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Level of ART Adherence and Associated Factors among HIV Sero- Positive Adult on Highly Active Antiretroviral Therapy in Debre Markos Referral Hospital, Northwest Ethiopia

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Abstract

Background: The current number of sero-positive HIV patients in Ethiopia is about 700,000 with overall estimated prevalence of 1.5%. The introduction of combination ART including protease inhibitors has resulted in striking reductions in HIV-related mortality. Numerous reports have documented that the key to the success of the new HAART is the ability and willingness of HIV-positive individuals to adhere to complex ART regimens, and at least 95% adherence is required for ART regimens to be fully effective.

Objectives: The main aim of this study was to assess level of adherence to ART and associated factors among HIV sero-positive adult on HAART.

Methods: An institutional based cross-sectional study was conducted on 377 participants selected by systematic sampling technique. A pre-tasted structured questionnaire was used by employing interview to collect necessary data. The collected data were analyzed using SPSS 16.0 version. Significance level was set at 95% CI and p-value of <0.05.

Results: The adherence rate of the study participants was 88.6%. Monthly family income [(AOR 0.3, 95%CI 0.13, 0.69)], delayed in taking ART drugs AIDS [(AOR 0.6, 95% CI 0.16,0.88)], fitness of daily treatment schedule [(AOR 9.7, 95% CI 4.6,28)] and consistently taking of ART drugs [(AOR 5.7,95%CI, 2.6,25.3)] were significantly associated with ART adherence.

Conclusion: The ART adherence level in this study was low. Delay in taking ART drug AIDs, monthly family income, fitness of daily treatment schedule and consistent taking of ART drugs were significantly associated with ART adherence. Measures have to be taken to address these problems.

Keywords: Adherence; HAART; Debre Markos; Treatment

Introduction

The number of People Living with HIV (PLWH) in Ethiopia is about 700,000. The overall prevalence is 1.5%, 4.2% urban and 0.6% rural respectively EDHS 2011 [1]. At present many researchers have proven that the introduction of HAART has transformed HIV infection into a chronic manageable disease, bringing a major impact to the quality of life and the prospects for extended survival in HIV sero-positive adults [2].

This introduction of combination ART has resulted in striking reductions in HIV-related mortality. However, these therapeutic regimens are very complex, often requiring that patients take numerous pills multiple times a day with specific. In addition, many factors can affect the ability of HAART to suppress viral replication, including low potency of one of the drugs in the combination, viral resistance, inadequate drug exposure and inadequate adherence. Among these the major factor determining Success of HAART is sustainable and optimum adherence. Poor adherence increases the risk of antiretroviral therapy failure and viral resistance [3,4].

Numerous reports have documented that the key to the success of the new HAART is the ability and willingness of HIV-positive individuals to adhere to complex ART regimens, and at least 95% adherence (missing no more than three doses per month) is required for ART regimens to be fully effective and to avoid the emergence of resistant strains of the virus. Attaining this high level of adherence is a serious concern today in the world including Ethiopia. It was also universally recognized that access to effective HIV/AIDS treatment and care till recently was highly inequitable [5,6]. As in many other resource poor countries, HIV- infected people in Ethiopia have not yet fully benefited from the use of ART [7].

Adherence in general is a complex behavior, which is influenced by several determinants belonging to the domains: the patient, the treatment, the disease state, the physician and patient-physician relationship and the health care system [8,9].

Currently the initial optimism regarding the efficacy of ART has also challenges of maintaining the nearly perfect and probably indefinite adherence to precise dosing schedules and exacting dietary adjustments that successful therapy requires. There is also a fear that sub optimal adherence, allowing ongoing viral replication, facilitates the emergence of HIV-1 variants resistant to the drugs being used. The emergence of drug resistance will also reduce considerably the treatment options

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for the individual patient, since drug cross-resistance exists to a large extent among antiretroviral agents within a therapeutic class [10]. In addition to the individual patient health impact, non-adherence has also implication for broader public health. Non-adherence to HIV treatments may increase the risk of HIV transmission as non-adherent patients have higher concentrations of HIV RNA in their semen or cervical secretion [10,11].

ART shortens illness duration, improves quality of life and survival of PLWH through reduction of viral load and increasing the level of CD4 cells. However, lack of adherence to ART is a major challenge to AIDS care [12]. suggested reasons for poor adherence in Ethiopia from study conducted about nine years back were being too busy/forgetting, travels, depression, drug adverse effects, treatment fitting to daily routine, health care providers and patients relationship, perceptions of their doctors' capacities, perceived access to support from their ART unit, and reliability of pharmacies, keeping clinical appointments, using memory aids, and educational levels [13,14].

Patient adherence to ARV combination therapy is a critical component of successful treatment outcome. To maximize intervention efforts, a program of research on adherence is needed. To the knowledge of investigators in the current study area level of ART adherence and factors contributing to it were not well established, even two studies conducted in two Hospital in Addis Ababa were take about decade. Therefore, the main aim this study was to assess level of ART adherence and associated factors in Debre Markos Referral hospital.

Methods and Patients

Study setting and study design

This study was conducted from March 10 to May 9, 2013 in Debre Markos referral Hospital, which is a Referral hospital found in Debre Markos town, Amhara national regional state Northwest Ethiopia. The estimated total populations of catchment of the hospital were 2,397,876. Debre Markos town is located 300 Km far from Addis Ababa, capital of the country. ART delivery was started at Debre Markos Hospital with aid from the Regional Health BUREAU and Ministry of Health (MOH) in April 2005. There were 2885 adult patients on ART and the number of patients who did not start ART but who follow up chronic care were 4658. An institution based cross-sectional study design was conducted.

Source and study population

Source populations were all HIV sero-positive adults on combination Anti-Retroviral therapy, and were on follow up in the hospital ART-Units. Study population were all systematically selected HIV sero-positive adults who were on combination ART treatment and on follow up at the Hospital whose age >18 years. The adults who were seriously sick and unable to give response were excluded from study.

Sample size and sampling procedure

The required Sample size was determined using single population formula by taking adherence prevalence rate 82.7% [10], Margin of error 4%, a 5% level of significance (two sided) i.e. 95% confidence interval of certainty.

P=assume stabilized adherence prevalence rate

d=precision (marginal error)=0.

Z α/2=1.96, Thus $n=Z^2\alpha/2\ p\ (1-p)$

d^2

Based on the above assumptions, with an additional 10 percent contingency for non-response the total sample size was 377. Systematic random sampling method was used to select study participants from registration book and through appointments. There were 2885 HIV sero-positives adults on combination ART treatment at Debre Markos referral hospital, so it was divided by 377(total sample size) which gave 7 interval (k). Therefore, every seven clients were taken among the daily appointees. In case of refusal of some participants to give informed consent and information the next participants were asked to give informed consent and information.

Measurements

Dependent variable of this study was Adherence status to ART and independent variables were Socio- demographic variable (Age in year, Sex, Marital status, religion, Ethnicity, Resident, monthly income, occupation, Educational level), Belief in efficacy of medication, Substance use, Patients and physician relationship, Patients' Keeping of clinical appointment., Understanding adherence, Severity of symptoms and illness, fit the medication in to their daily routine and others. While, ADHERENCE – It is perceived as a patient agreeing to make behavior changes that improve his / her health. Adherence levels of in this study >95% (missing no more than three doses per month) of patients were adhered. Adherence to ART- The extent to which a patient continues the agreed-upon made of treatment or intervention as prescribed ART medication. The patient has to take ART medication no more one dose interruption though out the month. Combination Therapy-Treatment of HIV infected people with two or more combination antiretroviral drugs.

Data collection instrument and procedure

Data were collected using pre-tested structured interviewer administered questionnaire that adapted from different related literature to increase comparability of finding. There were three data collectors who health professionals (BSC degree nurses) working in the ART unit and two supervisors. Training was given for data collectors and supervisors on objectives of the study, methods of data collection and ways of data collection for two days.

Data quality management and analysis

Two days training were given for supervisors and data collectors by principal investigators. The questionnaire and other data collection instruments were pre-tested and checked for completeness by supervisor. The questionnaire was prepared in English and translated into Amharic and back to English by another person to check for consistency of the two versions. The supervisors and principal investigators performed immediate supervision on a daily basis. Each and every completed questionnaire was checked for completeness. Five percent of the collected data were check by the supervisor daily for completeness and finally the overall data collection process was controlled by the principal investigator. Data were entered in EPI data 3.1 computer programs to minimize data entry error. The entered data were exported to Statistical Package for Social Sciences (SPSS) version 16 for analysis. Then recoded, categorized and sorted to facilitate its analysis. Descriptive analysis was used to describe the percentages and number distributions of the respondents by socio-demographic characteristics and other relevant variables in the study. Logistic regression was used to fit data in order to identify factors associated with adherence to ART. All explanatory variables that were associated with the outcome variable in univariate analysis with p-value of 0.25 or less were included in the initial logistic models of multivariable analysis. The

crude and adjusted odds ratio together with their corresponding 95% confidence intervals was computed. A P-value<0.05 was considered to declare a result as statistically significant in this study.

Ethical clearance was obtained from College of Medicine and Health Sciences of Debre Markos University. Then officials at different levels in the study area were communicated through letters from College of Medicine and Health Sciences. Permission was obtained from concerned authorities of East Gojjam Zonal Health Department after discussion of the purpose of the study. Study participants were told about the purpose of the study and verbal informed consent was secured. In addition they were told that they had the right to discontinue or refuse to participate in the study. In order to protect the confidentiality of the information, names and house numbers was not recorded on the questionnaire and privacy was maintained by independently answering the questionnaire.

Results

Socio-demographic characteristics

A total of 377 study participants were interviewed with overall response rate of 100%. The majority, 239(63.9%) of participants were females and 138(36.1%) of them were males. The Mean age of the study participants was 37.3 years (SD ± 9.8.).

The majority, 375(96.5%) of them were Amhara in ethnic group. Three hundred sixty four (96.6%) of them were Orthodox religion followers. One hundred eighty one (48%) of the participants interviewed were married. Their average educational attainment was relatively high with 125(33.2%) were illiterate, 62(16.2%) of them were read and write, 36(9.5%) of them were first cycle, 51(13.5%) of them were second cycle and high school, and 104(27.6%) of respondents were with college diploma and degree. Eighty two (21.8%) were employed and work active (Table1).

Information about ART, clinical treatment, and health care system variables of ART adherence

Of the total 265(70.3%) were Disclose their Sero-status for their relatives. One hundred sixty (42.7%) of the study participants had some doubt about ARV drugs before met their doctors. Nearly 216 (58%) heard about ART before starting ART. Two hundred seventeen (57.6%) participants had awareness about HIV/AIDS when they first met their doctors. Source of information about ART for 266(70.8%) of participants were heard from health care professionals. The rest were mass media and others like friends, families were 102(26.8%) and 10(2.4%) respectively. Two hundred fifty seven (68.2%) of the patients had not information about ART adherence before starting ART. But after treatment 100% of them were knew about the benefit of ARV drug. Three hundred thirty nine (90%) saying it had improved their life.

The average ARV treatment duration for the participants was four years (Ranging from one month to 10 years). Two hundred seventy (71.6%) of participants were heard of Information about illegibility of ART. Almost 374(99.5%) claimed they started the ART by their own decision. They were informed and assisted by the health care professionals. Two hundred twenty one (58.6%) had no discomfort when taking their drugs in front of others. Two hundred eighty six (75.9%) the regimen were convenient and easy to fit to their daily routine work. But 91(24.1%) of the participants were found it inconvenient and difficult to fit their daily routine. Among the total participants who had got adverse effect of the drug 64(16.9%) had got in the first one month of treatment of and 47(12.4%) after one month of the treatment.

Concerning the information available in patient recall and records reaction 13(11.6%), 21(18.8%), 6(7.7%), 14(13%) of participants mentioned anemia, skin rash, lipoatherophy, and Peripheral neuropathy respectively. The causes of reactions were stabudine, ephavernize, neverapine and zidovidine for 46(42%), 38(33.9%), 17(15.2%) and 10(8.9%) participants respectively. when they had the problem, 94(85%) of participants were consulted their doctors immediately whereas 30(27%) of them were discontinued their drugs up to appointment date. At the time of interview only 22(5.8%) had additional medicine with their ART drugs. The rest did not take additional drugs.

Majority of the patients in the study, three hundred fifty five (94.2%) were stated they had an excellent relationship with health care providers of which three hundred thirty eight (89.7%) of participants had good open discussion and agreement with the doctors and HCP. Three hundred fifty five (94.2%) of the patients were claimed that their

Variable	No (%)
Sex	
Male	138(36.1)
Female	239(63.9)
Age	
18-24 years	18(5.1)
25-29 years	57(15.3)
30-34 years	80(20)
35-39 years	66(17.6)
40-44 years	70(18.3)
45-49 years	38(11.3)
50-54 years	24(6.6)
55-59 years	10(2.2)
60-64 years	10(2.2)
>64 years	4(1.4)
Resident	
Urban	304(80.6)
Rural	73(19.4)
Occupation	
Employed	82(21.8)
Merchant	91(24.1)
Daily laborer	66(17.5)
No job	38(10.1)
Farmer, house wife	100(26.5)
Marital status	
Married	181(48)
Unmarried	26(6.9)
Divorced/Separated	89(23.6)
Widowed	81(21.4)
Educational status	
Illiterate	125(33.2)
Read and write	61(16.2)
First cycle	36(9.5)
Second cycle and High school	51(13.5)
Diploma and above	104(27.6)
Monthly income	
≤1200birr	171(45.4)
1201-5640 birr	68(18)
≥5641 birr	66(17)
Non fixed/irregular	72(19.6)

Table 1: Socio-demographic characteristics variables of ART adherence study at Debre Markos Hospital, East Gojjam Zone, North west Ethiopia, March, 2013.

doctors were capable and trusted. Three hundred seventeen (98.1%) of the patients showed improvement and satisfied by the benefit they obtained from ART drugs and 372(96.8%) of them were satisfied scheduling appointment and confidentiality of the treatment unit.

Three hundred sixty one (95.8%) of the patients had not interrupted the regular follow up visit in the ART unit every month, every two month, every three month and the rest had irregular visit and appointments. Three hundred fifty eight (95%) of participants were faced no problem so far to obtain the professional assistance they needed from the health unit. Two hundred forty seven (65.5%) responded care providers also assured them and had access to reliable pharmacies any time they went. Among the total participants who had children, 226(84.3%) of them had tested their children and reported that two hundred six (54.6%) of tested children were HIV negative and nineteen (5%) tested children were HIV positives. The rest of 42(11.1) % were not tested their children for HIV (Table 2).

ART adherence rate by self-reporting and pill counts

Among the total study participants 354 (93.9%) of them did not miss single doses of ART drugs according to self-report and pill counts in the week before the appointment date. In the three days duration of the interview, 351 (93.1%) of the participant did not miss the prescribed doses of ART drugs. Three hundred thirty four (88.6%) of the participants did not miss doses over past seven days duration. In this study the overall ART adherence was 88.6% based on number of missed doses in the previous seven days (Table 3).

Reasons for ART non adherence

The reasons got from the patients for missing doses were: simply forgot to take the pills for 152(40.3%), change in their daily routine work for 215(57%) participants. Other barriers fifteen (4%) they felt sleep. Two hundred two (53.6%) of participants had felt sick or ill at that time. Five (1.3%) of the patients had too money pills to take at the same time. Ninety three (27.7%) they felt the drug was too toxic (harmful) and want to avoid side effects were the main problems to adhere ARV drugs for the patients (Figure 1).

Factors associated with adherence to art

In order to investigate the association between independent variables with adherence both univariate and multivariate analysis were conducted for socio-demographic characteristics of participants, and Clinical Treatment and health care system related variable. But, socio-demographic characteristics of participants didn't show association whereas some of Clinical Treatment and health care system related variable showed association with outcome variable.

Those variables showed association with outcome variables at p-value ≤0.25 in the univariate like delay taking ART AIDS, Feeling Comfort on taking ART drug in front of others, Fitness of daily treatment Schedule with daily routine activities, Access to reliable pharmacy, Simply not forgot ART drug, getting education Or assistance during visit time, problem of taking medication at specific time, drug side effect were selected as candidate variables for multivariable logistic regression analysis. The multivariable logistic regression analysis was used by taking all the eight factors into account simultaneously and only four of the most contributing factors remained to be significantly and independently associated with adherence to ART. Participants those who delayed on taking Antiretroviral for HIV/AIDS were 0.6 less likely adhere to regimens as compared with those participants who were not delayed on taking Antiretroviral for HIV/AIDS with [AOR (95%CI)=0.60 (0.16-0.88)]. Those participants who were feel comfort on taking ART drug in front of others were 5.4 more likely adhere to regimens as compared with those who were not feel comfort on taking ART drug in front of others with [AOR (95%CI)=5.40 (3.9, 9.7)]. Those participants whose daily treatment Schedule was fit with daily routine activities were 9.7 more likely adhere to regimens as compared with those participants whose daily treatment Schedule was not fit with daily routine activities [AOR (95% CI)=9.70(4.6, 28)]. Those participants who were not forgot taking ART drug were 5.7 more likely adhere to regimens as compared with those who were forgot taking ART drug

Variables	No (%)
Aware of HIV.AIDS when they first meet their doctor.	
Yes	217(57.6)
No	160(42.4)
They heard about HIV/AIDS	
Before their illness	166(44.2)
After their illness	128(34)
During their illness	83(21.8)
Information about the important of adherence before they start ART	
Yes	120(31.8)
No	257(68.2)
The patient got information from	
Health care professional	266(70.6)
Mass media	102(27.1)
Others	9(2.4)
Benefit of ART for the patient	
Improve their life	339(89.9)
Increase their weight	152(40.9)
Decrease fever	137(36.3)
Decrease diarrhea	66(17.5)
Treatment duration (months)	
1-6	18(4.8)
7-12	31(8.2)
13-24	50(13.2)
25-60	165(43.9)
≥61	113 (29.9)
Did they get access to reliable pharmacy any time they want	
Yes	247(65.5)
No	130(34.5)
Disclosure of sero-status for relatives.	
Yes	265(70.3)
No	112(29.7)
Did the child test HIV	
Yes	225(84.3)
No	42(15.7)
Result of HIV test of the child	
Negative	206(54.6)
Positive	19(5)
Not tested	42(11.1)

Table 2: Information about ART, clinical treatment, and health care system variables of ART adherence study at Debre Markos Hospital, East Gojjam Zone, North west Ethiopia, March, 2013.

Variables	Adherence no (%)
Numbers of days missed	
Previous day	354(93.9)
Past three days	351(93.1)
Past seven days	334(88.6)

Table 3: ART adherence rate by self-reporting and pill count at Debre Markos Hospital, East Gojjam Zone, Amhara regional state, North west Ethiopia, March, 2013.

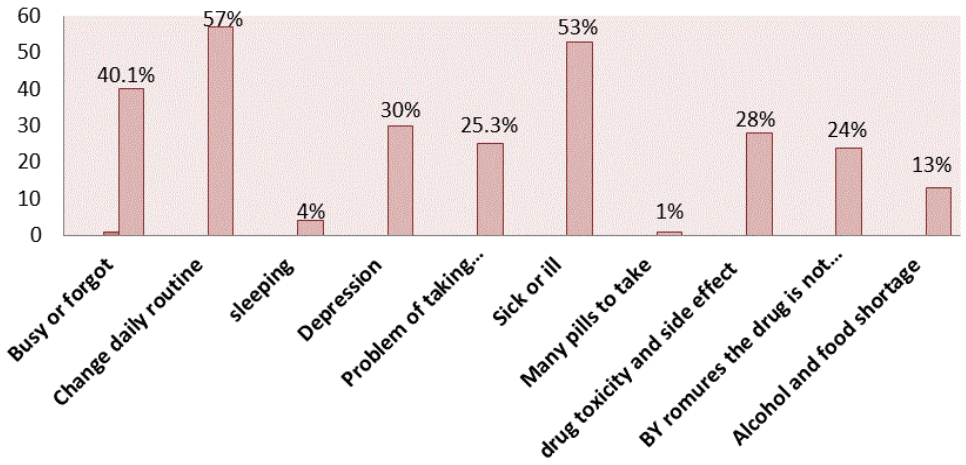

Figure 1: Reasons for ART adherence at Debre Markos Hospital. East Gojjam Zone Amhara regional state, North West Ethiopia, March, 2013.

Variable	Adherence		COR with 95% CI	AOR with 95% CI
	Yes	No		
	No (%)	No (%)		
Monthly family income				
≤1200 birr	18 (41.8)	187(47.5)	3(1.5, 6.1)	0.3(0.13, 0.69
1201-5640 birr	7(12.7)	37(11.5)	2(0.75, 5.3)	0.4(0.12, 1.04)
≥5640birr	13(14.8)	51(15.8)	24(0.9, 5.9)	0.5(0.2, 1.5)
Non fixed/irregular	17(30.9)	47(14.6)	1	1
Occupation				
Employed	12(21.1)	70(21.7)	1(0.4, 2.4)	1.2(0.44,3.2)
Merchant	7(20.8)	84(26.1)	2.1(0.8,5.4)	0.5(0,2,1.5)
Daily laborer	12(21.1)	53(16.5)	0.7(0.34,1.8)	1.4(0.6,3.3)
No job	9(16.4)	25(9.3)	0.56(0.12,3.2)	0.8(0.3,2.4)
Farmers	31(56)	74(23)	1	1
Marital status				
Married	27(49.1)	154(47.5)	0.78(0.36-1.71)	1.07(0.74,3.01)
Unmarried	5(9.1)	21(6.5)	0.58(0.18-1.8)	0.9(0.28,4.3)
Divorced	13(23.6)	75(23.3)	0.8(0.18-1.9)	1.2(0.43,5.6)
Widowed	10(18.2)	71(22.4)	1	1
Educational status				
Illiterate	22(40)	103(32.2)	1	1
Write and read	10(18.2)	50(15.5)	0.66(0.26-106)	1.3(0.5,4.1)
First cycle	4(7.3)	33(10.2)	1.04(0.31-3.5)	2.04(0.71,7.4)
High school & second cycle	7(12.7	44(13.7)	0.82(0.30-2.2)	3.2(0.91-3.05)
Diploma and above	12(21.8)	92(28.6)	0.61(0.28-1.3)	0.85(0.64,2.06)

Table 4: socio-demographic characteristics of multi variate Analysis and ART adherence at East Gojam zone, Debre Markos Hospital, North-West Ethiopia, March, 2013.

[AOR (95% CI)=5.70(2.6, 28.3)] (Tables 4 and 5).

Discussion

In summary, the adherence prevalence with antiretroviral drugs by self-report and pill counts in this study was 88.6%. The source of information about ART for 70.8% of participants was health care professionals. Accordingly, Health professionals were the main source of information for the community. Monthly family income; taking ART drugs AIDS would be delayed; the daily treatment schedule fit daily routine work and not taking ART drug doses consistently were showed significant association with ART adherence in this study.

The adherence prevalence with antiretroviral drugs by self-report and pill counts in this study was 88.6%. Non adherence in this study was found to be less than from most developed countries, where rates ranged from 50% to 70% [15]. Four studies in Ethiopia showed that the prevalence of adherence were different from each other. In Addis Abeba studies, 82.2% and 82.8% of prevalence of adherence was reported in 2006 and 2011. In Gonder and Felegehiwot hospitals North and Northwest Ethiopia) studies 82.7% of prevalence of ART adherence was reported in 2010. In Yergalem hospital adherence prevalence was 88.3% in 2008 [10,14]. In Yergalem hospital studies was determined for missing doses and count pills. Self-reporting may overestimate the rate of adherence to medication. This type of approach is not as objective as counting of pills by the data collector. But it provides useful additional information.

Comparison of data collected using each method showed that the information gathered using the two approaches was consistent. To compare the prevalence with the above mentioned hospitals the

Variable	Adherence		COR with 95% CI	AOR with 95% CI
	Yes	No		
	No (%)	No (%)		
Disclosure of HIV status				
Yes	37(67.3)	228(70.8)	0.08(0.21-1.01)	0.84(0.4-1.6)
No	18(32.7)	94(29.2)	1	1
Delay on taking ART AIDS				
Yes	45(81.8)	292(90.5)	0.46(0.21,0.65)	**0.6(0.16-0.88)**
No	10(18.2)	30(9.3)	1	1
Feeling Comfort on taking ART drug in front of others				
Yes	38(69.1)	182(56.5)	1.7(1.05, 7.1)	**5.4(3.9, 9.7)**
NO	17(30.9)	140(74.8)	1	1
Fitness of daily treatment Schedule with daily routine.				
Yes	45(81.8)	241(74.8)	1.5(1.05, 3.1)	**9.7(4.6, 28)**
No	10(18.2)	81(25.2)	1	1
Access to reliable pharmacy				
Yes	41(74.5)	206(64)	0.29(0.08,9.7)	0.34 (0.09, 1.3)
No	11(20)	64(19.9)	0.33(0.08, 1.2)	0.52(0.34-5.2)
Not sure	3(5.5)	52(16.1)	1	1
Simply not forgot ART drug				
Yes	22(40)	43(13.4)	4.3(2.3, 8.1)	**5.7(2.6, 28.3)**
No	33(60)	279(86.6)	1	1
Getting education				
Or assistance during visit time				
Yes	51(92.8)	310 (96.3)	6(0.8, 50))	6.3(0.9, 50.4)
No	2(3.6)	10(3.1)	0.4(0.41, 15.6)	2.5(0.85, 78)
Not sure	2(3.6)	2(0.6)	1	1
Problem taking medication at specific time				
Yes	3(5.5)	2(23.3)	8.8(1.5, 12.6)	10(0.78, 13)
No	52(76.4)	302(99.4)	1	1
Drug Side effect				
No	2(3.6)	2(0.6)	1.5(0.66- 9)	2(0.86-11)
Yes	53(96.4))	320(99.4)	1	1

Table 5: Clinical Treatment and health care system related variables of multivariate analyses at Debre Markose hospital,east Gojjam zone, March, 2013.

prevalence rate of adherence in this study was higher than Addis Abeba, Gonder and Fleghiwot Hospital. But the prevalence of ART adherence of this study was similar with Yergalem hospital [10,14]. This may suggest that adherence in regional setting is better than central settings especially in Addis Ababa. In this study the patients' adhered means; they did not miss more than three ART doses within a month.

Delay on taking ART drug AIDS of the participants was showed statistically significant association with adherence. This variable had not significant association in other reviewed research. The daily treatment schedule fit daily routine work had also significant association in this study. Adherence among those participants whose daily treatment schedule fit daily routine work were tenfold more likely higher than those who did not fit the treatment schedule and daily routine work. The finding was similar with the finding of study conducted at yergalem hospital. In other way inconsistent with the finding of study conducted in Addis Abeba study [14,15]. Those participants whose daily treatment schedule fit daily routine work were important to adhere ART regimen. 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 vermia, restoration and preservation of immune function, reduction of HIV-related morbidity and mortality, minimize of drug toxicity 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. Those participants whose daily treatment schedule fit with daily routine activities of the patient was a predictor variable in this study. 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 [5].

The participants in this study described some of their struggles with their regimens. Because the participant recognized that their options were limited without combination therapy. So the combination therapy enhanced more for the length of survival is increasing. 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. The patients feel free to ask information in addition those participants there need to be ongoing support available the patient.

The other variable which had significant association with ART adherence was not to taking ART drugs consistently. Patients had forgotten to take daily drug doses in different reasons. Simply forget the ART drug doses were occurred in different reasons. The ten participants in in-depth interview provided insight into living with combination therapy. Most participants have numerous difficulties they experienced taking combination therapy. One patient said that

problems and barriers of ART adherence such as forgetting ART doses in case of work, away from his house, and going to holly waters. Social support and using reminders for these patients may reduce the problem so relatives should remember the clients to take the pills on time. Lack of frequent follow up may lead to obtaining less information about adherence. Other respondent gave additional idea; forgetting ART dose should reduce by social support, so relatives should remember the client to take the pills on time. Lack of frequent follow up may lead to obtain less information about adherence.

Reasons for missing doses or delaying in dosing time were identified like, daily routine work did not fit daily schedule 57%, drug toxicity 27%, forgetting to take daily doses 40% were some of the reasons for missing doses. The data collectors were health providers, there might be chance to commit health professional bias.

In Conclusion the ART adherence prevalence of this study was relatively low compared with WHO standard and other study. Delayed on taking ART drug AIDs; fitness of daily treatment schedule, and not forget ART doses major contributing factors for ART adherence in this study. Based on the findings of the study the following recommendations were forwarded to the health care providers, woreda health offices, Regional Health Bureau, Zonal health Department and NGOS.

- To increase information about ART adherence of the client, health provider should give recent information about adherence.
- To decrease missing doses the daily treatment schedule should fit with the daily routine work. So clients should involve in decision on appointments and daily treatment schedule.
- Regional health bureau and NGOS should prepare the IEC/BCC materials for ART adherence.
- Further research preferably longitudinal designs needed to examine independent predictors of ART adherence.

Authors Contributions

MA wrote the proposal, participated in data collection, analyzed the data and drafted the paper. MA, MA and DJ approved the proposal with some revisions, participated in data collection and analysis, commented on the analysis and improved the first draft. All authors revised subsequent drafts of the paper.

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