WORKING PAPER

Enhancing HIV Retention and Clinical Outcomes in Tanzania through Pediatric- and Adolescent-Friendly Services

May 2018

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May 2018

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This research has been supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the United States Agency for International Development (USAID) under the terms of MEASURE Evaluation-Tanzania associate award AID-621-LA-14-00001. MEASURE Evaluation–Tanzania is implemented by the Carolina Population Center at the University of North Carolina at Chapel Hill, in partnership with ICF International; John Snow, Inc.; Management Sciences for Health; Palladium; and Tulane University. Views expressed are not necessarily those of PEPFAR, USAID or the United States government.
WP-18-204

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ACKNOWLEDGEMENTS

This research is the result of strong stakeholder commitment, and it would not have been possible without extensive collaboration among Tanzania Health Promotion Support (THPS) and the Ministry of Health, Community Development, Gender, Elderly and Children; the National AIDS Control Program; Kigoma Regional Hospital—Care and Treatment Clinic; and MEASURE Evaluation–Tanzania.

The authors (all with THPS) acknowledge support from the United States Agency for International Development (USAID), the United States President's Emergency Plan for AIDS Relief (PEPFAR), and the USAID- and PEPFAR-funded MEASURE Evaluation–Tanzania, which awarded THPS funding to carry out this study, through a small grants program. Tanzania Health Promotion Support also acknowledges the technical and financial support extended by MEASURE Evaluation–Tanzania through various stages of the research.

This research would not have been possible without the participation of the clients we serve: children and adolescents living with HIV who regularly receive care and treatment services at Kigoma Regional Hospital and their parents or guardians. We would like to acknowledge the hospital staff and management—including the Kigoma Regional Health Management Team (RHMT), under the leadership of Dr. Paul Chaote—and Ujiji Municipal Council, led by Dr. Peter Nsanya, District Medical Officer, who provided necessary support and collaboration. We also acknowledge the National AIDS Control Program, specifically Dr. Annath Rwebembera, and the National Institute of Medical Research (NIMR), for their support.

Special gratitude is extended to the staff at the HIV care and treatment clinic at Maweni Regional Referral Hospital in Kigoma, Tanzania and the THPS operations staff and research team who worked hard to conceptualize, implement, and develop this report. The following individuals worked tirelessly to contribute to this study: Dr. Fadhili Kibaya, Dr. Hosea William, Catherine Mabula, Rose Namfukwe, Shida Selemani, Rahabu Phillipo, and Marietha Fortunatus (Maweni Regional Hospital staff) and Dr. Samwel Kikaro, Cyrianus Lweyendeza, Essau Amenye, Ludovick Kamanzi, Lydia Temba, Francis Nyabukene, Agnes Rubale, Dr. Edward Mgelea, Christopher Henjewele, Dr. Benedicta Masanja, Dr. Sisty Moshi, and George Anatory (THPS staff).

We also thank the knowledge management team of MEASURE Evaluation, University of North Carolina at Chapel Hill (UNC), USA, for production and editorial assistance. Finally, we thank Bridgit Adamou, of MEASURE Evaluation, UNC, for her relentless encouragement and support during this study, and all who contributed to the success of this research activity.

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ABBREVIATIONS

ART	antiretroviral therapy
ARV	antiretroviral
CD4	cluster of differentiation
C&T	care and treatment
CHMT	Council Health Management Team
CTC	HIV care and treatment clinic
FDG	focus group discussion
HTC	HIV testing and counselling
HVL	HIV viral load
IDI	in-depth interview
LTF	lost to follow-up
NACP	Tanzania National AIDS Control Programme
NIMR	National Institute for Medical Research
RHMT	Regional Health Management Team
THPS	Tanzania Health Promotion Support
UNAIDS	The Joint United Nations Program on HIV/AIDS
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

Background: Despite significant success globally in curbing adult AIDS-related deaths between 2005 and 2012, AIDS-related deaths of children increased by 50 percent globally. This increase can be attributed to inadequate HIV testing and counselling (HTC) services, low treatment coverage, and poor retention in HIV services.[5] Evidence shows that early initiation of antiretroviral therapy (ART), good adherence to dosing regimens, and retention in HIV care and treatment (C&T) services reduces mortality and HIV progression to AIDS by 75 percent. This reduction depends, however, on several factors, including early diagnosis of HIV infection, adequate quality of antiretroviral drugs, ongoing support for clients on ART, and retention of people living with HIV in care and ART programs.

Pediatric- and adolescent-friendly (defined as ages 0–14 and 10–19 years, respectively) health services have the potential to improve retention and clinical outcomes among children living with HIV. This study was conducted to provide evidence of the effectiveness of pediatric- and adolescent-friendly clinics for decision making in program implementation and review of service delivery within the HIV C&T cascade at health facilities in Tanzania.

Methods: The study setting was Kigoma Regional Hospital, in Western Tanzania. We conducted a mixed-methods study using a retrospective cohort analysis of secondary data from the national CTC2 database that routinely collects patient-level information from all HIV clients receiving care and treatment. Several outcomes were compared among two groups of pediatric clients (also referred to in this report as children): those enrolled before (Group I) and after (Group II) the establishment of pediatric- and adolescent-friendly HIV C&T services. Using structured questionnaires, qualitative data were collected through focus group discussions (FDGs) and in-depth interviews (IDIs) to assess the perceptions of adolescents, health providers, and parents or guardians of pediatric and adolescent HIV clients.

Results: We extracted data from the CTC2 database on 490 clients with 204 (61%) in Group I and 286 in Group II. Both groups had more women than men: 60.8 percent for Group I and 61.3 percent for Group II. Twenty percent of study participants were in the mid-age band of six to ten years old, with equal representation of participants younger than six and 11–19 years old. Documentation on the four clinical stages at ART initiation established by the World Health Organization (WHO) was available for two-thirds of study participants (n=331). Forty-six percent of participants in Group I began ART at clinical stage IV (45.7%). Late initiation of ART in clinical stage IV was more common before the establishment of pediatric- and adolescent-friendly services (37% in Group I compared to 19% in Group II). Three-quarters of children and adolescents initiated on ART had an immunological assessment at baseline in Group II (75%) compared to less than half (40%) in Group I. Retention rates for children and adolescents at three, six, nine, and 12 months was better after the establishment of the friendly clinic. The probability of the child not remaining in HIV care after 12 months was higher in Group I. Qualitative analysis revealed that pediatric- and adolescent-friendly services provided support for disclosure of HIV status and strategies for coping with the disease. Participants agreed that adolescents would seek HIV services from health facilities if the services were friendly and the environment favourable for pediatric and adolescent clients.

Conclusion: This study showed that pediatric- and adolescent-friendly services for HIV care and treatment improve retention in HIV care.

INTRODUCTION

Worldwide, more than three million children under 15 years of age were living with HIV in 2012 (Joint United Nations Programme on HIV/AIDS [UNAIDS], 2013)—over 90 percent of them in sub-Saharan Africa.[1] Most HIV infections resulted from mother-to-child transmission.[1]

Evidence shows that early initiation of ART, good adherence, and retention in the therapy reduce mortality and HIV progression to AIDS by 75 percent.[2] However, achieving these three strategies depends on several factors, including early diagnosis of HIV, adequate quality of antiretroviral (ARV) drug prescriptions, ongoing support for children on ART, and retaining HIV-positive children in care and ART programs.[3] One study found retention rates among children varying from 71 percent to 95 percent at one year, and between 62 percent and 93 percent at two years, in sub-Saharan Africa.[4]

Between 2005 and 2012, AIDS-related deaths in children, especially adolescents, increased by 50 percent globally, despite significant decreases in all other age groups. This can be attributed to inadequate HIV testing and counselling, low treatment coverage, and poor retention in HIV services.[5]

Maximizing clinical outcomes and retention in ART services among children requires improvements in availability, affordability, and accessibility of quality child-friendly services; health care provider attitudes; clients' comfort with disclosing their HIV statuses; and knowledge of HIV/AIDS (particularly among traditional healers). Patient-related factors—such as presenting other health issues, social support, or parents' or guardians' ability to care for the child—also must be taken into consideration.[6, 7]

By 2014, a total of 26 percent of children and adolescents living with HIV in Tanzania were on ART. Tanzania adapted the 2015 WHO guidelines of initiating all HIV-positive children below 15 years of age on ART, regardless of their clinical stage or immunity level. In Kigoma Region, 74 percent of the 533 HIV-positive children under 15 years enrolled in HIV care are on ART, compared to 94 percent of adults.[9] The low ART initiation among children may be a result of incomplete linkages and attrition from the HIV care and treatment (C&T) cascade, owing to provider and service user factors as well as societal factors, such as stigma. Other factors include issues within the clinical setting and health system, such as, drug stock outs, staff shortages, and unfriendly clinical settings (e.g., lack of physical and aural privacy, rushed consultations with clients, lack of empathy, or disrespectful care/shouting at clients).

In 2014, Tanzania Health Promotion Support (THPS), in collaboration with the Kigoma Regional Health Management Team (RHMT), established pediatric- and adolescent-friendly services at Kigoma Regional Hospital—Maweni's HIV care and treatment clinic (CTC). This was an improvement on the children's specific clinic started in 2011. The goal of the services was to address the challenges children face along the HIV C&T cascade, including late ART initiation, delayed disclosure of HIV status, inappropriate clinical assessments, and poor management of nutritional deficiencies. The pediatric- and adolescent-friendly services package includes the following: assigning specific days for children and adolescents to receive services with their parents or guardians (i.e., family clinic), training providers on pediatric and adolescent HIV care, and initiating monthly adolescent clubs.

This study aimed to evaluate the use of pediatric- and adolescent-friendly HIV C&T services to improve adherence, retention, and clinical outcomes for children who are attending the HIV clinic at Kigoma Regional Hospital. The study was conducted by the THPS research team from August 2016 to May 2017 with support from MEASURE Evaluation–Tanzania (funded by the United States Agency for International Development [USAID] and the United States President's Emergency Plan for AIDS Relief [PEPFAR]) in collaboration with the Kigoma RHMT, Kigoma Regional Hospital staff, and the Maweni CTC staff and clients. It aligns with USAID's goal of controlling the HIV/AIDS epidemic,

PEPFAR's goal for HIV of doing the right things in the right places at the right times, and efforts to achieve the global 90-90-90 targets set by UNAIDS.*

Research Objectives

The study had the following objectives:

1. Determine how HIV-positive children, adolescents, and their caretakers perceive pediatric- and adolescent-friendly services.
2. Determine clinical and immunological outcomes of HIV-positive children in C&T before and after establishment of pediatric- and adolescent-friendly services.
3. Compare adherence outcomes of HIV-positive children and adolescents in C&T before and after the establishment of pediatric- and adolescent-friendly services.
4. Determine retention rates at three, six, and nine months among children and adolescents in C&T before and after the establishment of pediatric- and adolescent-friendly services.
5. Determine factors or reasons affecting retention in HIV care among HIV-positive children and adolescents.

* By 2020, 90 percent of all those with HIV will have been diagnosed, 90 percent of those diagnosed will be on ART, and 90 percent of those on ART will be virally suppressed (http://www.unaids.org/en/resources/documents/2017/90-90-90)

METHODS

This study took place at the CTC located at Kigoma Regional Hospital—Maweni, a regional referral hospital in Kigoma Region, Western Tanzania, with a catchment population of 810,664. The study population was all children and adolescents (zero to 19 years) registered and receiving HIV C&T who live in Kigoma-Ujiji Municipal. Based on UNAIDS' and the Government of Tanzania's goal of reaching 90 percent of people who are HIV-positive with appropriate C&T by 2020, and its relatively high burden of HIV, this area is targeted for aggressive scale-up of HIV C&T interventions.

As of September 2016, 400 children and adolescents (ages 10 to 19 years) were actively receiving HIV C&T at the Maweni CTC. Children and adolescents living with HIV in this clinic are distributed into three main groups according to age and level of understanding of HIV: zero to five years, six to 10 years and 11 to 19 years.

The study's inclusion criteria mandated subjects be children and adolescents registered and receiving HIV C&T at Maweni CTC, living within the Kigoma-Ujiji Municipality. For the FGDs and IDIs, all study participants provided informed consent or assent. Exclusion criteria were 18- and 19-year-old adolescents who declined informed consent and parents or guardians of children under 18 years of age who declined informed assent.

The children and adolescents enrolled in a CTC were categorized into two groups: those who had attended Maweni CTC before January 2014 (Group I) and those who started attending Maweni CTC after the establishment of pediatric- and adolescent-friendly services in January 2014 (Group II).

Permission was obtained from the Kigoma RHMT, Ujiji Municipal Council Health Management Team (CHMT), and facility manager to implement the study, after receiving ethical clearance from the National Institute for Medical research (NIMR).

Definition of terms

We define the terms in our study as follows:

- **Retention rate** is the rate of children attending C&T since enrolment or initiation, within a specified period (e.g., 12 months).
- **Clinical outcomes** refer to nutritional status as assessed by an increase or absence of weight and height gain, absence or presence of opportunistic infection, or chronic or recurring ear infections.
- **Adherence** refers to taking medication as prescribed and on time. Adherence was categorized as poor or good based on ARV doses missed, seven-day recall by the child's caretaker, and pill count.[10]
- **Lost to follow-up** (LTF) is defined as a person under C&T who has missed their scheduled visits for more than 90 days.[11]
- **Attrition** is death or LTF along the cascade of HIV/AIDS C&T.
- **Missed appointment** is defined as a person under C&T who has missed one to two scheduled appointments without notifying the facility.[10]

Study Design

This was a retrospective cohort analysis using secondary data from the CTC2 database. CTC2 is part of the standardized national HIV/AIDS client monitoring system where all patient-level information and visits are recorded at the CTC. Descriptive analysis was conducted using the national HIV C&T guidelines to compare outcomes of interest, including immunological and clinical assessments, before and after the establishment of pediatric- and adolescent-friendly services. We conducted two IDIs with health providers. Three FGDs were carried out with caretakers or parents of children and adolescents living with HIV and adolescents attending the Maweni CTC. The discussions solicited information on reasons for using pediatric- and adolescent-friendly services, perceptions of those services, and barriers to retention.

Data Collection

The study used both primary and secondary data. Quantitative data collection entailed C&T client data extracted from the CTC2 database for the period January 2009 through September 2016. The data covering January 2009 through December 2013 were chosen as a baseline because this period was prior to the improvement of pediatric- and adolescent-friendly services at Maweni CTC. Missing patient data in the database were retrieved from paper-based medical records. Information obtained included, socio-demographic characteristics and clinical information, i.e., WHO HIV clinical stage, weight, height, history of tuberculosis, baseline and six-month immunological assessment, and HIV viral load.

The qualitative data obtained through FGDs and IDIs provided an understanding of the perceptions of the children's and adolescents' clinic and identified sustainable and feasible areas for improvement. Potential FGD participants (parents/caretakers and adolescents) were approached by the study staff who briefly explained the study. Only those who provided informed consent (or, for those younger than 18 years of age, the assent of parents/caretakers) were enrolled in the study. Trained research assistants conducted the IDIs and FGDs using semi-structured interview guides that were translated into the Swahili language. Separate focus groups were conducted for adolescents and parents/caretakers. Each FGD session consisted of eight to 12 participants, with 40 participants in all.

Table 1. Study participants

Participant	Data source	Number
Pediatric CTC clients, January 2009–December 2013	CTC2 database	204
Pediatric CTC clients, January 2013–September 2016	CTC2 database	286
Adolescent clients of Maweni CTC	FGD	20
Parents and caregivers of pediatric clients at Maweni CTC	FGD	20
Health providers at Maweni CTC	IDI	2
Total		532

Data Analysis

The CTC2 database and appointment registers with unique identifiers for each client were used to obtain client characteristics, including transfers into and out of the facility, LTF, CD4 cell counts, and HIV viral load test results.

Descriptive analysis was conducted to look at the characteristics of the client population. The extracted client data set was used to create Kaplan-Meier curves to analyse survival (program retention) over time. Multivariable Cox regression assessed the association between retention and other variables in the models. The following baseline variables were potential risk factors for attrition: age, sex, clinical stage, CD4 count at ART initiation, and presence of opportunistic infection. Univariate and multivariate analysis were conducted for relevant variables.

Ethics Review

Ethical clearance was obtained from NIMR. All study team members were oriented in human subject research and good clinical practices. Client records were kept in locked cabinets, and the database was password protected. Unique identifiers are used in the CTC2 database to avoid revealing clients' names and other key identifiers.

RESULTS

From the CTC2 database, data on 490 clients were extracted with 204 (61%) in Group I and 286 in Group II. The groups represent before and after the establishment of pediatric- and adolescent-friendly services, respectively. The majority (61%) of study participants were female. Participants below the age of six years had similar representation to those in the 11–19 age category, at 39 percent (n = 191) for under-six and 41 percent (n = 202) for 11- to 19-year-olds. The mid-age band of five to 10 years contributed only 20 percent (n = 97) of the study participants.

Documentation of WHO clinical stage at ART initiation was available for two-thirds of study participants (331). Among these, the fewest presented at stage I (10.3%; n = 34) and the most presented at stage III (42.6%; n = 141). Most participants in Group I initiated ART at clinical stage III (39.6%). Late initiation of ART (stage IV) was more common before the establishment of pediatric- and adolescent-friendly services; nearly twice as many in Group I presented at stage IV compared to Group II (37% versus 19%).

Immunological assessment was only available for 39% (n = 190) of the study participants, where 29 percent (n = 144) had a CD4 count less than 500mm.[3] Three-quarters of children and adolescents initiated on ART had an immunological assessment at baseline in Group II—unlike Group I, where less than half (40%) had a recorded CD4 measurement at baseline. In both groups, males had a proportionally lower CD4 count at ART initiation before and after the establishment of pediatric- and adolescent-friendly services.

Table 2. Characteristics of pediatric clients at Maweni CTC, January 2009 through September 2016

Characteristics	Variables (N=490)			
	Group I (pre-intervention)		Group II (post-intervention)	
Age	***n*=286** (%)		***n*=204** (%)	
0–5	108 (37.8)		83 (40.7)	
6–10	59 (20.6)		38 (18.6)	
11–19	119 (41.6)		83 (40.7)	
Sex	***n*=286** (%)		***n*=204** (%)	
Female	174 (60.8)		125 (61.3)	
Male	112(39.1)		79 (38.7)	
WHO HIV clinical staging at ART initiation	***n*=169** (%)		**n=162** (%)	
	Female (*n*=100)	**Male** (*n*=69)	**Female** (*n*=93)	**Male** (*n*=69)
I	8 (8.0)	4 (5.9)	12 (12.9)	10 (14.5)
II	19 (19.0)	9 (13.0)	24 (25.8)	11(15.9)
III	41 (41.0)	26 (37.7)	42 (45.2)	32 (46.4)
IV	32 (32.0)	30 (43.4)	15 (16.1)	16 (23.2)
CD4+ Baseline at ART	***n*=122** (%)		***n*=68** (%)	
	Female (*n*=71)	**Male** (*n*=51)	**Female** (*n*=43)	**Male** (*n*=25)
< 500	53 (74.6)	40 (78.4)	31 (72.1)	20 (80.0)
> 500	18 (25.4)	11 (21.6)	12 (27.9)	5 (20.0)

More children reported good adherence to ART in Group II (n = 124; 76.5%), after establishment of child-friendly services, with the youngest age group showing best adherence. Nearly 80 percent (78.9%) of 0- to 5-year-olds in Group II had good adherence. Conversely, this age group recorded the poorest adherence in Group I (31.4%), before the establishment of pediatric- and adolescent-friendly services.

Table 3. Adherence status compared across age groups

Age group	*Group I:* ***n*=169** (%)		*Group II:* ***n*=162** (%)	
	Good: *n*=120 (71.1)	**Poor: *n*=49** (28.9)	**Good: *n*=124** (76.5)	**Poor: *n*=38** (23.5)
0–5	48 (68.6)	22 (31.4)	56 (78.9)	15 (21.1)
6–10	31 (71.5)	13 (29.5)	24 (72.7)	9 (27.3)
11–19	41 (74.6)	14 (25.4)	44 (75.9)	14 (24.1)

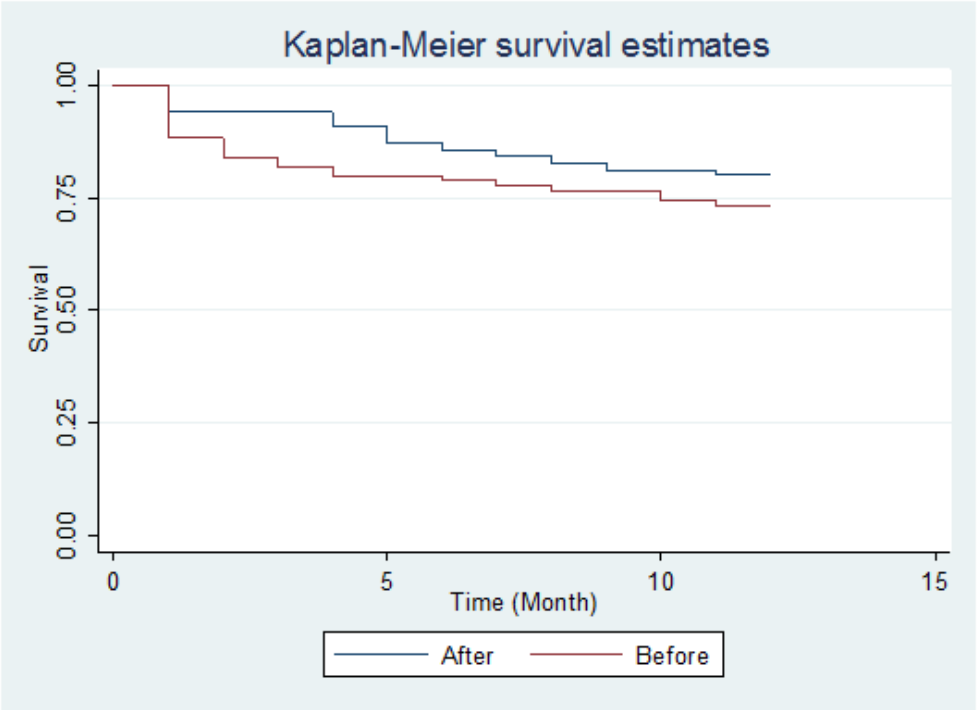
Only 77 clients (slightly more than a quarter of those in Group II) were tested for HIV viral load (HVL) count, which provides a critical value in determining the success of ARV therapy. As shown in Table 2, fewer than two-thirds (61%) had a viral load suppression below 1000 copies/ml. The distribution of HVL below 1000 copies/ml across the sex and age bands was lower for females than males and children under six than older children and adolescents. We observed the highest HVL suppression (80%) among female clients ages six to 10 years and the lowest suppression among females under six years of age.

Table 4. HIV viral load suppression by age and sex

	Total viral load test			**HVL <1000 copies/ml**			**% HVL <1000 copies/ml**		
Age	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
0–5	10	14	24	4	9	13	40%	64%	54%
6–10	10	12	22	8	7	15	80%	58%	68%
11–19	23	8	31	13	6	19	57%	75%	61%
Grand total	**43**	**34**	**77**	**25**	**22**	**47**	**58%**	**65%**	**61%**

The Kaplan-Meier survival analysis at three, six, nine, and 12 months, as shown in the figure below, was used to determine the retention rates of pediatric clients receiving HIV care before and after the establishment of pediatric- and adolescent-friendly services. At all time periods, retention rates were better after the establishment of a friendly clinic. More clients dropped from HIV care during the first month, before the establishment of friendly services. The probability of a child not remaining in HIV care after 12 months was higher before the pediatric- and adolescent-friendly clinic was established.

Figure 1. Retention rates of clients over time, before and after the establishment of pediatric- and adolescent-friendly services



In the qualitative part of the study, the most commonly reported reason for accessing adolescent services was seeking more information on HIV counselling and support. The main value of adolescent services was in providing support for disclosure of HIV status to the child or adolescent and their parents or caretakers. Children need counselling on coping mechanisms following discovery of their HIV status; and parents and caretakers need support deciding how to disclose to their child the child's HIV status. All focus group participants (adolescents and parents/caretakers) agreed that more adolescents would seek HIV services from health facilities if the services were friendly and the environment was favourable to them (e.g., flexible hours of service conducive to adolescents' schedules, educational posters and materials representing adolescents, and providers trained on counselling adolescents). Both parents/guardians and adolescents reported the healthcare providers' attitudes at Maweni Regional Hospital as "supportive." Notably, the healthcare providers were perceived to be more friendly and competent in dealing with adolescents.

> *The nurse (explains things very well and is very friendly; you feel like you can tell her anything.* (Female, 16 years old)

Most adolescents reported the quality of services as good, with minimal waiting hours, age-appropriate services, and health talks.

> *Nowadays, I don't miss classes on clinic days, as all the students are attended first.* (Male, 15 years old)

All groups reported improved provider-client relations as the healthcare workers have ample time to discuss the child's progress with the parent or guardian and provide the needed support to the client.

> *Healthcare workers now have more time for us; they have supported me in disclosing my child's status to my family members.* (Mother, 35 years old)

Most parents/guardians and adolescents agreed that a significant reason for accessing pediatric- and adolescent-friendly services was to seek more information. Adolescents perceived competent and supportive healthcare providers as being the most important aspect of pediatric- and adolescent-friendly services while parents/guardians perceived shorter waiting times and supporting disclosure of

child's HIV status as being the most important. Disclosure here refers to the process of the parent or guardian informing the adolescent living with HIV of his/her HIV status.

Table 5. Perception of adolescents and parents/guardians on pediatric- and adolescent-friendly services

	Percentage of parents/guardians (*n*=20)	**Percentage of adolescents** (*n*=20)
Reasons for accessing pediatric- and adolescent-friendly services		
Seek more information	**90**	**95**
Counselling and support	**85**	**60**
Perceptions towards pediatric- and adolescent-friendly services		
Support disclosure of child's HIV status	**90**	**75**
Friendly and favourable service delivery environment	**80**	**85**
Competent* and supportive healthcare providers	**80**	**90**
Shorter waiting times	**90**	**85**

*A competent healthcare provider is trained in adolescent HIV care and treatment and regularly provides services at CTCs with ongoing coaching from THPS teams.

During the FGDs, adolescents reported lack of disclosure of their HIV status (90%), long waiting hours (85%), lack of nutrition support (90%), and lack of space for playing (80%) as the primary barriers to both clinic attendance and ART medication adherence.

> *No one told me why I am taking the medications, I got tired and stopped taking them. As a result, I fell ill. That's when the nurse told me why I am taking the medication.* (Male, 14 years old)

Lack of disclosure of HIV status to the child has been reported by both parents/guardians and healthcare workers as being the main barrier to retention, owing to fear of how the child will perceive the results, and lack of support from the male partners of HIV-positive mothers or other family members.

> *Since I told my family members what my niece is suffering from, nobody wants to help take care of her.* (Female guardian, 34 years old)

Table 6. Barriers to retention to HIV C&T

	Parents/guardians (*n*=20)	**Adolescents** (*n*=20)
Individual level		
Lack of disclosure	19 (95%)	18 (90%)
Inadequate support from family members	8 (40%)	7 (35%)
Distance to CTC and transportation costs	13 (65%)	12 (60%)
Community level		
Stigma and discrimination	10 (50%)	11 (55%)
Institutional/structural Level		
Lack of space for playing at the CTC	9 (45%)	16 (80%)
Inadequate nutrition support	15 (75%)	18 (90%)
Lack of confidentiality and privacy	6 (30%)	4 (20%)
Long waiting hours	16 (80%)	17 (85%)
Mixed services with adults	8 (40%)	13 (65%)

DISCUSSION

Studies have shown that most children living with HIV in resource-limited settings start ART at WHO clinical stage IV.[5,6] We observed a similar trend in records of participants receiving HIV care prior to the establishment of pediatric- and adolescent-friendly services. After establishment of child-friendly HIV services, the proportion initiating ART late decreased from 37 percent to 19 percent. The friendly services attract more adolescents and children to access HIV services. They also promote early initiation of ART and retention, provide a platform for quality clinical care by skilled providers, and reduce stigma and discrimination while receiving services.[6]

The findings demonstrate improved immunological assessment after the establishment of pediatric- and adolescent-friendly services that instituted a system of identifying clients who were due for an immunological assessment and other services. The new system also resulted in improved clinical assessments and documentation by health providers. The friendly services allowed ample time to discuss disclosure and psychological support with the clients and parents/caretakers as well as provide sexual and reproductive health education.[7]

Early initiation of ART was associated with good adherence to ART, with 78.9 percent in Group II (compared to 76.5 percent in Group I) showing good adherence. Proportionate to the number of clients in each age band, adherence improved across age groups pre- and post-intervention. Violari, F. C., et al., found early initiation of ART leads to good adherence in 75 percent of infant clients (2008).[8] Achieving good adherence depends on several factors in the under-six age group, primarily appropriate supervision and support from the parent or guardian.[9] Because good adherence was reported more in Group II (75.0%) compared to Group I (64.5%), this difference can be attributed to the friendly services provided to Group II participants.

Adolescence is an age where young people, regardless of their HIV status, become inquisitive and observant of changes around them, including changes to their bodies. It is also the age puberty occurs. The adolescent focus group participants expressed a need for supportive and open communication with providers and parents/caretakers. This type of open communication facilitates adherence to ARVs and retention in HIV C&T, eventually fostering good clinical outcomes.

The adolescent FGDs indicated that lack of disclosure contributes to poor retention and adherence of children and adolescents to HIV C&T services. Children and adolescents are full of doubts, asking themselves why they should attend clinic every month and take medicine daily if they do not feel sick. When no one can provide clear and honest explanations, the result is often missed clinic attendance or lying about their adherence to ARVs.

Usually late disclosure is prompted by a decline in the child or adolescent's clinical outcomes. At that point, the child or adolescent's HIV status is revealed without fully taking into consideration how best to disclose the information and how the child or adolescent will react. This agrees with the health belief model where barriers in health-oriented actions (such as getting tested for HIV or disclosing to someone their HIV status) act as obstacles in undertaking recommended actions (Champion & Skinner, 2008). Parents and guardians face challenges both with disclosing their child's HIV status to the child and with disclosing their own HIV status to the child, because of the persistent stigma associated with HIV and AIDS. From ages four to six, parents should start educating their child about HIV in general terms: They should explain that it is a chronic disease that is not related to a person being bad, cursed, or dirty, and they should emphasize the importance of taking medicine every day. Disclosure of a child's HIV status should happen at the age of seven to 11 years (NACP, 2013).

Routine HVL testing in Tanzania started mid-2016, hence, HVL results were unavailable for Group I participants. Additionally, only one-third (35%) of the study participants received the test, so no comparisons were made between the groups. The lower overall HVL suppression rates (61%) observed may be attributed to inadequate dosing according to weight, delayed switching to second line ART, or poor adherence.

Achieving retention in HIV services is a necessary step towards achieving the UNAIDs' 90-90-90 targets. Our study demonstrated that instituting appropriate child-friendly services increases retention of pediatric and adolescent clients living with HIV in C&T programs and improves adherence to ART. Prior to the introduction of friendly services, program data showed clients were more likely to be LTF by 12 months after initiating ART. Factors affecting retention in care were investigated in other studies which addressed structural and client-driven services in resource-poor settings. In this study, retention at 12 months after ART initiation was better in Group II. Early initiation of ART significantly reduces morbidity and mortality for children living with HIV and improves pediatric ART service provision.[2,12] However, these gains can only be achieved if children are retained in care after ART initiation.[12]

Increased early initiation of ART and retention in HIV services may partly be attributed to policy changes that have occurred globally and within Tanzania since 2015, when all children and adolescents under 15 years were to be started on ART, irrespective of their clinical and immunological status. Likewise, in October 2016, a "Test and Start" policy was adopted in Tanzania, which required all individuals living with HIV, including adolescents, be initiated on ART soon after HIV diagnosis. With this recent policy change, relatively healthy individuals are now started on ART; however, retention remains an important challenge.

LIMITATIONS

Because this was a retrospective study, we had to rely on past medical records, and, we had no control over missing data (owing to poor documentation) on WHO clinical staging and CD4 results. Furthermore, HVL results were limited, so it was not possible to compare the viral load suppression between the two groups, in accord with the study objectives.

RECOMMENDATIONS

The study findings lead to several recommendations for improving HIV C&T for children and adolescents. To attain UNAIDS targets of 90-90-90, we recommend HIV programs optimize use of pediatric- and adolescent-friendly HIV services as the standard of care. To implement this model, service delivery points should adapt HIV service delivery guidelines, to include or elaborate on the guidelines for pediatric- and adolescent-friendly services, as necessary. HIV programs should enhance pre-service and in-service trainings, on provision of pediatric- and adolescent-friendly services, for health providers, to encourage clients to use these services and counsel children and adolescents about issues related to disclosure of HIV status. We recommend providers continue to mentor staff and engage in supportive supervision to ensure staff provide child-appropriate care and counselling.

Pediatric- and adolescent-friendly services provide a platform to leverage other integrated care: immunizations, family planning counselling and method provision, and linking children to other support services, such as nutritional support, educational or academic support, and psychosocial support networks.

This research identified nutritional support as a barrier to clinic attendance and ART medication adherence, so health facilities should employ nutrition and agricultural extension officers educate clients about nutrition and a balanced diet using locally available food. To accompany increased nutrition education, clinics should form support groups for adolescents, parents, and caregivers to discuss issues ranging from growing fruits and vegetables at home to income-generating activities and issues related to household economics.

Children and adolescents have a lot of energy and need physical exercise for their physical and mental health. To address lack of space for play as a barrier to adherence and retention, where feasible, safe outdoor space at the facility should be designated for children and adolescents' recreation. We recommend the government and other implementing partners in HIV services support the installation of playgrounds in open spaces around facilities and the provision of locally sourced materials for playing. Indoors, education and entertainment activities should be available during clinic hours to minimize boredom, simultaneously educating and providing the opportunity to make new friends. These improvements make health facilities friendlier and encourage attendance.

Finally, stigma and discrimination are significant barriers to optimal pediatric- and adolescent-friendly HIV services. We recommend strengthening partnerships with nongovernmental and community-based organizations, to address HIV stigma in the community.

CONCLUSION

Pediatric- and adolescent-friendly HIV services can improve retention in HIV C&T services at twelve months and support disclosure of HIV status to children and adolescents. Furthermore, the services improve CD4 assessments and support early initiation of, and adherence to, ART.

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This research has been supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the United States Agency for International Development (USAID) under the terms of MEASURE Evaluation-Tanzania associate award AID-621-LA-14-00001. MEASURE Evaluation–Tanzania is implemented by the Carolina Population Center at the University of North Carolina at Chapel Hill, in partnership with ICF International; John Snow, Inc.; Management Sciences for Health; Palladium; and Tulane University. Views expressed are not necessarily those of PEPFAR, USAID or the United States government. WP-18-204

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