Yes 2.No

35. Was the privacy maintained during your treatment? 1. Yes 2.No

36. Did you think relationship between you and health professional is good (friendly, listening, supportive, time to talk, polite)? 1. Yes 2.No

37. Did you have access to health center regardless of place and time? 1. Yes 2.No

From review of patient records

Medication related factors

38.For how long have you been on ART treatment? _____in months

39. Reason of taking other medication in addition to ART medication?

1. For TB treatment 2. For TB prophylaxis likes isoniazid

3. For opportunistic infection 4. Other specify_____

40. What are the medications other than ARV drugs?

1. Anti-TB 2. Cotrimoxazole 3. Fluconazole 4.other, specify__

41. Which ART medication was the patientinitially taking?

1.D4T/3TC/NVP (1a)2. ZDV/3TC/NVP (1c)

3. TDF/3TC/EFV (1e)4. D4T/3TC/EFV (1b)

5. TDF/3TC/NVP (1f)6. ZDV/3TC/EFV (1d) 7. Other, specify____

42. Which ART medication wasthe patient currently taking?

1. ZDV/3TC/NVP (1c) 2.TDF/3TC/EFV (1e)

3. TDF/3TC/NVP (1f) 4.ZDV/3TC/EFV (1d) 5.others, specify_____

Disease related factors

43. How many was baseline CD4 count? _____

44. How many was current CD4 count? _____

45. Which clinical category was the patient as WHO clinical stage at baseline?

1. Stage I 2. Stage II 3. Stage III 4. Stage IV

46. Which clinical category was the patient as WHO clinical stage at baseline?

1. Stage I 2. Stage II 3. Stage III 4. Stage IV

THANK YOU FOR YOUR PARTICIPATION AND PATIENCE!!!

ጅማ ዩኒቨርሲቲ

በሕብረተሰብ ጤና ና ሜዲካል ሳይንስ ኮሌጅ

የፋርማሲ ትምህርት ክፍል

በንግስትእሌኒ መሐመድ መታሰቢያ አጠቃላይሆስፒታል የኤች አይቪ መድኃኒት ተጠቃሚዎች ኤች አይ ቪ መድኃኒት አጠቃቀምና ቁርኝት የሚያስተጓጉሉ ምክንያቶችን ለመዳሰስ የተዘጋጀ መጠይቅ::

<u>የፍቃድ መጠየቂያ ቅፅ</u>

እንደምን አደሩ/ዋሉ ከጅማ ዩኒቨርሲቲ ከመጣ የጥናትና ምርምር ቡድን ጋር ነው የምሰራው:: በዚህ ሆስፒታል የኤች አይቪ መድኃኒት ተጠቃሚዎችን ከመድኃኒት አጠቃቀምና ቁርኝት የሚያስተጓጉሉ ምክንያቶችን ለመዳሰስ የኤች አይቪ መድኃኒት መጠቀም የጀመሩ ተገልጋዮችን የተለያዩ መጠይቆችን እየጠየቅናቸው ነው:: ጥናቱም በቀጥታ የኤች አይቪ መድኃኒት መጠቀም የጀመሩ ተገልጋዮችን የሚመለከት ነው:: ስለዝህእርሶበአጋጣሚ ሊመረጡ ችሏል:: ለመጠይቁ መረጃ በመስጠት አንድትተባበሩኝ በትህትና እጠይቆታለሁ:: አንዳንድ ግላዊ የሆኑጥያቄዎችንም እጠይቆታለው :: የሚሰጡት ምላሽበፍፁም ሚስጥራዊ ነው:: መመልስ የማይፈልጉትን ጥያቄያለመመለስመብቶ በሙሉ የተጠበቀ ነው:: በጥናቱ ውስጥያለመሳተፍ ከፈለጉበማንኛውም ጊዜ ማቋረጥ ይችላሉ:: የእርሶ ውሳኔ ከሆፒታሉ የሚያገኙትን ጥቅምና አገልግሎት አያሳጣዎትም :: ልነግርዎት የምፈልገውእርሶ የሚሰጡኝ ምላሽ ለዚህ ጥናትመሳካት ብቻ አይደለም የሚያስፈልገው ነገር ለተሻለ የኤች አይቪ መድሃኒት አጠቃቀምና ቁርኝትጠቃሚ መረጃ ሆኖ ሊያገለግል ይችላል:: ስሞን መጠየቁ እንዲሞሉ አያስፈልግም፤በፎርምም ላይ :: እናም ከማንኛውም መረጃ ጋር ተያይዞ ሊቀርብ አይችልም ::

ለጥያቄዎቼ ለሚሰጡኝ መልስ አድናቆቴ በጣምከፍተኛ ነው:: መጠይቅዎቼም ከ 20-35 ደቂቃዎች በላይ አይፈጅም:: ስለዚህ በጥያቄውለመሳተፍ ፍቃደኛ ኖት

1. **አዎ**
2. **አይደለሁም**

መልስ አዎን ከሆነ የ « √ » ምልክትበማረግ መጠይቁን መሙላትይቀጥሉ

(ሀ) <u>አጠቃላይመረጃ</u>

1. የተጠየቀበት ቀን ----------

2. የተጠያቂ መለያ ቁጥር ----------

3. የጠያቂ ስም ---------- ፊርማ ----------

4. መጠይቁበትክክል መሞላቱን ያረጋገጠው ሰውስም ---------- ፊርማ ---------

(ለ) <u>የማህበራዊ ኢኮኖሚያዊ ና የአኗኗር መረጃ</u>

1. ዕድሜ ምን ያህል ነው? ----------

2. ጾታ (1) ወንድ (2) ሴት

3. ብሄረሰቦት ምንድነው? 1/አማራ 2/ ጉራጌ 3/ ሃድያ 4/ ሌላ----------

4. ሀይማኖትህ/ሽ ምንድነው? 1. ኦርቶዶክስ 2/ ፕሮቴስታንት 3/ ሙስሊም 4/ ሌላ--------

5. በዚህ ጊዜ የጋብቻ ሁኔታእንዴት ነው?
1/ ያላገባ/ች 2/ ያገባ/ች 3/ ባል የሞተባት/ ሚስት የሞተበት 4/ የተለያዩ/የተፋታ/ች

6. ስራህ/ሽ ምንድነው ? 1/ የመንግስት ሰራተኛ 2/ሥራ የለኝም

7. የት ነው የምትኖረው/ሪው? 1/ከተማ 2/ገጠር

8. የትምህርት ደረጃ ምን ያህል ነው?
1/ ምንም የቀለም ትምህርት ያልተማረ/ች 2/ 1-8 የመጀመሪያ ደረጃ
3/ ሁለተኛ ደረጃ (9-19) 4/ ዩኒቨርሲቲ/ኮሌጅ

9. የወር ገቢህ/ሽ ምን ያህል ነው? ----------በኢትዮጲያ ብር ::

10. ከማን ጋር ትኖራለህ/ለሽ? 1/ ከቤተሰቦቼ ጋር 2/ ለብቻዬ

(ሐ)<u>በሽተኞች ያላቸውን ልምድ በተመለከተ የሚቀርቡጥያቄዎች</u>

11. በኤች አይ ቪ መያዝህን ለሌላ ሰውግልፅ አድርገሃል/ሻል? 1/አዎ 2/ አይደለም

12. ባለፈው ጊዜያት ዘመድ ፣ ጓደኛ ወይም የትኛውም የማህበረሰብ አካል መድኃኒትህን እንድትከታተል አግዞሃል/ሻል? 1/ አዎ 2/ አይደለም

13. ለተራቁጥር 12 መልስህ/ሽ አዎ ከሆነ ለምን ያህል ጊዜ?
1/ ብዙ ጊዜ 2/ አልፎ አልፎ 3/ በፍፁም አላገዘኝም

14. የኤች አይቪ ኤድስመድኃኒቱን በተቀጠረልህ ጊዜ እየመጣህ ከሆስፒታልትወስዳለህ/ለሽ ወይ? 1/ አዎ 2/ አይደለም

15. ለተራ ቁጥር 15 መልስህ አይደለም ከሆነ እንዳትወስድ የሚያደርግህ ምክንያት ምንድነው?

1/ የጎንዮሽ ጉዳቱ 2/ የትራንስፖርት ገንዘብ ስለሌለኝ 3/ መገለል ስለምፈራ 4/ የጤና ድርጅቱ ስለሚርቀኝ 5/ ሌላ (ጥቀስ)

16. የኤች አይቪ ኤድስመድኃኒት በተነገረ ሰዓትትወስዳለህ/ለሽ? 1/ ሁል ጊዜ 2/ አልፎ አልፎ

17. የኤች አይቪ ኤድስመድኃኒት በዕለት ተግባርህ/ሽ ጉዳት አለው? 1/ አዎ 2/ አይደለም

18. በጤና ባለሞያዎች የሚሰጥህን ምክር ትከታተላለህ/ለሽ? 1/ አዎ 2/ አይደለም

19. የኤች አይቪ ኤድስመድኃኒት ለሌላ ሰውታውሳለህ/ለሽ ? 1/ አዎ 2/ አይደለም

20. የኤች አይቪ ኤድስመድኃኒት ለረዥም ጊዜ መውሰድ ጉዳት አለውብለህ/ለሽ ታስባለህ/ለሽ?

1/ አዎ 2/ አይደለም

21. ብዙ ሰዎች በየቀኑአያንዳንዱን ታብሌት የሚውጡበትን ጊዜ ይረሳሉ ።። አንተ/ቺ መድኃኒትን/ሽን መውሰድ ትተሃል/ሻል

1/ ባለፈው አንድ ቀን ? 1/ አዎ 2/ አይደለም

2/ ባለፉትሶስትቀናት ? 1/ አዎ 2/ አይደለም

3/ ባለፉትሰባትቀናት ? 1/ አዎ 2/ አይደለም

22. አዎ ከሆነ ምን ያህል የመድኃኒት ዶዝ ትረሳለህ/ለሽ ?

1/ 2 ዶዝ ከ 30 ዶዝ

2. 4 ዶዝ ከ 60 ዶዝ

3. 2 ዶዝ ከ 30 ዶዝ ና 4 ዶዝ ከ 60 ዶዝ

4. 2 ዶዝ ከ 30 ዶዝ ና 8 ዶዝ ከ 120 ዶዝ

5. 4 ዶዝ ከ 60 ዶዝ ና 8 ዶዝ ከ 120 ዶዝ

23. መድኃኒት እንዳትወስድ/ጂ የሚያደርግ ምክንያት ምንድነው?

1/ መርሳት 2/ ስላልተመቸኝ 3/ መንገድ ስለሄድኩ 4/ በጣምስላመመኝ

5/ መገልገል ስለምፈራ 6/ ሌላ (ጥቀስ) ---------

24. የመድኃኒት ቁርኝትእንዳይኖርህ/ሽ የሚያደርጉ ነገሮችን ትጠቀማለህ/ለሽ?

1/ አዎ 2/ አይደለም

25. የኤች አይቪ መድኃኒት ለመውሰድ የሚጠቅሙማስታወሻ ነገሮችን ትጠቀማለህ/ለሽ?

1/ አዎ 2/ አይደለም

26. በተነገረህ መሰረት ከመድኃኒት ጋር ወይም በኃላለመብላት የምግብ እጥረት/ችግር አለብህ/ሽ?

1/ አዎ 2/ አይደለም

(መ) የመድኃኒት አጠቃቀምን (የመድኃኒት ጥምረት ና የሌሎች በሽታዎች ህክምና)

የተመለከቱ ጥያቄዎች

አሁንየምንጠይቆት ከዚህ በፊት የኤች አይ ቪ መድኃኒት እንዴት እንደወሰዱለማወቅ ነው፡፡ ልብ ማለት የሚገባዎት ማንኛውም ሰውመድኃኒቱን በተለያዩ ምክንያት አንዳንድ ጊዜ ወይም ለብዙ ጊዜ ላይወስድ ይችላል፡፡ አሁን የሚሰጡን መረጃ መድኃኒቱን የሚሰጠውድርጅት ጋር ምንም ግንኙነት ያለው አይደለም፡፡ መረጃውለጥናታዊ ጹሑፍ የሚያገለግል ስለሆነ እርሶን በምንም ዓይነት ሁኔታ አይጎዳዎትም፡፡

27. ከኤች አይቪ መድኃኒት ሌላ መድኃኒት ትወስዳለህ/ጅያለሽ? 1/ አዎ 2/ አይደለም

28. የመድኃኒት የጎንዮሽ ጉዳት አጋጥሞሃል/ሻል? 1/ አዎ 2/ አይደለም

29. የምትወስደው/ጅውመድኃኒት ለአወሳሰድ ይመችሃል/ሻል? 1/ አዎ 2/ አይደለም

(ሠ) <u>ስለ ኤችይቪ ኤድስበሽታ ያላቸውን አመለካከት የሚያስሱጥያቄዎች</u>

30. የኤች አይ ቪ ኤድስመድኃኒት ጤናዬን ያሻሽላልብለህታምናለህ/ኛለሽ?

1/ አዎ 2/ አይደለም

31. በሽታው ቢጠና ወይም ተጓዳኝ በሽታዎች ቢያጋጥሙህ/ሽ መድኃኒቱን ትቀጥላለህ/ለሽ?

1/ አዎ 2/ አይደለም

(ረ)<u>የጤናባለሙያዎችና የጤና ድርጅቱን በተመለከተ የሚቀርቡጥያቄዎች</u>

32. በወር የሚሰጥህ/ሽ መድኃኒት ሳትረሳ/ሽ መውሰድ ለምን እንደሚጠቅምባለሙያዎች አስረድተዋል/ሻል? 1/አዎ 2/ አይደለም

33. ከጤናባለሙያዎች ጋር ያለህ/ለሽ ግንኙነት በህክምና ላይ ለውጥ ያመጣል ብለህ/ለሽ ታስባለህ/ለሽ ? 1/ አዎ 2/ አይደለም

34. የምክር አገልግሎት ተሰጥቶሃል/ሻል? 1/አዎ 2/ አይደለም

35. ባለሙያዎችን ስታማክር/ሪ ገበናህ/ሽ ይጠበቃል? 1/ አዎ 2/ አይደለም

36. ከጤናባለሙያዎች ጋር ያልህ/ህ ግኑኙነት (በጓደኝነት ፣በመስማት፣ ግዜ ወስዶ ማናገር፣ የማገልገል ዝንባሌ ፣ትህትና) ጥሩ ነውብለህ/ሽ ታስባለህ/ሽ? 1/ አዎ 2/ አይደለም

37. የህክምና አገልግሎት የሚሰጥበትን ቦታበቅርበትታገኛለህ/ሽ? 1/ አዎ 2/ አይደለም

ከታካሚየህክምናካርድየሚወሰዱመረጃዎች

ከመድኃኒትጋርተያያዥነትያላቸውመጠይቆች

38. ለምን ያህል ጊዜ ነውመድኃኒቱን መውሰድ የጀመርከው/ሽው?.....(ወር)

39. ከኤች አይ ቪ ኤድስመድኃኒት በተጨማሪ የሚወስዱትመድኃኒት ምክንያት?

1/ ለሣምባ ነቀርሳ 2/ የሣምባ ነቀርሳን ለመከላከል

3/ ለተጓዳኝ በሽታዎች 4/ ሌላ (ጥቀስ) ----------

40. ከኤች አይ ቪ ኤድስመድኃኒት ሌላ የወሰዱት የመድኃኒት አይነት?

1/ የሳምባ ነቀርሳ 2/ የፀረ ተዋሲያን (አንቲ ባዮቲክስ)

3/ የፈንገስ መድኃኒት 4/ ሌላ (ጥቀስ)----------

41.በፊት የሚወስዱትመድኃኒት የትኛው ነው?

1. D4T/3TC/NVP (1a) 2.ZDV/3TC/NVP (1c)
3. TDF/3TC/EFV (1e) 4. D4T/3TC/EFV (1b)
5.TDF/3TC/NVP (1f) 6.ZDV/3TC/EFV (1d) 7.**ሌላ (ጥቀስ)----------**

42.አሁን የሚወስዱትመድኃኒት የትኛው ነው?

1. ZDV/3TC/NVP (1c)2. TDF/3TC/EFV (1e)

3.TDF/3TC/NVP (1f) 4.ZDV/3TC/EFV (1d) 5.**ሌላ(ጥቀስ)-------**

ከኤች አይ ቪ ኤድስበሽታጋርተያያዥነትያላቸውመጠይቆች

43. የመጀመሪያ ሲዲ ፎር ቁጥርህ/ሽ ስንት ነው?----------

44. የቅርብ ጊዜ ሲዲ ፎር ቁጥርህ/ሽ ስንት ነው? ----------

45.እንደ ዓለም ጤናድርጅት የመጀመሪያው ያንተ/ችው የኤች አይ ቪ ኤድስ ደረጃ ስንት ነው? 1/ ደረጃ አንድ 2/ ደረጃ ሁለት 3/ ደረጃ ሶስት 4/ ደረጃ አራት

46. እንደ ዓለም ጤናድርጅት የአሁኑ ያንተ/ችው የኤች አይ ቪ ኤድስ ደረጃ ስንት ነው?

1/ ደረጃ አንድ 2/ ደረጃ ሁለት 3/ ደረጃ ሶስት 4/ ደረጃ አራት

ስለትብብሮ አመሰግናለሁ!!!!