FACTORS ASSOCIATED WITH TWO YEARS RETENTION IN CARE AMONG ADOLESCENTS LIVING WITH HIV IN DODOMA MUNICIPALITY

Jacqueline Inoja Nkouabi, MD

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FACTORS ASSOCIATED WITH TWO YEARS RETENTION IN CARE AMONG ADOLESCENTS LIVING WITH HIV IN DODOMA MUNICIPALITY

By

Jacqueline Inoja Nkouabi

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
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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation titled: "Factors associated with two years retention in care among adolescents living with HIV in Dodoma municipality" in (partial) fulfillment of the requirements for the degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences.

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Dr Candida Moshiro

(Supervisor)

_____

Date:

_____

Dr. Mucho Mizinduko

(Supervisor)

_____

Date:

DECLARATION AND COPYRIGHT

I, **Jacqueline Inoja Nkouabi** 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 mother Adv. Margaret Julius Mziray and husband Dr. Renatus Fabiano.

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ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ALHIV	Adolescents Living with HIV
ART	Antiretroviral Therapy
CTC	Care and Treatment Clinic
DTG	Dolutegravir
EFV	Efavirenz
HIV	Human Immunodeficiency Virus
NACP	National AIDS Control Programme
NNRTI	Non-Nucleoside Reverse Transcriptase Inhibitor
PI	Protease Inhibitor
TB	Tuberculosis
UNAIDS	United Nations Programme on HIV and AIDS
WHO	World Health Organization

DEFINITION OF TERMS

Adolescent: A person belonging to the age of 10-19 years.

Retention in care: Having had at least 1 medical visit in each 3months period of the year of study.

Viral suppression: Having HIV viral load below 50 copies per milliliter of blood.

Adherence: Sticking to the treatment plan by consistently taking the appropriate medication, in the correct dosage, at the designated time intervals, following the prescribed instructions agreed upon by healthcare providers, clients and caregivers.

WHO Clinical stages: Clinical and immunological events that are used to categorize HIV disease among people confirmed with HIV infection.

ABSTRACT

Background:

Retention in HIV care services is an essential requirement for adherence to antiretroviral therapy and viral suppression, to avoid significant Human Immunodeficiency Virus-related illness and death. The United Nations Programme on HIV and AIDS 95-95-95 strategy outlines the goal of retaining 95% of individuals enrolled in HIV care. However, achieving this target has been challenging particularly in adolescents aged 10-19 years. To attain the objective of ending the AIDS epidemic by 2030, it is important to understand the demographic and clinical factors that are associated with adolescents' retention in care.

Objective: To assess the factors that are associated with retention in care among adolescents living with HIV/AIDS in Dodoma Municipality.

Methodology: This was a retrospective cohort study using data from the Care and Treatment Clinic database. The study involved adolescents between the ages of 10 and 19 living with HIV who were registered and attended CTC services in 5 clinics in Dodoma Municipality between July 2014 and June 2023. The key outcome variable was retention in care. Multivariable modified Poisson regression was used to examine the independent factors associated with retention in care. Relative risks (RR) and 95% confidence intervals (95% CI) are reported.

Results: A total of 291 records of adolescents were included; 206 (70.8%) were females**.** The proportion of adolescents who were retained in care over a 6, 12, and 24-months period was found to be 82.8%, 77.3% and 72.9% respectively. Adolescents aged 10 to 14 years (adjusted RR= 1.49; 95% CI 1.29-1.74) and those initiated on Dolutegravir based regimen (adjusted RR=1.34; 95% CI 1.16-1.54) were more likely to remain in care at 24 months.

Conclusion: A two-year retention rate among adolescents living with HIV in Dodoma Municipality was lower than the UNAIDS 2030 target of 95%. Age and ART regimen at initiation were associated with retention in care. Tailored interventions need to be implemented to improve retention in care especially among older adolescents aged 15 to 19 years.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background:

Retention in Human Immunodeficiency Virus (HIV) care services is an essential and important requirement for adherence to antiretroviral therapy (ART) and viral suppression, to avoid significant HIV-related illness and death (1). The United Nations Programme on HIV and AIDS 95-95-95 strategy emphasizes the goal of retaining 95% of individuals enrolled in HIV care. However, achieving this target has proven challenging in different contexts and subgroups such as adolescents aged 10-19 years (1).

Adolescence is a transition period from being a child to being an adult, it is characterized by the development of new behaviors that affect health behavior such as compliance with medication and remaining in HIV care services resulting in poor clinical outcomes (2). As of 2021, the global population of adolescents 10-19 years living with HIV was estimated at approximately 1.71 million, and they account for approximately 5% of all HIV-positive individuals (2) . Sub-Saharan Africa, is a home to 1.5 million of these adolescents, making up 88% of the global total in this age group. Tanzania alone accounts for 5.8% of adolescents living with HIV worldwide (2). Despite efforts to combat the epidemic, adolescents are the only demographic group whose AIDS-related death rate is not decreasing, they represent approximately 5% of all fatalities caused by this condition (3).

Compared to older people, adolescents aged 10- 19 years face an increased risk of becoming disconnected from HIV care at any point along the care continuum, however, retaining individuals in long-term HIV treatment continues to be a challenge across all age groups (4). According to data from the United States, 55% of adolescents diagnosed with HIV remained in care in 2014 (5). Meanwhile, a study in Uganda reported that 65% of adolescents continued to remain in care through the fifth year (6).

Effective HIV management continues to depend on early detection, prompt linkage to care, and maintaining continuous engagement in HIV/AIDS care and treatment for optimal clinical, physical, survival, and social outcomes (7,8). To achieve this, Tanzania has been updating its HIV treatment guidelines in line with World Health Organization

recommendations, transitioning from CD4 cell count-based treatment initiation to recommending Anti-Retroviral Therapy for all HIV-positive individuals irrespective of CD4 count (Test and Treat) (9,10). However, the effectiveness of the Test and Treat strategy in improving patient retention in care is debatable, although some studies indicate improved retention, others show worse outcomes(11,12).

Addressing clinical, mental and social well-being has become an important aspect of many adolescent HIV-related interventions, although these interventions are frequently limited to trial programs, small-scale operations, or centralized services, which reduces their potential impact (13).

Approaches such as peer support groups, aim to provide empathy-based support to adolescents living with HIV while also encouraging service use and treatment adherence, with the integration of peer-led psychosocial support alongside ART and clinical services showing promising results in engagement, retention, medication adherence, and viral load suppression (13,14). To improve engagement and outcomes, WHO recommends implementing adolescent-friendly health services within HIV programs, as a result, healthcare facilities address access barriers by implementing strategies like designating specific days and hours, creating fast-track or separate lines for adolescents, and offering services outside of school hours, including on weekends, to reduce loss to follow-up (13,15).

Although initiatives such as peer-based group interventions and adolescent-friendly health services, have been made in Tanzania to promote adolescent retention, there is currently a lack of national strategies to specifically tackle the challenge of sustaining adolescent's continuous engagement in care and treatment facilities (8).

Thus, understanding the factors that are associated with retention in care is crucial because it provides information that can be used to create strategies and interventions to improve and promote HIV retention among HIV-infected adolescents.

1.2 Problem Statement

According to the United Nations Programme on HIV and AIDS 95–95-95 strategy, it is recommended to retain 95% of individuals enrolled in HIV care, however, many contexts and subpopulations, especially adolescents have not been able to achieve this (1). It has been demonstrated that effective retention in HIV care reduces illness and death among individuals living with HIV, prevents treatment failure, decreases drug resistance, and achieves virological suppression (16). Despite the availability of different strategies to ensure continuity of HIV care, low retention rates have been observed, particularly in Low and Middle-Income Countries (LMICs) including Tanzania (4).

Studies conducted in South Africa, Uganda, and Namibia between 2013 and 2020 revealed retention rates over a period of 12 to 24 months ranging from 36.4% to 90.2% (1,17,18).

A study conducted in Mkuranga Pwani, Tanzania in 2015, found that adolescents aged 10-19 years enrolled in ART program had a poor retention rate of 25% (8). Several factors including structural, social, and health-related such as stigma and discrimination, travel distance and cost to the health facility, poverty, and social ties have been attributed to low retention rates (1).

While most studies have focused on adolescents as part of a wider population encompassing adults and children, factors such as demographic and clinical that are related to the age group (10-19 years) who constitute a rising population of people living with HIV and have distinct needs and experiences have received less attention. Thus, this study aims to assess socio-demographic and clinical factors associated with retention to care among adolescents 10-19 years living with HIV/AIDS in Dodoma Municipality.

1.3 Conceptual Framework

Anderson’s behavioral model provides a theoretical foundation for understanding how factors related to the patient, social structure and health care system influence health behavior and outcomes in the context of HIV retention in care (19). Anderson's behavioral model delineates how patient elements such as predisposing, enabling, and perceived need and environmental factors both external and health-related impact health behavior (19). This study is conceptualized based on Anderson’s behavioral model. The diagram below shows

how clinical factors such as HIV/TB coinfection, WHO clinical stage, timing of ART initiation, ART regimen, and viral suppression and socio-demographic factors (age, sex, marital status, having treatment supporter and being enrolled in peer support group) are associated with retention in care. Adolescents with HIV/TB coinfection and those started on ART within 7 days of HIV confirmation are less likely to remain in care. In contrast, those with WHO clinical stages I and II, initiated on DTG-based regimens and virally suppressed are more likely to be retained in care (14,20–22) Younger adolescents aged 10 to 14, are more likely to be retained as compared to the older adolescents aged 15 to 19 (17). Additionally, being male and married is associated with a higher likelihood of remaining in care (1). Lastly, having a treatment supporter and being in a peer support group is linked to better retention rates (20,23).

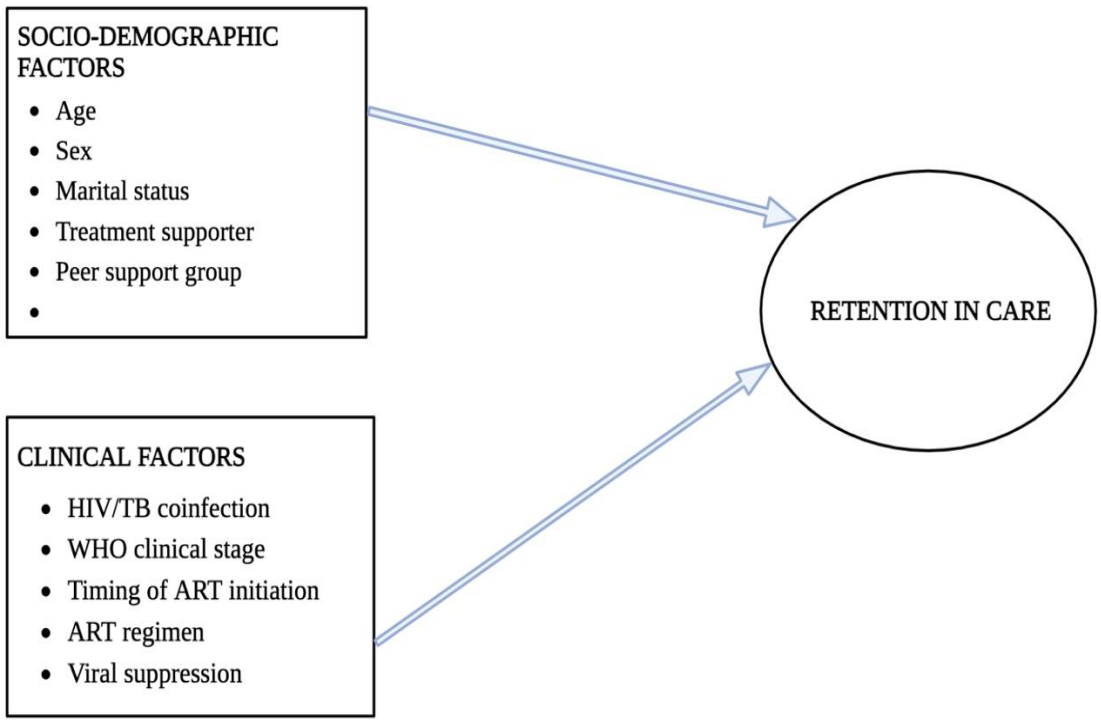


Figure 1: Conceptual framework for factors associated with retention in care.

1.4. Rationale of the study

Results obtained from this study would offer understanding and knowledge on the factors associated with the continuous involvement of adolescents living with HIV/AIDS in care to the policymakers, program managers and the community. The knowledge obtained will be crucial in designing and strengthening approaches that would encourage adolescents living with HIV/AIDS to be continuously engaged in care. Dodoma is one of the municipalities that has been implementing projects that aim at addressing the special needs of adolescents. Findings of this study will provide the National Aids Control Program, through the Ministry of Health with additional data to strengthen their interventions that are aiming at retaining more adolescents living with HIV in care and other related services. Ultimately, these interventions can be tailored to be more relevant and effective for adolescents living with HIV/AIDS, thereby improving their overall health outcomes and quality of life.

1.5 Research Questions

1.5.1 Main research question:

1. What are the factors associated with 24 months retention in care among adolescents living with HIV/AIDS in Dodoma Municipality?

1.5.2 Specific research questions:

i. What is the proportion of retention in care among adolescents living with HIV/AIDS in Dodoma Municipality at 6,12 and 24 months?
ii. What are the socio-demographic factors associated with 24 months retention in care among adolescents living with HIV/AIDS in Dodoma Municipality?
iii. What are the clinical factors associated with 24 months retention in care among adolescents living with HIV/AIDS in Dodoma Municipality?

1.6 Objectives of the Study

1.6.1 Main Objective:

The main objective of the study is to assess the factors associated with 24 months retention in care among adolescents living with HIV/AIDS in Dodoma Municipality.

1.6.2 Specific Objectives:

1. To determine the proportion of retention in care among adolescents living with HIV/AIDS in Dodoma Municipality at 6,12 and 24 months.
2. To determine the socio-demographic factors associated with 24 months retention in care among adolescents living with HIV in Dodoma Municipality.
3. To determine clinical factors associated with 24 months retention in care among adolescents living with HIV/AIDS in Dodoma Municipality.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Proportion of adolescents retained in care:

Studies conducted in different settings such as South Africa, Namibia, and Uganda between 2013 and 2020 have shown a decreasing trend in adolescent retention in HIV care and treatment over time, with retention rates dropping from 68.6% at 4 months to 36.4% at 12 months in South Africa, a decline from 97.7% at 6 months to 84.6% at 36 months in Namibia, and a decrease in Uganda from 61.3% at 6 months to 21.9% at 12 months (17,18,20).

Findings from a systematic review of primary data from the United States, which focused on particular age categories revealed that 43% of adolescents aged 10-19 years and youth remained in care throughout the initial three years after enrollment (24).

Also, 83% of older adolescents aged 15 to 19 years on ART remained in care during the initial one to two years of treatment this is according to a systematic evaluation of the continuum of care for adolescents with HIV in South Africa (25). Results of a study conducted in Southwest Uganda indicated a retention rate of 65.7% (1).

A study that included Tanzania among other seven African countries, showed that adolescents had lower retention rates than older adults in each of the seven countries, about 55% of older adolescents aged 15 to 19 years in Tanzania remained in care (26). Between 2008 and 2016, a study conducted in Tanzania examined the pattern of HIV care and treatment retention and revealed a notable decrease in the continuity of care among adolescents, this decline was specific to the adolescent and youth of the age group 15 to 24 years and was not observed in other age categories (27). Nevertheless, there few comprehensive research on retention specifically focusing on the age group 10 to 19 years. Most studies have instead focused on adolescents within a broader population that includes adults.

2.2 Socio-demographic factors associated with retention in care

Studies that have compared retention rates of adolescents aged 10-14 years and those aged 15-19 years have found those aged 15-19 years have a decreased likelihood of remaining in care (14,17,23). A study done in Zimbabwe, however, found no variation in retention rates between the two age groups at 6, 12, and 24 months (28).

Data on the association between sex and continuous engagement in care have indicated that male adolescents are more likely compared to females to remain in care (22,29). Furthermore, when observing over extended periods, specifically 24 and 36 months, male adolescents aged 10-19 years were more likely to remain in care as compared to female adolescents (14).

Being married or having a spouse offers a significant source of psychological and emotional support, leading to better retention in HIV care when compared to individuals who are single or not in a relationship. Muwanguzi, *et al*., in Uganda, reported that adolescents who were married exhibited a greater likelihood of maintaining engagement in care compared to those who were not married (1).

Some studies have highlighted the importance of peer and family support in retaining adolescents in care. Encouragement and assistance from peers and family members together have a positive influence on retention (30). A study conducted in Malawi found that adolescents who had teen club exposure had 3.7 higher odds of being retained in care, in contrast to individuals who did not have any exposure to teen clubs (23). In Uganda, a study found that having a treatment supporter was associated with retention in care (20). Adolescents learn and share HIV experiences when attending adolescent clubs and this influences them in attending to care (8).

Retention in care and the associated factors among individuals in the age group 10-19 years have received little attention in Tanzania.

2.3 Clinical factors associated with retention in care

Adolescent continuous engagement in care has been linked to several clinical factors. Several studies have reported on how HIV/TB coinfection affects retention. Studies in South Africa, Namibia, and Tanzania found that adolescents who were HIV/TB coinfected at the time of enrollment were more prone to disengagement from care (18,22). These findings are in line with observations from Uganda, whereby those who did not have TB were more likely to continue with care (20).

Contradicting findings have been reported on the association between WHO clinical stage and retention in care. While a study in South Africa reported that adolescents with clinical stage IV on diagnosis had better retention rates, a study in Zimbabwe found that those with clinical stage IV on diagnosis were less likely to be retained in care (17,28). A study in Uganda reported that those diagnosed at an early clinical stage (Stage I) were retained in care (20). Another study in Uganda showed that adolescents with clinical stages I and II had a greater likelihood of sustaining engagement in care compared to those in stages III and IV (14). Conversely, Ojwang, *et al.*, in Kenya in 2010, found no association between WHO clinical stage and retention in care (31).

Studies conducted in South Africa in 2019 and Namibia between 2019 and 2021, have examined the relationship between viral suppression following the initiation of ART and retention in care among adolescents aged 10-19 years have consistently demonstrated that adolescents who achieved virological suppression had a higher probability of remaining engaged in care (18,22).

It is necessary to initiate ART on the same day of HIV diagnosis or within seven days if there are no medical or psychological constraints (32). A study done in South Africa showed that adolescents who commenced ART on the same day as their HIV diagnosis had a lower probability of remaining in care than those who began ART later (21). Retention after six months was considerably lower in the test and treat compared to before the test and treat, according to a study in Zimbabwe (33).

Comparatively to adolescents who began treatment on an Efavirenz-based regimen, those who began treatment on a dolutegravir-based regimen were found to remain in care (20).

Contrary to those on the second line of treatment, adolescents in Tanzania who were on the first line of treatment had a lower retention rate (29).

There is limited understanding of clinical factors that affect retention of adolescents living with HIV in care. Most of the existing studies have explored these factors among adults.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

This retrospective cohort study used routinely obtained data from the CTC database between July 2014 to June 2023. The enrollment period was from July 2014 to June 2021. Retention patterns were examined retrospectively over a 2 years period after enrollment, until June 2023.

3.2 Study area

This was a hospital-based study, conducted in 5 Care and Treatment Clinics for HIV/AIDs with a significant number of adolescents living with HIV, in Dodoma Municipality. Dodoma Municipality has 20 facilities that provide HIV Care and Treatment services to adolescents. However, five of these CTCs serve a large number of adolescents and offer specialized care. The five facilities are Dodoma Regional Referral Hospital (DRRH), Makole Health Centre, St. Gemma Hospital, Mirembe Hospital and Village of Hope health center (VOH). These facilities provide services such as games, refreshments, interest-based clubs, psychoeducation, and counseling on adherence to treatment and risky sexual behaviors. Adolescents visit four of these CTCs on the last Saturday of each month, while at Dodoma Regional Referral Hospital (DRRH), they are attended to twice a month. DRRH offers CTC services to 930 children and adolescents under the age of 19, Makole Health Center has 475 children and adolescents, while VOH is a primary health care health facility and HIV orphanage center with 1602 clients (34). Dodoma stands out as one of the rapidly developing cities in the country with the highest number of youths. According to the National Bureau of Statistics report of 2022, Dodoma municipality had a population of 765,179 people. Of these, 20.9% were adolescents aged 10-19 (35,36). The prevalence of HIV in Dodoma is 3%, close to the national rate of 4.4% (37)**.** Dodoma Municipal Council collaborates with various implementing partners to support national multi-sectoral initiatives in HIV prevention, treatment, care, and health systems strengthening, aiming to achieve an AIDS-free generation (38).

3.3 Study Population

Adolescents aged between 10-19 years, living with HIV/AIDS enrolled at Makole Health Centre, Village of Hope Health Centre, Mirembe Hospital, St. Gemma Hospital, and Dodoma Regional Referral Hospital between July 2014 and June 2021.

3.3.1 Inclusion and exclusion criteria

3.3.1.1 Inclusion criteria

1. HIV-positive adolescents who were enrolled in the selected CTCs, between July 2014 and June 2021 and followed for retention at 2 years.

3.3.1.2 Exclusion Criteria

1. Adolescents who were enrolled and transferred in from other CTCs.
2. Adolescents who were transferred out during the follow-up period.

3.4 Sample size

The formula below was used to determine the sample size:

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where by:

Z = Standard normal deviate (1.96 for 95% confidence level)

p = proportion (cumulative incidence) of adolescents living with HIV retained in care =25%(8)

q=1-p

e= margin of error (5%)

$n_0 = \frac{1.96^2 \times 0.25 \times (1-0.25)}{0.05^2} = 288$

The minimum sample size of this study was 288 adolescents.

3.5 Sampling technique

The researcher included records of all adolescents meeting the inclusion criteria from the 5 Care and Treatment Clinics, where by 104 adolescents were from Makole Health Centre, 75 were from Dodoma Regional Referral Hospital, 41 were from Village of Hope Health Centre, 38 from Mirembe Hospital and 33 were from St. Gemma hospital.

3.6 Study Variables

3.6.1 Dependent variable

The outcome variable for this study was retention in care (having had at least 1 medical visit in each 3 months of the 2 years after enrollment to CTC).

3.6.2 Independent variables

The independent variables for this study were:

1. Socio-demographic factors (age, marital status, sex, treatment supporter, peer support group).
2. Clinical factors (HIV/TB coinfection, WHO clinical stage, timing of ART initiation, ART regimen, viral suppression).

3.7 Data collection tool and procedures

Data were obtained from the CTC 2 electronic database, which is a digital version of the CTC 2 card that captures information on the client's demographic and clinical history. Before recording information from the CTC2 database, the researcher together with the data clerks ran a consistency check for the specific variables of interest in the CTC2 database, ART register and CTC2 files. A predefined tool was used to record information from the CTC 2 database, this was done by the researcher in collaboration with the CTC data clerks, and this information was entered into an Excel spreadsheet.

3.8 Data analysis

Data collected was compiled in an Excel template and then imported to the Statistical Package for Social Sciences (SPSS), version 23 for analysis.

Descriptive statistics were utilized to summarize the demographic and clinical characteristics of the participants. Categorical variables were expressed in proportion, and retention to care

is reported for 6, 12 and 24 months follow-up period. We used an equal follow-up period of 24 months for each participant to examine the relationship between the various factors and retention to care. We estimated the cumulative incidence of retention to care (proportion) as the number retained in the 24 months' period divided by the total number at risk. The cumulative incidence was common (>10%). Poisson regression model would have produced wider confidence intervals (39). Hence, we used modified Poisson regression analysis, which is less prone to convergence problems compared to log-binomial models to investigate factors associated with retention to care (40). Univariable and multivariable regression analyses were performed. Variables with p-value of <0.2 in the univariable model were included in the multivariable model to control for the effect of confounding. Viral load suppression was not included in the multivariate analysis because it correlated with other variables thus leading to distortion of the model. Relative risks (RR) and 95% confidence intervals (CI) are reported. The significance level for this study was set at a p-value of <0.05.

3.9 Ethical Issues

Ethical clearance was sought from the Muhimbili University of Health and Allied Sciences Institutional Review Board (IRB). After approval, permission to collect data was sought from the District Medical Officer (DMO) and respective facility and CTC administration. Patient records were anonymized, and study participants were identified by their unique CTC registration. Soft copies of the data collected were kept in a computer protected by a password while the copies of the pre-defined tool for data collection were kept securely in a room that is only accessible to the researcher.

CHAPTER FOUR

4.0 RESULTS

4.1 Sociodemographic and clinical characteristics of participants.

A total of 291 records of adolescents who had met the inclusion criteria were extracted from the CTC 2 database. The majority of the adolescents were females (70.8%), 51.5% were aged between 15 to 19 years with mean age being 15 years (standard deviation=3.3). Most of them were single (99%) and had treatment supporters (93.8%). Almost all of the adolescents (96.2%) had not joined peer support groups at the time of enrolment.

Three-quarters of the adolescents were started on NNRTI based regimen (75.6%) at the time of ART initiation. Most of them had no TB (96.6%) and 70.8% had WHO clinical stage I and II at diagnosis. Most of the adolescents started ART in less than 7 days of diagnosis (64.6%). The majority of the adolescents were virally suppressed (72.2%) at the time when the first viral load test was taken after ART initiation.

Table 1: Demographic and clinical characteristics of adolescents (10-19 years) on ART in Dodoma Municipality 2014-2021 (N =291)

Characteristic	Frequency	Percent
Age (Years)		
10 to 14	141	48.5
15 to 19	150	51.5
Sex		
Male	85	29.2
Female	206	70.8
Marital Status		
Single	288	99
Married	3	1
Treatment Supporter		
Yes	273	93.8
No	18	6.2
Joined Peer support Group		
Yes	11	3.8
No	280	96.2
ART Regimen at Initiation		
NNRTI based	219	75.3
PI based	8	2.8
DTG based	64	21.9
TB diagnosis at Initiation		
Negative	281	96.6
Positive	10	3.4
WHO Clinical stage at Diagnosis		
I &II	206	70.8
III &IV	85	29.2
Timing of ART Initiation		
≤ 7days	188	64.6
> 7 days	103	35.4
Viral load suppression (copies/ml)		
Suppressed (≤1000)	210	72.2
Unsuppressed (>1000)	16	5.5
Not tested	65	22.3

4.2 Retention in care among HIV-infected adolescents at 6, 12, and 24 months after ART initiation.

The proportion of adolescents who were retained in care over a 6, 12, and 24-months period was found to be 82.8%, 77.3% and 72.9% respectively. The proportion of retention at 6, 12, and 24 months was high among adolescents aged 10-14 years and male adolescents.

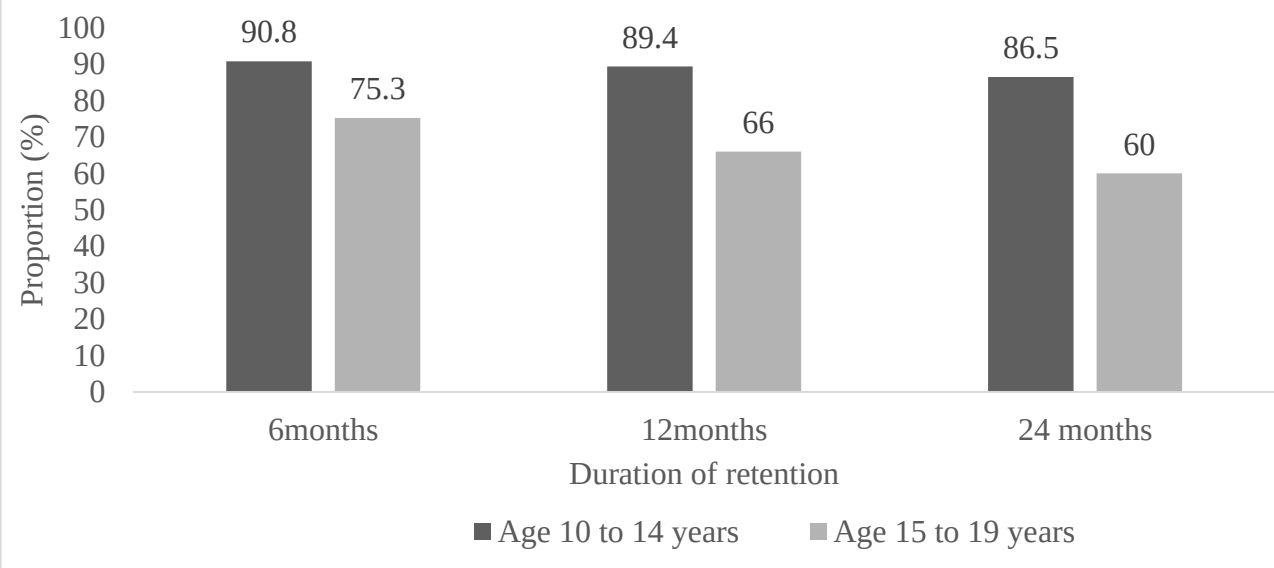


Figure 2: Proportion of retention among adolescents by age groups

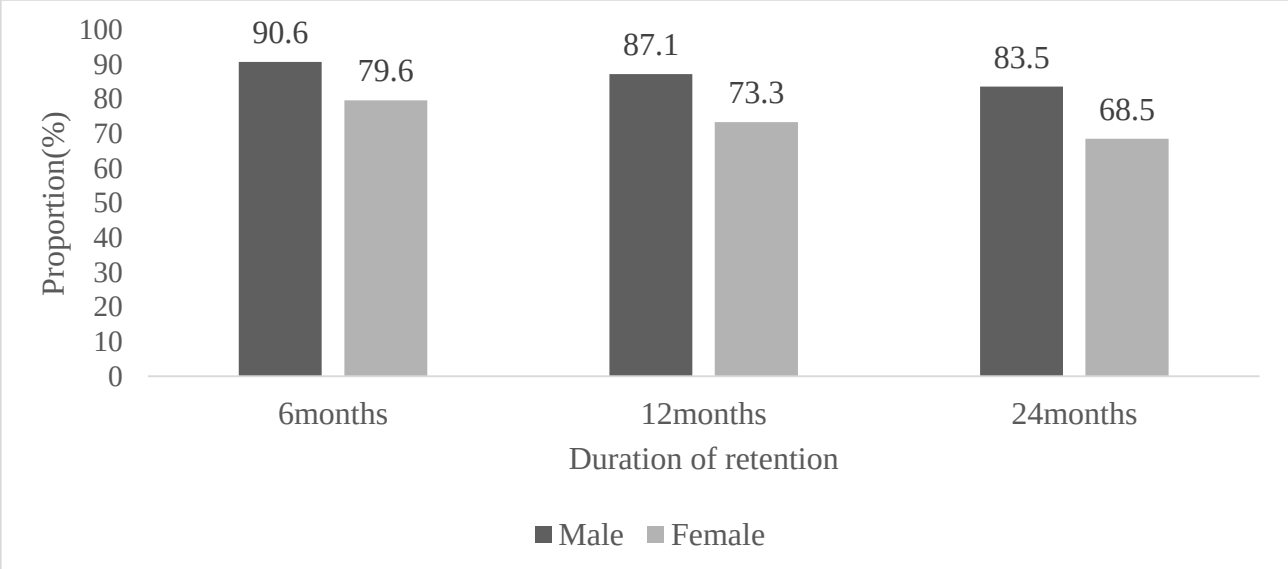


Figure 3: Proportion of retention among adolescents by sex

4.3 Univariable and multivariable modified Poisson regression analysis for factors associated with retention in care at 24 months among adolescents

Table 2 shows univariable and multivariable modified Poisson regression results for factors associated with retention in care among adolescents. The factors examined included, age, sex, joining peer support group, having a treatment supporter, ART regimen at initiation, TB diagnosis at initiation, WHO clinical stage at initiation, timing of ART initiation and viral load suppression. In the univariable analysis, the likelihood of retention was 1.44 times higher in adolescents aged 10 to 14 years compared to those aged 15 to 19 years (RR=1.44; 95% CI 1.25-1.67). Adolescents initiated on a DTG-based regimen were 1.34 times more likely to remain in care as compared to those initiated on NNRTI based regimen (RR=1.34; 95% CI 1.06-1.39). Female adolescents were less likely to be retained as compared to male adolescents (RR=0.82;95% CI 0.72-0.94). After adjusting for other factors, adolescents aged 10 to 14 years (adjusted relative risk (ARR)= 1.49; 95% CI 1.29-1.74) and those initiated on DTG based regimen (ARR=1.34; 95% CI 1.16-1.54) were more likely to remain in care at 24 months. Sex and joining peer support group were not significantly associated with retention.

Table 2: Univariable and multivariable modified Poisson regression analysis for factors associated with retention in care at 24 months among adolescents (N=291)

Characteristic	Total	Retention at 24months (n, %)	RR (95% CI)	P-value	ARR (95% CI)	P- value
Sex						
Female	206	141 (68.5)	0.82 (0.72- 0.94)	<0.01	0.89 (0.78-1.02)	0.09
Male	85	71 (83.5)	Reference		Reference	
Age (years)						
10 to 14	141	122 (86.5)	1.44 (1.25-1.67)	<0.0001	1.49 (1.29-1.74)	<0.0001
15 to 19	150	90 (60)	Reference		Reference	
Treatment Supporter						
Yes	273	200 (73.3)	1.03 (0.75-1.42)	0.84		
No	18	12(66.7)	Reference			
Joined peer support group						
No	280	202 (72.1)	0.80 (0.64-1.00)	0.05	0.79 (0.60-1.05)	0.11
Yes	11	10 (90.9)	Reference		Reference	
ART regimen at initiation						
DTG based	64	54 (84.4)	1.34 (1.06-1.39)	<0.01	1.34 (1.16-1.54)	<0.0001
PI based	8	6 (75)	1.08 (0.72-1.63)	0.71	0.96 (0.60-1.54)	0.88
NNRTI based	219	151(69.4)	Reference		Reference	
TB Diagnosis						
Negative	281	206 (73.3)	1.10 (0.69-1.75)	0.70		
Positive	10	6 (60)	Reference			
WHO clinical stage at Diagnosis						
I&II	206	153(74.3)	1.07 (0.91-1.26)	0.82		
III&IV	85	59 (69.4)	Reference			
Timing of ART Initiation						
≤ 7days	188	159 (84.6)	1.07 (0.91-1.24)	0.82		
> 7 days	103	82 (79.6)	Reference			
Viral load suppression ((copies/ml)						
Unsuppressed (>1000)	16	11 (68.8)	0.73 (0.02-0.15)			
Not tested	65	3(4.6)	0.05 (0.52-1.02)			
Suppressed (≤1000)	210	198 (94.3)	Reference			

Note: RR= Relative Risk ARR= Adjusted Relative Risk CI= Confidence Interval

CHAPTER FIVE

5.0 DISCUSSION

Results from the study show that age and ART regimen at initiation were significantly associated with retention. Furthermore, retention in care was 82.8% at 6 months, 77.3% at 12 months and 72.9% at 24 months.

Proportion of adolescents retained in care at 6,12 and 24months:

The proportion of adolescents retained in care declined over time, from 82.8% at 6 months to 72.9% at 24 months. This finding aligns with findings from a study conducted in South Africa in 2019 which found a decline in retention rates from 90.5% at 6 months to 76.2% at 24 months (22). Another study carried out in Metropolitan South Africa in 2013 revealed a significant and rapid decrease in retention rates at 4, 12, and 24 months with proportions of 68.6%, 50.5%, and 36.4% respectively, these results have been suggested to be associated with the methodology used in measuring retention in care, which included the consideration of transfers out in the denominator (17). The decline in the proportion of adolescents retained in care over time may be due to them not understanding the need to take medication daily as a result of improper disclosure of their HIV status (41). The successful transfer of HIV management duties from caregiver to adolescents requires a transition process that involves patient education and empowerment, early exposure to the concept of transfer, and a well-defined plan for the continuity of care (42).

Demographic and clinical factors associated with retention in care:

Demographic and clinical factors have been reported to be associated with retention among adolescents. Our findings show that younger adolescents (10 to 14 years) were more likely to be retained in care compared to older adolescents (15 to 19 years). Similar findings were reported in studies conducted in Uganda and South Africa in 2013 whereby, younger adolescents 10 to 14 years were significantly retained in care at 24 months because they rely more on their caregivers to manage their treatment journey, while older adolescents as they grow independent, may experience poor retention due to challenges that are associated with transitioning from pediatric to adult HIV care, fear of stigma, discrimination, and peer pressure (6,17,23).

Findings from our study indicated an association between ART regimen at initiation and retention in care, adolescents initiated on a Dolutegravir-based regimen were more likely to be retained in care compared to those initiated on a NNRTI-based regimen. Contrasting findings have been reported in a study conducted in Uganda in 2019 whereby those initiated on NNRTI were significantly retained in care (20). The difference could be explained by the higher numbers of adolescents initiated on DTG in our study unlike in the other study wherein the majority of the adolescents were initiated on NNRTI based regimen, also more complicated medications such as NNRTI-based, require increased dosing (twice daily) and have more adverse effects, posing a risk for non-retention (43).

Although not statistically significant, findings from our study are in line with what was found in Uganda in 2020 and South Africa between 2013 and 2019, whereby male adolescents were more likely to be retained in care as compared to their female counterparts (1,17,22). The decreased retention rates among female adolescents living with HIV may be attributed to various factors such as stigma and discrimination, conflicting responsibilities at home, and the occurrence of pregnancy (44).

Our study found no association between joining peer support groups and retention. This finding is contrary to what was observed in studies conducted in Mkuranga Tanzania, Zambia, and Uganda which found that support and encouragement from peers and family facilitated retention (8,30,45). The difference in our findings could be explained by the fact that the majority of the adolescents in our study had not joined peer support groups which have been reported to influence retention into care by adolescents as reported in the study conducted in Tanzania, Namibia, and Uganda.

Furthermore, adolescents who had a treatment supporter were more likely to be retained in care, although not statistically significant, similar findings have been reported in a study conducted in Mkuranga Pwani Tanzania in 2015 by adolescents with treatment supported adhered to their clinic schedules and were retained in care because the of psychosocial support proved by the treatment supporters (8).

Our findings indicate that adolescents with WHO clinical stage I and II at diagnosis had better retention although no statistical significance was achieved compared

to stages III and IV. In contrary, studies done in South Africa and Uganda had different results which suggested that young people with WHO stage III and IV had higher retention in care at 12 months and are likely to remain in care because they are motivated by their poor health status (6,17)**.**

TB diagnosis was not significantly associated with retention in care however studies conducted in South Africa and Namibia between 2019 and 2021 reported a significant association between TB diagnosis and retention, whereby adolescents with positive TB results were less likely to be retained in care as compared to those with negative TB results (18,22). The difference in our findings could be attributed to differences in the sample size utilized in the analysis. Our study had a smaller sample size in comparison to the two other studies.

Our study found no significant association between the timing of ART initiation and retention in care, similar to our findings, a study conducted in South Africa in 2019, showed no significant association between timing of ART initiation and retention (22). The timing of ART initiation depends on the adolescent's acceptability and the lack of symptoms of HIV-associated opportunistic infections (21).

5.1 Study Limitations:

The study relied on retrospective routine data, which may be subjected to errors and incompleteness. To mitigate these, multiple data sources such as ART register and CTC 2 files were used to check for completeness and validity of the information.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

A two-year retention rate among adolescents living with HIV in Dodoma Municipality was 72.9%, lower than the UNAIDS 2030 target of 95%. Age and ART regimen at initiation regimen were statistically associated with retention in care, while sex, joining peer support group, having a treatment supporter, WHO clinical stage at initiation, TB diagnosis, and timing of ART initiation was not statistically associated with retention in care.

6.2 Recommendations

1. It is essential for researchers to conduct qualitative studies to thoroughly understand further the reasons for lower retention rates at 6,12, and 24 months among adolescents living with HIV.
2. Evidence-based, age and gender specific interventions are needed to keep ALHIV motivated and engaged in long-term care particularly, for females and older adolescents.

REFERENCES

1. Muwanguzi M, Lugobe HM, Ssemwanga E, Lule AP, Atwiine E, Kirabira V, et al. Retention in HIV care and associated factors among youths aged 15–24 years in rural southwestern Uganda. BMC Public Health. 2021;21(1):1–8.
2. Adolescent HIV prevention - UNICEF DATA [Internet]. [cited 2023 Feb 21]. Available from: https://data.unicef.org/topic/hivaids/adolescents-young-people/
3. Children and AIDS | UNICEF United Republic of Tanzania [Internet]. [cited 2023 Feb 21]. Available from: https://www.unicef.org/tanzania/what-we-do/hiv-aids
4. Maskew M, Technau K, Davies MA, Vreeman R, Fox MP. Adolescent retention in HIV care within differentiated service-delivery models in sub-Saharan Africa. Lancet HIV [Internet]. 2022;9(10):e726–34. Available from: http://dx.doi.org/10.1016/S2352-3018(22)00137-0
5. HIV Surveillance | Reports| Resource Library | HIV/AIDS | CDC [Internet]. [cited 2023 Feb 21]. Available from: https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html
6. Okoboi S, Ssali L, Yansaneh AI, Bakanda C, Birungi J, Nantume S, et al. Factors associated with long-Term antiretroviral therapy attrition among adolescents in rural Uganda: A retrospective study. J Int AIDS Soc. 2016;19(Suppl 4):1–7.
7. United Republic of Tanzania, Ministry of Health, Community Development, Gender, Elderly and Children. National Guidelines for the Management of HIV and AIDS. Development. 2019;7(April).
8. Mosha IH, Wiliam Nsanzugwanko N, Ezekiel MJ, Metta E. Factors Influencing Retention of HIV/AIDS Care and Treatment among Adolescents Living with HIV in Mkuranga District Tanzania. Baoj Hiv [Internet]. 2018;4(2):38. Available from: https://bioaccent.org/hiv/hiv38.pdf
9. The United Republic of Tanzania. Ministry of Health and Social Welfare. National Guidelines for the Management of HIV and AIDS. 2012.
10. The United Republic of Tanzania; Ministry of Health, Community Development Gender, Elderly, and Children. National Guidelines for the Management of HIV and AIDS. 2017.
11. Alhaj M, Amberbir A, Singogo E, Banda V, van Lettow M, Matengeni A, et al.

Retention on antiretroviral therapy during Universal Test and Treat implementation in Zomba district, Malawi: a retrospective cohort study. J Int AIDS Soc. 2019;22(2):1–7.

12. Chauke P, Huma M, Madiba S. Lost to follow up rate in the first year of art in adults initiated in a universal test and treat programme: A retrospective cohort study in ekurhuleni district, south africa. Pan Afr Med J. 2020;37(198):1–13.
13. UNICEF. Support for Adolescents Living With Hiv in Eastern and Southern Africa. 2021;38.
14. Ssali L, Kalibala S, Birungi J, Egessa A, Wangisi J, Okullu LJ, et al. retention of ADOLESCENTs living with HIV in care , treatment , and support Programs in UGANDA. 2014;(December).
15. WHO. Adolescent-Friendly Health Services for Adolescents Living With Hiv : From Theory To Practice. Techinical Brief. World Heal Organ Geneva, Switzerland2019 (WHO/CDS/HIV/1939) Licence CC BY-NC-SA 30 IGO. 2019;(December):48.
16. Pugh LE, Roberts JS, Viswasam N, Hahn E, Ryan S, Turpin G, et al. Systematic review of interventions aimed at improving HIV adherence to care in low- and middle-income countries in Sub-Saharan Africa. J Infect Public Health [Internet]. 2022;15(10):1053–60. Available from: https://doi.org/10.1016/j.jiph.2022.08.012
17. Wyk B Van, Kriel E, Mukumbang F. Retention in care for adolescents who were newly initiated on antiretroviral therapy in the Cape Metropole in South Africa. South Afr J HIV Med. 2020;21(1):1–8.
18. Munyayi FK, van Wyk BE. Determinants and rates of retention in HIV care among adolescents receiving antiretroviral therapy in Windhoek, Namibia: a baseline cohort analysis. BMC Public Health. 2023;23(1):458.
19. Rhodes RA. Revisiting the Behavioral Model and Access to Medical Care: Does it Matter? J Health Soc Behav. 1970;12(10):645–7.
20. Nimwesiga C, Taremwa IM, Nakanjako D, Nasuuna E. Factors Associated with Retention in HIV Care Among HIV-Positive Adolescents in Public Antiretroviral Therapy Clinics in Ibanda District, Rural South Western Uganda. HIV/AIDS - Res Palliat Care. 2023;15(March):71–81.
21. Lilian RR, Rees K, McIntyre JA, Struthers HE, Peters RPH. Same-day antiretroviral

therapy initiation for HIV-infected adults in South Africa: Analysis of routine data. PLoS One [Internet]. 2020;15(1):1–13. Available from: http://dx.doi.org/10.1371/journal.pone.0227572

22. Okonji EF, Wyk B Van, Mukumbang FC. Two-year retention in care for adolescents on antiretroviral therapy in Ehlanzeni district, South Africa: a baseline cohort analysis. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV [Internet]. 2022;1–11. Available from: https://doi.org/10.1080/09540121.2022.2057409
23. Mackenzie RK, Lettow M van, Gondwe C, Nyirongo J, Singano V, Banda V, et al. Greater retention in care among adolescents on antiretroviral treatment accessing "Teen Club" an adolescent-centred differentiated care model compared with standard of care: a nested case–control study at a tertiary referral hospital in Malawi. J Int AIDS Soc. 2017;20(3).
24. Zanoni BC, Mayer KH. The adolescent and young adult HIV cascade of care in the United States: Exaggerated health disparities. AIDS Patient Care STDS. 2014;28(3):128–35.
25. Zanoni BC, Archary M, Buchan S, Katz IT, Haberer JE. Systematic review and meta-analysis of the adolescent HIV continuum of care in South Africa: The Cresting Wave. BMJ Glob Heal. 2016;1(3):1–9.
26. Frieden TR, Harold Jaffe DW, Kent CK, Leahy MA, Martinroe JC, Spriggs SR, et al. Centers for Disease Control and Prevention MMWR Editorial and Production Staff (Weekly) MMWR Editorial Board. Morb Mortal Wkly Rep [Internet]. 2019;8(47):4–9. Available from: https://www.cdc.gov/mmwr/staff/staff.html
27. Mee P, Rice B, Lemsalu L, Hargreaves J, Sambu V, Harklerode R, et al. Changes in patterns of retention in HIV care and antiretroviral treatment in Tanzania between 2008 and 2016: An analysis of routinely collected national programme data. J Glob Health. 2019;9(1):1–11.
28. C. M. J. Matyanga, K. C. Takarinda, P. Owiti, T. Mutasa-Apollo, O. Mugurungi, L. Buruwe AJR, Http://dx.doi.org/10.5588/pha.15.0077. Outcomes of antiretroviral therapy among younger versus older adolescents and adults in an urban clinic, Zimbabwe. World Heal Organ Reg Publ - Eur Ser. 2016;I(56):31–49.
29. Tesha ED, Kishimba R, Njau P, Revocutus B, Mmbaga E. Predictors of loss to follow up from antiretroviral therapy among adolescents with HIV/AIDS in

Tanzania. PLoS One [Internet]. 2022;17(7 July):1–14. Available from: http://dx.doi.org/10.1371/journal.pone.0268825

30. Mesic A, Halim N, MacLeod W, Haker C, Mwansa M, Biemba G. Facilitators and Barriers to Adherence to Antiretroviral Therapy and Retention in Care Among Adolescents Living with HIV/AIDS in Zambia: A Mixed Methods Study. AIDS Behav [Internet]. 2019;23(9):2618–28. Available from: https://doi.org/10.1007/s10461-019-02533-5
31. Ojwang VO, Penner J, Blat C, Agot K, Bukusi EA, Cohen CR. Loss to follow-up among youth accessing outpatient HIV care and treatment services in Kisumu, Kenya. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV. 2016;28(4):500–7.
32. United Republic of Tanzania; Ministry of Health, Community Development, Gender E and C. National Guidelines for the Management of HIV and AIDS. Development. 2019;7(April).
33. Matare T, Shewade HD, Ncube RT, Masunda K, Mukeredzi I, Takarinda KC, et al. Anti-retroviral therapy after "Treat All" in Harare, Zimbabwe: What are the changes in uptake, time to initiation and retention? F1000Research. 2020;9:1–17.
34. Bitwale NZ, Mnzava DP, Kimaro FD, Jacob T, Mpondo BCT, Jumanne S. Prevalence and Factors Associated With Virological Treatment Failure Among Children and Adolescents on Antiretroviral Therapy Attending HIV / AIDS Care and Treatment Clinics in Dodoma Municipality , Central Tanzania. 2021;10:131–40.
35. The United Republic of Tanzania (URT), Ministry of Finance and Planning, Tanzania National Bureau of Statistics and President's Office - Finance and Planning, Office of the Chief Government Statistician, Zanzibar. The 2022 Population and Housing Census: A. 2022. 51–63 p.
36. Ministry of Finance and Planning, Tanzania National Bureau of Statistics, Office of the Chief Government Statistician Zanzibar. The 2022 Population and Housing Census: Age and Sex Distribution Report Tanzania Mainland. 2022;1–23.
37. THIS. Hiv Impact Survey. 2023(December 2023):6–9.
38. the United Republic of Tanzania Prime Minister ' S Office Regional Administration and Local Government Dodoma Municipal Council Strategic. 2021;
39. McNutt LA, Wu C, Xue X, Hafner JP. Estimating the relative risk in cohort studies and clinical trials of common outcomes. Am J Epidemiol. 2003;157(10):940–3.

40. Zou G. A Modified Poisson Regression Approach to Prospective Studies with Binary Data. Am J Epidemiol. 2004;159(7):702–6.
41. Lanyon C, Seeley J, Namukwaya S, Musiime V, Paparini S, Nakyambadde H, et al. "Because we all have to grow up": supporting adolescents in Uganda to develop core competencies to transition towards managing their HIV more independently. J Int AIDS Soc. 2020;23(S5):40–6.
42. DeSouza F, Paintsil E, Brown T, Pierre R, Keene D, Kim N, et al. Transfer is not a transition–voices of Jamaican adolescents with HIV and their health care providers. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV [Internet]. 2019;31(3):293–7. Available from: https://doi.org/10.1080/09540121.2018.1533226
43. Holtzman CW, Brady KA, Yehia BR. Retention in care and medication adherence: Current challenges to antiretroviral therapy success. Drugs [Internet]. 2015 Mar 20 [cited 2024 Jun 18];75(5):445–54. Available from: https://link.springer.com/article/10.1007/s40265-015-0373-2
44. UNAID. Women and HIV: A spotlight on adolesecent girls and young women. 2019.
45. Nabukeera-Barungi N, Elyanu P, Asire B, Katureebe C, Lukabwe I, Namusoke E, et al. Adherence to antiretroviral therapy and retention in care for adolescents living with HIV from 10 districts in Uganda. BMC Infect Dis [Internet]. 2015;15(1):1–10. Available from: http://dx.doi.org/10.1186/s12879-015-1265-5

APPENDICES

Appendix 1: Data extraction form

Date confirmed HIV+…….

Date ART was started …….

Date Enrolled in Care……...

Date start ART…….

Date of birth ……. Age ……. Sex…….

Address …… CTC ID……. Marital status …….

Age of ART initiation	
Joined peer support group	( )Yes ( )No
Treatment Supporter	( ) Yes ( )No
Timing of ART initiation	< 7days 2. > 7days
WHO clinical stage at Diagnosis	1. I 2. II 3. III 4. IV
TB results at diagnosis	1. Positive 2. Negative
CD4 count at diagnosis	1. <200 2. >200
ART combination regimen at initiation	1. NNRTI based 2. PI based 3. DTG based
Viral suppression (Copies/ml)	1.Fully suppressed (< 50) 2.Suppressed (50-1000) 3.Not suppressed (> 1000)
Duration on ART (Months)	1. 0–6

	2. 7–12 3. 13–18 4. 19–24		
Visits (Months)	Scheduled Date	Attended Date	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Appendix 1.1: Fomu ya kukusanyia taarifa

Tarehe ya kuthibitishwa maambukizi …….

Tarehe ya kusajiliwa katika huduma za matibabu …….

Tarehe ya kuanza tiba ya kupunguza makali ya UKIMWI **.....**……...

Tarehe ya Kuzaliwa ……. Umri……. Jinsia…….

Anwani …… Nambari ya CTC……. Hali ya ndoa …….

Umri wa kuanzishwa tiba ya kupunguza makali ya UKIMWI	
Amejiunga na kikundi cha msaada wa rika	( )Ndiyo ( )Hapana
Ana msaidizi tiba	( ) Ndiyo ( )Hapana
Wakati wa kuanza tiba ya kupunguza makali ya UKIMWI	< siku 7 2. > siku 7
Hatua ya kliniki ya WHO wakati wa kugundulika	5. I 6. II 7. III 8. IV
Matokeo ya kifua kikuu wakati wa kugundulika	2. Chanya 2. Hasi
CD4 wakati wa kugundulika	2. <200 2. >200
Dawa za kupunguza makali ya UKIMWI zilizoanzishwa	2. NNRTI 2. PI 3. DTG
Udhibiti wa Virusi (Masilahi/ml)	1.Kikamilifu kudhibitiwa (< 50) 2.Kudhibitiwa(50-1000) 3.Haijadhibitiwa (> 1000)

Muda aliotumia dawa za kupunguza makali ya UKIMWI (Miezi)	5. 0–6 6. 7–12 7. 13–18 8. 19–24		
Mahudhurio (Miezi)	Tarehe aliyopangiwa	Tarehe aliyohudhuria	Hali ya mahudhurio
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Appendix 2: Ethical Clearance

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATION

Ref. No.DA.282/298/01.C/1848 Date: 06/08/2023

MUHAS-REC-08-2023-1848

JACQUELINE INOJA NKOUABI

SHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES

MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: FACTORS ASSOCIATED WITH RETENTION IN CARE AMONG ADOLESCENTS LIVING WITH HIV IN DODOMA MUNICIPALITY

Reference is made to the above heading,

I am pleased to inform you that the Chairperson has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 06/08/2023

EXPIRATION DATE OF APPROVAL: 06/08/2024

STUDY DESCRIPTION:

Purpose:

The purpose of this retrospective observational cohort study is to assess the factors associated with retention in care among adolescents living with HIV in Dodoma Municipality

.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided:

https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2014844.pdf and in the MUHAS archives.

Appendix 3: Letter of permission

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA JIJI LA DODOMA

Unapojibu tafadhali taja:

Kumb. Na. HJD/A.20/VoL IV/8

Tarehe 15 /08/2023.

Mganga Mfawidhi,
Hospitali ya Rufaa ya Mkoa (DRRH),
Halmashauri ya Jiji,
DODOMA.

YAH: KIBALI CHA KUFANYA UTAFITI

Husika na kichwa cha habari hapo juu.

2. Napenda kumtambulisha kwako mwanachuo kutoka chuo Kikuu cha Afya Sayansi shirikishi cha Muhimbili, amekuja kufanya utafiti kuhusu **"Sababu zinazohusiana na kubaki kwenye huduma kwa vijana wanaoishi na virusi vya UKIMWI katika Halmashauri ya Jiji la Dodoma"**

3. Lengo la utafiti huu ni kubaini idadi ya vijana wanaobaki kwenye huduma, sababu binafsi na za kliniki zinazohusiana na kubaki kwenye huduma kwa vijana wanaoishi na VVU katika Halmashauri ya Jiji la Dodoma, utafiti huu utafanyika kuanzia tarehe 16/8/2023 hadi tarehe 02/09/2023.

3. Tafadhali mpokee na umpe ushirikiano.

CITY COUNCIL OF DODOMA
P.O. Box 1249, DODOMA
CITY MEDICAL OFFICER
OF HEALTH

Dr. Andrew Method,
Mkuu wa Divisheni ya Afya, Ustawi wa Jamii na lishe,
DODOMA.

3 Mtaa wa CDA, S.L.P 1249, 41183 Dodoma, Simu: +255262354817, Nukushi: +255262321550, Barua Pepe: cd@dodomacc.go.tz, Nukushi: www.dodomacc.go.tz