Determinants of Loss to Follow-up among HIV-infected Adult Patients Enrolled in Antiretroviral Therapy in Tepi General Hospital, South west Ethiopia: A case control study

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Abstract

Background: Retention in care and adherence to the treatment is key indicator of the HIV program effectiveness. HIV-infected patients who are lost to follow-up while on treatment compromise their own health and the long-term achievement of antiretroviral therapy (ART) plans. However, there is limited evidence on the determinants of lost to follow-up among HIV infected patients ART in the study area.

Objective: Thus, this study was aimed to assess the determinants of loss to follow-up among HIV-infected patients on ART at ART clinic of Tepi General Hospital, South West Ethiopia.

Method: Unmatched case control study was used among a total of 360 records of (120 cases and 240 controls) patients who were registered on antiretroviral therapy in Tepi General Hospital from January 1st, 2017 to December 30, 2019. Baseline patient records were extracted from electronic data base and registration books. Statistical Analysis was done using backward method and multivariable logistic regression model to identify the determinants of loss to follow up among patients on ART. Level of statistical significance was declared at p –value less than 0.05.

Results: After controlling for possible confounders, the independent variables that increased lost to follow-up of patient were being male [AOR = 2.2, 95% CI: (1.27, 4.10)], being aged 15-24 years[AOR = 3.8, 95% CI (1.0, 14.5)],being rural resident [AOR = 2.2, 95% CI: (1.2, 3.9)],being single [AOR = 3.6, 95% CI: (1.9, 6.7)] ,baseline CD4count <500cells/ml[AOR = 4.2, 95% CI: (2.01, 8.5)] , not disclosing HIV status [AOR = 1.8, 95% CI: (1.0, 3.2)] having WHO clinical stage three [AOR = 3.4, 95% CI: (1.6, 7.3)] and lack of telephone contact [AOR = 1.9, 95% CI: (1.03, 3.6)].

Conclusion: The current study found that, being male, being single, being aged 15-24 years-not disclosing HIV status, having baselineCD4 count<500cells/ml, being rural residents, having WHO clinical stage three and four and lacking telephone contact at start of follow-up were determinants of loss to follow-up from chronic HIV care. The findings of this study have implications for patient support and monitoring in ART programs such as reengaging those who have been lost to follow-up from ART. Clinicians working in ART care shall consider the identified risk factors while giving ART service. Tracking the lost patients to make the evidence more complete is recommended for future research.

Keywords: ART, lost to follow-up, HIV, South West Ethiopia.

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Abbreviations /Acronyms

AIDS	Acquired Immune Deficiency Syndrome
AOR	Adjusted Odds Ratio
ART	Anti-retroviral Therapy
CD4	Cluster for Differentiation 4 (Type of T-lymphocytes)
CI	Confidence Interval
COR	Crude Odds Ratio
EDHS	Ethiopian Demographic and Health Survey
HIV	Human Immune Deficiency Virus
LTFU	Lost to Follow-up
OI	Opportunistic Infections
PLWHIV	People Living With HIV
UNAIDS	United Nations Program on HIV/AIDS
USAID	United States Agency for International Development
W H O	World Health Organization

1. Introduction

1.1. Background

Antiretroviral therapy (ART) has significantly reduced mortality and improved the life expectancy of Human Immunodeficiency Virus (HIV)-infected patients but the achievement still critically depends on consistent patient follow up (1–4). ART is the base for all-inclusive health sector answer to HIV treatment, care, and support (5).

The ART coverage in 2018, globally 23.3 million people living with HIV were accessing ART, up from 7.7 million in 2010 (6). In East and Southern Africa, the aver- age adult ART coverage is 66% (1).Sub-Saharan Africa had coverage of about 42% but, making sure adherence to HIV treatment remains difficult in all countries (7).

The HIV/AIDS widespread in Ethiopia remains to pose a threat to the lives of its people. (8) HIV/AIDS prevalence in 2019 in the country were 0.9% (9). In latest Ethiopia Country Operational Plan Strategic Direction Summary, there were 665,723 HIV-infected people and 33,800 new HIV infections in Ethiopia (10). The people living with HIV (PLHIV) on ART in Ethiopia in 2019 year was 468,705 (10).

Effective ART program is when the patient follows and retained in care (11). Appropriately taking of the medication is the advisable choice in order to obtain full benefits of ART (12). It has been estimated that for ART treatment to be actual; adherence should be as a minimum 95% (3). Ideal clinical and public health attainments of ART requires regular long-term adherence (7).

Loss to follow-up is a term used to categorize patients no longer being seen in a chronic HIV care treatment programs (28, 29). It is defined as not taking ART replenishment for last 90 days or more from last attendance for refill, but not classified as dead or transferred out (14).The amount of time for LTFU for the patient once on ART is three months and above after the last replenishments in this study (30,31).Loss to follow-up (LTFU) is a situation where PLHIV receiving combination ART become unaccounted for within a specified period (13). It ruins a frequent clinical and epidemiological challenge for HIV agendas such as drug resistance (12) , weakens the immunological benefit of treatment (7), and rises AIDS-related morbidity and mortality. (14) Additionally, it is also a major impediment to successful carrying out of HIV care and treatment programs (15,16).

Rates of LTFU among adults from ongoing chronic care are approximately 10-20% globally (16). However, some reports suggest that LTFU rates are overvalued due to patient movement to other facilities and inadequate medical records (17). The magnitude of interruptions from chronic HIV care in Asia and Africa by year 2009 and 2012 was between 9 to 34% and 13.7 to 57 % respectively (18). On the other hand, in Sub-Saharan Africa with an estimated 20-40% of patients being LTFU from HIV care (16).

Studies done in Ethiopia shows, incidence of loss to follow-up in 2018 was 12.2 per 100 person years (14). However different studies done in southwest Ethiopia, the prevalence of withdrawal in 2012 and 2014 was between 9.8–31.4% (7). As the number of patients on ART increases, giving due attention to the quality of care to ensure optimal viral suppression and to improve quality of life for PLWHIV is essential (19). In systematic reviews of the different literatures, programs' holding of persons with HIV in low-income countries is a matter of concern; objectively large proportions of patients are LTFU from ongoing HIV care program, especially in the first year of ART(20,21)**.** The relative new occurrence of HIV infection reduced over time in settings where a high level of ART coverage was achieved through fruitful scale-up of HIV treatment services (18,22)**.**

1.2. Statement of problem

The time of HIV/AIDS care moves from HIV testing and diagnosis to linkage to care, retention in care, participation in care with the prescription of ART up to achieving viral suppression and maintenance of status (23,24). LTFU is associated with poorer consequences because of loss of PLWHIV across the care extent and complicates global evidence of the rapid ART scale up (20,22).

According to the United States Agency for International Development *(USAID*) fast-track strategy, 90% of people on ART should achieve maintained viral suppression with good adherence and holding to ART follow-up (22). But, poor retention in care and defaulting from follow-up of chronic HIV-care are not easy in achieving this target (14).

Several consequences have been reported for patients who were classified as LTFU from ongoing ART programs: death, withdrawal from care, transferred to a new treatment site or unable to stay in care due to medical, economic, social and psychological barriers (4,7,14,25). Additionally it causes discontinuation of treatments, drug toxicity, treatment failure and ART drug resistance (7,14,17). Patient tracing has assisted to further qualify the true status of patients categorized as LTFU sometimes with the positive effect of reengagement in care (26). LTFU is challenging for the health care facilities to retain all patients in HIV-care (27).

In Ethiopia various appreciated strategies implemented to scale-up antiretroviral therapy such as promotion of ART, Task shifting from physician to nurses and decentralization of ART delivery service to health center was done over the last decade (4). Despite this, enormous number of individuals who initiate ART do not receive long-term follow-up care (25).

Retention in care and patients' adherence to the treatment programs are concern for the health sector to gain the desired outcome of ART (17). It doesn't get due attention because many treatment provider facilities have limited resources to trace missing patients (14,17). As a result health facilities have concentrated on patient regular adherence to antiretroviral treatment (17).

To improve retention of patients on ART and reduce patients lost from chronic care, the factors that affect LTFU of the patients on ART need to be identified (15). The inquiry of LTFU in HIV care has been used to monitor and improve program effectiveness, using patient retention as a measure of quality of care (12).

Despite, many studies done in Ethiopia are related to adherence to ART and associated factors. But major of LTFU are not identified in the study area. Thus, this study was aimed to assess the determinants of LTFU among HIV-infected adults by using three years (2017–2019) ART clinic data from Tepi General Hospital in southwest Ethiopia.

1.3. Significance of the study

The factors contributing to LTFU can vary from place to place. In Tepi town many people fluctuating seasonally for reason of plantation and production of coffee because of this like that of other people HIV-infected adult patients move in and out of town by different time. To better characterize reasons that affects LTFU is important to distinguish the intervention areas and improve the life of PLWHIV through improved viral suppression.

Lost to follow-up patients can't be easily reached, because patients involved in that way have decided to be out of care voluntarily or involuntarily. Without more precise findings the factors that affect loss to follow up and the characteristics of those who move away from the treatment program of hospital an appropriate interventions to increase ART adherence cannot be designed and implemented.

This finding of the study would be helpful for health professionals in distinguishing techniques to hold HIV patients on chronic HIV-care services. On other hand, the result could serve as a base line data for researchers who interested to perform their research on lost to follow up and its determinants. Furthermore, it would be helpful for design interventions that reduce LTFU and improve clinical outcome of patients who initiate ART. Finally, it benefits health policy makers and planners for designing possible interventions on lost to follow-up.

2. Literature review

Early identification, timely starting of treatment and retention in care depends both on patient characteristics and health systems factors (11,32). Long-term regular follow up of ART is an important component of chronic HIV care Program. (27) Retention in care and adherence to ART are vital for the optimal success of HIV treatment scale-up (33).

Furthermore, prolonged holding of patients in ART programs is essential for fight against the HIV widespread and for the success of the treatment programs (24). Failure to notice patients with LTFU weakens overall retention and underestimates program-level mortality (17,32). Nowadays, interest has grown in tracing patients LTFU to ascertain their life-sustaining and treatment status, to bring patients back to care and further characterize the true status of patients classified as LTFU (14,17,22).

Modeling by the UNAIDS and others indicates that, there is now a unique opportunity to end the HIV/AIDS epidemic by reaching the 90-90-90 targets by 2020: 90% of HIV infections are diagnosed, 90% of people known to be HIV-positive are on ART and 90% of individuals on ART are virological suppressed (11). By those targets of the UNAIDS: all people living with HIV 79% knew their status, 62% were accessing treatment and 53% were virally suppressed in 2018 (34). Interruption from ART treatment program has been recognized as an impediment for attainment of the second 90 of the UNAIDS treatment targets as it affects the sustainable intake of the treatment (34,35). Furthermore, LTFU impacts the performance of the third 90 of the UNAIDS 90-90-90 that targets at achieving 90% of the virological success of patients on ART (35). This is because ART interruption lowers the capacity of the

treatment and afterward leads to falling the number of CD4 cells, enhancing the number of viral counts, and then to diminishing immunological or virological success (1,7).

Nowadays, about 65 to 80% of patients are retained in HIV care in resource-limited settings (36). ART programs in Sub-Saharan Africa countries are highly affected by LTFU which remains a major challenge to success of ART programs in these settings (17). In an ART in lower income countries study, LTFU after 1 year was greater than 40% in some programs, and associated with more advanced clinical disease and lower CD4 cell counts (22). Holding patients in care are also essential to ensure ongoing receipt of ART, timely evaluation of ART toxicity, new opportunistic infections occurrences and development of ART resistance (27). Whereas, suboptimal retention is related to poor viral suppression, treatment failure, and raised diseases and fatality rate (26). Recent studies in Sub Saharan Africa showed that, PLWHIV lost to follow-up had declined in more recent years, whereas silent transfer and treatment interruption steps-up (16).

In Ethiopia, ART coverage for adults' age greater than 15years living with HIV has reached 75% (37). Based on the Spectrum estimate of 2018, ART needs in Ethiopia are 551,630 for adults, from those only 414,854 adults are taking ART (38). Public Hospitals in Ethiopia started providing charge free ART in March 2005 (39). Nowadays, ART service is being available in more than 1361 health facilities of which around 909 are health centers (40). Studies done in Ethiopia shows, the prevalence of loss to follow-up in 2018 was 12.2 per 100 person years (14).

Determinants of lost to follow-up among HIV-infected adult patients on ART includes socio-demographic factors such as the younger age group (15–24 years), male gender, the single (never married), not being permitted by religion or faith in causal fashion (7,11,12,14), tuberculosis, ionized prophylaxis, ART side effects, changing ART, duration on ART, viral load, CD4 count, WHO stages III &IV, being bed-ridden, and ambulatory patient were some of the factors associated with LTFU. (7,17,22,29,30)

Different studies reported that LTFU from ART are determined by transportation cost or long travel time to the clinic, drug abuse, having HIV negative partner and depression. (3,29,31)

2.1. Conceptual framework

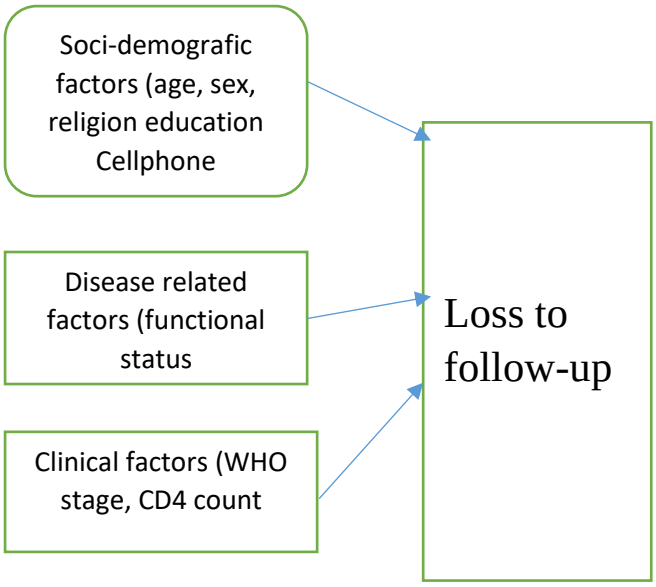

Figure 1: Predictors of loss to follow-up among HIV-infected adult Patients, in Tepi General Hospital, June, 2021

Source. MacheTsadik and et.al, 2015; Abebe M and et.al 2016

3. Objective

3.1 Objective of study

• To identify determinants of loss to follow-up among HIV-infected adult patients attending antiretroviral treatment at Tepi General Hospital from January 1st, 2017 to December 30, 2019.

3.2 Hypothesis

- Do clinical factors increase the risk of LTFU?
- Do socio demographic factors enhance LTFU?

4. Methods

4.1 Study Area and Period

The study conducted at Tepi General Public Hospital which is found in Sheka Zone, Southern Regional State. Tepi General Hospital is located at 611 kilometers from Addis Ababa, the capital city of Ethiopia. It serves more than 500,000 people of the Sheka Zone and neighboring areas. There are 14 government health centers surrounding Tepi General Hospital out of this eight health center give HIV services. The hospital started providing ART in 2015 and gives comprehensive HIV/AIDS care such as prevention, curative and support services. The study period was from December 1 to 30, 2020.

4.2 Study design: Facility based case control study design was used.

4.3 Source Population: The source population were records of all HIV-infected adult patients aged 15 or greater years enrolled for ART services in Tepi General Hospital from January 1st, 2017 to December 30, 2019.

4.4 Study Population

Cases: Records were all randomly selected lost to follow-up patients registered in the study hospital for last three years (from January 2017 to December 2019) prior to study.

Controls: All randomly selected records of all HIV-infected adult patients aged 15 or greater years on ART with optimum adherence level of 95%) to the treatment.

The cases were selected HIV-infected adult patients whose age ≥15 years and were registered as LTFU during the three years prior to the study. The controls were selected ART adherent HIV-infected adult patients whose age ≥15 years with adherence to ART of 95% or more and followed ART as scheduled selected from the patients known to be adherent to the treatment.(29)

4.6 Inclusion and Exclusion criteria

Inclusion criteria: Records of All adults' age ≥15 years, HIV-infected patients in the chronic HIV treatment program from January 1st, 2017 to December 30, 2019 were included.

Exclusion criteria: Records of HIV-infected patients who were died, transferred out and with unknown initiation date of ART were excluded.

4.7. Sample size determination and Sampling procedure

4.7.1. Sample size determination

Proportion of exposure for distance among cases to be 44% and 26% among controls respectively (29). The corresponding Z score of 95% confidence level, 80% power, 2 expected odds ratio and control to case ration of 2:1. It was calculated by Epi Info version7 and the total sample size of 360 (240 controls and 120 cases).

4.7.2. Sampling procedure

National standardized ART register form in the hospital was used to counting for both cases and controls. An ART electronic database (electronic medical records) was used to generate lists of patients who were LTFU (cases). After identifying 120 cases from lists ART electronic database who were lost to follow-up during January 1st, 2017 to December 30, 2019 then for each case, two HIV-infected adult patients with adherence of ≥95%(good adherence) a total of 240 controls to ART were selected from ART register or retrieved from electronic medical records by simple random sampling method (lottery method).

4.8 Data collection

4.8.1. Data collection tool

Data abstraction tool (checklists) was adapted by reviewing different literatures (29,31,41), ART registration book, reporting formats and patient monitoring formats employed by the Federal Ministry of Health of Ethiopia. The standard ART entry and follow-up form included questions on socio-demographic information, past medical status, substance use, disclosure status, and mental health status, concern for adherence, knowledge on HIV and knowledge on ART.

The data were extracted from routinely collected HIV patients ART database during the follow-up time. The checklists used to extract secondary data from medical records of the ART adherent patients (controls) and LTFU patients' (cases) data.

8.8.2. **Data collection procedure** and data quality assurance

Experienced, two diploma nurses who were trained on comprehensive HIV care and treatment, and working in ART clinic (who already knew the details of the patients) extracted data from standardized ART registration book or patient's card. Whenever relevant information is missed, the ART electronic database retrieved by expertise of Centers for Disease Control and Prevention Program of the hospital.

Two days training was given for both data collectors and supervisors to standardize and agree on the way to review medical records. Data were retrieved secretly from medical registers using patients' unique ART number or medical record number. During the data extraction process the checklist checked for their completeness, consistency and accuracy by the one Bachelor degree nurse and one heath officer trained supervisors. Furthermore, principal investigator monitored the overall quality of the data extraction every day.

4.9 Study variables

4.9.1. Dependent variable: The dependent variable was Loss to Follow-up; Coded as '0' adherent on ART and '1' LTFU.

4.9.2. Independent variables: included both Socio-demographic (age, sex, marital status, educational status, religion, and residence), clinical factors and laboratory measurement information collected from the intake form or follow-up card (baseline CD4 count, WHO clinical stage, side effects of drug, functional status, ART change and presence telephone contact at start of ART).

4.10 Operational definition

LTFU: patients who had not returned for more than 3 months after missing their last scheduled visit (31). Retention: patients who were known to be alive and receiving ART. Functional status were classified in to the following categories: 1.work-able to perform usual work, 2. ambulatory-able to perform activity of daily living, and 3.bedridden –not able to perform activity of daily living (7).Educational status would be categorized in to no education (could not read and write), primary (grade 1-8), and secondary and above (grades ≥9) (7).

Adherence Status 1. Good (≥95%): Missing <3 doses out of 30 doses or missing <4 doses out of 60 doses 2. Fair (85-95%): Missing 3-5 doses out of 30 doses or missing 4-9 doses out of 60 doses 3. Poor (<85%): Missing >6 doses out of 30 doses or missing >9doses out of 60. (7) Disclosure status: - is a patient when disclosing their status for family, friend, partner or others for support.(12)

4.11. Data quality assurance:

During the data extraction process the checklist checked for their completeness, consistency and accuracy by the one Bachelor degree nurse and one heath officer trained supervisors. Furthermore, principal investigator monitored the overall quality of the data extraction every day.

4.12 Data processing and analysis

Completed data extraction tools were double checked by trained supervisors and principal investigator manually before data entry and cleaned, edited and checked for missed value. Data were recoded as "1" for cases and "0" for controls. Data entry and coding was done by using Epi data version 3.1and exported to SPSS windows version 25 for analysis.

Descriptive summary using frequency tables and proportions for categorical data ; and. Median, interquartile range for continuous data were used to present results and then bivariable logistic regression analysis done for each variable. Lastly, multivariable logistic regression analysis was fitted to observe the relative effect of independent variables on the dependent variable by controlling for the effect of other variables. P-value <0.25 cut-off point in the bivariable analysis was considered as candidate to be entered into the multivariable logistic regression model. The models were evaluated using backward method to examine the relation among independent variables and dependent variable. Hosmer-lemeshow goodness-of-fit was used to assess the goodness of fitness of the final model. Adjusted odds ratio along with 95% confidence interval were computed to determine predictors of LTFU. P-value <0.05 was considered as a cutoff value for statistical significance in the final model.

4.13 Ethical considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of the Institute of Health at Jimma University. Permission to undertake the study was obtained from every relevant authority in Sheka Zone Health Department and Tepi General Hospital. All information collected from patients cards were kept strictly confidential and names of patients on ART were not included in the data abstraction form. Confidentiality also maintained by using non-personal identifiers such as patients' medical registration number and unique ART number were used to distinguish study subjects during data reviewing and extraction process.

5. Results

During the study period both ART register and electronic medical records were reviewed. One hundred twenty adult patients were registered as LTFU in the Tepi General Hospital during three years of study period (from January 2017 to December 2019). Of the total registered LTFU patients, 93(77.5%) were restarted treatment.

5.1 Socio-demographic and clinical characteristics

A total of 360 patient records were analyzed and the median age of the cases was 23 years with interquartile range of 20–31 years, and that for the controls was 29 years with interquartile range, 23–37years. Majority of the cases and controls were males, comprising 65(54.2%) and 136(56.7%) respectively. Nearly three-fourth of the cases (73.4%) and more than half of controls (53.8%) were rural dwellers. About half of cases, 60(50.0%) and

71(29.5%) of controls were single. Fifty five (45.8%) of cases and 96(63.6%) of the controls attended primary education. (**Table 1**).

Table 1: Socio-demographic characteristics of study participants in Tepi General Hospital, South west, Ethiopia, January, 2017 to December, 2019.

Variables	Cases(LTFU) N (%)	Controls(adherent) N (%)
Sex		
Male	84(70.0)	127(52.9)
Female	36(30.0)	113(47.1)
Age category		
15-24years	67(55.8)	79(32.9)
25-34years	32(26.6)	94(39.1)
35-44years	10(8.3)	34(14.1)
45-54years	7(5.8)	8(3.3)
≥55years	4(3.3)	25(10.4)
Residence		
Urban	32(26.6)	111(46.2)
Rural	88(73.4)	129(53.8)
Marital status		
Married	50(41.6)	125(52.0)
Single	60(50.0)	71(29.5)
Divorced	8(6.6)	30(12.5)
Widowed	2(1.6)	14(5.8)
Educatinalstatus		
No education	34(28.3)	70(29.1)
Primary	55(45.8)	96(40.0)
Secondary	25(20.8)	64(26.6)
Tertiary	6(5.0)	10(4.1)

5.2. **Clinical and follow-up characteristics of study participants**

The baseline clinical characteristics of cases and controls were also analyzed. About, 16(13.4%) of the cases and 16(6.7%) of the controls had adverse effects of ART. Regarding

HIV-disclosure status 67(55.8%) of cases and 184(76.6%) of controls disclosed their HIV status at least to one family member. Of the total, 84(40.0%) of the cases were WHO clinical stage three and similar percent of controls were WHO clinical stage two at the start of ART.

Similarly, in terms of partners' HIV status, 74(61.6%) of cases and 175(72.9%) of controls' partners had known their sero-status. Majority (85.0%) of the cases and 154(64.2) controls had a CD4 count of less than 500 cells/ml at start of the ART follow-up. Of the total study participants, majority 87(72.5%) of the cases and more than half 127(52.9%) of the controls had no documented (poor written) cell phone number at ART initiation. (**Table 2**)

Table 2: Clinical and follow-up characteristics of study participants in Tepi General Hospital, South west, Ethiopia, January, 2017 to December, 2019

Variables	Cases(LTFU) N (%)	Controls(adherent) N (%)
Presence of ART side effects		
No	104(86.6)	224(93.3)
Yes	16(13.4)	16(6.7)
HIV disclosure status		
Disclosed	67(55.8)	184(76.6)
Not disclosed	53(44.2)	56(23.4)
Partner's HIV status		
Known	74(61.6)	175(72.9)
Unknown	46(38.4)	65(27.1)
Baseline CD4 count		
500 cells/ml or more	18(15.0)	86(35.8)
<500 cells/ml	102(85.0)	154(64.2)
WHO Clinical stage		
Clinical stage 1	18(15.0)	77(32.0)
Clinical stage 2	31(25.8)	96(40.0)
Clinical stage 3	48(40.0)	58(24.1)
Clinical stage 4	23(19.1)	9(3.7)

Telephone contact		
No	87(72.5)	127(52.9)
Yes	33(27.5)	113(47.1)

5.2 Determinants of Loss to follow-up

In bivariable analysis on socio-demographic characteristics, the study found that being a male gender, younger age (15-24 years), rural dwellers, and single marital status were candidates for the final model. Regarding, clinical and follow-up characteristics of study participants variables like, presence of side effects, HIV disclosure status, partner's HIV status, baseline CD4 count<500cells/ml, WHO Clinical stage three and four ,and absence of telephone contact were candidates at p value<0.25 for the final model.

In final multivariable analysis, variables such as being male, younger age, residence, marital status, baseline CD4 count<500cells/ml, HIV disclosure status, absence of telephone contact at start of ART, and WHO clinical stage three and four were found to be the determinants of LTFU from chronic ART follow-up.

Patients with male sex were 2.2 times more likely to lost to follow-up from chronic HIV care than female patients [AOR = 2.2, 95% CI (1.27, 4.10)]. Those in the 15 to 24 years age group were 3.8 times more likely to LTFU [AOR = 3.8, 95% CI (1.0, 14.5)] compared to those over age 55years old. This study revealed that rural dwellers were 2.2 times more likely [AOR = 2.2, 95% CI (1.2, 3.9)] to become LTFU than urban residents. Similarly single patients were 3.4 times more at risks of LTFU [AOR = 3.4, 95% CI (1.8, 6.4)] than married patients. Patients with baseline CD4 count less than 500 cells/ml were 4.2 times [AOR = 4.2, 95% CI (2.0, 8.5)] more likely to be LTFU from ART compared to those with a CD4 count greater than 500 cells/ml. Lost to follow-up patients had 3.4 times [AOR = 3.4, 95% CI (1.6, 7.3)] more risk with advanced WHO clinical stage three, using WHO clinical stage one as the reference. Similarly, LTFU were 14.4 times more likely to exhibit WHO clinical stage four [AOR = 14.4, 95% CI (4.4, 46.7)] compared to WHO clinical stage one. Patients who not disclosed their sero-status were 1.8 times [AOR = 1.8, 95% CI (1.0, 3.2)] more likely LTFU as compared their counterpart. Our study reported that patients with no telephone contacts among cases were 1.9 times as likely [AOR = 1.9, 95% CI (1.03, 3.6)] to get LTFU as compared to who had telephone contacts at starting of ART. (**Table 3**)

Table 3: Determinants of loss to follow-up among study participants in Tepi General Hospital, South west, Ethiopia, January, 2017 to December, 2019.

Variables	Cases(LTFU) N (%)	Controls(adherent) N (%)	Crude odds ratio (95% CI)	Adjusted odds ratio (95% CI)	p-value
Sex					
Male	84(70.0)	127(52.9)	**2.0(1.3,3.3)***	**2.2(1.2,4.1)****	**0.005**
Female	36(30.0)	113(47.1)	1		
Age category					
15-24years	67(55.8)	79(32.9)	**5.3(1.7,15.9)***	**3.8(1.0,14.5)****	**0.045**
25-34years	32(26.6)	94(39.1)	2.1(0.6,6.5)	1.2(0.3,4.5)	0.77
35-44years	10(8.3)	34(14.1)	1.8(0.5,6.5)	1.7(0.3,7.6)	0.48
45-54years	7(5.8)	8(3.3)	5.4(1.2,23.6)	3.0(0.5,17.1)	0.20
≥55years	4(3.3)	25(10.4)	1		
Residence					
Urban	32(26.6)	111(46.2)	1		
Rural	88(73.4)	129(53.8)	**2.3(1.4,3.8)***	**2.2(1.2,3.9)****	**0.007**

Marital status					
Married	50(41.6)	125(52.0)	1		
Single	60(50.0)	71(29.5)	**2.1(1.3,3.3)***	**3.4(1.8,6.4)****	**0.001**
Divorced	8(6.6)	30(12.5)	0.6(0.2,1.5)	0.9(0.3,2.6)	0.94
Widowed	2(1.6)	14(5.8)	0.3(0.07,1.6)	0.5(0.06,3.3)	0.46
Presence of side effects					
No	104(86.6)	224(93.3)	1		
Yes	16(13.4)	16(6.7)	2.1(1.0,4.4)	1.4(0.5,3.7)	0.49
HIV disclosure status					
Disclosed	67(55.8)	184(76.6)	1		
Not disclosed	53(44.2)	56(23.4)	**2.5(1.6,4.1)***	**1.8(1.0,3.2)****	**0.03**
Partner's HIV status					
Known	74(61.6)	175(72.9)	1		
Unknown	46(38.4)	65(27.1)	1.6(1.0,2.6)	1(0.5,1.9)	0.84
Baseline CD4 count					
500 cells/ml or more	18(15.0)	86(35.8)	1		
<500 cells/ml	102(85.0)	154(64.2)	**3.1(1.7,5.5)***	**4.2(2.0,8.5)****	**0.001**
WHO Clinical stage					
Clinical stage 1	18(15.0)	77(32.0)	1		
Clinical stage 2	31(25.8)	96(40.0)	1.3(0.7,2.6)	1.2(0.6,2.6)	0.50
Clinical stage 3	48(40.0)	58(24.1)	**3.5(1.8,6.7)***	**3.4(1.6,7.3)****	**0.001**
Clinical stage 4	23(19.1)	9(3.7)	**10.9(4.3,27.5)***	**14.4(4.4,46.7)****	**0.000**
Telephone contact					
No	87(72.5)	127(52.9)	**2.3(1.4,3.7)***	**1.9(1.0,3.6)****	**0.03**
Yes	33(27.5)	113(47.1)	1		

Note: *Definition of abbreviation: CI=confidence interval; LTFU=lost to follow-up *Candidate at bivariable,*

*** significantly associated at multivariable analysis at P-value <0.05. **1:** Reference category.*

6. Discussion

The findings of the multivariable logistic regression revealed that, male sex, younger age, rural residence, being single, baseline CD4 count <500cells/ml, WHO clinical stage three and four, HIV disclosure status and no documented cell phone contact at starting of ART follow-up were determinants of LTFU from chronic HIV/AIDs care.

Males have higher risk of being lost from the long term ART service. In our study males had 2.2 times more risk to be LTFU compared to females. Literature documented that, men have a habit of presenting with advanced HIV disease at diagnosis and to be at higher risk of LTFU and death (42).In line with this, a study done in Tigray region showed being male had almost 3 fold higher risk of loss to follow-up (2).This finding is inconsistent with a study done in Gondar (Amhara region) (43) and Jimma (Oromia region) (7).

The young patients (15-24years) in this study had greater odds of LTFU than those greater than 55years of age. This finding implied that as age increased the likelihood of LTFU decreased. The factors that might contribute for this variation could be fear of stigma and discrimination in younger age groups (17). Moreover, the 15-24 years old age groups tend to be less adherent to ART and to health facility visits (11).This finding is consistent with studies conducted in different region of Ethiopia like, Jigjiga town and, Oromia region (12, 17).

This study showed that marital status is a predictor of LTFU. Single patients were 3.4 times more likely to be LTFU as compared to their married (cohabiting) counterparts. Because of not disclosing to any one in family members and society the patient's didn.t get support from family or elsewhere. Single patients might not disclose due to any family members and society as well due to fear of stigma. This implies that having a dedicated spousal care system could be a motivation for patients to overcome existing obstacles to continuing care. This finding is similar with a study done in Northern Ethiopia and Central Kenya. (4, 11)

Rural residents were 2.3 times more likely to be LTFU from the ART treatment program than urban dwellers. This might be due to different factors such as distance from treatment centers, transport related costs and level of patient's awareness of the treatment. This finding is in line with study done in Oromia region. (41).

Loss to follow-up was 4.2 times higher among patients with a CD4 count <500 cells/ml compared to CD4 cell counts 500 cells/ml or more. This could be indicative of patients with lower CD4 cell counts being too sick to follow on care, transferring to clinics closer to them, or they may have died. Additional justification is that patients with low CD4 counts who are on ART may not be taking their medication as recommended. Lack of clinical response to treatment may reinforce poor adherence and result in stopping ART completely. This finding is consistent with studies done in Kenya (21), Uganda (27) and South Africa (28).

Patients who had never disclosed their sero status to anyone were 1.8 times more likely to become LTFU. This is similar to study done in Kenya (21). Disclosure might have benefits to HIV-infected adults by improving adherence to ART and engagement of social support.

According to findings from this study, patients who started ART with HIV disease classified as WHO clinical stage three were 3.4 times more likely to be LTFU and WHO clinical stage four were 14.4 times more likely compared to those with WHO clinical stage one. This indicates that, the odds of patients being lost from chronic HIV care increased with increasing WHO clinical stage. This finding is similar with study done in Uganda (44) , Oromia region (Ethiopia) and Pawi Hospital-northwest Ethiopia (41,45).

Our study revealed that, patients with no documented cell phone contacts among cases were 1.9 times higher to get LTFU as compared those with documented cell phone contacts among controls. This means that cases without documented cell phone contact would lack clinic appointment visits implying that they couldn't access reminders. This evidence was supported by studies conducted in Uganda (27).

This study might suffer many limitations such as, the outcome status of LTFU patients was not clear (death, going to other facility by self-referral), finding of this study might not be generalized to wider context like private hospitals and health centers, Variables like mental illness was not assessed because of nature of study design, Viral load not determined due to poor documentation on patients' cards and data were not taken from LTFU patients directly as

tracing them were difficult. Lastly, this is a retrospective review of routine medical records and subject to missing data.

7. Conclusion

The current study found that, being male, having baseline CD4 count<500cells/ml, being rural residents, having WHO clinical stage three and four and lacking telephone contact at start of follow-up were determinant factors for loss to follow-up from chronic HIV care.

8. Recommendation

Based on the findings of this research, the following recommendations were forwarded;

To health care providers working in ART clinics

• The completeness of the medical records on charts should be given due attention especially during first visit.

• Should collect timely updated cell phone contact information on all patients to allow the effective tracing of patients during loss to follow-up time.

To governmental and nongovernmental organizations

- A special emphasis and close follow up should be given to patients at risk of younger age, male, rural residents, never disclosed, low CD4 count, WHO clinical stage three and four and no telephone contact were needed to prevent LTFU
- Ongoing evaluation of LTFU among HIV-infected adult is required

To researchers

- Identifying the outcome of LTFU patients and tracking the lost patients to make the evidence more complete are recommended.

9. References

1. Birhanu A, Id T, Tsegaye AT, Wolde HF. Incidence and predictors of loss to follow up among adult HIV patients on antiretroviral therapy in University of Gondar Comprehensive Specialized Hospital : A competing risk regression modeling. 2020;90:1–14. Available from: http://dx.doi.org/10.1371/journal.pone.0227473

2. Tadesse K, Haile F. Predictors of Loss to Follow Up of Patients Enrolled on Antiretroviral Therapy : AIDS & Clinical Research. 2014;5(12).

3. Aferu T, Doang G, Zewudie A, Nigussie T. Adherence to Antiretroviral Therapy Among HIV-Positive Pregnant Women on followup at Mizan Tepi University Teaching and Tepi General Hospitals , Southwest Ethiopia. 2020;

4. Gebrezgabher BB, Kebede Y, Kindie M, Tetemke D, Abay M. Determinants to antiretroviral treatment non - adherence among adult HIV / AIDS patients in northern Ethiopia. AIDS Res Ther. 2017;1–7.

5. Preference P. Adherence and Its Associated Factors Among Adult HIV-Infected Patients on Antiretroviral Therapy in South Western Ethiopia , 2020. 2021;

6. UNAIDS. Joint United Nations Programme on HIV/AIDS. Factsheet: Global AIDS Update. Geneva:Swizerland. 2019;1–6.

7. Gesesew HA, Ward P, Woldemichael K, Mwanri L. Prevalence , trend and risk factors for antiretroviral therapy discontinuation among HIV-infected adults in Ethiopia in 2003-2015. 2017;1–16.

8. Hospital S, Deribe K, Hailekiros F, Biadgilign S, Amberbir A. Defaulters from antiretroviral treatment in Jimma University. 2008;13(3):328–33.

9. Demographeic and Health Survey of Ethiopia. 2016, Key indcator report

10. Rt A. Ethiopia Country Operational Plan Strategic Direction Summary. 2020;

11. Mirkuzie AH, Ali S, Abate E, Worku A, Misganaw A. Progress towards the 2020 fast track HIV / AIDS reduction targets across ages in Ethiopia as compared to neighboring countries using global burden of diseases 2017 data. 2021;1–10.

12. Care P, Ejigu M, Desalegn Z, Mosisa G. Adherence to Combined Antiretroviral Therapy and Associated Factors Among People Living with HIV Attending Nekemte Specialized Hospital , Oromia , Ethiopia : A Cross-Sectional Study. 2020;97–106.

13. Aliyu A, Adelekan B, Andrew N, Ekong E, Dapiap S, Ibrahim FM, et al. Predictors of loss to follow - up in art experienced patients in Nigeria : a 13 year review (2004 – 2017). AIDS Res Ther [Internet]. 2019;1–9. Available from: https://doi.org/10.1186/s12981-019-0241-3

14. Mekonnen N, Abdulkadir M, Shumetie E, Baraki AG. Incidence and predictors of loss to follow - up among HIV infected adults after initiation of first line anti - retroviral therapy at University of Gondar comprehensive specialized Hospital Northwest Ethiopia , 2018 : retrospective follow up study. BMC Res Notes [Internet]. 2019;1–7. Available from: https://doi.org/10.1186/s13104-019-4154-y

15. Assefa Y, Lynen L, Kloos H. Long-term Outcomes and Their Determinants in Patients on Antiretroviral Treatment in Ethiopia , 2005 / 6 – 2011 / 12 : A Retrospective Cohort Study. 2015;70(4):414–9.

16. Kathrin Zürcher1, Anne Mooser1, Nanina Anderegg1, Olga Tymejczyk2, 3, Margaret J. Couvillon1, Denis Nash2, 3, and Matthias Egger1, 4 for the leDEA and MESH consortiaMooser A, Anderegg N, Tymejczyk O, Margaret J, Nash D, Egger M, et al. Outcomes of HIV-positive patients lost to follow-up in African treatment programmes. 2017;22(4):375–87.

17. Seifu W, Ali W, Meresa B. Predictors of loss to follow up among adult clients attending antiretroviral treatment at Karamara general hospital , Jigjiga town , Eastern Ethiopia , 2015 : a retrospective cohort study. 2018;1–8.

18. Gunda DW, Kilonzo SB, Mtaki T, Bernard DM, Kalluvya SE, Shao ER. Magnitude and correlates of virological failure among adult HIV patients receiving PI based

second line ART regimens in north western Tanzania ; a case control study. 2019;1–7.

19. Care P. Do loss to follow-up and death rates from ART care vary across primary health care facilities and hospitals in south Ethiopia ? A retrospective follow-up study. 2015;167–74.

20. Alizadeh F, Mfitumuhoza G, Stephens J, Habimaana C, Myles K, Baganizi M. Identifying and Reengaging Patients Lost to Follow-Up in Rural Africa : The " Horizontal " Hospital-Based Approach in Uganda. 2019;7(1):18–22.

21. vo ojwang, j penner, C Blata, K Agotd, EA Bukusia, and CR Cohen loss to follow-up among youth accessing outpatient HIV Care and treatment services in kisumu,kenya. 2017;28(4):500–7.

22. Chammartin F, Zürcher K, Keiser O, Weigel R, Chu K, Kiragga AN, et al. Outcomes of Patients Lost to Follow-up in African Antiretroviral Therapy Programs : Individual Patient Data. 2018;67.

23. H N Fomundam, PharmD1, A R Tesfay, MSc (Med)1, S A Mushipe, MPH1, M B Mosina, BSc1, C T Boshielo, MPH1, H T Nyambi, BA1, A Larsen, MPH2, M Cheyip, MSc (Med)2, A Getahun, MD, MPH2, and Y Pillay P 1Howard. Prevalence and predictors of late presentation for HIV care in South Africa H. 2018;107(12):1058–64.

24. Action GH. Factors associated with attrition, mortality, and loss to follow up after antiretroviral therapy initiation: data from an HIV cohort study in India. 2013;9716.

25. Berheto TM, Haile DB, Mohammed S. Predictors of Loss to follow-up in Patients Living with HIV / AIDS after Initiation of Antiretroviral Therapy. 2014;6(9):453–9.

26. Id MB, Meloni ST, Igwilo UU. Status of HIV-infected patients classified as lost to follow up from a large antiretroviral program in southwest Nigeria. 2019;355:1–15.

27. Opio D, Semitala FC, Kakeeto A, Sendaula E, Okimat P, Nakafeero B, et al. Loss to follow-up and associated factors among adult people living with HIV at public health facilities in Wakiso district , Uganda : a retrospective cohort study. 2019;6:1–10.

28. Arnesen R, Moll AP, Shenoi S V. Predictors of loss to follow-up among patients on ART at a rural hospital in KwaZulu-Natal , South Africa. 2017;56(July 2016):1–12.

29. Asefa T, Taha M, Dejene T, Dube L. Determinants of Defaulting from Antiretroviral

Therapy Treatment in Nekemte Hospital , Eastern Wollega Zone , Western Ethiopia. 2013;3(5):130–5.

30. Birhanu MY, Leshargie CT, Alebel A, Wagnew F, Siferih M. Incidence and predictors of loss to follow- up among HIV-positive adults in northwest Ethiopia : a retrospective cohort study. 2020;

31. Mehari D, Mache T, Hailemariam L. Predictors of lost to follow up to antiretroviral therapy in primary public hospital of Wukro, Tigray, Ethiopia: A case control study. J AIDS HIV Res. 2015;7(1):1–9.

32. Adelekan B, Andrew N, Nta I, Gomwalk A, Ndembi N, Mensah C, et al. Social barriers in accessing care by clients who returned to HIV care after transient loss to follow - up. AIDS Res Ther [Internet]. 2019;1–7. Available from: https://doi.org/10.1186/s12981-019-0231-5

33. Shaweno T, Shaweno D. When are patients lost to follow-up in pre-antiretroviral therapy care ? a retrospective assessment of patients in an Ethiopian rural hospital. ??? [Internet]. 2015;1–8. Available from: ???

34. GeGlobal AIDS Monitoringneva SUnaid. Summary of indicators for Global AIDS Monitoring,Swizerland,Geneva,. 2018;

35. WHO. Ending AIDS progress towards the 90–90–90 targets: GlobaL AIDS update. Geneva: swizerland,2018.

36. Ahmed I, Gugsa ST, Lemma S, Demissie M. Predictors of loss to follow-up before HIV treatment initiation in Northwest Ethiopia : a case control study. 2013;333434(June 2011).

37. EPHI. HIV Related Estimates and Projections for Ethiopia.Ethiopia. 2017;(March).

38. MOH. National Guidelines for Comperhensive HIV Prevection , Care and Treatment,Ethiopia,. 2017;

39. MOH. National Guidelines for Comprehensive HIV Prevention, Care and Treatment.Ethiopia,. 2014;

40. FMOH. National Consoleted Guidelines for Comperhensive HIV Prevection , Care and Treatment. 2018;

41. Press D. Predictors of loss to follow-up in antiretroviral treatment for adult patients in the Oromia region ,. 2016;83–92.

42. Wekesa P, Mcligeyo A, Owuor K, Mwangi J, Nganga E, Masamaro K. Factors associated with 36-month loss to follow-up and mortality outcomes among HIV-infected adults on antiretroviral therapy in Central Kenya. 2020;1–11.

43. Wubshet M, Berhane Y, Worku A, Kebede Y. Death and Seeking Alternative Therapy Largely Accounted for Lost to Follow- up of Patients on ART in Northwest Ethiopia : A Community Tracking Survey Death and Seeking Alternative Therapy Largely Accounted for Lost to Follow-up of Patients on ART in Northwest Ethiopia : A Community Tracking Survey. 2013;(March).

44. Id JK, Waila JM, Kahungu MM. Determinants of loss to follow-up among HIV positive patients receiving antiretroviral therapy in a test and treat setting : A retrospective cohort study in Masaka ,. 2020;231:1–17. Available from: http://dx.doi.org/10.1371/journal.pone.0217606

45. Assemie MA, Muchie KF, Ayele TA. Incidence and predictors of loss to follow up among HIV - infected adults at Pawi General Hospital , northwest Ethiopia : competing risk regression model. BMC Res Notes [Internet]. 2018;1–6. Available from: https://doi.org/10.1186/s13104-018-3407-5

10. Appendix

Checklist: This tool is prepared for the collection of socio-demographic, clinical, laboratory and treatment related information that are important for the assessment of predictors of Lost to follow up among HIV-infected adults on antiretroviral therapy at Sheka Zone, Tepi General Hospital, Southern Regional State, 2020. All this information will be adopted from the previous similar studies and from individual patient ART card without mentioning the name of clients. This information will be collected by health care providers possibly working in the ART clinic of the hospitals.

Part I. Socio demographic Characteristics

Serial Number	Socio demographic Characteristics	Coding classification	Skip
1	Age	Age in years----------	
2.	Sex	1.Male 2.Female	
3.	Residence	1. In Teppi town 2.Out of Teppi town	
4.	Marital status	1.never married 2. married	

		3.divorced 4. widowed	
5.	Religion	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Others specify-----	
6.	Level of education	1.No education 2.Primary 3.Secondary 4. Tertiary	
7.	Occupation	1. Day laborer 2. Employee 3. Others	
8.	Family monthly income	----------in ETB	
9.	Distance of ART clinic	----------km from home	
10.	HIV disclosure status	1. Disclosed 2. Not disclosed	
11.	Partner's HIV status	1.Known 2.Unknown	
12.	Bereavement concern	1.Yes 2. No	

PART- II Clinical characteristics of Patients

Serial Number	Clinical characteristics	Coding classification	Skip
13.	Body weight in kilogram	----------Kg	
14.	CD4 count at base line	----------Cells/mm^3	
15.	Recent CD4 count	---------- Cells/mm^3	
16.	OIS prophylaxis	1.Not given 2. Cotrimoxazole 3. INH 4. Others specify------	
17.	Baseline functional status	1.Functional 2.Ambulatory 3.Bedridden	
18	Current functional status	1.Functional 2.Ambulatory 3.Bedridden	
19.	Presence of side effects	1.Yes 2.No	
20.	ART regimen	1. TDF/3TC/EFV 2.Others	
21.	Initial ART change	1.Yes 2.No	

22.	If yes Reason for change regimen	1.Side effect 2.TB treatment 3.ART failure	
23.	Stigma	1.Yes 2.No	

Part- III ART treatment and Patient follow up information

Serial Number	Characteristics	Coding classification	Skip
24.	Date confirmed HIV positive	(--------/----------/----------)	
25.	Starting date of ART	(--------/----------/----------)	
26.	Last follow up date	(----------/----------/----------)	
27.	WHO Clinical stage	1.clinical stage I 2. clinical stage II 3. clinical stage III 4. clinical stage IV	
28.	Duration since initiation of ART	(----------months)	
29.	Opportunistic infections during follow up	1. No 2. Herpes zoster 3. Pneumonia 4. TB	

		5. Oral thrush 6. Diarrhea 7.Othes specify------	
30.	Recent ARV adherence to treatment	1. Good (≥95%) 2. Fair (85-94%) 3. Poor (<85%)	
31.	Reason for fair/poor adherence	1. Toxicity/side effects 2. Forgot 3. Felt better 4. Too ill 5. Stigma 6. Travelling problem 7. Others specify-----	
32.	Drug side effect	1. Yes 2. No	
33.	Current status	1. Alive 2. Dead 3 .Lost follow up 4. transfer to other health facility	
34.	If lost to follow up when after initiation of ART	(----------) month	
35.	If dead or transfer to other facility when	(----------) month	

	after initiation of ART?		
36.	Telephone contact	1.Yes 2. No	

DECLARATION

I hereby declare that this thesis my original work and all sources of material used in the document have been duly acknowledged

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