



Socio-Clinical Characteristics of patients on Antiretroviral treatment in Tulu Bolo, South-Central, Ethiopia, from December 2008 to August 2019

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Advisor: Dr. Hassen Mamo

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A Thesis Submitted to the School of Graduate Studies, Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Biology.

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Acronyms

HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
WHO	World Health Organization
SSA	Sub-Saharan Africa
UN	United Nations
LV	Least vulnerable
NGOs	Non-Government Organizations
BWHOBH	Becho District Health Office Bureau Head
BWHOBVH	Becho District Health Office Bureau Vice Head
SPSS	Statistical Package for Social Sciences
BIM	Body Mass Index
PLHIV	People Living with HIV/AIDS
TBHC	Tulu Bolo Health Center
TBGH	Tulu Bolo General Hospital
TBHACM	Tulu Bolo HIV/AIDS Club Member
BDPADO	Becho District Plan and Development Office, 2019
FHAPCO	Federal HIV/AIDS Prevention and Control Office
UNAIDS	Jointed United Nations Program on HIV/AIDS
PEPFAR	President's Emergency Plan for AIDS Relief
VL	Viral load
FMoH	Federal Ministry of Health
PrEP	Pre-exposure prophylaxis
PEP	Post-exposure prophylaxis
AAU	Addis Ababa University
CNCS	College of Natural and Computational Sciences
IRB	Institutional Review Board
EFHAPCO	Ethiopia Federal HIV/AIDS Prevention and Control Office
VMMC	Voluntary Male Medical Circumcision

Abstract

The discovery of antiretroviral treatment (ART) substantially reduced the burden of HIV/AIDS and improved the life quality of people living with HIV/AIDS (PLHIV). However, ART effectiveness is subject to various determinants, and regular monitoring of the clinic-characteristics data of attendants is recommended. This study was aimed at analyzing the socio-clinical characteristics of patients on ART at Tulu Bolo Health Center (TBHC) and Tulu Bolo General Hospital (TBGH) in Becho woreda district (south-central Ethiopia) from December 2008 to August 2019. Overall, 538 PLHIV (M=229, F=309) were registered during the last twelve-year at the ART center of both facilities. The retrospective data was collected by tally method from the “voluntary counseling and Testing Registration Log Book” and from quarterly reporting formats of the health institution. The research sites were identified, Socio-clinical data were collected, measurements were made, and analysis of data was made. Heteromantic mode of transmission was the known way in the area and pulmonary tuberculosis was the most common opportunistic infection. Many of the participants (212(39.4%)) were 40 years and above. Overall, the data demonstrates age-dependent increase in the number of PLHIV in the facilities. The proportion of rural ART followers (265(49.3%)) was nearly the same as the urban residents (273(50.7%)). The number of underweight participants decreased from 62(11.0%) to 12(2.2%). The pooled viral load test results showed that 468(93.9%) out of the tested 498 was undetectable. In some few patients although the viral load was detectable, their health status was good. The number of participants having CD₄ count below 350 before ART initiation was 358(66.5%) and this number substantially dropped to 54(10.1%) after ART initiation. Correspondingly, 502(92.5%) participants were in the WHO stage I, 26(5.7%) stage II and 10(1.8%) stage III. Majority of the participants (335(61.7%)) had a follow-up period of ≥ 4 years, 107(21.1%) 3 years, 55(9.9%) 2 years and 41(7.3%) 1 year. During the overall follow-up period, 50 died, 51 *lost-to-follow-up* and 43 were *transferred*. The highest number of PLHIV registered in TBGH was in 2017 and in TBHC in 2015. The data in the rest years were up and down with no clear pattern of gender-based distribution. ART adherence of 483(89.2%) participants was *good* and the clinical status of the participants was good. ART adherence of 483(89.2%) participants was *good* and the clinical status of the participants was good. Although the overall clinical characteristics of the patients was considered good because of good adherence, awareness creation and training more healthcare workers must be done to support especially those in the rural area.

Keywords: Adherence, ART, Socio-demographic, HIV/AIDS, opportunistic infections

1. INTRODUCTION

1.1 Background

The Human Immune Deficiency virus(HIV) remains one of the leading causes of infectious disease morbidity in the world (Zemenu Sifr et.al 2021). It was known since the early 1980s remains a global pandemic despite the major achievement with the advent of antiretroviral treatment (ART). HIV/AIDS is the most destructive pandemic worldwide influencing overall social, economic and political wellbeing of nations apart from its impact on individual health and the same situation seen in Africa and Sub-Saharan Africa (SSA) carries the heaviest burden(Kefale Lejadiss Workie et.al 2021).There were 770,000 deaths and 1.7 million new cases in Southern Africa in 2018 (Galvani et al. 2018). There are over 718,550 people living with HIV/AIDS (PLHIV) in Ethiopia (Granich et al. 2018).

Antiretroviral treatment (ART) for human immunodeficiency virus (HIV) Not only coverage but to benefit from ART, adherence is a key factor. However, there is a concern about the capacity of patients in resource-limited settings to adhere to ART, especially in SSA. Human immune deficiency virus is a significant cause of morbidity and mortality, especially in developing countries. Human immune deficiency virus is a significant cause of morbidity and mortality, especially in developing countries (Gebreagziabhe TT et al.2020). Attention is needed to address service gaps that prevent community achieving the full health benefits of ART such as viral load suppression , CD₄ increase and health status increase . Closing the gaps in treatment demands concerted efforts at each step of the process-starting with HIV testing. Most people in SSA have never been tested and thus do not know their status (WHO 2013).

1.2 Statement of the problem

Regular monitoring Socio-Clinical-characteristics data is necessary to evaluate health status of ART attendants and associated problems. This study is aimed at retrospectively and analyzing clinical-characteristics data of PLHIV living in Tulu Bolo, south-central Ethiopia. This is useful devise appropriate interventions.

2. LITERATURE REVIEW

2.1 The global HIV/AIDS burden

HIV is a major global problem with rapid increase. UNAIDS estimates that approximately about 37.9 million people were living with virus in 2018, 1.7 million were newly infected and approximately near to 0.77 million died from AIDS-related illness. Near to 23.3 million people were on ART (UNAIDS 2019). In 2016, 35.5 million people were living with HIV worldwide including 3.3 million children. The global prevalence rate (the percent of people aged 15-49 who are infected) has leveled since 2013 and was 0.9 % in 2018. 1.6 million People died of AIDS in the same year, 30% decrease since 2005. Still there were about 20.3 million new infections in 2018 or more than 6,300 new infection per year. Deaths have declined due to in part ART scale-up. HIV is the leading cause of death worldwide (UNAIDS 2018). HIV/AIDS is a cause of death and disability, especially in low- and middle-income countries. About 36.7 million people are living with this virus in the SSA (Bogale 2017).

2.2 Impact of HIV

PLHIV face multiple problems like depression, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration. HIV-positive status affects quality of life. People that live with chronic health conditions may be at a significantly higher risk of experiencing mental health problems. HIV/AIDS infected individuals are more prone for depression and anxiety disorders which, in turn, increase stigmatization, decrease quality of life, increase mortality, reduce adherence and impair their immune function (Tesfaw 2016). An effective response to HIV/AIDS requires a supportive social, economic, political and environmental infrastructure that includes strong health systems and universal access to social determinants of health.

2.3 HIV control: community-led approach

Among the lessons learned in a diversity of geographic, epidemic and cultural settings is that providing a comprehensive set of services tailored by and for the people in greatest need and removing gender and human rights related barriers to service access is a winning approach that alters the HIV epidemic. Reaching large percentage of the people in greatest requires a

community-based and community-led approach. In South Africa and Zambia, an intensive door-to-door effort by community health workers to promote and provide a range of HIV and health services has achieved the 90-90-90 testing, treatment targets, and dramatically reduced new HIV infections. This was set by UNAIDS for 2020 (Hayes et al. 2019).

In western Kenya, VMMC (Voluntary male medical circumcision) promoted by community circumcision mobilizes alongside other HIV prevention interventions and high coverage of ART has led to steep reductions in the number of new HIV infections. In New South Wales and Australia, strong collaborations between public health authorities and community groups to provide PrEP, combined with immediately starting treatment for all people diagnosed to their lowest level since 1985 (Grulich et al. 2018).

ART has been shown to reduce HIV-related morbidity and mortality among PLHIV and to halt onward transmission of the virus. Studies also show that early initiation, regardless of a person's CD₄ cell count, can enhance treatment benefits and save lives. WHO currently recommends treatment for all PLHIV. The percentage of people on ART among PLHIV provides a benchmark for monitoring global targets over time and comparing progress across countries. This indicator also monitors progress toward the second 90 of the UNAIDS 90-90-90-target: that 90% of the people who know their HIV-positive status are accessing ART by 2020 (UNAIDS 2016).

2.4 Global ART Data Quality

Data quality assessments aimed to improve the quality of data being reported from facilities to sub-national and national health system managers. In most countries where these assessments were conducted, the data were determined to be of sufficient quality. However, problems were identified in some countries that led to underreporting or over-reporting. The primary reason for underreporting was missing or delayed reporting of facility data to the national level. Over-reporting was due primarily to not removing from registers who stopped treatment, die, or transferred facilities, other errors, such as incorrectly abstracting data from facility-based registers or completing reporting forms, led to over-reporting and underreporting to varying degree (Mylan 2016).

2.5 Challenges of HIV/AIDS in sub-Saharan Africa

The HIV pandemic is not only limited to the health of individuals, but its effect reaches to the communities, and the development and economic growth of nations. Many of the countries hardest hit by HIV also suffer from other infectious disease, food insecurity, and other serious problems. HIV primarily affects those in their most productive years, about half of new infections are among under the age of 30 (Global AIDS update 2016).

2.6 ART Challenge in SSA Africa and Ethiopia

Although there is good progress towards meeting the UNAIDS 90-90-90 targets SSA including Ethiopia are still suffering very much from HIV/AIDS. Data from Ethiopian Federal HIV/AIDS Prevention and Control Office (EFHAPCO) indicates that there are over 718,550 people (a little over 1.18% of the population) living with HIV in Ethiopia alone (UN 2016). Since its report Ethiopia in 1984, HIV/AIDS has claimed the lives of millions and left behind an estimated 744,100 orphans (FMoH 2014).

In SSA, in 2018, 85% of ART follower were aware of their status, 79% of them were on treatment and 87% of those on treatment had achieved viral suppression (equivalent to 58% of all people living with virus in the region) (UNAIDS 2019). Barriers for HIV testing in SSA include no proposing for HIV testing during health consultations; thinking not at risk for HIV infection; fear of being HIV positive; fear of stigma if HIV positive; no available cure; fear of no privacy and no confidentiality, no permission from partner especially for women (Kwapong et al. 2014). Worldwide, only half of the persons with HIV infection are aware of their status and only 20% know about their seropositive status in low-income and middle-income countries (WHO 2015).

Another problem in Ethiopia like elsewhere in other low-income countries is the management of HIV mother-to-child transmission. The best solution would be to not breastfeed the child, but this has proven to be not very easy because of social, cultural and financial reasons, including the cost and availability of the powdered milk, stigma and tradition. Lack of clean water is another problem because HIV positive babies need to be protected more from unsafe water because this will weaken their resistance and shorten their lives. It is obvious that there is strong link between water, sanitation, hygiene and HIV/AIDS. With HIV/AIDS, this becomes even more urgent

because water and sanitation related diseases such as diarrhea belong to the most common opportunistic infections.

1.3 Objectives

1.3.1 General objective

- ❖ The objective of this study was to assess the Socio-Clinical characteristics status of patients on ART in Tulu Bolo, south-central Ethiopia.

1.3.2 Specific objectives

- To evaluate the socio- characteristics profile of people on ART in Tulu Bolo.
- To evaluate the clinical characteristics of people on ART in Tulu Bolo.

3. MATERIALS AND METHODS

3.1 Description of the study area

The study was conducted in Tulu Bolo, Southwest Shoa Zone, Oromia Region, Ethiopia. Its capital is Tulu Bolo located at 80km to the southwest of Addis Ababa along the main road to Jima and 34km from Woliso town. Becho District is located between 8°16' to 9°56'N and 37°05' to 38°46'E latitude and longitude respectively. It is bordered by Ilu District to the east, Woliso District to the west, Saden Sodo District to the South and Dawo District to the North (Fig 1). Its altitude range is 2100-2600m above sea level. Its total landmass is 44,282 hectares and it is subdivided into 21 *kebeles* of which 19 are rural and two are urban (BWPADO).

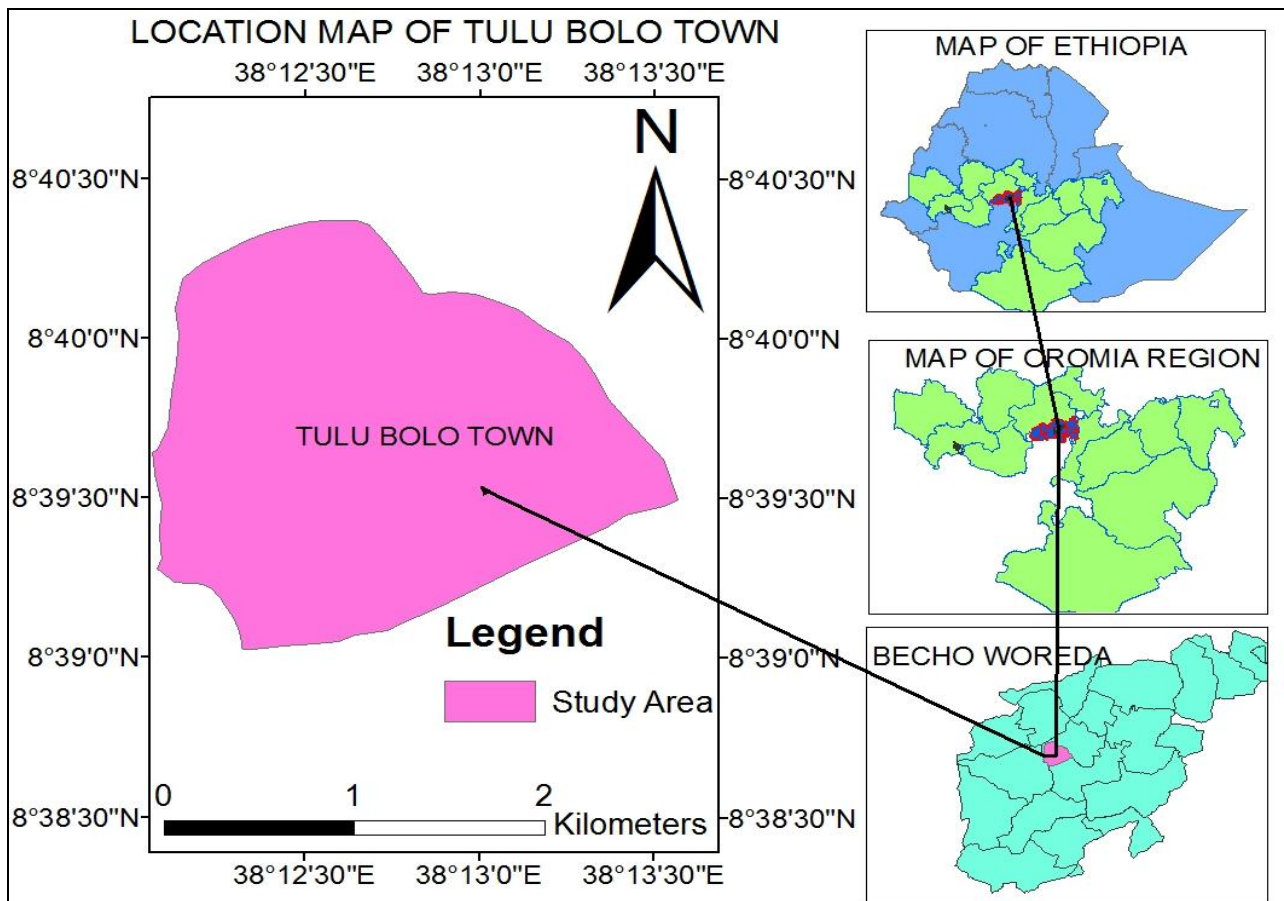


Figure 1 Map of the study area.

Source: Becho District Plan and Development Office, 2019

3.2 Study population and design

Based on the 2007 census by the Central Statistics Agency, the projected total population of the District is 99,295 people (50,257 were males and 40,038 were females). The majority of the people 77,401(77.95%) were rural dwellers and the rest 21,894 (22.05%) were urban residents. Currently there is one general Hospital and four health centers in the district (BWHO 2018). The study was carried out based on quantitative data collected from health facilities in the Tulu Bolo. Focus group discussions, guided field visit of the Tulu Bolo HIV/AIDS Club and some confidential carriers were used. Only those 18 and above aged patients data was collected by tally method from the “voluntary counseling and Testing Registration Log Book” and from quarterly reporting formats of the health institution.

3.3 Data analysis

The retrospective data was analyzed using statistical package for social sciences (SPSS) version 22 using descriptive statistics such as percentiles.

3.4 Ethical clearance

Ethical clearance was obtained from the College of Natural and Computational Sciences Institutional Review Board (CNS-IRB) [16 Oct 2020; Minutes No. IRB/45/2020]. Support letter from Addis Ababa University Department of Zoological Sciences was submitted to health facilities. Then Officials at different levels communicated and finally permission was obtained. Privacy was assured by avoiding patient identity. Additional letters were received from TBHC administrator and TBGH medical director.

4. RESULTS AND DISCUSSION

4.1 Socio- characteristics

There were 538 PLHIV on ART in the two facilities, among which 229(42.6%) were male and 309(57.4%) females (Table 1). The data shows that females were more affected compared with the males. This might be due to socioeconomic influences and cultural burdens as well as the female reproductive anatomy and vaginal microbiota, and number of factors that influence this mucosal microenvironment (Vitali et al. 2017). Many of the study participants (212(39.4%)) were 40 and above age and the least (76(14.1%)) were 18-24 years old. Overall, the data demonstrates age-dependent increase in the number of PLHIV in the facilities. The proportion of rural ART followers (265(49.3%)) were nearly the same as the urban residents (273(50.7%))(Table-1).

The jobless youth were 170(31.6%) dominating the group followed by farmers (153(28.4%) and the least drivers and divorce (14(2.6%)). 'Sex-workers' constituted only 28(5.2%). Tulu Bolo HIV/AIDS Club members suggested the reason for the high number was joblessness, poverty, lack of working habit, lack of continuous counseling services. The participants who had only primary school education were the highest in number (222(41.3%)) followed by those who had no formal schooling (177(32.9%)), secondary school 106(19.7%) and tertiary education (33(6.1%)). The less educated and uneducated outnumbered the other categories of PLHIV. Surprisingly, married participants constituted the highest percentage of the population (200(37.2%)). The 'never-married' were the second highest 162(30.1%) and the least (84(15.6%)) were 'others'.

4.2 Clinical characteristics

After 12 months of ART initiation, there were substantial improvements in bodyweight and BMI, functional status, CD4 count and viral load drop (Table 2). The number of underweight participants decreased from 62(11.0%) to 12(2.2%). Viral load could be checked for 498(91.8%) participants and only 40(8.2%) had missed the test. This might be due to travel problem, stigma, fear of drug toxicity and others. The pooled viral load test results of the participants up to 12 years (2008-2019) showed that 468(93.9%) out of the tested patients 498 was undetectable. In

some few patients although the viral load was detectable, their health status was good for certain reason.

The number of participants having CD₄ count below 350 before ART initiation was 358(66.5%) and this number substantially dropped to 54(10.1%) after ART initiation because of good treatment and viral load suppression in patients. The result of CD₄ count after ART initiation showed that if the patients followed the treatment accordingly the viral reproduction cycle stopped and the WBC return to normal state and the patient return to a 'workable' state from 'ambulatory' or 'bedridden' condition. There were 79(14.7%), 37(6.9%), 442(78.4%) and 19(3.5), 9(1.7), 510(94.8) 'bedridden', 'ambulatory' and 'workable' participants before and after ART initiation respectively. Correspondingly, 502(92.5%) participants were in the WHO stage I, 26(5.7%) stage II and 10(1.8%) stage III.

The number of participants with CD₄ cell count >350 only for 180(32.2%) had increased to 484(90.1%). With CD₄ increase and there is reduced rate of opportunistic infection (UNAIDS 2016). CD₄ count at the beginning of the patient's treatment is a pre-condition for the estimation of the CD₄ count to return to their normal count. Early initiation, regardless of a person's CD₄ cell count, can enhance treatment benefits and save lives as suggested by several international experts and the WHO. ART adherence of 483(89.2%) participants was *good*, 41(8.3%) *fair* and only 14(2.5%) *poor*. Majority of the participants (335(61.7%)) had a follow up period of ≥ 4 years, 107(21.1%) 3 years, 55(9.9%) 2 years and 41(7.3%) 1 year.

Table 1 Socio-Characteristics of PLHIV on ART in TBHC and TBGH, south-central Oromia, Ethiopia (2008-2019)

Variable (N= 538)	Number (%)
Gender	
Female	309(57.4)
Male	229(42.6)
Age	
18-24	76(14.1)
25-32	106(19.7)
33-39	146(27.1)
≥ 40	210(39.0)
Residence area	
Rural	265(49.3)
Urban	273(50.7)
Occupation	
Farmer	153(28.4)
Merchant	60(11.2)
House-wife	66(12.3)
Sex worker	28(5.2)
Jobless	170(31.6)
Civil servant	47(8.7)
Driver	14(2.6)
Education	
No formal schooling (Those didn't enter school)	177(32.9)
Primary school (Grade 1-8)	222(41.3)
Secondary school (9-12)	106(19.7)
Tertiary school(College & University)	33(6.1)
Marital status	
Married	200(37.2)
Never married	162(30.1)
Widowed	46(8.6)
Separated	84(15.6)
Divorced	46(8.6)

PLHIV: People living with HIV/AIDS, ART: Antiretroviral Therapy; TBHC: Tulu Bolo Health Center, TBGH: Tulu Bolo General Hospital

Table 2 Clinical characteristics of PLHIV on ART in TBHC and TBGH, south-central Oromia, Ethiopia (2008-2019)

Variable (N= 538)	Before ART	After ART
BMI (kg/m²)		
Normal (18.5-25)	360(66.9)	488(90.7)
Moderate (18-16)	116(21.6)	38(7.1)
Underweight (< 16)	62(11.5)	12(2.2)
Weight (kg)		
< 60	375(69.7)	93(17.3)
≥ 60	163(30.3)	445(82.7)
Viral load		
Detectable Viral load	70(13)	24(4.5)
Undetectable “ “	468(87)	514(95.5)
Functional status		
Bedridden	79(14.7)	19(3.5)
Ambulatory	37(6.9)	9(1.7)
Workable	422(78.4)	510(94.8)
WHO AIDS stage		
I & II stage	528(98.1)	528(98.1)
III & IV stage	10(1.9)	10(1.9)
CD₄		
> 350	180(33.5)	484(89.9)
< 350	358(66.5)	54(10.1)
ART adherence		
Poor	-	14(2.5)
Good	-	483(89.2)
Fair	-	41(8.3)
Follow up period		
1-year		41(7.6)
2-year		55(10.5)
3-year		106(19.5)
≥4-year		336(62.4)

PLHIV: People living with HIV/AIDS, ART: Antiretroviral Therapy; TBHC: Tulu Bolo Heath Center, TBGH: Tulu Bolo General Hospital

During the overall follow up period, 50 participants died, 51 lost-to-follow-up and 43 were transferred (Table 3).

Table 3 Number of dead, Lost-to-follow up and Transferred among PLHIV on ART in TBHC and TBGH, south-central Oromia, Ethiopia (2008-2019)

Follow up year	Dead		Lost-to-follow up		Transfer out	
	Male	Female	Male	Female	Male	Female
1	8	6	7	4	3	1
2-3	11	7	9	8	12	9
>3	13	5	13	10	11	7
Total	32	18	29	22	26	17
Overall	50		51		43	

PLHIV: People living with HIV/AIDS, ART: Antiretroviral Therapy; TBHC: Tulu Bolo Health Center, TBGH: Tulu Bolo General Hospital

The participants mentioned that suspending drug intake when felt well after ART initiation was the leading cause of poor adherence followed by stigma, alcohol and khat (Table 4). Travel problem and other factors were the least to affect ART adherence of the patients in Becho District. ART focal persons and providers in both health centers largely agreed on this. In an interview, one nurse at TBHC responded that caregivers to PLWH need training in safe water handling and sanitation practices, personal hygiene, food hygiene and safe water disposal and drainage to effectively reduce the exposure to water and sanitation related opportunistic diseases to improve on the health status of the participants. These are more or less the additional reasons for the overall health status of the participants.

ART adherence remains the major challenge in both low-income and high-income countries in HIV/AIDS control and management. In this study, however, in general, the participants had a high level of adherence to ART and thus had sustainable viral suppression and better clinical outcomes.

Table 4 Self-cited factors affecting adherence to ART among PLHIV on ART in TBHC and TBGH, south-central Oromia, Ethiopia (2008-2019)

Factor	Frequency	Percent
Khat	30	5.3
Alcohol	27	4.8
Stigma	29	5.2
Drug toxicity	41	7.3
Travel problem	7	1.2
Economy(food)	8	1.4
Felt better after ART initiation	396	70.6
Total	538	100

PLHIV: People living with HIV/AIDS, ART: Antiretroviral Therapy; TBHC: Tulu Bolo Heath Center, TBGH: Tulu Bolo General Hospital

The highest rate of people caught HIV in TBGH was in 2017 (Table 5), among which 45(36.89%) were males and 43(34.13%) were females and in TBHC in 2015, 21(19.63%) males and 27(14.75%) females were caught. The data in the rest years were up and down with no clear pattern of gender-based distribution.

From the study participants about thirty-nine male(39) and thirty-one females (31) were showed viral load delectability while one-hundred-ninety males (190)and two hundred-seventy-eight females (278) results had non-detectable viral load (Fig 2).

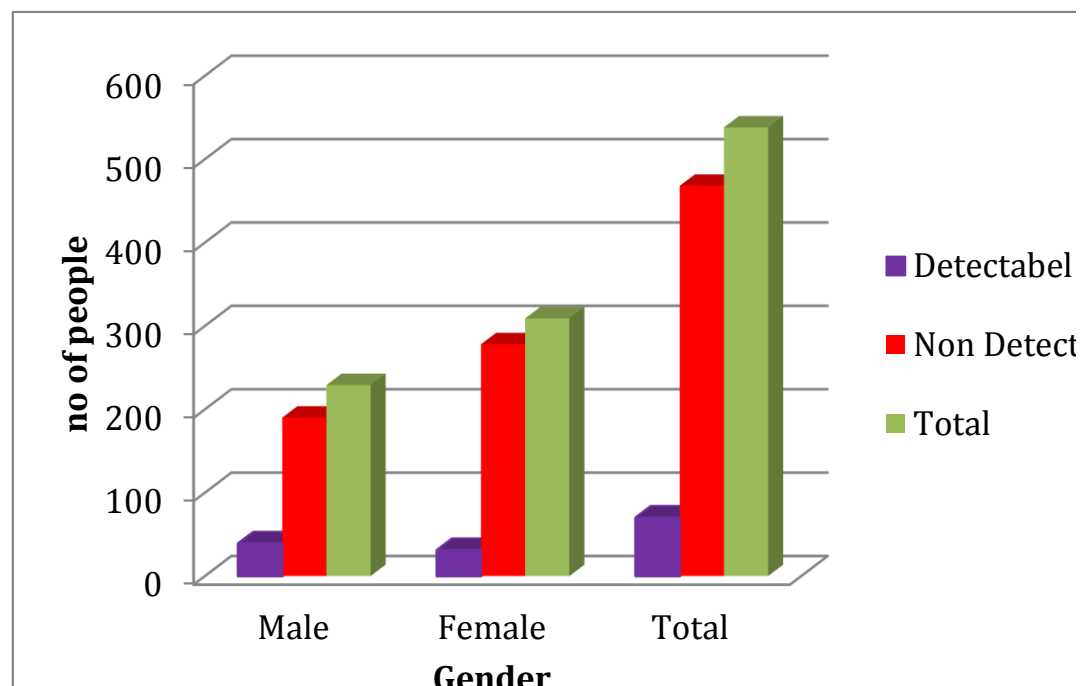


Figure 2 Viral load detectability after 12 months treatment follow-up of the patients.

Table 5 Yearly Distribution of PLHIV Attending ART in TBHC, and TBGH, south-central Oromia, Ethiopia (December 2008- August 2019)

Year	Facility					
	TBGH			TBHC		
	Gender		Total, no(%)	Gender		Total, no(%)
Male, no(%)	Female, no(%)	Male, no(%)		Female, no(%)		
2008	-	-	-	4(3.7)	11(6.1)	15(9.8)
2009	-	-	-	8(7.5)	13(7.1)	21(14.6)
2010	-	-	-	7(6.5)	15(8.2)	22(14.7)
2011	-	-	-	8(7.5)	14(7.7)	22(15.1)
2012	-	-	-	10(9.4)	13(7.1)	23(16.5)
2013	8(6.6)	11(8.7)	19(15.3)	12(11.2)	17(9.3)	29(20.5)
2014	10(8.2)	15(11.9)	25(20.1)	12(11.2)	31(16.9)	43(28.2)
2015	11(9.0)	11(8.7)	22(17.8)	21(19.6)	27(14.8)	48(34.4)
2016	10(8.2)	9(7.1)	19(15.3)	9(8.4)	16(8.7)	25(17.2)
2017	45(36.9)	43(34.1)	88(71.0)	8(7.5)	14(7.7)	22(15.1)
2018	17(13.9)	25(19.8)	42(33.8)	5(4.7)	7(3.8)	12(8.5)
2019	21(17.2)	12(9.5)	33(26.7)	3(2.8)	5(2.7)	8(5.5)

6. CONCLUSIONS and RECOMMENDATIONS

ART adherence of 483(89.2%) participants was *good* and the clinical status of the participants was good. However, more work is needed to achieve the percentage of *good adherence* and better quality of life.

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Annex III. Questionnaire

1. Name of institution A. Tulu Bolo General Hospital B . Tulu Bolo Health Center
2. Date_____
3. Gender A. Male B. Female
4. Age 18____20, 21____27, 28____ 34, 35 _____41, ≥ 42
5. What is the residence of the patient? A . Urban B . Rural
6. What is the occupation of the patient? A . Farmer B . Merchant C . House wife D . Sex worker E . Jobless F . Civil servant
7. What is educational status of the patient?
A. No formal schooling B. Primary school C. Secondary School D. Tertiary school
8. What is the marital status of the patient? A. Married B. Never married C. Widowed
D. Separated
9. was the viral load done in the last 12 months yes_____ No _____
10. What is the CD4 Count of the patient before ART initiation ? A . >350 B . ≤ 350
- 11 . What is the CD4 Cell count of the patient after 6 months of ART? A . >350 B . ≤ 350
12. What is VL of the patient after 12 months? A. >1000 (detectable) B. <1000 (undetectable)
13. What is the recent adherence health status of the patient to ART A. Good B. Fair C. poor
- 14 . What is the factor that affect the patient adherence to ARV drug ?
A. khat chewing B. Alcohol use C. Stigma D. Drug toxicity E. Felt better
F. Delivery/travel problem E. others
15. What is the patient's recent WHO AIDS stages? A. I B. II C. III D. IV
16. What is the patient's follow up period (year)? A. 1 year B. 2 year C. 3year
D . 4 year E. >4 year

DECLARATION

I, the undersigned, declare that this Thesis entitled **Socio-Clinical Characteristics of People on Antiretroviral Therapy in Tulu Bolo, South-Central, Ethiopia, from 2008 to 2019** is my original work.

Name Masino Amano Ibrahim

Signature _____

Date _____

Statement of Supervisors

This thesis has been approved for submission to the Department of Zoological Sciences for public defense.

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