

Determinants of Antiretroviral Treatment Interruptions among Adult HIV Patients on antiretroviral therapy in Woliso Town Health Facilities, Woliso, Oromia, Ethiopia, 2022

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Abstract

Background: Close observation is essential for long-lasting viral suppression and effective treatment outcomes in HIV patients undergoing antiretroviral therapy (ART). However, many HIV patients find it difficult to continue receiving antiretroviral therapy, and stopping ART continues to impede the development of HIV programmes aimed at containing the HIV epidemic.

Objective: The objective of the study aimed to assess the determinants of antiretroviral therapy interruptions among adult HIV patients receiving ART in Woliso Health Facilities, Woliso, Oromia, Ethiopia, in 2022.

Methods: With 164 cases and 164 controls, a facility-based unmatched case-control study was carried out. The study participants were chosen using a simple random sampling method. Data extraction forms were used to gather the data. Epi Info version 7 was used to input the data, while SPSS version 20 was used for analysis. The data were summarised using descriptive statistics. Variables having a P-value 0.25 were added to the multiple binary logistic regression model after performing binary logistic regression analysis. Using an adjusted odds ratio with a 95% confidence interval (CI), the relationship between the dependent and independent variables was evaluated. A P-value of 0.05 was used to denote a significant relationship.

Results: 107 (66.88%) cases and 103 (62.8%) controls out of the total study participants were female. The mean ages of the cases and controls were, respectively, 36.95 (10.7 SD) and 39.4 (10 SD) years. Not disclosing their HIV status (AOR 3.04, 95% CI: 1.65, 5.59), not following a monthly ART dispensing model (AOR 4.44, 95% CI: 2.40, 8.20), being a farmer (AOR 3.71, 95% CI: 1.36, 10.13), not being assessed for drug side effects (AOR 2.26, 95% CI: 1.23, 4.15), and not being able to read or write were found to be important predictors of interrupting antiretroviral therapy (AOR 4.28, 95% CI: 1.77, 10.33).

Conclusion: In this study, not having a formal job, being a farmer, HIV status non-disclosure, following the monthly based ART dispensing model, not having a registered viral load, being unable to read and write, and not being assessed for drug side effects were found to be determinant factors of antiretroviral treatment interruption. Therefore, health facilities, district health departments, and zonal health offices should work to improve HIV clinical care and treatment.

Keywords: facility based; unmatched; interruption; woliso

Introduction

Antiretroviral treatment interruption is defined as antiretroviral therapy (ART) cessation for at least 28 days or more for any reason and return to care [1]. Retaining HIV-positive persons throughout their treatment is critical for obtaining the best possible health results. Uninterrupted ART and continuous follow-up are critical for sustained viral suppression and good treatment results in HIV patients receiving ART. Adult women and men, in general, have a harder time staying on ART. Person-centred monitoring and care is the greatest practice for meeting both the patient's needs and the larger goals of epidemic control initiatives [2]. Poor HIV

programme retention is a serious issue in sub-Saharan Africa; a significant fraction of those who begin antiretroviral therapy—between 30% and 60%—have their medication terminated or are lost to follow-up care. Few research has looked at why HIV-positive individuals in sub-Saharan Africa have missed visits [3]. Interruption of antiretroviral treatment (ART) was associated with negative outcomes. The risk of disease progression was considerably higher in treatment interrupted (TI) patients, largely due to low CD4 counts and high viral loads [4]. Treatment interruptions are also linked to a rapid decline in CD4 count, viral load (VL) rebound, and mortality in other studies. The duration of treatment interruption

is a strong predictor of high viral load. When ART is restarted after a longer period of treatment interruption, the probability of treatment failure is higher [5]. Treatment interruption among adult HIV-infected patients, whether deliberate or not, increases the risk of opportunistic infections and death. In the first two months, the increase in viral load and concomitant CD4 reduction were most noticeable. Interruptions raise concerns regarding drug resistance and increased mortality due to suboptimal adherence. In many African countries, retention of HIV treatment and care remains a problem [6,7]. The commitment to health-related visits, such as clinical evaluations, laboratory testing, and medication adherence, is necessary for HIV care retention. After beginning ART, studies from sub-Saharan Africa showed declining average retention rates for HIV-positive individuals, from 80% in the first year to 70% in the third year [8]. Results for patients who leave the care system are frequently hard to get. Studies on tracking people indicate that, at one extreme, some have transferred but continued to get treatment, while others have passed away [9-11]. Between these two extremes, some patients lose interest in receiving care, while others take a break and then resume it [12-15]. HIV care interruptions, whether short-term or long-term, are a barrier to providing appropriate care.^{16,17} Treatment interruptions raise morbidity and mortality, according to numerous research conducted in the middle of the 2000s [18]. Studies have indicated that ART interruption among adult HIV-infected patients is a problem in sub-Saharan Africa [19]. Studies conducted in different countries have shown that being male adult HIV patients, pharmacy stock shortage, being far from health facilities, not having the transportation fee, not being on a multi-month drug dispensing (MMD) model, ART drug side effects, and having comorbid diseases are determinant factors for ART treatment interruption among adult HIV-infected patients [4,20-25]. Annually, between 5 and 7 percent of adult HIV-positive patients receiving ART at St. Luke Hospital and the Woliso Health Centre in the town of Woliso interrupt their treatment, according to data taken from health facilities' smart care records [26]. In order to determine the causes of ART treatment interruption among adult HIV patients receiving antiretroviral medication in Woliso town, this study was carried out.

Methods

Study area and period

The study was conducted in Woliso town administration, southwest Ethiopia, from August 19 to September 20, 2022. G.C. Woliso town is 114 kilometres to the southwest of Addis Ababa. Woliso town has two hospitals and two health centres. In addition, 17 private clinics were included during data collection. ART services are available at one health centre and one hospital in the town. According to the Health Facility Report of July 2022, there were 2436 adult HIV patients on ART at Woliso Health Centre Number One and St Luke Hospital in Woliso town. Among them, 490 patients had ART interruption whereas 1855 had no history of interruption.

Study design and population

A facility based, un-unmatched case-control study design was used

Sample population

Cases: Randomly selected medical records of all adult patients on ART at Woliso Health Centre Number One and St. Luke Hospital, who had a history of ART interruption for 28 days or more and returned to care.

Controls: Randomly selected medical records of all adult patients on ART at Woliso Health Centre Number One and St. Luke Hospital with no history of ART interruption for 28 days or more.

Sample size determination

The sample size was computed by with two population proportion formulas using Epi-info version 7 by considering the ratio of cases to controls 1:1, power of 80%, 95% confidence level, and odds ratio = 1.99. Considering HIV patients receiving their ART medication in the southwest zone, obtained from a study conducted in Nigeria.²⁴ The calculated sample size was 298 (149 cases and 149 controls). After adding a 10% incomplete data rate, a minimum sample size of 328 (164 cases and 164 controls) was used.

Sampling technique

Before selecting the patients' medical records, data cleaning was performed, and medical records that missed important variables were excluded. Records of the study participants were selected using a simple random sampling technique from Woliso Health Centre Number One and St. Luke Hospital, after proportionally allocating the calculated sample size to both health facilities.

Variables

The dependent variable was ART treatment interruption and the independent variables were sociodemographic, patient-related, health-related, ART drug-related, and disease-related factors.

Operational Definitions

ART treatment interruptions were defined as adult HIV patients on ART with a history of HIV treatment discontinuation for at least 28 days who subsequently returned to care before the study period [4,27].

Data Collection Tools and Techniques

Data were collected using a data extraction form developed based on Ethiopia's Federal Ministry of Health ART guidelines, ART follow-up forms, and patient medical cards.² The data extraction form had four parts: sociodemographic factors and health facility-related factors. Data were collected from the patient's follow-up form, ART registration, and intake form.

Data Quality Control and Management

To ensure data quality, a data extraction checklist was prepared from patient cards and follow-up forms. In addition, a verification of the tool was carried out to check consistency between data recording systems and the prepared checklist by randomly selecting and completing 5% of the total sample size at Dilella Health Centre, which was out of the catchment area. Depending on the pretested checklist, some questions were not found in detail, such as the baseline CD4 count and entry point to care. To minimise incomplete data, patients' follow-up forms and cards were cleared, and those missing important variables, 30 from Woliso Health Centre Number One and 61 from St. Luke Hospital were excluded. Three data collectors and one supervisor were recruited and trained for one day before data collection.

Data Analysis and Processing

Data were coded, inputted, and exported to SPSS version 20 for analysis after being coded in Epi Info version 7.0. The descriptive portions of the data

collected were summarised using descriptive statistics including frequency, percentage, mean, and standard deviation. To find potential variables for the multiple logistic regression analysis, binary logistic regression analysis was used. Multiple logistic regression analysis was performed on variables whose P-value in the binary logistic regression analysis was less than 0.25. In order to evaluate statistical significance, an adjusted odds ratio (AOR) with a 95% confidence interval (CI) and a P-value of 0.05 were utilised. The Hosmer-Lemeshow test of goodness of fit was used to evaluate the final model's goodness of fit, with a good fit being considered at a p-value of 0.05, and no significant difference existed across all variables. A tolerance test and the variance inflation factor (VIF) were used to evaluate multicollinearity.

Ethical Consideration

The Ethics Committee of the Ambo University College of Medicine and Health Sciences granted approval for the study. The Woliso Town Health Office, Woliso Health Centre Number One, and St. Luke Catholic Hospital each received a permission letter from the college. Because patient names and other personnel identifiers were not collected from the data gathering techniques, anonymity and confidentiality were guaranteed.

Results

Sociodemographic factors

For both the cases and controls, there were 164 (100%) total medical records that were evaluated. Females made up the majority of the responders, 107 (66.9%) cases and 103 (62.8%) controls. The average ages of the cases and controls were respectively 36.95 (10.7 SD) and 39.4 (10 SD). Among the cases, 126 (76.8%) belonged to the 25–49 age group, while 131 (79.8%) of the controls were inside same bracket. In urban areas, 56 cases and 97 (59.5%) controls were found (Table 1).

Table 1: Sociodemographic characteristics of the study participants, Woliso town, Southwest Shoa, Ethiopia, 2022

Variables	Category	Case	Control
Sex	Female	107(66.88%)	103(62.8%)
	Male	57(33.22%)	61(37.2%)
Age Category	≤24 years	19(11.6%)	7(4.3%)
	25-49 years	126(76.8%)	131(79.8%)
	≥50 years	19(11.6%)	26(15.9%)
Marital status	Single	27(16.9%)	13(8%)
	Married	88(53.66%)	111(67.6%)
	Divorced	18(11.25%)	14(8.3%)
	Separated	13(8.1%)	4(2.5%)
	Widowed	18(11.3%)	22(13.5%)
Occupation	No job	90(54.88%)	40(24%)
	Farmer	38(23.8%)	16(9.8%)
	Daily labourer	11(6.9%)	46(28.2%)
	Have job	19(11.9%)	53(32.5%)
Level of education	Cannot read and write	57(34.8%)	30(18.3%)
	Primary school	72(43.9%)	78(47.6%)
	Secondary school and above	35(21.3%)	56(34.1%)
Residence	Rural	74(43.7%)	67(40.5%)
	Urban	90(56.3%)	97(59.5%)

From the records, 101 (63.1%) cases and 57 (35%) controls did not disclose their HIV status to their relatives. Among cases, only 36.9% of them had family support to receive ART treatment, from controls 67.5% of them had support from their families to take their ART medication.

Health facility related factors

The same number of cases and controls, 73 (45.6%) started ART treatment after seven days of knowing their HIV status, and only one fourth of cases and one third of controls started ART medication on the same day of knowing their HIV status. For treatment, 102 cases (52.2%) and 103 controls (62.8%) received cotrimoxazole prevention therapy. TB prevention therapy was administered to 128 (78%) cases and 149 (90.8%) controls.

ART drug related factors

Among study participants, 71 (43.3%) and 109 (66.9%) of cases and controls were assessed for drug side effects, respectively, during their health facility visits. Among those assessed for drug side effects, 35 (21.3%) and 13 (7.4%) cases and controls were diagnosed with diarrhoea, respectively. On hundred and seven (65.24%) and 41 (24.5) cases and controls did not use the differentiated service delivery (DSD) model, respectively.

Disease related determinants

Almost all cases and controls were classified according to WHO Clinical Stage I. Among cases, 87 (52%) and

14 (8.6%) controls did not have registered viral loads in their medical records. Regarding their nutritional status assessment, 97 (59.1%) of the cases and 133 (82.8%) of the controls were found to be in the 18.5–24.99 kg/m² BMI range. Viral load assessment was conducted in 77 (47%) cases and 150 (91.4%) controls.

Determinants of ART treatment interruptions

After conducting bivariable logistic regression analysis, occupational status, educational status, HIV disclosure status, lack of family support, TB prevention therapy provision, routine viral load assessment, drug side effects assessment with diarrhoea, and utilisation of the DSD model were found to have a P-value <0.25 and were selected as candidate variables for multiple logistic regression models. Multivariable logistic regression analysis showed that not having registered routine viral load assessment results, HIV disclosure status, inability to read and write, using a monthly ART drug dispensing model, having no job, being a farmer, and not being assessed for drug side effects were associated with ART treatment interruptions among adult HIV patients.

Adult HIV patients who had no registered viral load on their follow up forms were 7.86 times (AOR= 7.86, 95% CI: 3.70, 16.71) more likely to interrupt their ART treatment than those who had a registered viral load. Adult HIV patients who used a monthly based ART drug dispensing model were 4.44 times (AOR =

4.44, 95% CI: 2.40, 8.20) more likely to interrupt their ART treatment than those who used a multi-month ART drug dispensing model. HIV patients who were farmers were 3.71 times (AOR = 3.71, 95% CI: 1.36, 10.13) more likely to interrupt their ART treatment than those having another job.

Adult HIV patients who did not have a job were 3.23 times (AOR = 3.23, 95% CI: 1.49, 7.00) more likely to interrupt their treatment than those who had a job. Adult HIV patients who did not disclose their HIV status to others were 3.04 times (AOR = 3.04, 95% CI: 1.65, 5.59) more likely to interrupt their ART

treatment than those who disclosed their HIV status to others. Adult HIV patients who were not assessed for drug side effects during their health facility visit were 2.26 times (AOR = 2.26, 95% CI: 1.23, 4.15) more likely to interrupt their treatment than those who were assessed for drug side effects during their health facility visit. Adult HIV patients who were not able to read and write were 4.28 times (AOR = 4.28, 95% CI: 1.77, 10.33) more likely to interrupt their treatment than those who had secondary school and above educational status (Table 2).

Table 2: Determinants of ART treatment interruption in Woliso town, Southwest Shoa, Ethiopia, 2022

Variables	Group	Case N (%)	Control N (%)	P-value	COR	AOR (95% CI)	P-value
Occupation	No job	90 (54.88)	40 (24)	0.001	5.34	3.23 (1.49, 7.00)	0.003
	Farmer	38 (23.8)	16 (9.8)	0.001	6.62	3.71 (1.36, 10.13)	0.007
	Daily labourer	11 (6.9%)	46 (28.2)	0.234	0.89	0.88 (0.33, 2.29)	0.251
	Have any kind of work	19 (11.9)	53 (32.5)		1.00	1.00	
HIV disclosure status	Not disclosed	101 (63.1)	57 (35)	0.001	3.26	3.04 (1.65, 5.59)	.001
	Disclosed	63 (36.9)	107 (65)		1.00	1.00	
Type of DSD model used	Regular monthly base	107 (65.24)	41 (24.5)	0.001	5.66	4.44 (2.40, 8.20)	0.001
	>=3-month model	57 (35.6)	123 (75.5)		1.00	1.00	
Having registered viral load assessment	No	87 (53)	14 (8.6)	0.001	12.11	7.86 (3.70, 16.71)	0.001
	Yes	77 (47)	150 (91.4)		1.00	1.00	
Drug side effects Assessment	No	93 (56.7)	55 (33.1)	0.001	2.55	2.26 (1.23, 4.15)	0.009
	Yes	71 (43.3)	109 (66.9)		1.0	1.00	
Education	Cannot read and write	57 (34.8)	30 (18.3)	0.003	3.04	4.28 (1.77, 10.33)	0.02
	Primary	72 (43.9)	78 (47.6)	0.149	1.47	1.79 (0.88, 3.66)	0.11
	Secondary and above	35 (21.3)	56 (34.1)		1.00	1.00	
HIV disclosure status	Not disclosed	101 (63.1)	57 (35)	0.001	3.26		
	Disclosed	63 (36.9)	107 (65)		1.00		
Having family support	No	101 (63.1)	53 (32.5)	0.001	2.39		
	Yes	63 (36.9)	111 (67.5)		1.00		
TB prevention therapy	No	36 (22%)	15 (9.2)	0.005	2.59		
	Yes	128 (78)	149 (90.8)		1.00		
Diarrhoea ass side effects	Yes	35 (21.3)	13 (7.4)	0.001	3.37		
	No	129 (79.7)	151 (92.6)		1.00		

Discussion

Occupation of the patient, HIV disclosure status, DSD model utilisation, ART drug side effect assessment, and educational status of the patient are determinant factors of ART treatment interruption. Patients who had no job were 3.23 times more likely to interrupt their ART treatment when compared with those who had jobs, while farmers were 3.71 times more likely to interrupt their ART treatment than those who had other jobs. This result was similar to a study conducted in Lilongwe, Malawi and a study conducted in sub-Saharan Africa, where patients who were not employed and had no money for travelling, those who had another family related burden, and those who were living in rural areas were found to be

more likely to interrupt their medication than those employed or had any job [19,28,29]. This could be explained by a lack of income from transportation and non-ARV drug-related expenses. Patients who did not have a formal education were 4.28 times more likely to interrupt their ART treatment when compared with those who had formal education at the secondary school level. This finding was also similar to that of a study conducted in other parts of Ethiopia on continuing challenges among adults in HIV care, where lack of formal education was found to be a significant factor associated with ART interruption [30]. This could be because of better access to information, which can lead to better decision-making.

The other factor identified as a determinant of ART treatment interruption in this study was the HIV disclosure status. Patients who did not disclose their HIV status to their family or other people were 3.4 times more likely to interrupt their ART treatment than those who disclosed their HIV status to their family or other people. This finding is similar to that of a study conducted in the Oromia region, Ethiopia, on barriers to ART treatment and care that showed adult HIV patients who had social support and disclosed their HIV status to be more likely to retain their HIV care and treatment than those who did not have social support and did not disclose their HIV status [30-32]. This indicates that community support will lead to better retention of ART treatment and care. Patients who used the monthly-based ART drug dispensing model were 4.44 times more likely to interrupt their ART treatment than those who used the multi-month drug dispensing model. This finding is similar to that of a study conducted in Nigeria and Malawi. This indicates that the frequency of health facility visits for HIV patients increased the patient's ability to pick their medication from health facilities [14,23]. Another finding of this study was the assessment of drug-related adverse effects. According to this study, adult HIV patients who were not assessed for drug side effects were 2.26 times more likely to interrupt their ART treatment than those who were assessed for drug side effects. This finding is similar to those of studies conducted in Nigeria, Malawi, and Ethiopia [13,14,23]. This could indicate that patients who interrupted ART medication were probably those who experienced ART drug side effects. Patients who did not have a recorded routine viral load from their follow-up cards were 7.86 times more likely to interrupt their ART treatment when compared with those who had recorded viral loads in their ART follow-up cards. This finding was similar to that of a study conducted in Nigeria [24]. This suggested that a higher level of interruption was probably associated with patients who had an unsuppressed viral load, most likely due to poor adherence, which was indicative of poor clinical care associated with ART interruption.

Limitation of the study

The findings of this research used secondary data and other variables, such as patient behavioural and social aspects, that can be directly obtained through patient interviews that were not addressed in this study.

Conclusion

This study identified that having no job, being a farmer, not disclosing HIV status, not using a multi-month drug dispensing model, not having a registered viral load, not being assessed for drug side effects, and not having a formal education as determinant factors of ART treatment interruption in HIV patients on ART in the study area. The factors identified should be considered to improve ART adherence in the study area. Improved clinical care and social support for HIV patients should be a priority for health professionals, adherence advocates, the government, and NGOs. In order to fully comprehend the sociocultural and behavioural factors that influence the discontinuation of ART treatment, additional longitudinal studies should also be conducted.

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