

Full Length Research Paper

Barriers of adherence to antiretroviral therapy among HIV/AIDS infected persons in Nekemte referral Hospital, East Wollega, Oromia Regional State, Western Ethiopia, 2017

Kassahun Tegegne Bidu¹ and Zalalem Kaba Babure^{2*}

¹Primary Health Care Project, East Wollega Zone, Nekemte, Western Ethiopia.

²East Wollega Zonal Health Office, Nekemte, Western Ethiopia.

Received 9 March, 2018; Accepted 29 March, 2018

Adherence is engagement and accurate participation of an informed patient in a plan of care. A combination of factors:-the relationships between the patient and the provider, medication issues, psychological status, and structural issues can impede adherence efforts. The objectives were to assess barriers of adherence to antiretroviral drugs (ART) among Human immunodeficiency virus or Acquired immunodeficiency Syndrome (HIV/AIDS) infected persons in Nekemte Referral Hospital, Ethiopia. The descriptive cross-sectional study design was conducted from March 1st to March 31st 2017. Data was collected from 321 client following ART unit of this hospital using interviewer administered questionnaire. A systematic sampling technique was used. The data were checked for completeness, cleared, coded and entered into computer software Statistical Package for Social Science (SPSS) version 20 after collected. Data analysis was done and the statistical association between variable was described using logistic regression. The result of the study is summarized using tables, graphs and figures. From all, 89 (27.70%) missed taking their ART drug in the last month prior to data collection. Factors of non-adherence were age, educational status, using reminder, drinking alcohol, co-worker awareness, developing sickness and living style. Non-adherence to ART was high in the study area. Concerned bodies should work on identified barriers of adherence to improve the quality of service as well as adherence rate. Increasing awareness and belief of HIV patients towards ART is needed and health care providers should work strongly on those who miss their ART regimen.

Key words: Adherence, antiretroviral drugs (ART), barriers, HIV/AIDS, Nekemte referral hospital.

INTRODUCTION

Human immunodeficiency virus or Acquired immunodeficiency (HIV/AIDS) was initially recognized in United States of America among homosexual males in 1981. It was first identified on individuals with

*Corresponding author. E-mail: kabazalalem@gmail.com. Tel: +251921192448.

Pneumocystis Carinii Pneumonia (PCP) who were previously healthy but homosexual males. Human immunodeficiency virus or Acquired immunodeficiency nowadays is one of the devastating illnesses witnessed worldwide. Worldwide, an estimated 33.4 million people are living with HIV in which two-third of them lives in sub-Saharan Africa including Ethiopia (Ethiopian Federal Ministry of Health, 2012). The HIV prevalence in Ethiopia was 3.5% (urban 10.5% and rural 1.9%). The situation of HIV epidemic in Amhara, Oromia, Addis Ababa, and SNNPR is worse than other regions. Together these regions accounted for 86.6% of all people living with HIV (PLWHA) in Ethiopia (Cramer et al., 2008).

Antiretroviral therapy (ART) is a key component to curbing the spread of HIV. When adequately adhered to, ART is known to stop the progression of the virus and allow for the HIV-infected person to live a longer, more productive life (WHO, 2015a, b). The therapy is generally a regimen of at least three antiretroviral (ARV) drugs (WHO, 2015a, b). There are more than 25 ARVs that fall into six different categories: nucleoside or nucleotide reverse transcriptase inhibitors (NRTIs), non-nucleoside reverse transcriptase inhibitors (NNRTIs), protease inhibitors (PIs), a fusion inhibitor (FI), a chemokines receptor type five (CCR5) antagonist, and integrated strand transfer inhibitors (INSTIs) (WHO, 2015a, b).

Adherence is described as engagement and accurate participation of an informed patient in a plan of care. The concept of 'adherence' has a broader meaning than compliance which encompasses the extent to which a patient follows instructions, implying understanding, consent and partnership. It also includes entering into and continuing in a program, or care plan, notably, meeting appointment and tests as scheduled. Adherence to treatment encompasses more than adherence to medications and ARVs (Rabkin et al., 2003).

In poor countries, adherence can be a problem for a number of reasons. Yet studies have shown no significant difference in adherence between resource-limited and resource-rich countries, which suggests that patients in all environments have trouble taking 100% of their pills. It is therefore recommended worldwide that all ARV programs should have a concurrent plan for adherence assessment and support (Rabkin et al., 2003; Weiser et al., 2003).

Adherence to an ART regimen is the key if an HIV-positive individual is to live long and productive life. A combination of factors like, the relationships between the patient and the provider, medication issues, psychological status, and structural issues can impede adherence efforts (Agwu and Fairlie, 2013). Adolescents have a lower rate of ART adherence than HIV-positive adults in both high and low income countries (Cluver et al., 2015; Rudy et al., 2010; Sherr et al., 2010; Nachega et al., 2009).

The global HIV prevalence in adults is 0.8%, 71% of

which are people living in Sub-Saharan Africa (Global Health Observatory, 2016), and only half of whom know their HIV-positive status (UNAIDS, 2014). In South Africa, the national HIV prevalence rate is 18.8% (Millennium Development Goals, 2015). Totally, up to 6.3 million people are currently living with HIV/AIDs (UNAIDS, 2014). Most of these patients were in Sub-Saharan Africa. Within South Africa, the national prevalence rate of HIV for people aged 15-24 was 7.1% (Millennium Development Goals, 2015).

In Sub-Saharan Africa, 1.2 million of deaths related to AIDS had been recorded in 2012 (ONUSIDA, 2013). The "3 by 5" and "Treatment 2015" an initiative launched jointly by WHO and UNAIDS in 2003 and 2011 respectively have created a truly dynamic environment in HIV care for PLWHA in developing countries. Access to antiretroviral treatment (ART) has considerably expanded since then, to reaching 9.7 million persons in resource-limited countries in late 2012 (ONUSIDA, 2014). This has led to the reduction of not only the number of new HIV infections, but also in AIDS mortality and its related co-morbidities. The introduction of ART in the treatment of PLWHA has dramatically changed the course of HIV/AIDS epidemic; making AIDS a chronic disease (Yaya et al., 2014).

Adherence to ART is essential for long-term therapeutic success and is therefore a major concern to ART programs. Studies have shown that good adherence to ART has huge benefits because it is necessary not only in reducing the risk of emergence of HIV resistance strains but also in improving the health status of the PLWHA (Pennap et al., 2013; Meresse et al., 2014). Evidence shows that lack of adherence can lead to failure of the treatment and even accelerated development of drug-resistant HIV as well as more rapid progression to AIDS (Biadgilign et al., 2011). Therefore, adherence to prescribed ART regimens becomes an important predictor of treatment success which has direct impact on the disease progression and patients' quality of life (Obirikorang et al., 2013).

Socioeconomic factors such as age, gender, race, educational level and income level are inconsistent in influencing adherence (Tadios and Davey, 2006). Women who live together with children tend to have a lower level of adherence (Amico et al., 2006). Social support from family and friends affects adherence positively (Tadios and Davey, 2006; Nachega et al., 2009).

Over 800,000 patients are living with HIV/AIDS in Ethiopia and the prevalence of HIV/AIDS in the general population is estimated to be 1.5%. In the past 8 years decentralization and scale-up of the HIV care program have occurred and by the end of 2011; 249,174 adult patients (86% of eligible patients) had been prescribed ART (Ethiopian Federal Ministry of Health, 2012). Antiretroviral therapy (ART) has been life saving for

hundreds of thousands of Ethiopians. With increased availability of ART in recent years achievement of optimal adherence and patient retention are becoming the greatest challenges in the management of HIV/AIDS in Ethiopia. Different studies have explored factors influencing medication adherence to ART in various study. However, in this study area, there were limited studies (Bezabhe et al., 2014). Therefore, this study was designed to be conducted to assess the barrier of ART drugs adherence in Nekemte referral hospital among PLWH in ART unit of outpatient department (OPD). It contributes to health professional understanding of non-adherence and be useful in developing interventions that will take into consideration the problems raised by people taking ARV treatment. The hospital will also utilize for quality service on ART and related services in the hospital. In addition it may help the counselors to focus on factors which affect the adherence during their counseling services. It will also provide as a baseline data for other researchers.

MATERIALS AND METHODS

Study area

Nekemte is the capital city of East Wollega zone located at 331 km away from Addis Ababa, the capital city of Ethiopia. Its altitude ranges from 1380 to 2300 m above sea level and the total surface area of the sub-city is estimated to be 32 sq km. The climatic condition of the town is midland with annual temperature of 12-34°C. The rain fall covers about seven months of the year with mean annual rainfall of 1,850 mm.

The total population of the town as projected from 2007/2008 census is about 88,969 from which 44,340 (49.8%) are males and 44,627 (50.2%) are females. Different ethnic group: Oromo, Amhara, Gurage, Tigre, etc live in the town. Different religion follower like Protestant, Orthodox, Muslim, and waqeffata live in the sub-city. There are different government, private and non-governmental organizations and institutions in the town. The town is divided into six sub-cities. Nekemte town has one governmental hospital, three health center (two governmental and one non-governmental), and seven higher private clinics.

Nekemte referral hospital was established in 1932 Ethiopian calendar (E.C). The hospital has 185 beds and gives service for about 11,295 patients per month as new and repeated visit. The ART service of this hospital also provides service for PLWH that started from 1997 E.C. It gives service for about 2,158 ART patients currently (Nekemte Town Administration, 2016).

Study period

The study was conducted in Nekemte referral Hospital East Wollega Zone from March 1st to 30th 2017 among patients infected with HIV/AIDS.

Study design

Hospital based descriptive cross-sectional study was conducted.

Source population

All HIV/AIDS infected people attending ART at Nekemte Referral Hospital was a source population of the study.

Study subject

Those people infected with HIV/AIDS and fulfill the inclusion criteria in the Hospital were study population.

Eligibility criteria

Inclusion criteria

HIV positive (Sero-positive) patient taking ART drugs and willing to take part in the study were included.

Exclusion criteria

Severely sick patient who cannot respond to the questionnaire and patients who developed psychotic problem was excluded from the study. Children less than 18 years were excluded due to ethical issue and patients who took ART drugs for less than 3 months were also be excluded.

Sample size determination

The sample size of the study was determined using the formula for a single population proportion with assumptions of 63.8% of adherence rate (33), 95% confidence interval, 5% of degree of desired precision or margin of error for sampling and 5% for non-response rate.

A Z-value of 1.96 was used at 95% CI and d of 5% (n= sample size, p = prevalence, d = margin of error).

$$n = \frac{Z^2 P(1 - P)}{d^2}$$

$$n = \frac{(1.96^2 * 0.638)(1 - 0.638)}{0.05^2} = 355$$

Since the total number of the source population is 2,158 and below 10,000 a correction formula is used to adjust the sample size as follows:

$$nf = \frac{n}{1 + n/N}$$

$$nf = \frac{355}{1 + \frac{355}{2158}}$$

$$= \frac{355}{1.16} = 306$$

The initial sample size was 306 and by considering a 5% (≈ 15 subjects) non-response rate, the final sample size was 321.

Sampling technique

A systematic random sampling technique was employed on patients who come for treatment during study period. The interval of study subject is determined every K^{th} , $K = N/n = 2158/321 = 6.7$ (N =Source population and n = sample size). So that, the sampling interval was every 7th and the first respondents was selected using lottery method between 1 to 7th. Data collection will continue every 7th until the required sample size is achieved.

Pre-testing the questionnaire

A pilot study was under taken a week before the actual data collection on 5% (15 study subjects) of the respondents who were selected randomly to check the appropriateness and completeness of the questionnaire in Nekemte Health Center of Nekemte town and some modification on the questionnaire was performed for clarity and understanding of the patients.

Data collection procedure

The data was collected by using structured questionnaire by interviewer which is prepared in English language and translated to Afaan Oromo (local language) by person who knows both languages very well. The questionnaire was developed based on the objective of the problem, conceptual frame work and adapted after different literature review.

In the data collection, two diploma nurses were recruited and collected the data by using questionnaire. During data collection one BSc nurse supervisor was assigned to assure the quality of data collection at spot. Interview was conducted with people infected with HIV/AIDS to fill the questionnaire in separate room near the ART unit to keep confidentiality. If the patient is not willing to take part in the study during time of data collection the next patient was interviewed.

Variables of the study

Dependent variables

Adherence to ART.

Independent variables

The following categories of variables were assessed as independent variables.

Socio-economic and demographic variables

These were sex, age, marital status, ethnicity, religion, family size, income, education, occupation.

Health system and care provider related variables

These included support from provider, approach, attitude, service system of hospital, adherence counseling, clear instruction, number of pills and daily dose.

Psycho-social related variables

These were support from families, relatives, co-worker, psychological distress, substance use.

Other variables

These were health status, symptom of illness, food restriction, side effect and understanding of treatment.

Operational definitions

Adhered to ART

This is taking medicines exactly as recommended \geq or = 95% in a month (based on WHO recommendations and prior published studies).

Not adhered to ART

Not taking medicines exactly as recommended or taking $<$ 95% in a month (based on WHO recommendations and prior published studies).

Barriers of adherence

Factors that hinder adherence of the clients to their drugs.

Clients

Persons who use the services.

Complex regimens

Drugs that have been manufactured to suppress the HIV virus.

Protease inhibitor

This is introduced when combinations of highly active antiretroviral regimens have failed to work.

Family size

This refers to total number of people living in a house during the study period.

Income

It is periodical monthly earning from one's business, lands, work, investment etc.

Data quality management

Structured questionnaire was prepared in English and translated into Afaan Oromo (local language) and retranslated back to English language by language expert to increase measurement accuracy

and for field work purpose. Pre-test of the questionnaire was done on 5% of sample size in similar area which is not include in study before the actual data collection to see the accuracy of responses and to estimate time needed. On daily basis collected information was reviewed and possible errors were returned to the collectors for correction. Training and orientation was given to the data collectors and close supervision was done during data collection.

Data processing and analysis

After data collection was completed, data was checked for completeness and consistency and then it was coded. Using computer software SPSS version 20.0, data analysis was done and descriptive summary of study result such as frequencies, proportions, mean, mode, median and range were computed. Barriers of adherence to ART were computed by logistic regression and multivariate analysis. The result of the study was presented using graphs, tables and charts.

Ethical consideration

Ethical clearance was obtained from Ethical Review Board of Wollega University, College of Health Sciences, Department of Nursing and midwifery. Privacy and confidentiality of collected information were ensured at all level. Respondents were asked for their willingness to participate on the study and verbal consent was obtained. The purpose of the study was clearly explained for the respondents and the study was depending on their willingness.

RESULTS

All expected study participants (321) were involved in the study which makes the response rate of the study 100%.

Socio-economic and demographic characteristics of study participants

From all study participants involved in the study, 165 (51.40%) were male and 156 (48.60%) were female. The mean age of the respondents were 38.89 (SD \pm 9.29) years with a minimum and maximum of 18 and 67 years respectively. The average family sizes of the respondents were 3.66 (SD \pm 1.61) ranging from 1 member to 8 members of the households. Regarding distance of the respondents' home from hospital, the mean was km 13.49 (SD + 23.61) with a minimum and maximum of 1 Km to 200 Km respectively (Table 1).

Service provider and institution related characteristics

Service provided in the hospital for the respondents was assessed and the respondents rated it as very good, good, fair and bad. From the total respondents, 179 (55.80%) of them replied that the service at ART unit was good, 158 (49.20%) of the respondents rated the approach of health care provider as good and 143

(44.50%) reported that ART unit set up was very good for the confidentiality of the respondents.

Perceived feeling of the respondents that makes them not to come for follow-up visit was assessed nearly half, (139, 43.30%) and more than quarter, (88, 27.40%) reported that the reason is side effect of drugs and psychological distress and depression (forgetfulness) respectively (Figure 1).

ART Adherence related characteristics of respondents

From all study participants involved, 116 (36.10%) of the respondents missed ART since they started the regimen while 89 (27.70%) of the respondents missed taking their ART drug in the last month prior to data collection from one to four days. Most of the respondents (201, 62.6%) used an alarm as a reminder to take their drug on time. For reported reason for missing ART, 31 (34.80%) of the respondents was due to forgetting followed by long distance to hospital which was 17(19.10%) of the respondents.

Among the study participants involved, 186 (57.90%) of them disclosed their HIV status to family (spouse), 63 (19.60%) to friends and the remaining 72 (22.40%) did not disclosed their HIV status.

Perceived factor for poor adherence to ART among respondents reported drug related side effects 129 (40.20%), lack of social support from family and friends 75 (23.40%), number of pills 47 (14.60%) and other 40 (12.50%) reported food restriction and lack of support from health care providers. Perceived factor that helps the respondents to take their ART drugs as prescribed 138 (43.00%) of respondents reported knowledge and belief of treatment, 81 (25.20%) social support from families and friends, 67 (20.90%) support from nurses and pharmacists and the remaining 35 (10.90%) reported support from co-worker helps them to take drugs as prescribed. Among the study participants 176 (54.80%) of respondents' co-worker are not aware that the respondent is on ART while 145 (45.20%) their co-worker are aware that the respondents are on ART (Table 2).

Regarding the participants years on ART, 34.30% of them take the treatment for more than five years (Figure 2).

Disease related and other characteristics of the respondents

Health condition of the respondents one month prior to data collection was assessed and among all study participants, 97 (30.20%) of them developed common disease of different system. Type of disease respondents developed were cough with or without sputum (27, 27.80%), fever with chills and rigor (21, 21.60%),

Table 1. Socio-economic and demographic characteristics of respondents East Wollega, Nekemte Hospital, March 2017.

Variables	Response	Number	Percent
Sex	Male	165	51.4
	Female	156	48.6
Age of respondents	15 to 24 Years	39	12.1
	25 to 34 Years	110	34.3
	35 to 44 Years	112	34.9
	> or = 45 Years	60	18.7
Residence	Urban	275	85.7
	Rural	46	14.3
Religion	Orthodox	147	45.8
	Muslim	44	13.7
	Protestant	113	35.2
	Catholic	17	5.3
Ethnicity	Oromo	236	73.5
	Amhara	57	17.8
	Gurage	15	4.7
	Tigre	13	4.0
Educational status	Unable read and write	36	11.2
	Read and write only	44	13.7
	Primary (1-8)	101	31.5
	Secondary (9-12)	76	23.7
	Diploma and above	64	19.9
Occupation	House wife	54	16.8
	Government employee	72	22.4
	Merchant	92	28.7
	Farmer	28	8.7
	Daily laborer	39	12.1
	student	18	5.6
	Bar lady	18	5.6
Marital status	Single	59	18.4
	Married	202	62.9
	Divorced/Widowed	60	18.7
Family size	< or = 3 Members	140	43.6
	4 to 6 Members	169	52.6
	> or = 7 Members	12	3.7
Average monthly income	< or = 500 ETB	111	34.6
	501 to 1500ETB	109	34.0
	1501 to 3000ETB	73	22.7
	3001 to 4500ETB	28	8.7
Distance from home to hospital	< or = 3 Km	84	26.2
	4 to 6 Km	113	35.2
	7 to 12 Km	61	19.0
	> or = 13 Km	63	19.6

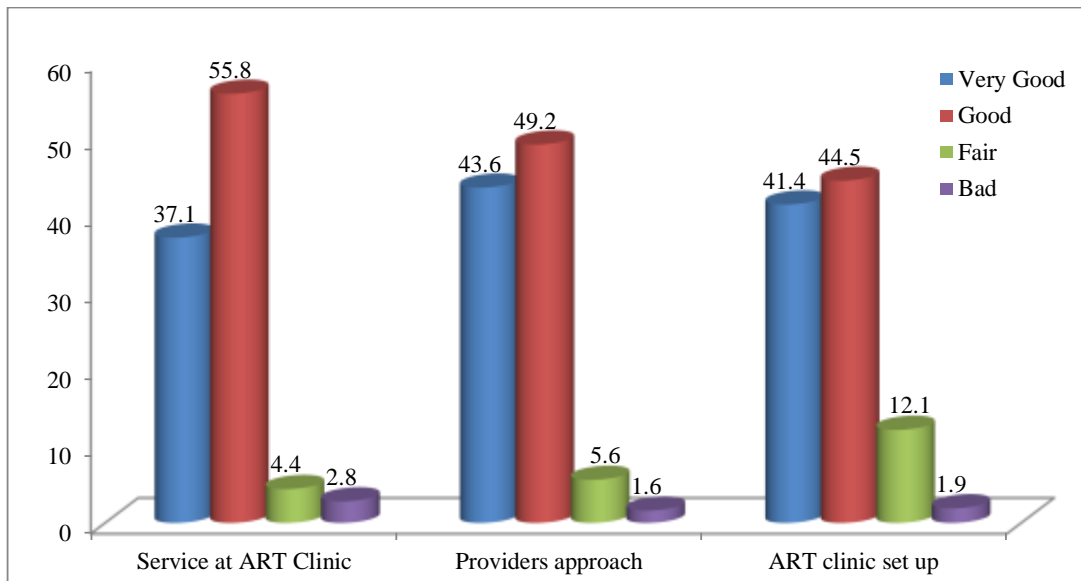


Figure 1. Service and care provider related characteristics of respondents, Nekemte Referral Hospital, East Wollega, March 2017.

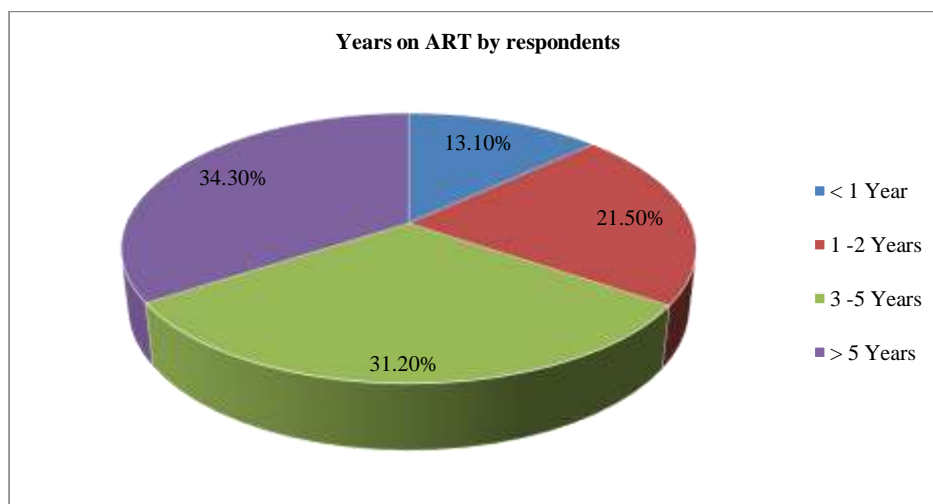


Figure 2. Years on ART by respondents in Nekemte referral hospital, East Wollega, March 2017.

abdominal pain with diarrhea (21, 21.60%), skin diseases (16, 16.50%) and other diseases (12, 12.40%). On action taken when developed disease, majority (66, 68.00%) of the respondents come to ART clinic of the hospital (Figure 3).

From the total study participants, 58 (18.10%) of them drink alcohol with different frequency in a week. Twenty three (7.20%) of respondents chew khat, 5 (1.60%) use illicit drug other than alcohol and khat and 20 (20%) of them had multiple sexual partner currently. Majority, 282

(87.90%) of the respondent reported that they have belief on ART as it helps in life health and improve quality of their life (Figure 4).

Factors associated with adherence to ART among study participants

Barriers of adherence to ART were assessed among the study participants using bivariate and multivariate

Table 2. ART related characteristics of the respondents Nekemte referral hospital, East Wollega, March 2017.

<i>Variables</i>	<i>Response</i>	<i>Number</i>	<i>Percent</i>
Ever missed ART drug since started	Yes	116	36.1
	No	205	63.9
Ever missed ART drug in last month	Yes	89	27.7
	No	232	72.3
No of days missed (n = 89)	1.00	23	7.2
	2.00	44	13.7
	3.00	14	4.4
	4.00	8	2.5
Reason for missing (n = 89)	Forgot	31	34.8
	Busy	8	9.0
	Too many pills/taste of medicine	8	9.0
	Long distance to hospital	17	19.1
	Run out of medicine	12	13.5
Reminders used to take ART drug	Severe symptoms/difficult to follow-up	13	14.6
	People	31	9.7
	Alarm	201	62.6
	None	89	27.7
	Behavior of neighbor changed?	Yes	42
No		279	86.9

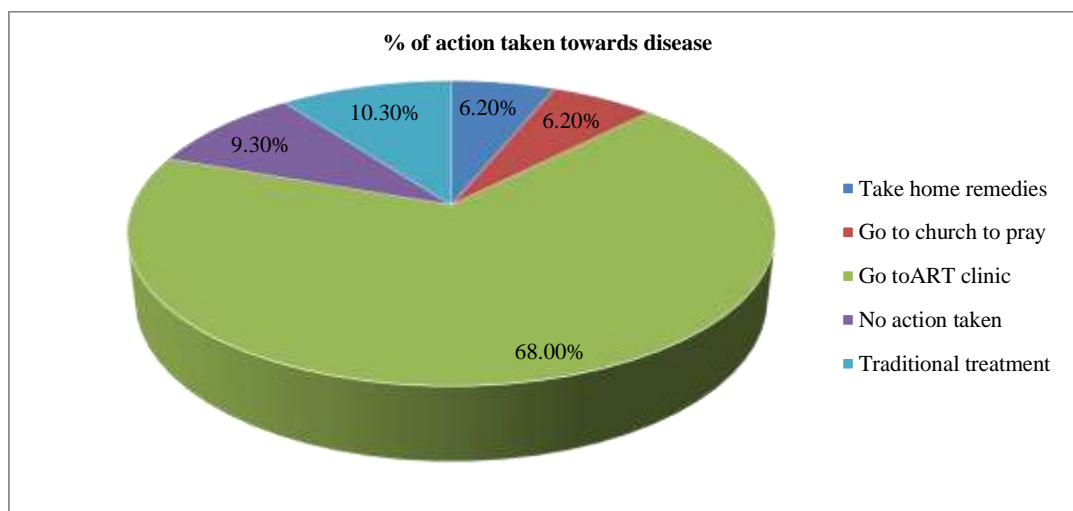


Figure 3. Action taken by respondents when get diseased, Nekemte referral hospital, East Wollega, March 2017

analysis. On bivariate analysis sex, age, educational status, occupation, distance from home to hospital, reminder to take ART drug, living style, awareness of

co-worker about ART of respondents, disease condition alcohol drinking, khat chewing, having multiple sexual partner and belief on ART significantly associated with

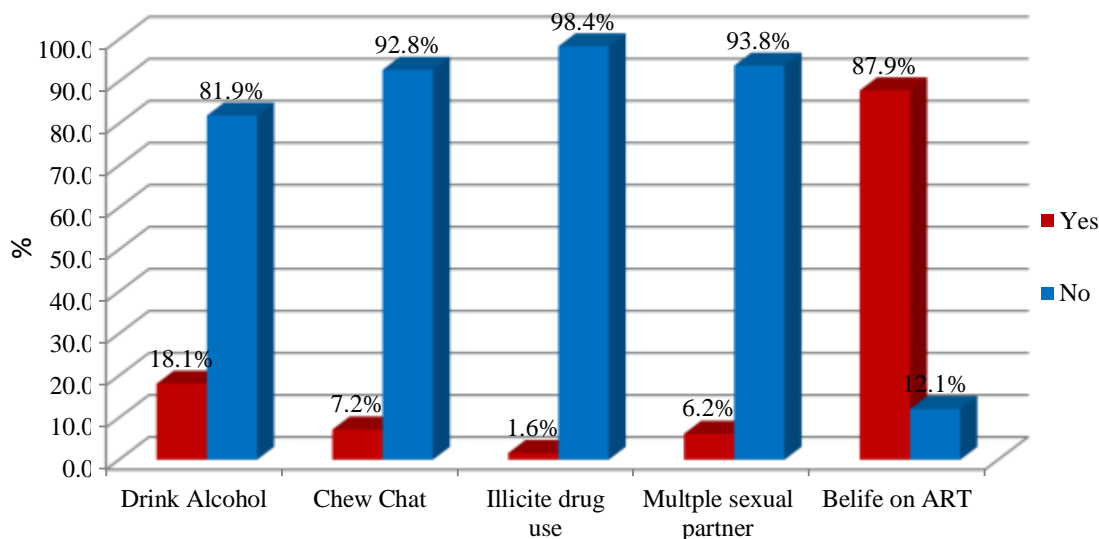


Figure 4. Respondents behavior and belief on ART Nekemte referral hospital, East Wollega, March 2017.

missing of ART by the respondents. On multivariate analysis age, educational status, reminder to take ART drug, living style, awareness of co-worker about ART of respondents, disease condition, alcohol drinking, and belief on ART significantly associated with adherence of the respondents to ART drug.

Study participants aged 25 to 34 years are nearly four times, (3.78) (95% CI 1.19, 11.97), aged 35 to 44 are six times 6.00 (95% CI 1.72, 20.89) and aged 45 and above are five times (5.28, 95% CI 1.34, 20.75) at risk to miss their ART drug when compared to those study participants between age 15 to 24 years.

For the risk of missing ART drugs by level of education, those who read and write were only 8.7(95% CI 2.11, 35.88) times, primary level were 5.11 (95% CI 1.75, 14.86) times and secondary were 8.00 (95% CI 2.51, 25.42) times at risk than those whose educational status is diploma and above.

The study participants who use alarm as a reminder to take their ART drug were more at risk to miss their drug when compared with those who use people as a reminder to take ART drug. The risk was more than five times (5.51, 95% CI 1.77, 17.18) than that of people used as a reminder. Those who do not use anything are two times at risk to miss ART drug but was not significant. Clients living with HIV and attending ART at Nekemte hospital and living with their biological parents were five times (4.95, 95 % CI 1.28, 19.00) to miss their ART drug in comparison to those clients living with their own families (wife/husband and children).

Awareness of co-worker about the ART drug use of respondents were assessed and those clients whose co-worker do not know whether they use ART or not are at less risk (0.45, 95% CI 0.21, 0.93) to miss their ART drug than those clients whose co-worker know that they use

ART or not. Among the study participants, those who develop sickness in the last month prior to data collection were at less risk to miss ART drugs (0.17, 95 % CI 0.08, 0.36) in relation to those who did not developed sickness. This could be due to feeling of wellness among those who did not develop sickness and those who develop sickness adhered to their drug during sickness. Drinking alcohol and belief on ART was included in the study as a factor of adherence. Both drinking alcohol 0.32 (95% CI 0.13, 0.80) and belief on ART, 0.23 (95% CI 0.09, 0.61) were inversely associated with adherence of ART among study participants (Table 3).

DISCUSSION

The finding of this study showed that service provided in the hospital was rated as very good and good by majority of the respondents. About 92.80% of the study participants rated the approach of the health care providers as very good and good which helped them for their adherence to ART. Regarding the setup of the ART unit for confidentiality of the respondents, they found the setup is appropriate for them which improve the follow up and visit.

Among study participants, 116 (36.10%) and 89 (27.70%) of the respondents missed ART and ever started ART in the last month prior to data collection respectively. This number is very high according to expected standard of care for HIV/AIDS treatment and care. Expected good adherence for the patients on ART should be 95% or more in a month and number of days of missed ART in last month by respondents' ranged from one to four days for which greater than one day will make the patient non-adherence based on criteria set by

Table 3. Factors of adherence to ART among study participants in Nekemte referral hospital, East Wollega, March 2017.

Variables	Response	Missed ART in last month		COR (95% CI)	AOR (95% CI)
		Yes	No		
Sex	Male	54 (16.8%)	111 (34.6%)	1	1
	Female	35 (10.9%)	121 (37.7%)	1.68(1.02, 2.76)	1.49((0.70, 3.193)
Age	15 to 24 years	23 (7.2%)	16 (5.0%)	1	1
	25 to 34 years	29 (9.0%)	81 (25.2%)	4.01(1.86, 8.63)	3.78(1.19, 11.97)
	35 to 44 years	22 (6.9%)	90 (28.0%)	5.88(2.66, 12.96)	6.00(1.72, 20.89)
	45 and above years	15 (4.7%)	45 (14.0%)	4.31(1.81, 10.24)	5.28(1.34, 20.75)
Educational status	Unable to read & write	13 (4.0%)	23 (7.2%)	1.37(0.59, 3.18)	3.42(0.88, 13.23)
	Read and write only	10 (3.1%)	34 (10.6%)	2.64(1.11, 6.25)	8.70(2.11, 35.88)
	Primary	23 (7.2%)	78 (24.3%)	2.63(1.33, 5.19)	5.11(1.75, 14.86)
	Secondary	15 (4.7%)	61 (19.0%)	3.16(1.49, 6.69)	8.00(2.51, 25.42)
	Diploma & above	28 (8.7%)	36 (11.2%)	1	1
Occupation	House wife	14 (4.4%)	40 (12.5%)	1	1
	Government employee	16 (5.0%)	56 (17.4%)	1.22(0.53, 2.79)	2.07(0.55, 7.83)
	Merchant	24 (7.5%)	68 (21.2%)	0.99(0.46, 2.13)	1.23(0.41, 3.69)
	Farmer	9 (2.8%)	19 (5.9%)	0.73(0.27, 2.00)	2.01(0.43, 9.20)
	Daily laborer	13 (4.0%)	26 (8.1%)	0.70(0.28, 1.72)	0.57(0.14, 2.36)
	student	3 (0.9%)	15 (4.7%)	1.75(0.44, 6.96)	0.84(0.11, 6.23)
	Bar lady	10 (3.1%)	8 (2.5%)	0.28(0.02, 0.85)	0.21(0.03, 1.18)
Distance from home to hospital	1 to 3 Km	17 (5.3%)	67 (20.9%)	1	1
	4 to 6 Km	41 (12.8%)	72 (22.4%)	0.44(0.23, 0.85)	0.61(0.24, 1.55)
	7 to 12 Km	8 (2.5%)	53 (16.5%)	1.68(0.67, 4.19)	1.98(0.59, 6.62)
	≥ 13 Km	23 (7.2%)	40 (12.5%)	0.44(0.21, 0.92)	0.42(0.14, 1.26)
Reminder used to take ART drug	People	15 (4.7%)	16 (5.0%)	1	1
	Alarm	42 (13.1%)	159 (49.5%)	3.54(1.62, 7.75)	5.51(1.77, 17.18)
	Nothing	32 (10.0%)	57 (17.8%)	1.67(0.73, 3.81)	2.16(0.59, 7.84)
Living with whom?	Own family	65 (20.2%)	149 (46.4%)	1	1
	Biological parents	4 (1.2%)	35 (10.9%)	3.81(1.30, 11.18)	4.95(1.28, 19.00)
	Relatives	7 (2.2%)	23 (7.2%)	1.43 (0.58, 3.50)	3.78(0.91, 15.72)
	Alone	13 (4.0%)	25 (7.8%)	0.83(0.40, 1.74)	2.66(0.74, 9.51)
Co-worker aware as you use ART	Yes	32 (10.0%)	113 (35.2%)	1	1
	No	57 (17.8%)	119 (37.1%)	0.59(0.35, 0.97)	0.45(0.21, 0.93)
Developed sickness	Yes	44 (13.7%)	53 (16.5%)	0.30(0.18, 0.50)	0.17(0.08, 0.36)
	No	45 (14.0%)	179 (55.8%)	1	1
Drink alcohol?	Yes	28 (8.7%)	30 (9.3%)	0.32(0.17, 0.58)	0.32(0.13, 0.80)
	No	61 (19.0%)	202 (62.9%)	1	1
Chew khat?	Yes	13 (4.0%)	10 (3.1%)	0.26(0.11, 0.62)	1.21(0.24, 6.18)
	No	76 (23.7%)	222 (69.2%)	1	1
Multiple sex partner	Yes	12 (3.7%)	8 (2.5%)	4.36(1.79, 11.07)	0.61(0.12, 3.00)
	No	77 (24.0%)	224 (69.8%)	1	1
Belief on ART	Yes	63 (19.6%)	219 (68.2%)	1	1
	No	26 (8.1%)	13 (4.0%)	0.14(0.07, 0.29)	0.23(0.09, 0.61)

national and WHO (Ethiopian Federal Ministry of Health HIV/AIDS Prevention and Control Office, 2012; Cramer et al., 2008).

This study found that non-adherence to ART was lower when compared to research conducted in Jima University Teaching Hospital, Southwest Ethiopia of which 36.19% of respondents had poor adherence to their ART treatment. Among socio-demographic characteristics, educational status, residence, occupation and alcohol addiction were the significant factor of non-adherence which was similar with others studies (Kasumu and Balogun, 2014; Mohammed et al., 2015).

In the current study, 201 (62.20%) respondents used alarm as a remainder to take their ART drug which is almost higher than that of study conducted in South West Nigeria. In the same study, age was a factor of non-adherence and similarly in the current study, it was significantly associated with non-adherence of patients to ART (WHO, 2015; Tadios and Davey, 2006; Kasumu and Balogun, 2014).

Disclosure of HIV and ART status of the respondents to concerned bodies who support them on care and treatment is very important. More than half (57.90%) of the respondents disclosed their ART status to their family and among those who disclosed their HIV status, 12.10% of them faced problem due to their disclosure. Based on research conducted in Felege Hiwot Hospital of Gonder, Northern Ethiopia, disclosure of HIV status was significantly associated with adherence of ART which have some similarity with current study (Amico et al., 2006; Bezabhe et al., 2014; Katz et al., 2013; Ankrah et al., 2016; Chindedza et al., 2013; Obirikorang et al., 2013).

This study reported that reason for missing ART 31(34.80%) of the respondents was due to forgetting followed by long distance to hospital which was 17 (19.10%) of the respondents. This has similarity with the study conducted in Bayelsa state, Nigeria. Some of the most important reasons given for missing doses include, "simply forgot" (24.5%), and "wanted to avoid the side-effects of drugs" (5.5%) (Suleiman and Momo, 2016) and in more than 75% of the cases in Jimma specialized Hospital the principal reasons reported for skipping doses of ART were simply forgetting, feeling sick or ill, being busy and running out of medication (Amberbir et al., 2008).

The cross-sectional study conducted in Bale Robe Hospital, South East, Ethiopia indicated that, 83.1% of the respondents had good dose adherence and 14.4% had adhered fairly while 2.4% were adhered poorly. This study had higher adherence rate when compared with current study which was 72.30%. In the same study, greater than half (54.1%) of the study participants missed ART due to disappearance of symptom or feeling healthy but in current study, the major reason was forgetting (34.80%) (Mohammed et al., 2015).

Factors of non-adherence among study participants in the current study were age, educational status, using alarm as a remainder and living with biological parents significantly associated with non-adherence of ART (Bezabhe et al., 2014; Abera et al., 2015). Alcohol drinking and belief on ART is also a factor of non-adherence among study participants in line with others study finding (Abera et al., 2015; Mohammed et al., 2015).

Conclusion

The prevalence of non-adherence among the study participants was 27.70% which is very high based on expected standard set by national and WHO care and support of HIV patients. Factors of non-adherence to ART was found to be age and educational status of the respondents, using alarm as a remainder, living style, belief on ART and alcohol drinking were significantly associated to it. Service provided in the hospital, approach of health care providers and ART unit set up was rated very satisfactory for the expected services and patients attending the clinic.

RECOMMENDATION

- 1) Increasing knowledge and improving attitude of HIV patients towards impact of missing ART drug should be done by the hospital and concerned bodies.
- 2) Reminders should be specifically created for the HIV patients taking ART other than alarm by concerned bodies.
- 3) Disclosure of HIV/ART status to families and friends as well as co-worker might help the patient on taking ART drug as required
- 4) Some patients come from very distant area from hospital and they missed their ART due to lack of transportation and other reason. So such patients should be re-counseled to take ART at nearby health facility where ART is provided like health center.
- 5) Health care providers should specifically identify those patients missing ART and must take action not to miss ART drug through orientation and counseling.

Limitation of the study

The main aim of the study was to investigate barriers of adherence to ART among people infected with HIV/AIDS in Nekemte referral hospital, East Wollega zone. There may be recall bias from the respondents and social desirability bias on the requested data.

Abbreviations:

ARVs, Anti Retro Viral; **BSc**, Bachelor of Science;

CCR5, Chemokines receptor type five; **E.C**, Ethiopian calendar; **FI**, Fusion Inhibitor; **HAART**, Highly Active Antiretroviral Therapy; **HIV/AIDS**, Human immunodeficiency virus or Acquired immunodeficiency Syndrome; **INSTIS**, Integrase Strand Transfer Inhibitor; **NNRTIs**, Non Nucleotide Reverse Transcriptase Inhibitors; **PCP**, Pneumocystis Carinii Pneumonia; **PIS** = Protease Inhibitors; **PLWH**, People Living with HIV; **PLWHA**, People living with HIV/AIDS; **SNNPR**, South Nation Nationality and People Region.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to Nekemte Referral Hospital Administration and ART unit coordinator for giving us an opportunity to conduct this study in the hospital. The warmest thanks go to study participants for giving us genuine response and data collectors and supervisors for their unreserved contribution during data collection period. We would also thank our families for their psychological and financial support during this period.

REFERENCES

- Abera A, Fenti B, Tesfaye T, Balcha F (2015). Factors Influencing Adherence to Antiretroviral Therapy among People Living With HIV/AIDS at ART Clinic in Jimma University Teaching Hospital, Southwest Ethiopia. *J. Pharm. Rep.* 1(101):2.
- Agwu AL, Fairlie L (2013). Antiretroviral treatment, management challenges and outcomes in perinatally HIV-infected adolescents. *J. Int. AIDS Soc.* 16:18579.
- Amberbir A, Woldemichael K, Getachew S, Girma B, Deribe K (2008). Predictors of adherence to antiretroviral therapy among HIV-infected persons: a prospective study in Southwest Ethiopia. *BMC Public Health* 8:265.
- Amico KR, Harman JJ, Johnson BT (2006). Efficacy of antiretroviral therapy adherence interventions: a research synthesis of trials, 1996 to 2004. *J Acquir Immune Defic Syndr.* 41(3):285-297.
- Ankrah DN, Koster ES, Mantel-Teeuwisse AK, Arhinful DK, Agyepong IA, Lartey M (2016). Facilitators and barriers to antiretroviral therapy adherence among adolescents in Ghana. *Patient Prefer. Adherence* 10:329-337.
- Bezabhe WM, Chalmers L, Bereznicki LR, Peterson GM, Bimirew MA, Kassie DM (2014). Barriers and Facilitators of Adherence to Antiretroviral Drug Therapy and Retention in Care among Adult HIV-Positive Patients: A Qualitative Study from Ethiopia. *PLoS One* 9(5):e97353.
- Biadgilign S, Deribew A, Amberbir A, Escudero HR, Deribe K (2011). Factors Associated with HIV/AIDS Diagnostic Disclosure to HIV Infected Children Receiving HAART: A Multi-Center Study in Addis Ababa, Ethiopia. *PLoS one* 6(3):e17572.
- Chindedza M, Mutseyekwa F, Chideme-Munodawafa A (2013). Perceived barriers to accessing and achieving adherence in antiretroviral therapy among HIV patients at a rural mission hospital in Zimbabwe. *Eur. Scientific J.* 9(24):277-287.
- Cluver LD, Hodes RJ, Toska E, Kidia KK, Orkin FM, Sherr L, Meinck F (2015). HIV is like a tsotsi. ARVs are your guns': associations between HIV-disclosure and adherence to antiretroviral treatment among adolescents in South Africa. *AIDS* 29(Suppl 1):S57-S65.
- Cramer JA, Roy A, Burrell A, Fairchild CJ, Fuldeore MJ, Ollendorf DA, Wong PK. (2008). Medication compliance and persistence: terminology and definitions. *Value Health* 11(1):44-47.
- Ethiopian Federal Ministry of Health (2012). Human immunodeficiency virus or Acquired immunodeficiency (HIV/AIDS) Prevention and Control office (HAPCO);Country progress report in HIV/AIDS response, Addis Ababa. Available at: <http://files.unaids.org/en/dataanalysis/knownyourresponse/countryprogressreports/2012countries/GAP%20Report%202012.pdf>
- Ethiopian Federal Ministry of Health HIV/AIDS Prevention and Control office (HAPCO) (2012). Country progress report in HIV/AIDS response. Addis Ababa: Ethiopian Federal Ministry of Health HIV/AIDS Prevention and Control office. Available at: <http://files.unaids.org/en/dataanalysis/knownyourresponse/countryprogressreports/2012countries/GAP%20Report%202012.pdf>
- Global Health Observatory (GHO) (2016). HIV/AIDS. Available at: <http://www.who.int/gho/hiv/en/>
- Kasumu LO, Balogun MR (2014). Knowledge and attitude towards antiretroviral therapy and adherence pattern of HIV patients in southwest Nigeria. *Int. J. Infect. Control* 10(3):1-8.
- Katz IT, Ryu AE, Onuegbu AG, Psaros C, Weiser SD, Bangsberg DR, Tsai AC (2013). Impact of HIV-related stigma on treatment adherence: systematic review and meta-synthesis. *J. Int. AIDS Soc.* 16(3 Suppl 2):18640.
- Meresse M, March L, Kouanfack C, Bonono RC, Boyer S, Laborde-Balen G, Aghokeng A, Suzan-Monti M, Delaporte E, Spire B, Carrieri MP (2014). Patterns of adherence to antiretroviral therapy and HIV drug resistance over time in the Strat all ANRS 12110/ESTHER trial in Cameroon. *HIV Med.* 15(8):478-487.
- Millennium Development Goals (MDGs) (2015). Millennium Development Goals: Country report 2015 / Statistics South Africa. Pretoria: Statistics South Africa, 2015. Available at: http://www.statssa.gov.za/MDG/MDG_Country%20Report_Final30Sep2015.pdf
- Mohammed AY, Ahmed MB, Tefera TB (2015). Assessment of Factors Affecting Art Adherence among People Living with Human Immune Virus in Bale Robe Hospital, South East Ethiopia. *Am. J. Public Health* 3(2):60-67.
- Nachega JB, Hislop M, Dowdy DW, Lo M, Omer SB, Regensberg L, Chaisson RE, Maartens G (2006). Adherence to Highly Active Antiretroviral Therapy Assessed by Pharmacy Claims Predicts Survival in HIV-Infected South African Adults. *J. Acquir. Immune Defic. Syndr.* 43(1):78-84.
- Nachega JB, Hislop M, Nguyen H, Dowdy DW, Chaisson RE, Regensberg L, Cotton M, Maartens G (2009). Antiretroviral therapy adherence, virologic and immunologic outcomes in adolescents compared with adults in southern Africa. *J. Acquir. Immune Defic. Syndr.* 51(1):65-71.
- Nekemte Town Administration (2016). Socio-demographic profile of Nekemte town, 2016 (Unpublished). Available at: https://www.researchgate.net/figure/Socio-demographic-characteristics-of-men-and-women-on-ART-in-Nekemte-town-Ethiopia_tbl1_233910199
- Obirikorang C, Selleh PK, Aledu JK, Fofie CO (2013). Predictors of adherence to antiretroviral therapy among HIV/AIDS patients in the upper west region of Ghana. *AIDS* 2013:1-7.
- ONUSIDA (2013). Rapport mondial, Rapport ONUSIDA sur l'épidémiologie mondiale de sida, Genève. Available at: http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Global_Report_2013_fr_1.pdf
- ONUSIDA (2014). SIDA: Vers une issue heureuse de la lutte contre le sida. Available at: http://www.groupe sida.ch/filrouge/archives/2014/04/sida_vers_une_issue_heureuse_d/
- Pennap GR, Abdullahi U, Bako IA (2013). Adherence to highly active antiretroviral therapy and its challenges in people living with human immunodeficiency virus (HIV) infection in Keffi, Nigeria. *J. AIDS HIV Res.* 5:52-58.

- Rabkin M, El-Sadr W, Abrams E (2003). The MTCT-Plus clinical manual. Mailman School of Public Health Columbia University. Available at: http://www.who.int/hiv/pub/prev_care/en/Saving_Mothers_E.pdf
- Rudy BJ, Murphy DA, Harris DR, Muenz L, Ellen J (2010). Prevalence and interactions of patient-related risks for non-adherence to antiretroviral therapy among perinatally infected youth in the United States. *AIDS Patient Care STDS* 24(2):97-104.
- Sherr L, Lampe FC, Clucas C, Johnson M, Fisher M, Leake Date H, Anderson J, Edwards S, Smith CJ, Hill T, Harding R (2010). Self-reported non-adherence to ART and virological outcome in a multi-clinic UK study. *AIDS Care* 22(8):939-945.
- Suleiman IA, Momo A (2016). Adherence to antiretroviral therapy and its determinants among persons living with HIV/AIDS in Bayelsa state, Nigeria. *Pharm. Pract.* 14(1):631.
- Tadios Y, Davey G (2006). Antiretroviral treatment adherence and its correlates among people living with HIV/AIDS on highly active antiretroviral therapy in Addis Ababa, Ethiopia. *Ethiop. Med. J.* 44(3):237-44.
- United Nations Programme on HIV and AIDS (UNAIDS) (2014). The gap report. Available at: http://www.unaids.org/en/resources/documents/2014/20140716_UNAIDS_gap_report
- Weiser S, Wolfe W, Bangsberg D, Thior I, Gilbert P, Makhema J, Kebaabetswe P, Dickenson D, Mompoti K, Essex M, Marlink R (2003). Barriers to Antiretroviral Adherence for Patients Living with HIV Infection and AIDS in Botswana. *J. Acquir. Immune Defic. Syndr.* 34(3):281-288.
- World Health Organization (WHO) (2015a). Health topics: Adolescent Health. Available at: http://www.who.int/topics/adolescent_health/en/.
- World Health Organization (WHO) (2015). HIV/AIDS: Treatment and care. Available at: <http://www.who.int/hiv/topics/treatment/en/>
- Yaya I, Landoh DE, Saka B, Patchali PM, Wasswa P, Aboubakari AS, N'Dri MK, Patassi AA, Kombaté K, Pitche P (2014). Predictors of adherence to antiretroviral therapy among people living with HIV and AIDS at the regional hospital of Sokodé, Togo. *BMC Public Health* 14:1308.