SUSTAINABILITY OF AN EVIDENCE BASED INTERVENTION SUPPORTING TRANSITION TO INDEPENDENT CARE FOR ADOLESCENTS LIVING WITH HIV IN KENYA

Alina Metje

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Committee:

Irene Njuguna
Kristin Beima-Sofie

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Abstract

Sustainability of an evidence-based intervention supporting transition to independent care for adolescents living with HIV in Kenya

Alina Metje

Chair of the Supervisory Committee:

Irene Njuguna

Department of Global Health

Background: Integrating and sustaining evidence-based interventions in routine care is crucial to improve HIV treatment outcomes among youth living with HIV (YLH). An Adolescent Transition Package (ATP), tested in Kenya in 2021, significantly improved YLH readiness to transition from pediatric to adult care. Post-trial, participating clinics could continue using the ATP after study staff exited. We evaluated ATP use in intervention clinics one-year post-trial.

Methods: We conducted thirty in-depth interviews with health care workers (HCWs) from ATP intervention sites to characterize determinants of continued ATP implementation. HCWs were purposively recruited to represent a range of cadres and ATP implementation experiences. Interviews used semi-structured guides, informed by the Consolidated Framework for Implementation Research (CFIR) version 2.0, were audio recorded, translated, and transcribed. Transcripts were analyzed thematically to identify key influences of ATP sustainment and fidelity post-trial.

Results: The median age of participating HCWs was 34 years, and the majority (73%) were female. The median number of years working with YLH was 7 years, with 2.8 years implementing the ATP. HCWs described overall high acceptability, feasibility, and appropriateness of the ATP, which motivated sustained implementation. Effective training and ongoing support were crucial for continued implementation, especially among newly hired clinic staff. Key determinants of sustainment included observed positive impact of the ATP on patient outcomes (improved literacy, adherence or viral suppression), patient-centered clinic cultures and supportive clinic and external (Ministry of Health) leadership. Staff shortages and high rates of staff turnover, lack of integration into the existing electronic medical system, and maintaining staff motivation were barriers to ATP sustainment. Implementation fidelity was similarly influenced by workforce resources and HCW beliefs about the importance of individualizing content and delivery to be responsive to individual patient needs. ATP adaptability afforded optimization of delivery to overcome workforce constraints and meet patient needs, increasing HCW perceptions of feasibility and motivating continued use.

Conclusion: Post-trial, sustained ATP use was influenced by HCW perceptions of the ATP, workforce resources, and intervention adaptability. Strategies to ensure continued training and integration of tools into existing systems have the potential to further enhance ATP sustainability.

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Acronyms

ATP: Adolescent Transition Package

YLH: Youth Living with HIV

HCW: Health care worker

OTZ: Operation Triple Zero

MOH: Ministry of Health

HIV: Human Immunodeficiency Virus

RCT: Randomized controlled trial

ATTACH: Adolescent Transition to Adult Care for adolescents living with HIV

ART: Antiretroviral Therapy

EMR: Electronic medical records

OJT: On-the-job training

SCASCO: Sub- County AIDS and STI coordinator

EBI- Evidence based intervention

Background and Significance

While significant advances have been made toward achieving the UNAIDS 95-95-95 goal[1], HIV/AIDS is still the leading cause of death and disability in Kenya.[2] In 2021, the national HIV prevalence was estimated at 4%, and an estimated 145,000 adolescents and young adults (YLH) ages 15-24 living with HIV.[3,4] HIV incidence among adolescents remains high, with 12,000 Kenyan young people becoming newly infected in 2021.[5] Achieving viral suppression is crucial to reduce HIV-related morbidity and improve the quality of life for YLH, and reduce onward transmission to uninfected partners and children.[6] However, retention in care and viral suppression rates among YLH remain relatively low compared to the adult population. In 2018, viral suppression for adolescents on ART in Kenya was only 61.4%, compared to adults at 71.6%.[7] High HIV incidence coupled with poor clinical outcomes among YLH generates an urgent need for interventions that improve HIV outcomes for youth.[8]

Adolescents undergo substantial physical and mental changes and have unique needs and vulnerabilities. They face major life transitions, including school changes, moving away from home, new partnerships, and parenthood. The transition from pediatric to adult care presents unique challenges and is often accompanied by anxiety and reluctance to transition.[9] Adolescents frequently experience treatment interruptions due to insufficient preparation for transition.[10] It is estimated that 10% of YLH die during the transition phase,[11] demonstrating continued need for optimizing transition processes to improve health outcomes.

Literature shows that a standardized transition plan is a crucial element of a successful transition and necessary to overcome barriers like anxiety or reluctance to transition, fear of HIV-related

stigma, and dependence on pediatric providers.[12] While successful transition interventions have been implemented in resource-rich settings, there are limited tools available to guide this process for countries in Sub-Saharan Africa.[13,14] Many health interventions in high burden HIV countries that address the HIV diagnosis, linkage, and continuum of care do not specifically address adolescents[15] despite YLH having the poorest health outcomes and highest mortality.[16–19] There is an urgent need to implement evidence-based tools and structured policies and guidelines to improve the transition process for YLH in high burden HIV settings.[20–22]

The Adolescent Transition to Adult Care for adolescents living with HIV (ATTACH) study conducted in Kenya was designed to develop and test tools to support YLH transition to adult care.[23,24] ATTACH tested a structured transition toolkit (the Adolescent Transition Package [ATP]) using a hybrid 1 cluster randomized trial (cRCT) design to assess both clinical and implementation outcomes. The ATP was co-developed with frontline healthcare workers (HCWs), clinical specialists, Ministry of Health personnel, and youth representatives and includes a structured transition booklet, readiness assessment, and progress tracking form, as well as tools to support HIV disclosure for younger adolescents. The ATP was delivered by existing HCWs, with support for implementation in the first six months. The cRCT found significantly higher overall transition readiness among YLH in intervention compared to control facilities.[24] Healthcare workers found the intervention to be acceptable and feasible to implement.[25,26] For the ATTACH study, intervention sites were allowed to continue to use the ATP post-trial. One-year post-trial, we returned to ATTACH intervention sites to evaluate ATP use and identify factors associated with sustainment and fidelity. Sustainment is defined as continued program delivery after initial implementation,[27] while fidelity is defined as the extent to which delivery of the intervention

adheres to the protocol as intended.[28] Both sustainment and fidelity are crucial for ensuring that the intervention remains effective, achieves the intended outcomes, and can be successfully scaled up.

Study Question

What are the determinants of sustainment and fidelity of the ATP at ATTACH study intervention sites one-year post-intervention?

Project Goal and Objectives

The goal of this study was to understand factors associated with continued ATP use (sustainment) and fidelity to intervention implementation in ATTACH intervention sites. We conducted individual interviews with HCWs in clinics that participated in the cRCT to assess barriers and facilitators of continued ATP implementation at intervention sites. This information will help inform future scale-up efforts for the intervention in similar settings.

Methods

Research ethics approval was provided by the KNH/UoN Ethics and Review Committee.

Participating HCWs provided written informed consent.

Study Design and Framework

This qualitative research study is part of a larger study to identify determinants of ATP sustainability and adoption (ATTACH-Sustain) and develop a plan for future intervention scale-

up. ATTACH-Sustain includes surveys and qualitative interviews from intervention and control sites and a stakeholder workshop to understand contextual factors affecting future scale-up.
This analysis evaluates sustainment and fidelity using in-depth interviews (IDIs) conducted with a subset of HCWs from ATP intervention sites. We used a thematic analysis approach to explore factors influencing ATP fidelity and sustainability.

The Consolidated Framework for Implementation Research (CFIR)[29] guided all aspects of the study, including data collection, data analysis, and reporting of findings. It is a comprehensive, metatheoretical framework to guide an implementation process and was developed by the implementation scientists Damschroder et al. with the goal of combining many existing implementation frameworks into one consolidated version. [30] By fostering a consistent use of constructs, it provides an organized structure and depth and increases generalizability and interpretability. It facilitates all stages of evidence-based interventions, including the design, implementation, and evaluation. The CFIR consists of five domains (code categories) that organize and influence the implementation: Innovation, outer setting, inner setting, individuals, and implementation process. Each domain has a menu of constructs (codes) with definitions. Since its first release in 2009, it underwent several adaptations, which were informed by feedback from experienced CFIR users. The most recent version is the CFIR 2.0, which was released in 2022. It includes an added outcomes addendum and some revised constructs to incorporate various improvements such as better centralization of recipients. The clear and organized structure of the CFIR provided depth and helped to reinforce a logical and rigorous analysis of the qualitative data. It supported identifying the various contexts that influence the success of the ATP sustainment and is well suited for a complex challenge like the scale-up of the ATP intervention.

Study Setting

The ATTACH study was conducted in 20 clinics located in four high HIV-burden counties in Kenya: Homa Bay, Kajiado, Nairobi, and Nakuru. There are substantial geographical differences in HIV prevalence and incidence in the 42 counties in Kenya, and Homa Bay, Kajiado, Nairobi, and Nakuru are 4 of 13 counties accounting for 72% of all new infections. All four counties have high HIV prevalence with minimal progress in HIV prevalence reduction (Homa Bay and Nairobi) and increasing HIV incidence rates (Kajiado and Nakuru) between 2018 and 2020. In 2020, Homa Bay had the highest HIV prevalence of all counties at 20.2%, while Kajiado (3.6%), Nairobi (5.4%), and Nakuru (4.0%) had lower HIV prevalence.[4] Kenya has a decentralized health system where county governments regulate health facilities, promoting primary healthcare and supporting the establishment of youth-friendly services. Human resource management remains challenging, with health workforce shortages and staff strikes. Our study population included two to three HCWs working with YLH from each intervention clinic. During the ATTACH study, HCWs delivered the intervention during regular clinic visits with limited study support (presence of ATTACH staff to answer questions as needed, replacement of ATP material) during the trial and without support post-trial.

Data collection

Using purposive sampling, two to three HCWs working with YLH from each ATTACH study intervention clinic were selected. Prior to selection of HCW participants for interviews, HCWs from each study site completed surveys to capture data on experience with ATP delivery, professional role within the clinic, and overall satisfaction with the ATP tools. HCWs were selected for interviews based on survey responses, in order to capture a range of cadres,

experiences, and satisfaction scores. The study team confirmed eligibility and interest before obtaining informed consent from the participants. The study team also provided ample opportunity for participants to ask questions and clarify any concerns before giving their consent. In-depth interviews were conducted individually at a convenient time for the HCWs by one of four trained interviewers. The interviewers were all Kenyan women with substantial experience conducting qualitative interviews. Interviews lasted between 16 and 66 minutes and were performed in English, Dholuo, or Kiswahili. They took place between October 2022 and December 2022, and all were audio-recorded. Debrief reports were completed by the interviewers on the same day as the interview to capture subjective impressions on how the interview went, the participant's feelings, and brief descriptions of the participant's responses. Interviews were translated into English as needed and transcribed.

The CFIR was used to develop a semi-structured interview guide that included an introductory script, semi-structured questions, and possible probes. Interview questions focused on the overall environment and structure of the clinic, the early implementation phase and initial perception, current ATP implementation, the role of community and external partners in implementation and support, and recommendations for scale-up to other health facilities.

Data Analysis

ATLAS.ti was used for data management and analysis. The codebook was developed using a hybrid of deductive and inductive coding approaches. Deductively, predetermined codes based on the latest CFIR version, the CFIR 2.0, were used to develop an initial codebook. While the majority of CFIR constructs were used, several constructs within the process domain were found to be

irrelevant for this analysis and were removed from the codebook. Open coding was used to identify concepts emerging directly from the transcripts not captured by CFIR. Inductive codes were added primarily to capture the recommendations provided by participants regarding future design and implementation ideas. A team of three researchers conducted coding and analysis of the interview transcripts. To ensure coding strategies were consistent and dependable, the team held regular meetings to discuss codes, establish a common understanding, and resolve code interpretation discrepancies through discussion. The team continuously reviewed and revised codes in the context of the data to ensure accuracy and improve understanding.

Members of the coding team engaged in ongoing reflexivity throughout the entire project to consider their personal biases and discuss alternative interpretations of the data. The team systematically organized and categorized the data into meaningful concepts to identify themes related to the sustainment and fidelity. Initially, a broad review was conducted to identify patterns in constructs consistently associated with ATP sustainment and fidelity. Constructs were queried and HCW descriptions of their influence on implementation was summarized into memos, which the team reviewed and refined to identify key themes. Findings were integrated to develop a comprehensive understanding of key influences on ATP implementation post-trial, highlighting both common and contrasting findings across sites.

Positionality

I acknowledge that my positionalities impact all stages of the research process. I identify as a white cisgender female physician who has primarily lived and worked in Europe and the USA. Coming from Germany, a country that subsidizes tertiary education, I am conscious of the privileges associated with it. My experience providing HIV health services to patients in South Africa has

given me some familiarity with the context and the challenges involved. I understand the significance of social and cultural factors in shaping health outcomes. However, my awareness of specific cultures and needs is influenced by my lived experience, and I acknowledge that I lack direct experience with Kenya, including knowledge of local languages and culture. Nevertheless, I'm committed to ongoing reflexivity throughout the entire project.

Through the research process, I have gained a deeper understanding of the local context and the unique challenges faced by YLH. While I bring my own cultural background, training, and expertise to the project, I am aware of how my positionalities shape my perspectives and assumptions. I actively recognize and challenge my own biases. My medical and public health background may be valuable, but I remain mindful of my limitations and biases, particularly regarding assumptions about the experiences and needs of YLH in Kenya and the individuals that provide health services to them. Thus, engaging in ongoing reflexivity is essential for me to acknowledge and address my biases and limitations in the research process.

In addition to my own perspectives, it is important to highlight the diverse backgrounds and expertise of the other analysis team members. They identify as black and white female researchers with qualitative analysis and implementation science backgrounds. Importantly, they have lived in Kenya and have closely worked with the local study team responsible for conducting and transcribing the interviews. Their intimate involvement with the local context and their direct engagement with the participants provide invaluable insights and perspectives that complement my own. Together, our analysis team will continue to engage in the process of reflexivity throughout the entire project.

Results

Of 30 HCWs who participated in the study, median age was 34 years (range from 22- 62), and the majority (73.3%) were female. The median number of years working with YLH was 7 years, with 2.8 years implementing the ATP. Seventy- seven percent of the participants had been trained on ATP implementation by the ATTACH study staff.

The majority of HCWs were peer counselors (23.33%), followed by counselors (20%) and clinical officers (13.33%), as presented in Table 1.

Table 1: Profession/ Role at the clinic of interview participants

Profession/Role at the clinic	n (%) [N=30]
Clinical officer	4 (13.33)
Counselor	6 (20)
Counselor/Mentor mother	1 (3.33)
Mentor father/Male champion	1 (3.33)
Mentor mother	2 (6.67)
Nurse	2 (6.67)
OTZ champion	1 (3.33)
Peer counselor	7 (23.33)
Psychologist	2 (6.67)
Psychologist/Counselor	2 (6.67)
Psychologist/Social worker	1 (3.33)
Youth Champion	1 (3.33)

Overall, HCWs shared positive feedback on ATP tools and implementation processes. HCWs described the ATP as a valuable tool for staff and patients, which positively influenced their perceptions of acceptability, feasibility and appropriateness. HCWs believed ATP tools were well-designed, easy to use, and had a positive impact on YLH health, all of which influenced initial uptake and implementation. When evaluating key influences on sustainment and fidelity, we

identified several factors that facilitated or hindered continued implementation post-trial, which are highlighted below.

Effective training and continued internal and external support are crucial for ensuring sustained acceptability

HCWs at intervention facilities received initial training from ATTACH study staff followed by six months of supported implementation optimization at their respective clinics through continuous quality improvement cycles (CQI). When asked to reflect on ATP training, almost all participants reported positive, interactive training experiences, finding trainings informative, comprehensive, and engaging. Training participation helped overcome initial negative perceptions of ATP tools being complex and burdensome by making them accessible and relatable.

> *"The fact that we understood the tools...If we had not understood them, we might have stopped using them. our knowledge of the tools has made us continue using them."*
>
> *- Counselor, 3 years of ATP experience*

HCWs described their appreciation for the CQI meetings and continued insight provided by ATTACH study staff throughout the study period, which helped maintain motivation and provide encouragement to HCWs during the trial and facilitated sustained use post-trial.

> *"I really appreciate the consultative meeting that we had with [Study staff member] whenever we had any challenges and even if we didn't have any challenges just meeting us in specific times to discuss issues, how we are, our gaps and airing out our challenges."*
>
> *- Nurse, 2 years of ATP experience*

HCWs who had been part of the study since the beginning felt that the training they received from ATTACH staff equipped them with the skills and confidence to effectively train new staff. Some HCWs who received on-the-job training described less enthusiasm for ATP tools, especially HCWs from clinics with high rates of staff turnover. HCWs also noted the importance of including all staff members in trainings to raise awareness and foster clinic-wide acceptance.

> *"You see, the ATTACH study was being done in the facility but only a few healthcare individuals were involved, not all of them. So, you see, it is doable. But now, it will need either you do an OJT [on-the-job training] or you do more training for the healthcare workers who are coming in so that they embrace it."*
>
> *- Peer counselor, 3 years of ATP experience*

Some HCWs also described how internal ATP champions helped drive sustained implementation, and the importance of clinic leadership and team work in facilitating the successful integration of the ATP into workflows.

> *"Here we have a lot of teamwork, our relationship is not bad at all, our supervisors are there for our aid. When we need some support, they are there."*
>
> *- Counselor and mentor mother, 2 years of experience with ATP*

> *"I would say seamless, it is a good relationship because we all know our job descriptions and we work, we all know the main aim why we are here, the clients."*
>
> *- Nurse, 2 years of ATP experience*

External support from HIV implementing partners or the MOH also played a crucial role in ensuring the sustained utilization of the ATP. The level of external support and involvement described by HCWs varied at the different clinics, ranging from granting permission to implement the tools to actively encouraging their ongoing usage and expressing the desire to share the tools with other facilities.

However, some participants highlighted the challenges of coordinating with multiple external agents, mainly when collaborating with partners who prioritize different objectives.

> *"Yes we have AHF Kenya and we have the LVCT, it was PATH, it is LVCT, how is it… So sometimes when we look at that like it is for the client, then we work soberly. But the moment we each have to push the organizational objectives then we begin to have loggerheads. One will want this, one the other one and the 'grass' who is the client gets hurt, yeah."*
>
> *- Nurse, 2 years of ATP experience*

ATP adaptability and alignment between observed impact and care provision goals were motivators for continued ATP use

HCWs noted improved clinical outcomes following ATP implementation, including decreased anxiety regarding viral load checks, increased willingness to attend clinic appointments, and improved self-acceptance. HCWs also believed that the ATP improved patient-provider

relationships. Observing the positive impact the ATP had on YLH experiences and clinical outcomes motivated HCWs to sustain use.

> *"And in fact, what I am really happy about too is now they are really open, they are ready to share their concerns which was not there before. Before you realize an adolescent could come very quiet, an introvert, not wanting to speak but nowadays, she is the one to tell you that 'Sister you are not talking about it today why? I have one, two, and three we need to discuss about this' yes"*
>
> *- Nurse, 2 years of ATP experience*

In addition, seeing how the tools positively impacted youth outcomes among current patients motivated HCWs to continue use to also benefit new patients needing disclosure or transition support.

> *"….everyday we get new clients who have not been disclosed and those that need transition. So, there is no way it can be finished, unless we close down the clinic."*
>
> *- Psychologist, 3 months of ATP experience*

HCWs also appreciated the positive feedback from YLH and their caregivers on the tools, which further motivated continued use.

> *"There is a lot of positive feedback from the clients and even the caregivers. We used to struggle with the caregivers, with why they should do the disclosure. After the introduction of the tools, we have a very good guideline. The caregivers have also embraced the tools.*

The adolescents are so eager about the tools, when they come, they even remind you where we had reached with the tools."

- Psychologist and counselor, 3 years of ATP experience

HCWs described how these positive outcomes among YLH aligned with clinic goals and objectives, which included a strong commitment to providing patient-centered care and prioritizing youth needs and well-being. Clinic goals of providing the best care possible for youth helped HCWs remain open to new ideas and trying new interventions.

"[I]f you see there is no progress or it is not benefiting the clients, because we are here because of the client, so we would stop. But if it can be something that is going to benefit our clients I will positively accept."

- Psychologist, 2 years of ATP experience

"I would say interest, personal interest and having children at heart because it's not easy to live with HIV especially being a child, the transitioning has a lot of challenges. So having that at heart and my interest and my wish to see these children get through until transitioning is what drives me."

- Counselor, 2 years and 10 months of ATP experience

HCWs also described how easy it was to adapt the ATP to different delivery formats, which allowed them to manage workforce constraints and meet YLH needs and preferences. Several HCWs described adjusting to workload constraints by varying how much content was delivered at a time and using the tools in support groups and peer-to-peer education.

"Now it is about the patient need, being that I know my adolescents. I know the gaps that each and every adolescent has so there are some adolescents that forces me now to go per chapter, and there are others that I look at the need and sort out."

- Nurse, 2 years of ATP experience

"That one made it easier when to create the support group for the adolescents, since we had something to talk about"

- Clinical officer, 1 year of ATP experience

Some HCWs extended use of the tools to adult patients, finding that the educational material included in the ATP also helped when counseling adult patients who were not suppressed, had knowledge gaps, or were newly diagnosed with HIV.

"And adults need to be taken through that book because there are some adults who do not know why they are taking their medicine."

- Counselor, 3 years of ATP experience

Staff shortages and high turnover, lack of integration into the existing electronic medical system, and maintaining staff motivation present barriers to intervention sustainment

Several barriers to implementation and sustainment were identified. One common challenge was increased workload, particularly in clinics with staff shortages impacting implementation.

"*As much as I was interested with the knowledge, I found it as a work load. Already that was the first challenge and so it was difficult to use it because it was time-consuming because you had to go per page with the client." - Counselor, 3 years of ATP experience*

A few participants highlighted missed opportunities resulting from insufficient staff resources.

> *"Yes, it is a bit difficult. Sometimes people get burn out until they don't get enough time to go through the tools."*
>
> *- Clinical officer, 1 month of ATP experience*

Additionally, when new staff members were not adequately trained, they were less inclined to embrace the tools and staff turnover was a recurrent challenge. In addition to challenges having enough staff, some clinics did not have enough ATP tools, which negatively influenced implementation.

> *"…the manuals are not enough, yeah they are few like now we have only two, they have disappeared and the disclosure we have one which is not enough for us because we are three people implementing yeah. Because when you have 100 clients and only one or two books then it will not work."*
>
> *- Psychologist, 2 years of ATP experience*

One adaptation clinics made that was not fidelity consistent was discontinuing use of tracking tools. These tools were not used as consistently by HCWs due to limited time, lack of resources for making paper copies, and reliance on the EMR system for patient management. One participant mentioned adapting using tracking sheets solely for patients who were lost to follow-up or had a high viral load.

R: "So we don't use the files…frequently. You only find us using the files when we are in a very close follow-up. Maybe a lost follow-up client or a brought back to care or unsuppressed. So we don't use. We normally have Kenya EMR [electronic medical records] and EMR has everything. So I feel the form will always remain that way because… I will just tell you the truth. Previously, the colleagues were motivated by maybe the support they were getting from… so when you take the file and then you give this too, it will sound heavy to them because they have taken like their 20 or 15 minutes with the client and then after that they fill the form. It sounds a bit… but if there is another way of doing it, it will be better."

- Peer counselor, 2 years and 9 months of ATP experience

A few participants noted that the absence of additional resources, such as travel and time reimbursements and support for phone call reminders to attend visits made it difficult to sustain motivation for implementing the tools.

I: "Why did you believe that it was going to work?"

R: "I believed so because…those who were involved in the study, and these were the adolescents, they were being facilitated to come to the facility because that is one of the challenges. Maybe you want to enroll a particular cohort and once they are gone, probably calling them back to the facility was a challenge. But when transport was provided, we saw a huge turnout."

- Counselor, 3 years of ATP experience

R: "Like enrollment of new clients, you realize that when [Study staff name] was there whenever we had a new client we'd always take to her to enroll but now that is not

happening, we need to do it ourselves and then there was that motivation during enrolment…"

I: "They used to motivate participants or the provider?"

R:" Participants, yes and even the providers whenever we had a meeting."

I: "By giving you fare back home?"

R: "Yes"

- Nurse, 2 years of ATP experience

Recommendations for Scale-up

Many participants thought it would be beneficial to scale up the ATP across all facilities in Kenya regardless of HIV prevalence, to support HCWs to deliver transition services and reduce need for repeated training.

"I think the book is okay, it can be adopted but everybody needs to be engaged yes so that in case of transfer outs, rotations we are still okay. If I come from another facility, I just blend in."

- Counselor, 3 years of ATP experience

"I'd rather we didn't prioritize certain facilities; we should just prioritize all over. Adolescents are all over, they are in every facility in the whole country."

- Mentor mother, 3 years of ATP experience

HCWs emphasized the need to include more language translations to meet needs of diverse populations. HCWs also noted the importance of expanding the availability of the tools including to other departments and digital versions of the tool to increase availability.

"We can have it in an online package, a soft copy. For someone who is learning I think everybody has a phone…I find the booklet being tiresome to carry. So, if I have the package in a phone, in a soft copy or in something, it is easier to let them go through it."

- Counselor, 3 years of ATP experience

Some HCWs suggested integrating the ATP into existing point-of-care systems, such as EMRs, to ensure its widespread adoption and familiarity amongst clinic staff. The tools would become an integral part of routine care, minimizing the risk of overlooking or forgetting their use. Many HCWs recommended integrating the tools into official policies at the MOH level as part of scale up efforts to maximize acceptability.

"So personally, at the facility level I will say this tool is a nice tool that can be used at any facility. So if it's able to go around nationwide, then it's better if we can involve MOH and people in the offices like the government of Kenya… Until they see something like that, they will not see the essence of using it. So it's also better to also involve the government."

- Peer counselor, 2 years and 9 months of ATP experience

Discussion

Our study identifies several key themes regarding ATP sustainment and fidelity one year post RCT. We found that effective training helped overcome high workload perceptions and equipped HCWs with the skills and confidence to deliver the ATP and train new staff. Supportive internal and external structures helped maintain motivation and long-lasting enthusiasm for ATP tool use among HCWs. However, implementation was impacted by workforce shortages, high staff

turnover and lack of integration into existing EMR systems. Some of these challenges were able to be addressed by high ATP adaptability, which facilitated continued use despite constraints.

HIV incidence among adolescents remains high, and retention in care and viral suppression rates among YLH are notably lower compared to the adult population. The transition from pediatric to adult care presents unique challenges and is the most vulnerable period. The ATP significantly improved YLH's readiness to transition from pediatric to adult care.[31] Ensuring the continuity of evidence-based interventions (EBIs) such as the ATP beyond clinical trials is crucial for bridging the know-do gap and improving HIV treatment outcomes for YLH. However, there is evidence that most interventions are not sustained post clinical trial, and therefore do not translate to benefit YLH, and sustainment studies are often lacking[32,33]. Our study provides evidence of key determinants of sustainment that could translate to other studies of YLH EBIs in similar settings. We found that effective training helped overcome negative perceptions of the tools, and equipped HCWs with the skills and confidence to train new staff. Training is identified as a key component of initial implementation and sustainment of EBIs[34–36]. However, training must accommodate existing staff turnover challenges. Incorporation of specific EBI training during in service training may be an effective way to sustain changes.[37]

As with other studies [38–40] we found that supportive internal structures helped maintain motivation and long-lasting enthusiasm for ATP tool use among HCWs. The use of internal champions who are defined as individuals who continually advocate for use of interventions has proved effective in implementation of prevention of vertical transmission of HIV programs as well as viral suppression among youth.[41,42] In HIV clinics, peer champions could serve this role, and have effectively been supportive in delivery of other youth interventions.[43,44] Government buy-in

remains critical for future sustainment; integration of tools within existing national frameworks ensures continued implementation through existing systems.

Intervention adaptability is a key driver of sustainment. Clinical trials often have rigid protocols and require additional staff not available post-trial. The ATTACH study was a pragmatic trial, built to ensure continued use of the tools post RCT. Key considerations are in intervention design; a co-designed intervention is likely to fit clinic flow and incorporate views of a wide range of users, making it adaptable to local settings [45–47]. The successful sustainment of the ATP is likely related to the wide range of stakeholders including the Kenya MoH who were included in the initial intervention development.[48] Similarly, as we found in our study, interventions that are aligned to common clinic goals are more likely to be sustained. The ATP met an unmet clinic need. None of the available tools addressed transition, yet this remains an important challenge in YLH care.[49,50]

Work force challenges as we found in our study are common challenges in health systems in many countries in sub-Saharan Africa.[51–53] Approaches to address this have previously included task shifting and task sharing. [54–56] While workforce challenges are likely to continue, incorporating these approaches in EBI implementation may support continued EBI use. As much as possible, EBI's should align to existing resources and be adaptable to the existing workforce.

Strengths and Limitations

Findings from this study synthesize experiences of a subset of HCWs from the original ATTACH study intervention sites located in four counties in Kenya, and therefore might not be

generalizable to all HIV clinics in Kenya. However, the use of the updated CFIR, version 2.0, allows for a standardized assessment of varied implementation contexts and facilitates comparison with other settings. Moreover, the qualitative study approach with interviews that included broad probes allowed HCWs to interpret and answer based on their true experiences, which will lead to participant-driven themes. This may provide direction to determine necessary steps to facilitate a successful and sustainable scale-up of the ATP.

Conclusion

Our findings highlight key determinants of post RCT EBI sustainment, emphasizing the importance of training, internal and external support, and intervention adaptability. Strategies to ensure continued training and improve intervention integration into existing point-of-care systems can contribute to enhanced sustainability and scalability. Translating the ATP materials to more languages, creating digital versions, and integrating ATP tools into official policies at the MoH level as part of scale-up efforts could maximize acceptability and further extend ATP impact and reach among YLH. The findings have broader implications for improving long-term HIV care for youth with HIV in sub-Saharan Africa and may be relevant to similar settings. The insights gained from this research may provide valuable directions for future efforts to improve HIV treatment outcomes among youth living with HIV.

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