

**EFFECTIVENESS OF ADOLESCENT FRIENDLY CLINICS ON
RETENTION AMONG YOUNG PEOPLE ON ANTIRETROVIRAL
THERAPY IN TABORA REGION TANZANIA**

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School of Public Health and Social Sciences**



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By

**A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Public Health of**

**Muhimbili University of Health and Allied Sciences
October 2021**

CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences (MUHAS) a dissertation titled: **“Effectiveness of adolescent friendly clinics on retention among young people on antiretroviral therapy in Tabora region Tanzania”** in (partial) fulfillment of the requirements for the degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences.

.....
Dr Candida Moshiro
(Supervisor)

Date:

DECLARATION AND COPYRIGHT

I, **Benedict Peter Kafumu** declare that this **dissertation** is my original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature:..... Date:.....

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DEDICATION

I am dedicating this dissertation to my lovely wife Angel Joseph Lupembe “Malaika”

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ABBREVIATIONS

AIDS	:	Acquired Immunity Deficiency Syndrome
AFHS	:	Adolescent Friendly Health Service
ALHIV	:	Adolescent Living with HIV
ART	:	Anti-Retroviral Therapy
ARV	:	Anti-Retroviral
CTC	:	Care and Treatment Center
DHIS2	:	Districts Health Information System 2
DAC	:	Data Analysis Companion
EFV	:	Efavirenz
DTG	:	Dolutegravir
HIV	:	Human Immunodeficiency Virus
HVL	:	HIV Viral Load
LPV/r	:	Lopinavir/Ritonavir
LTFU	:	Lost to Follow-Up
NACP	:	National AIDS Control Program
NVP	:	Nevirapine
OIs	:	Opportunistic Infections
RCHS	:	Reproductive and Child Health Section

SRH	:	Sexual Reproductive Health
STI	:	Sexual Transmitted Infections
USAID	:	United State Agency for International Development
WHO	:	World Health Organization
YLHIV	:	Youth Living with HIV

DEFINITION OF KEY TERMS

Adolescent: Any person between ages 10 and 19.(1)

Adolescent Friendly Health Service: Specialized clinics providing a range of services including HIV services, sexual and reproductive health and behavioral education.(1)

Lost to follow up (LTFU): Refers to HIV-infected individuals who are not taking an ART to refill for a period of 3 months or longer from the last attendance and is not yet classified as dead or transferred-out i.e., clients with unknown outcomes.(2)

Retention into care: A continuous engagement from diagnosis in a package of prevention, treatment, support and care services.(2)

Young people: WHO defines young people with age between 10 and 24 years.(3)

ABSTRACT

Background: Adolescent Friendly Health Service (AFHS) meet the needs of young people in this sensitive age as majority of them are going through drastic changes psychologically, mentally, and physically. Adolescent Friendly Health Services are inclusive of all young people with all the key services for young people. Retaining young people on care and treatment clinics has been a challenge in many resources limited countries including Tanzania. Limited studies have been done to assess the effectiveness of AFHS clinics in Tanzania. Understanding the effectiveness of youth and adolescent friendly clinics on retention is very important in improving retention.

Objective: To determine the effectiveness of adolescent friendly health services in retention among young people enrolled on Antiretroviral Therapy aged 10 to 24 years in Tabora Region, Tanzania from January 2014 to December 2019.

Methodology: A retrospective cohort analysis of young people aged 10–24 years receiving ART between January 2014 and December 2019 was conducted. Routine patient data were extracted from CTC2 database, an electronic database used for daily service provision. A sample of 3,695 participants was analyzed: 2,598 in AFHS clinics and 1,097 in non-AFHS clinics in Tabora. The key outcome variable was retention. Multivariable analyses were performed using the logistic regression model to analyze differences in retention rates between AFHS clinics and the young people in standard care, adjusting for other variables of interest.

Results: The overall retention at 12 months was significantly higher in AFHS (85.5%) compared to non-AFHS clinics (75%). After adjusting for other factors, the odds of retention were 1.96 times higher among young people attending AFHS clinics than non-AFHS clinics (AOR=1.96; 1.39 – 2.77). WHO staging, treatment regimen, age, sex and marital status were not significantly associated with retention.

Conclusion: This study demonstrated that AFHS clinics had effect on retention among young people. These results provide a basis for scaling up AFHS clinics in Tabora region. Furthermore, supportive supervision to existing facilities and mentorship to non-AFHS facilities may be needed to improve health outcomes among young people.

CHAPTER ONE

1.0 INRODUCTION

1.1 Background

World Health Organization (WHO) defines young people as the period between the ages 10-24 years(4). There are an estimated 2.9 million 10–24-year-olds living with HIV in sub-Saharan Africa, in Tanzania, about 0.2 million youth are HIV-infected comprising 11% of all People Living with HIV (PLHIV) in the country.(5)

Linkage to care is the biggest gap to achieving the 90–90–90 targets, but retention on treatment of people living with HIV is an increasing challenge(5). Retention in Anti-Retroviral Therapy (ART) presents a challenge in sub-Saharan Africa(6). ART programs in Africa have retained about 60% of their patients at the end of 2 years. Loss to follow-up is the major cause of attrition, followed by death.

AIDS is now the leading cause of death among young people in Africa and the second leading cause of death among young people world-wide. Young people experience various barriers to their access to HIV services including the poor attitude of health care workers, lack of awareness on where those services are provided, lack of confidentiality and privacy of which adolescent-friendly services address those challenges to improve young people accessibility.(7)

USAID Boresha Afya is implementing a 5 years project (2017-2021) on Adolescent Friendly Health Service (AFHS) intervention targeting young people aged 10-24 both, HIV and Non-HIV in the northern and central zones of Tanzania. One the aim of the project is to deliver quality health services to children, adolescents, and adults living with HIV focusing retention. The intervention is implemented in 53 health facilities of five supported regions such as Arusha, Kilimanjaro, Dodoma, Tabora, and Singida and is in the fourth year of its implementation.

AFHS intervention aims at capacitating health facilities in supported regions to provide a comprehensive package of sexual and reproductive health services including HIV services among young people focusing on retention. Evaluations of the effectiveness of these services on retention to HIV care, particularly in resource-limited settings including Tanzania have been very limited(8). This study will examine the effectiveness of these clinics towards retention to advice the government on policies and protocols on adolescent and youth friendly services.

1.2 Problem Statement

There are an estimated 2.9 million 10–24-year-olds living with HIV in sub-Saharan Africa.(5) ART programs in Africa have retained about 60% of their patients at the end of 2 years.(9) Loss to follow-up is the major cause of attrition, followed by death. Better patient tracing procedures, better understanding of loss to follow-up, and earlier initiation of ART to reduce mortality are needed if retention is to be improved. Linkage to HIV care and treatment and retention in care is a challenge for people living with HIV in Tanzania, as in many other resource-limited settings.(10)

According to the study done in Kigoma Tanzania on retention, it found that Retention rates for adolescents at three, six, nine, and 12 months was better after the establishment of the friendly clinic.(11) Several studies have been done to evaluate the effectiveness of AFHS in Sub Sarah Africa, including countries such as Namibia South Africa and Kenya in which the evaluation was based on few clinics.(12–14) In Tanzania a single study was done in which a single clinic was used however no control clinics was included.(11)

Previous studies have identified the factors associated with low retention rates among persons on ART to include younger age, male sex, single, divorced or separated marital status, illiteracy, having no income-generating occupation, non-disclosure of HIV diagnosis, stigma, distance to health facilities, poor nutrition, normal body mass index, pregnancy, high or low CD4 count, tuberculosis co-infection, advanced clinical staging, detectable viral load and adverse drug reactions.(10,15,16)

USAID Boresha Afya in collaboration with the Ministry of Health through National AIDS Control Program (NACP) and Reproductive and Child Health Section (RCHS) is implementing youth and adolescent-friendly health services intervention in Tabora Region to increase their access to ART services with the aim of increasing adherence and retention. Youth and adolescent-friendly health services in Tabora included capacity building to both health care workers and peers, special clinic hours for age specific young people, peer support and family and community support biannual meetings. The intervention has been implemented for three years since January 2017. However, the effectiveness of the intervention on retention has not been done, therefore, this study will assess the effectiveness of youth and adolescent-friendly health services on retention in Tabora region.

1.3 Conceptual Framework

Figure 1 illustrates the conceptual framework for the proposed study. It illustrates the AFHS and standard care clinics as independent variables while Clinical, treatment factors and demographics (CD4 counts, type of ART, WHO staging, and age of ART initiation, age, marital status and sex) and how they effectiveness retention of young people on ART services as the outcome variable.

Marital status and gender such as being male and married or in a relationship have been associated with retention in HIV care among young people.(17)

Age has been associated with retention a study conducted Ethiopia found that adolescent aged 11-19 years and young adults' years were at higher risk not being retained when compared to children aged ≤ 10 yrs. Patients with WHO clinical stage III and clinical stage IV had higher retention rate at enrollment compared to clinical stage I clients.(18)

This framework was adopted and modified from a study done by Jonathan Izudi in Western Uganda 2018(19).

Resources → **Effectiveness**
Intervention (AFHS) **Outcome**

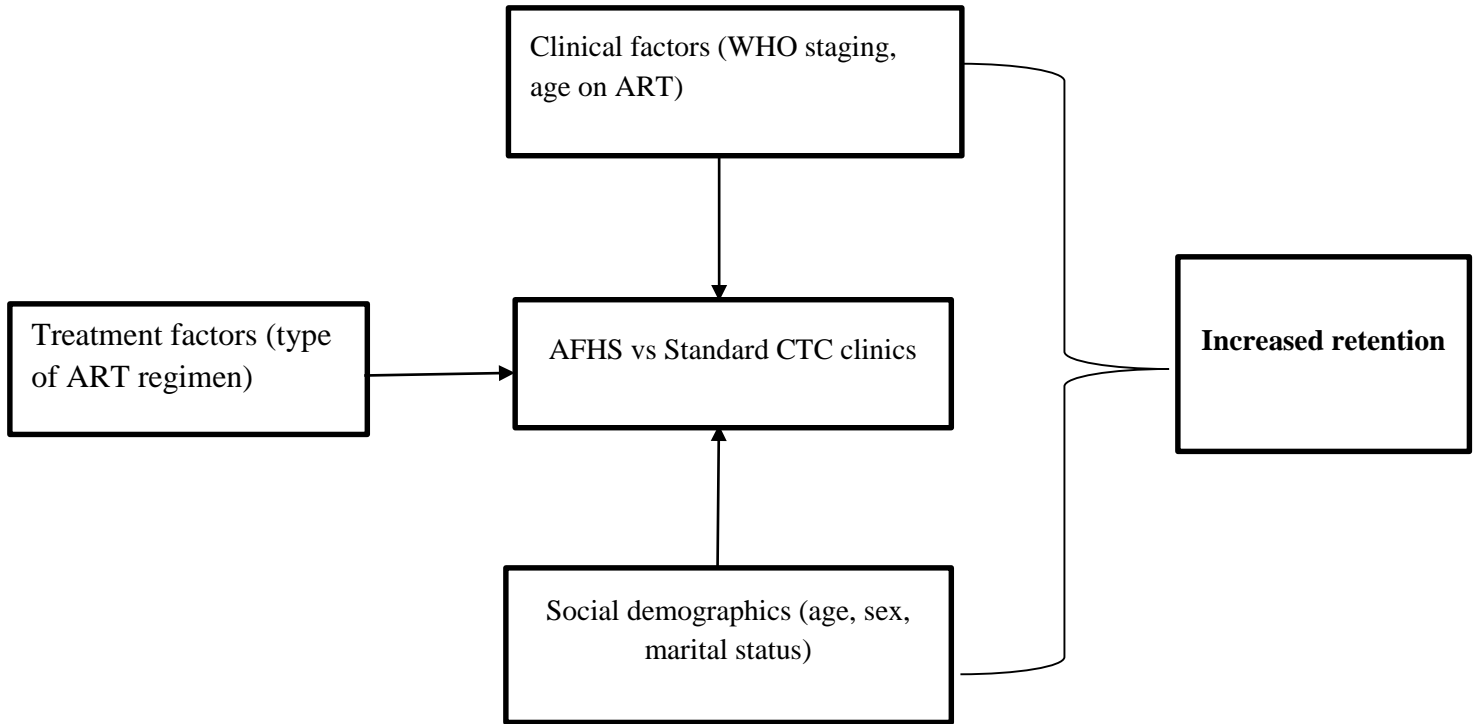


Figure 1: Conceptual framework of effectiveness of AFHS clinics on retention

1.4 Rationale of the Study

The evaluation study will establish the contribution of adolescent and youth-friendly services on improving retention to young people. Also, the findings of this study will also inform the Ministry of Health Community Development Gender Elderly and Children and the regional and council health management teams the outcome of targeted health facilities in providing Adolescent friendly health services to young people on ART services the extent to which access to those services has been improved. The results of this outcome study on the effectiveness of adolescent friendly health services on retention will be used to advice the government and provide recommendation on the scale up of AFHS to all standard ART clinics as part of the national and global effort to achieve the 90-90-90 goals.

1.5 Research questions

Main research question

What is the effectiveness of Adolescent Friendly Health Services (AFHS) on retention among young people in Tabora Region?

- i. What is the difference in retention rates of HIV-positive young people attending AFHS clinics and standard care and treatment clinics after the establishment of adolescent-friendly health services?
- ii. What are the clinical and treatment factors associated with retention among young people after establishment of AFHS?

1.6 Objective of the Study

1.6.1 General Objective

The main objective of the study was to determine the effectiveness of Adolescent Friendly Health Services (AFHS) on retention among young people in Tabora Region, Tanzania January 2014 to December 2019.

1.6.2 Specific Objectives

- I. To compare retention rates of HIV-positive young people in AFHS clinics and standard care and treatment clinics after the establishment of adolescent-friendly health services.
- II. To determine the clinical and treatment factors associated with retention among young people after establishment of AFHS.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Effectiveness of AFHS on retention to care and treatment

Retention in care, defined as having two or more HIV outpatient visits in a year with at least 90 days between the first and last visits during the calendar year.(20) Retention in HIV health care services is a critical precursor to ART adherence and viral suppression. Clinical visits for patients on ART are essential to initiate ART, ensure continuous access to medication, monitor medication side effects, diagnose treatment failure, and, when necessary, switch to second- or third-line ART regimens. Retaining patients in care helps them maintain high medication adherence, thereby achieving viral suppression, improving health outcomes, and reducing the risk of horizontal transmission.(21,22)

Lana Lee et al found that youth living with HIV were more likely to be retained in care at clinics with a youth-friendly waiting area, evening clinic hours, and providers with adolescent health training.(20) Mean while Teasdale CA et al found that the lack of improvement in retention after introduction of AFHS may be a result of several factors. Data from the AFHS facilities were evaluated for the period immediately after implementation of the program and more time may be needed to scale-up services, fully engage adolescents/youth, and evaluate outcomes to see results. In addition, there may have been heterogeneity across facilities regarding quality of services and participation. It is possible that some health facilities implemented more robust AFHS programs and may have had better results, however because of a small number of sites and small sample sizes at the facilities, the study was unable to examine inter facility differences.(8)

Study done in South Africa, adolescents attending a dedicated Saturday Teen clinic had higher retention in care and viral suppression rates compared to adolescents attending a standard paediatric clinic, the overall 12-month retention was high among adolescents and young adults attending teen clinics, reaching 82%, and it was significantly higher among those who were stable on ART. (23) Also, similar study done in South Africa by Zaroni, Brian C et al found

that We found significantly higher retention rates in adolescents and young adults attending the dedicated adolescent clinic (95%) versus those in standard care. (24)

A study conducted by Denise Evans et al in South Africa (2013) found that Poor adherence, factors influencing transition between adolescence and adults, and barriers to full participation in HIV care may be responsible for the poorer treatment outcomes and increased LTFU in this unique group.(25)

Past study conducted in Uganda showed that adolescent friendly services including quality improvement interventions increased retention by 29.3% HIV-positive adolescents were retained in care prior the intervention with inception of intervention the number of HIV-positive adolescents retained in care was 96.7%.(19)

Study conducted by Lindsey K Reif et al in Haiti found that youth-friendly adolescent clinic improved retention in HIV care among adolescents, particularly in the assessment of ART eligibility and ART initiation. The proportion of patients categorized with suboptimal eligibility and ART initiation decreased post-clinic. At three months, 47% of adolescents had suboptimal eligibility and ART initiation pre-clinic compared to 19% post-clinic. Additional interventions are needed to improve retention among pre-ART patients and support long-term retention among ART patients was recommended.(12)

A study conducted in Kibaha Pwani region Tanzania found that to improve adolescent's retention on HIV/AIDS care and treatment services, factors influencing their retention should be addressed. Suggesting specific strategies to address all causes of poor retention by considering adolescents living with HIV's perception of the care and treatment and actively involve them in their HIV care and treatment services.(26).

A study conducted in seven African countries including Tanzania found that compared with older adults, adolescents and young adults had lower rates in all seven countries, reaching statistical significance in three countries (Côte d'Ivoire, Mozambique and Tanzania) in both crude and multivariable analyses. In this study, Tanzania had about 55% of youth retained on care, the rest being LTFU or reported dead.(27)

2.2 Factors associated with retention

Several factors have been associated with retention among young people on HIV care and treatment. Age has been one of the factors associated with retention on care and treatment services, A study conducted in Kenya found that there are some evidence suggesting that youth-friendly services improve retention of younger patients compared to older young people.(28)

Studies on comparison of youth's age category with retention on HIV care and treatment services found mixed results. Findings from some studies on retention showed that the 15-19 years age group had lower retention compared to the 20-24 years age group one year after ART initiation. Contrary, other studies found lower retention in the 20-24 years age group compared to the 15-19 years. Furthermore, a few studies showed no association between youth's age category and retention.(29)

Also, a study conducted in Namibia by Munyayi, Farai K et al found that were significant differences observed in this study in retention rates between younger and older adolescents at 24 months, with younger adolescents having better retention rates.(14) This finding is supported by observations reported in other studies conducted in other low-and middle-income countries where the risk of non- retention among older adolescents was 1.30 times higher than the risk in younger adolescents at 24 months.(30)

Youth experienced substantially higher attrition before and after ART initiation compared with younger adolescents and older adults. Adolescent-friendly services were associated with reduced attrition among youth, particularly after ART initiation.(31)

Moses Muwanguzi et al in a study conducted in Uganda found that there are differences in retention have been previously observed by age, with younger adolescents (10–14) being less likely to be LTF compared with older youth.(17) Also, a study done by Chloe A. Teasdale et al in Kenya found that there may be differences in the effectiveness of adolescent youth friendly services on retention for adolescents compared with older youth at the health facilities implemented special services for youth. (8)

A similar study done in South Africa by Zandoni, Brian C et al found that older adolescents and young adults had lower retention in care adjusting for clinic attendance, such that older youth were less likely to be retained in either the standard or adolescent clinics.(24)

Studies have reported social demographics such as gender and marital status have been associated with retention among young people, A study conducted by Muwanguzi, Moses et al in Rural Southwestern Uganda found that In being male and married was independently associated with retention in HIV care.(17) similar study conducted South Africa found that being males had higher retention in care compared to females. (24)

A study conducted by Ssali, Livingstone Kalibala et al in Uganda found that the risk of non-retention in care was significantly greater among adolescents at WHO clinical stage 3 and 4 than among those at stage 1 and 2 at 12 months.(30)

2.3 Literature gap

Studies evaluating the effectiveness of adolescent-friendly health services in HIV programs are limited. Majority done have been done in small settings such that they include few clinics. Also, in Tanzania few studies were done assessing the effectiveness of adolescent and teen health services without having control sites. Available studies have reported effectiveness on retention mostly among adults.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

A retrospective cohort study design was conducted using routinely collected program data extracted from the CTC2 client data base from AFHS and non-AFHS. Data was extracted from CTC2 data base between the period of January 2014 to December 2016 as pre-intervention, then implementation phase was between Jan 2017-Dec 2017 and post intervention was the period between January 2018 to December 2019.

3.2 Study Area

The study was conducted in Tabora Region of which it's one of Tanzania's 31 administrative regions. The regional capital is the municipality of Tabora. According to the 2012 national census, the region had a population of 2,291,623. (17) Tabora has been divided in 7 Districts named Tabora Municipal, Uyui, Igunga, Nzega, Urambo, Kaliua and Sikonge Districts. The region is in the central-western part of the country.

According to the Tanzania HIV Effectiveness Survey of 2016-2017 (THIS 2017), Tabora region has HIV prevalence of 5.1%, slightly above the national prevalence of 4.8%. (18) Tabora has a total 147 care and treatment centers supported by USAID Boresha Afya program across all the 7 Districts. Due to high program targets, 43% of AFHS clinics are in Tabora region.

I selected Tabora Region since the youth and adolescent friendly services has been implemented across the region, in which twenty-three AFHS were established across the care and treatment centers out of 147 care and treatment centers supported by USAID Boresha Afya program.

Tabora has the highest number of adolescents on ART clinics comparing to other program regions and is among regions with the highest teenage childbearing rates which signifies high sexual activities before the age of 20 years old. (32)

3.3 Study population

The study population constituted all young people aged 10 to 24 years, who have ever been enrolled in care and treatment services and are on ART in AFHS and non-AFHS facilities for period between January 2014 to December 2019.

3.4 Inclusion and exclusion criteria

3.4.1 Inclusion criteria

- Young people with at least 3 months on ART during pre-intervention and post-intervention periods

3.4.2 Exclusion criteria

- Those transferred in from another health facility within the last 12 months before January 2014 (before the beginning of data collection)

3.5 Description of intervention

Adolescent Friendly service intervention under USAID Boresha Afya in Collaboration with the Ministry of Health Community Development Gender Elderly and Children (MHCDGEC) and Tabora Regional Health Management Team (RHMT) implemented the following activities to facilitate the provision of Adolescent Friendly Health services in twenty-three health facilities to improve retention and viral load suppression to young people January 2017 to December 2017. The implemented activities included;

- a) Trained health care workers and peer educators (young people living with HIV) on HIV continuum of care including HIV testing services, linkage, and retention among young people.
- b) Establishment of special clinics for young people living with HIV including on weekends
- c) Established age specific clinics (10-15 years old and 15-24 years old)
- d) Established peer educator support for adolescent and young people attending clinics
- e) Supported parents' semiannual meetings for experience sharing with peer parents

Through the provision of comprehensive adolescent sexual and reproductive health services in an adolescent-friendly manner, the project expected to observe an increase in HIV case identification, linkage to care and treatment and retention among young people and increase in access to sexual and reproductive health services to young people including prevention services for HIV such as condom distribution and family planning services.

3.6 Power calculations and sampling method

There are 23 AFHS facilities in Tabora, all were included. For the non-AFHS sites, twenty-three facilities were selected using simple random sampling technique from a sampling frame of 124 non-AFHS facilities. All young people who attended the selected facilities during the specified period were eligible for the analysis.

It was assumed that if the retention rates post intervention will be 60% to 90% in the non-AFHS and AFHS facilities, the study had more than 95% power to detect a significant difference at 95% confidence level.

As per Figure 2, it shows that 4,538 young people (10-24 years) were receiving ART at both AFHS and non-AFHS clinics for the period of January 2014 to December 2016 and January 2018 to December 2019. For both AFHS and non-AFHS sites for the period of the study had a total of 3,695 young people enrolled in care and treatment after excluding transfer in and those not on ART. A total of 2,598 and 1,097 young people from AFHS and non-AFHS sites respectively were included in the analysis.

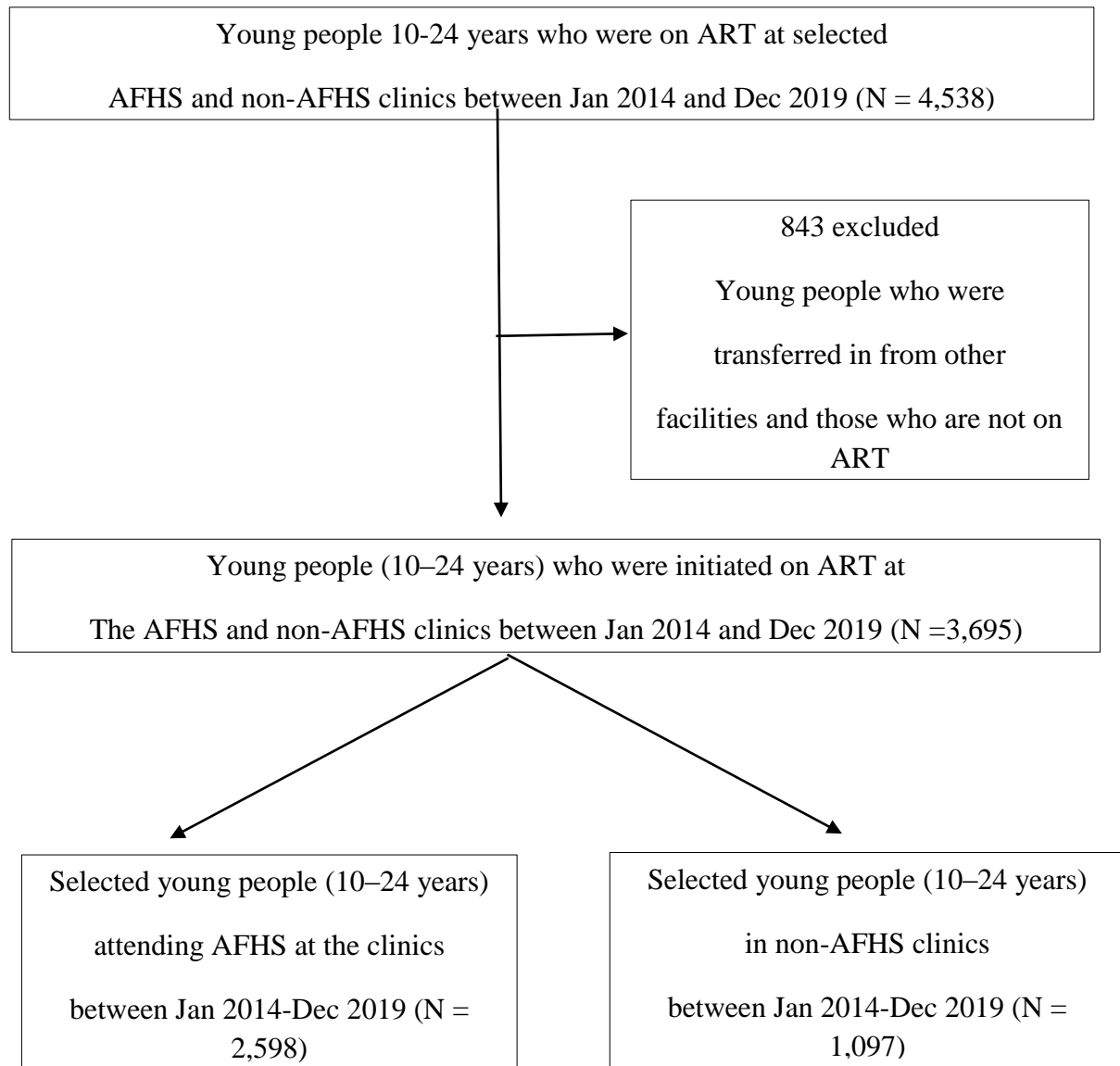


Figure 2: Flow chart of the selection procedure of study subjects

3.7 Data Collection

Data were extracted from an electronic data base system CTC2 which is normally used by service providers when providing services to clients. All data were extracted by the researcher in collaboration with Regional DHIS2 focal persons. A CTC2 data base is a digital version of a paper chart which normally contains all client's data from the outpatient file/card (CTC2 cards). It captures information on patient's demographics, medical history, medication, laboratory test results, vital signs, and personal variables like weight, family history, and next of kin/caretaker and adherence status. Before data was extracted from the CTC2 data base, the research assistant ran a query for the specific variables of interest in the CTC2 data base. The data from the CTC2 data base was then downloaded into an excel file through the Data Analysis Companion (DAC) analysis tool which provide further analysis on variables of interest.

3.8 Variables

The dependent variable was retention to care. Retention was defined as having two or more HIV outpatient visits with at least 90 days between the first and last visits during the calendar year. Independent variables included demographic characteristics (age, sex, marital status), clinical and treatment variables such as WHO clinical staging, type of ART regime, months on ART and age of start ART.

3.9 Data Management and Analysis

Data cleaning was done to identify anomalies which were corrected using the patient's paper files. Data was exported from Excel to Statistical Package for the Social Science (SPSS) version 24 computer software program for analysis. Categorical variables were presented using frequencies and proportions while continuous variables were presented using means and standard deviation or median and interquartile range. Bivariate analysis was performed using the Chi-square test to determine the association between retention in care and selected demographic and clinical variables. Fisher's exact test was used as an alternative to the Chi-square test where necessary. Changes in the retention over time, that is before and after AFHS was compared between the AFHS and non-AFHS facilities. Logistic regression analysis was performed to examine factors associated with retention. The cut-off for significance is set at $p < 0.05$.

3.8 Ethical issues

Ethical clearance for the study was obtained from MUHAS Institutional Review Board (IRB). Permission from the Regional Medical Officers Office (RMO) was sought. Furthermore, district and facility administration were informed together with local government authorities to provide permission to conduct the study in the respective areas. Patients' records were anonymized, and study participants were identified by their unique CTC registration number.

CHAPTER FOUR

4.0 RESULTS

4.1 Sociodemographic characteristics for participants

A total of 2,598 clients were extracted from AFHS clinics whereby 1,265 (49%) and 1,333 (51%) were from pre and post intervention periods respectively. For 1097 clients from non-AFHS clinics, 638 (58%) and 459 (42%) were included for pre and post intervention periods respectively.

For the pre-intervention period, there were no differences with respect to sex between the AFHS and non-AFHS sites. Most young people on both AFHS and non-AFHS pre and post periods were female with over 81% distribution among the study population. Age group for both pre and post for intervention (AFHS) sites majority was between 20-24 with 55% and 61% respectively. For non-intervention site pre and post intervention majority of the participants were in age group between 20-24 with 65.7% and 63.4% respectively. For WHO staging in pre and post intervention among intervention sites, at pre intervention for non-AFHS sites 63% were in WHO stage 1 while for intervention sites its only 38.5%.

For the post intervention phase, the distribution of age, sex, age at start of ART and WHO staging at enrollment was similar for both AFHS and non-AFHS sites. More than 50% of the participants were in stage 1, most were in the age group of 20-24 years of age. Treatment regime majority of the young people on ART for both AFHS and non-AFHS in both pre and post period were on EFV based regime with over 73% participants, while for DTG based regime only post AFHS in intervention site reported to have over 24% on the regime for post AFHS period. For characteristics such marital status the distribution for both pre and post intervention was the same across AFHS and non-AFHS.

Table 1: Demographics and clinical characteristics of young people in Tabora region on AFHS and non- AFHS for pre and post intervention periods (N= 3,691)

Variable	Category	Pre-Intervention (n=1,903)		P-value	Post-Intervention (n=1,792)		P - value
		AFHS (n=1,265)	Non-AFHS (n=638)		AFHS (n=1,333)	Non-AFHS (n=459)	
Age (years)	10-19	565 (44.7)	219 (34.3)	< 0.001	519 (38.9)	168 (36.6)	0.077
	20-24	700 (55.3)	419 (65.7)		814 (61.1)	291 (63.4)	
Sex	Male	237 (18.7)	112 (17.6)	0.270	250 (18.8)	68 (14.8)	< 0.001
	Female	1028 (81.3)	526 (82.4)		1083 (81.2)	391 (85.2)	
Marital status	Single	432 (46.9)	191 (38.1)	< 0.001	367 (40.3)	93 (28.5)	< 0.001
	Married	397 (43.1)	234 (46.7)		377 (41.4)	196 (60.1)	
	Widowed	8 (0.9)	2 (0.4)		7 (0.8)	6 (1.8)	
	Divorced	30 (3.3)	23 (4.6)		41 (4.5)	12 (3.7)	
	Cohabiting	54 (5.9)	51 (10.2)		119 (13.1)	19 (5.8)	
Age at start of ART	10-14	25 (2.0)	12 (1.9)	< 0.001	31 (2.3)	5 (1.1)	0.180
	15-19	546 (43.2)	209 (32.8)		481 (36.1)	161 (35.1)	
	20-24	694 (54.9)	417 (65.4)		821 (61.6)	293 (63.8)	
Treatment regimen	NVP	213 (16.8)	56 (9.2)	< 0.001	69 (5.4)	61 (14.7)	< 0.001
	EFV	1051 (83.1)	509 (84.0)		936 (73.0)	353 (85.3)	
	LPV/r	1 (0.1)	41 (6.8)		4 (0.3)	0 (0.0)	
	DTG	0	0 (0.0)		274 (21.4)	0	
ART	First line	1264 (99.9)	606 (100)	1.000	1281 (99.8)	414 (100)	0.999
	Second line	1 (0.1)	0 (0.0)		2 (0.2)	0 (0.0)	
Baseline WHO clinical stage	1	479 (38.5)	346 (63.0)	< 0.001	676 (58.3)	226 (55.5)	0.524
	2	272 (21.9)	128 (23.3)		222 (19.2)	78 (19.2)	
	3	398 (32.0)	62 (11.3)		234 (20.2)	89 (21.9)	
	4	95 (7.6)	13 (2.4)		27 (2.3)	14 (3.4)	

4.2 Retention into care

Retention among HIV infected young people initiated on ART at 6 and 12 months of enrolment pre and post intervention

For AFHS sites pre and post intervention period proportion of retention was slightly higher compared to non-AFHS for both pre and post period. At 6 months small increase in proportion retained in non-AFHS sites for post intervention while modest change for AFHS sites. At 12 months, for both non-AFHS and AFHS, the proportion of retention among young people slightly increased by 0.5% and 2.8% respectively.

Table 2: Proportion of HIV-infected youth retained in 6 and 12 months for AFHS and non-AFHS Pre-intervention and post intervention

Months since ART initiation	Site	Pre-Intervention		Post-Intervention		Difference (post – pre intervention)
		n	Retention (%)	n	Retention (%)	
6	AFHS	1,022	927 (90.7%)	844	760 (91.5%)	0.8%
	Non-AFHS	298	245 (82.2 %)	407	351 (86.2%)	4%
12	AFHS	866	715 (82.7%)	651	557 (85.5%)	2.8%
	Non-AFHS	199	151 (75.8%)	360	271 (75.3%)	0.5 %

4.3 Univariable and multivariable logistic regression analysis of factors associated with retention at 12 months post intervention among young people

Univariable and multivariable logistic regression was performed to assess factors that are associated with retention among young people post intervention period. The likelihood of retention was higher in AFHS clinics compared to non-AFHS clinics (crude OR= 1.95; 95% CI 1.41 – 2.69). After adjusting for other factors, the odds of retention were 1.96 times higher among young people in AFHS clinics than non-AFHS clinic (AOR=1.96; 1.39 – 2.77). There was no significant association between WHO staging, age, sex, marital status, treatment regimen and retention (Table 3).

Table 3: Univariable and multivariable logistic regression analysis of factors associated with retention at 12 months post intervention among young people

Variable	Total	Retention at 12 months No. (%)	Univariable OR (95% CI)	p-value	Multivariable OR (95% CI)	p-value
Site						
Non-AFHS	359	270 (75.2)	Reference		Reference	
AFHS	650	559 (86.0)	1.95 (1.41 - 2.69)	<0.0001	1.96 (1.39 - 2.77)	<0.0001
Age (years)						
<15	128	104 (81.2)	Reference		Reference	
15 - <20	240	191 (79.6)	0.89 (0.52 - 1.55)	0.70	0.77 (0.39 - 1.54)	0.47
20-24	641	531 (82.8)	1.11 (0.68 - 1.82)	0.68	0.99 (0.59 - 1.99)	0.97
Sex						
Female	806	668 (82.9)	Reference		Reference	
Male	203	158 (77.8)	0.73 (0.45 - 1.06)	0.09	0.76 (0.51 - 1.14)	0.19
Marital status						
Single	532	437 (82.1)	Reference		Reference	
Married/cohabiting	436	353 (80.9)	0.92 (0.67 - 1.28)	0.64	1.04 (0.74 - 1.47)	0.81
Divorced/widowed	41	36 (87.8)	1.57 (0.60 - 4.09)	0.36	2.61 (0.77 - 8.83)	0.12
Treatment regimen						
EFV	772	627 (81.2)	Reference		Reference	
NVP	63	49 (77.9)	0.81 (0.44 - 1.51)	0.50	0.96 (0.43 - 2.13)	0.91
DTG	155	136 (87.7)	1.66 (0.99 - 2.76)	0.05	1.47 (0.87 - 2.47)	0.15
Baseline WHO stage						
1	562	470 (83.6)	Reference		Reference	
2	255	205 (80.4)	0.80 (0.55 - 1.18)	0.26	0.84 (0.57 - 1.25)	0.39
3	168	133 (79.2)	0.74 (0.48 - 1.15)	0.18	0.67 (0.43 - 1.07)	0.09
4	24	18 (81.9)	0.59 (0.23 - 1.52)	0.27	0.66 (0.25 - 1.77)	0.41

CHAPTER FIVE

5.0 DISCUSSION

Results from the study show that retention at 12 months post intervention was significantly higher in AFHS compared to non-AFHS clinics among young people in Tabora region. Furthermore, results indicates that WHO staging, age, marital status, treatment regimen were not significantly associated with retention.

Higher retention rates were observed 12 months post intervention among young people attending AFHS. A similar study conducted in South Africa found that retention at 12 months among adolescent friendly clinics had higher retention rates compared to standard clinics. (24)

In contrast from this study, a study conducted in Kenya found that there was no difference in retention post intervention period between AFHS and non-AFHS in which retention at 12 months for was 74.8% and 74.4% respectively.(8) The lack of difference in the study has been suggested to be associated with the fact that most of the facilities that implemented AFHS were larger and more likely to be urban.(33,34)

Also, results suggest that retention at 6 months was slightly higher in AFHS than non-AFHS post intervention with 91.5% and 86.2% respectively. In contrast, a study done in Kenya among adolescents/youth who started ART, it was observed AFHS and non-AFHS post intervention had no effect on retention at 6 months after the start of treatment in both facilities that implemented AFHS and those non-AFHS at 83% and 83.5% respectively.(8) The lack of difference between the intervention and nonintervention sites was associated with data from the AFHS facilities were evaluated for the period immediately after implementation of the program and more time may be needed prior to evaluation, to fully engage adolescents/youth, and evaluate outcomes to see results. In addition, there may have been heterogeneity across facilities regarding quality of services and participation.(8)

Demographic and clinical factors have been reported to be associated with retention among young people. In this study we analyzed the demographic and treatment factors such as age, sex,

type of ART regime, marital status and WHO clinical staging and whether they were associated with retention post AFHS period. Multivariate analysis for factors associated with retention indicated that age and sex were not associated with retention post AFHS period. Contrasting results were observed in a study conducted in South Africa found that older adolescents and young adults had lower retention in care highlighting the difficulty with preparations for transition to adult care for older adolescents and young adults who often decrease engagement in care.(35) Also sex differences have been seen in other cohorts and are likely multifactorial and related to local socioeconomic factors. (36,37)

In this study when analyzing marital status in association with retention, it was found that marital status was not associated with retention. A study conducted in Kenya on predictors of retention had similar results in which retention was not associated with marital status or time to link to care in any age group including young people. (38)

Our findings indicate that young people who were classified as WHO stage I at base line showed better retention rates at months 12 although no statistical significance was achieved compared to stage III and IV. In contrary studies done in South Africa and Uganda had different results in which it suggested that young people with WHO stage III and IV had higher retention in care in at 12 months and are likely to remain in care because they are motivated by their health status.(39,40)

5.1 Study Limitations

The study relied on the retrospective data collected from the routine care and service delivery which could be subjected to data incompleteness. Also, data from the AFHS facilities were evaluated for the period immediately after implementation of the program. A longer follow up time may have been needed to fully measure the impact of the services.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Retention among young people attending AFHS clinics was significantly higher compared to non-AFHS after the introduction of AFHS clinics in Tabora Region. Age, sex, type of ART regime and WHO clinical staging were not associated with retention.

6.2 Recommendations

Based on the study findings, I recommend the following:

1. Support the scale up of AFHS clinics across standard care and treatment centers for young people to be able to offer age specific, separate clinics and parent support.
2. Further studies are needed to evaluate factors associated with retention among young people attending care and treatment services in AFHS clinics and standard clinics.

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APPENDICES

Appendix 1: Consent form (Swahili version)

RIDHAA YA KITUO KUSHIRIKI KATIKA UTAFITI HUU

Habari! Jina langu naitwa Dkt. Benedict Peter Kafumu. Ninafanya kazi katika mradi huu wa utafiti wenye lengo la kutambua mchango wa Vituo Rafiki kwa ajili ya Vijana vya kutolea huduma kwenye kuhakikisha vijana wanaoishi na Virusi vya UKIMWI wanabaki kwenye huduma matunzo Mkoa wa Tabora

Malengo ya utafiti

Utafiti huu una lengo la kutambua machango wa vituo Rafiki kwa ajili ya Vijana vya kutolea huduma kwenye kuhakikisha vijana wanaoishi na Virusi vya UKIMWI wanabaki kwenye huduma matunzo Mkoa wa Tabora

Kituo kinaombwa shiriki katika utafiti huu kwa sababu ya utoaji huduma Rafiki kwa vijana katika kituo hiki.

Mimi na timu yangu tunaomba kwa upole kituo chako cha afya kushiriki katika utafiti huu ambapo taarifa zitachukuliwa kutoka kwa mfumo wa taarifa wa CTC2

Ikiwa unakubali Kituo chako kushiriki katika utafiti huu mambo yafuatayo yatatokea:

- Taarifa za wateja zitachukuliwa kutoka kadi za CTC2 na mfumo wa kutunzia taarifa wa CTC2
- Hakuna habari itakusanywa kutoka kwa mfumo ambayo itatambulisha majina ya wateja isipokuwa umri wa Mteja na jinsia yake na kiwango cha elimu.

Usiri: Nakuhakikishia kwamba taarifa zote zitakazokusanywa kutoka katika kituo hiki ni siri. Watu wanaofanya kazi katika utafiti huu pekee tu ndio wanaweza kuziona taarifa hizi. Taarifa hizi zitafanyiwa kazi na watu kutoka chuoni pekee.

Faida : Taarifa utakayotupatia itasaidia kuongeza zaidi uelewa wetu kuhusu manufaa ya huduma maalumu kwa vijana katika kuhakikisha vijana wanakua na ufuasi mzuri wa dawa na wanabaki kwenye huduma matunzo katika kituo.

Watu wa kuwasiliana nao: Kama una maswali katika utafiti huu unaweza kuwasiliana na mratibu mkuu wa mradi, Dkt Benedict Peter Kafumu, Chuo Kikuu cha Muhimbili, S.L. P 65001, Dar es Salaam (Simu namba 0762891098).

Kama utakua na maswali yoyote kuhusu utafiti huu unaweza kupiga simu kwa Dkt. Honoratha Rwezahura ambaye ni Mganga Mkuu wa Mkoa wa Tabora kwenye nambari 0783 270 946

Sahihi

Sahihi ya Mkuu wa Kituo

Sahihi ya mtafiti muandamizi

Tarehe ya makubaliano

Appendix 2: Consent form (English version)**CONSENT TO PARTICIPATE IN THIS STUDY**

Greetings! My name is **Dr. Benedict P. Kafumu**. I am working on the research project with the

objective to **ASSESSING THE EFFECTIVENESS OF ADOLESCENT FRIENDLY CLINICS ON RETENTION AMONG YOUNG PEOPLE (10-24 YEARS) ON ANTIRETROVIRAL THERAPY IN TABORA REGIONS TANZANIA.**

Purpose of the study will collect information on **ASSESSING THE EFFECTIVENESS OF ADOLESCENT FRIENDLY CLINICS ON RETENTION AMONG YOUNG PEOPLE (10-24 YEARS) ON ANTIRETROVIRAL THERAPY IN TABORA REGIONS TANZANIA.**

I and my team are kindly requesting your health facility to participate in this study as information will be taken from CTC2 data base If you agree to participate in this study the following will occur:

- Your information will be taken from the CTC2 cards and data base in order to obtain the intended information to improve student welfare in the university.
- No identifying information will be collected from you during this, except your age, gender, level of education and residence.

Confidentiality: I assure you that all the information collected from you will be kept confidential. Only people working in this research study will have access to the information. We will be compiling a report, which will be presented to fellow students. We will not put your name or other identifying information on the records of the information you provide.

Benefits: The information you provide will help to increase our understanding on the effectiveness of Adolescent friendly health services on the retention of young people and advice the government.

Whom to contact: If you ever have questions about this study, you should contact the study Coordinator **Dr, Benedict Peter Kafumu**, Muhimbili University of Health and Allied Sciences (MUHAS), P.O. Box 65001, Dar es Salaam (Tel. no. 0762891098). If you ever have questions about the participation of your facility on the study please consult **Dr. Honoratha Rwezahura** Regional medical Officer Tabora with mobile number 0783 270 946

Signature of Facility in charge _____

Signature of research assistant _____

Date of signed consent

Appendix 4: Copy of permission from Regional Administration Secretary

**The United Republic of Tanzania
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**

Telegrams: **MKUUMKOA**
Telephone: 026 2604058/2604116
Fax: 026 - 2604274
Email: ras.tabora@tamisemi.go.tz
In reply please quotes



Regional Commission's Office,
P.O.Box. 25,
TABORA.

Ref No CA. 54/218/01D/84

17th August, 2020

Municipal Director
TABORA MC,

Town Director
NZEGA TC,

Districts Executive Director's
TABORA REGION.

REF: REQUEST TO CONDUCT RESEARCH IN TABORA REGION.

Please refer to the heading above.

We received letter from Muhimbili University of Health and Allied Sciences (MUHAS) with Ref.No.HD/MUH/T.519/2017 of date 03rd August, 2020. Introducing Mr. Benedict P. Kafumu as Muhimbili University (MUHAS) student Pursuing MPH-Distance Learning who is required to conduct research as part of his study Programmes and kindly requesting to provide assistance to him to collect data on the research proposal Titled "**Assessing the Impact of Adolescent Friendly Clinics on Retention Among Young People on Antiretroviral Therapy in Tabora Region.**" I would like to inform that the permission is open to him to October, 2020. Under the condition that, the information obtained for this permit is for internal use not for publication, For this letter I ask you to give him administrative support on his research by supplying information required to accomplish the research.

Yours Sincerely.

PP *Rukia S. Manduta*
RUKIA S. MANDUTA

**FOR: REGIONAL ADMINISTRATIVE SECRETARY
TABORA**

Copy: Regional Administrative Secretary (To see in the file)
TABORA.

Vice Chancellor
MUHAS

District Administrative Secretary
TABORA (For Information)

Mr Benedict P. Kafumu.
MPH Student (For identification).