

**Quality Improvement Initiatives to Strengthen Viral
Suppression Among Adolescents Living with HIV in
Institute of Human Virology (IHVN) Supported
Facilities in Abuja Nigeria**

by

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Ethics Statement

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Abstract

Adolescents living with HIV (ALHIV) in high ALHIV-burden, resource-limited settings like Nigeria have significantly inferior outcomes from antiretroviral therapy (ART). This study reports on analysis, innovations, processes and outcomes of several continuous quality improvement (CQI) initiatives by the Institute of Human Virology Nigerian (IHVN) to identify gaps in achieving adolescent viral suppression among Nigerian ALHIVs - including suboptimal or complete lack of HIV status disclosure, higher rates of loss to follow up, poor ART adherence and increased need for psychosocial support. These CQI initiatives referred to as “small tests of change” to improve poor performing areas help to bridge identified gaps and follow four major steps per CQI requirements including – problem statement; root cause analysis; developing solutions and making an aims statement; and implementation of improvement changes which involves a plan-do-study-act (PDSA) cycle. The PDSA cycle represents a series of tests that forms the basis of a monitoring cycle to track innovations, outcomes and document change. It involves developing a strategy to test the change (Plan), executing the test (Do), observing and learning from the consequences (Study), and determining what modifications should be made to the test (Act). Strengthening adolescent viral suppression within IHVN supported sites in Abuja Nigeria ensures that ALHIVs are not left behind in the UNAIDS 90-90-90 targets.

Key Words: Human Immune Deficiency Virus (HIV); Adolescents Living with HIV (ALHIV); Anti Retro-Viral Therapy (ART); Viral Suppression; Nigeria; Continuous Quality Improvement (CQI)

Dedication

This project is dedicated to the glory of God.

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Table of Contents

Approval	ii
Ethics Statement	iii
Abstract	iv
Dedication.....	v
Acknowledgements	vi
Table of Contents	vii
List of Tables	viii
List of Acronyms	ix
Chapter 1. Introduction	1
Chapter 2. Background	3
Chapter 3. HIV in Nigeria: Overview and Burden.....	5
Chapter 4. Adolescent HIV.....	7
Chapter 5. UNAIDS 90-90-90 Targets	9
Chapter 6. Literature Review	10
6.1. The Science of Continuous Quality Improvement (CQI).....	10
6.2. Getting to 90-90-90 through CQI	11
6.3. Challenges to attaining the UNAIDS 90-90-90 targets for adolescents in Nigeria	12
Chapter 7. Purpose and Objectives	15
Chapter 8. Methods	16
Chapter 9. Findings	19
Chapter 10. Discussion	23
Chapter 11. Recommendations	26
Chapter 12. Conclusion.....	28
Chapter 13. Reflections.....	29
References.....	30
Appendix 1.....	34
Appendix 2.....	35

List of Tables

Table 1. Shows findings from several PDSAs run, root cause analysis identified, change ideas tested and effects of these interventions.21

List of Acronyms

AIDS	Acquired immune Deficiency Syndrome
ALHIV	Adolescents Living with HIV
ART	Antiretroviral Therapy
ARV	Antiretroviral
CQI	Continuous Quality Improvement
IHVN	Institute of Human Virology Nigeria
IAC	Intensified Adherence Counselling
PDSA	Plan Do Study Act
RCA	Root Cause Analysis
UNAIDS	United Nations AIDS
UNICEF	United Nations Children's Funds
VL	Viral Load
WHO	World Health Organization

Chapter 1.

Introduction

The three decade long global HIV epidemic has had its remarkable share of impact on nearly every aspect of our world and existence. Awofala and Ogundele (2018) describe this as “a great impact on health, welfare, employment and criminal justice sectors; affecting all social and ethnic groups throughout the world.” (p.1) According to the Global Health Observatory’s statistical data (2018), about 36.9 million [31.1–43.9 million] people were living with HIV globally at the end of 2017. Though the burden of HIV epidemic varies considerably between countries and regions, Kharsaney and Karim (2016) write that Sub-Sahara Africa reportedly carries a disproportionate burden of HIV- accounting for more than 70% of the global burden of HIV infection. The World Health Organisation (WHO) African region where Nigeria falls remains most severely affected with nearly 1 in every 25 adults (4.1%) living with HIV and accounting for nearly two-thirds of the people living with HIV (PLHIV) worldwide. (WHO, 2018). Similarly, sub-Sahara Africa together with South Asia account for the highest numbers of HIV-positive adolescents globally, and of the 1.8 million adolescents living with HIV globally, about 1.5 million (85 per cent) live in sub-Sahara Africa. (UNICEF DATA, 2018). Although multiple responses by different agencies and organisations exist to tackle the HIV epidemic, this review focuses on the UNAIDS 90-90-90 strategy, which aims that by 2020, 90% of all people living with HIV will know their HIV status, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy and, 90% of all people receiving antiretroviral therapy will attain viral suppression. (UNAIDS, 2018).

I come to this study based on the background of a Nigerian trained physician who considers herself a strong ally to women and girls, and has six years of medical practice, out of which 4 years involved HIV/AIDS primary care practice. In my keen interest in HIV/AIDS medicine and research, I have found the UNAIDS 90-90-90 campaign quite fascinating, and have followed the progress of the targets. The inferior outcomes of Adolescents Living with HIV (ALHIVs) on ARTS (with young women being disproportionately affected) pose a big question to me. In a recent life changing experiential learning in Durban Kwazulu Natal, South Africa - the epicenter of the global

HIV epidemic, I became familiar with some of the reasons behind the lack of remarkable success with ALHIVs, and this formed the basis of focusing my practicum at the Institute of Human Virology Nigeria (IHVN) on ALHIVs and the last '90 component' of the UNAIDS 90-90-90 targets, namely for 90% of those receiving antiretroviral medication to achieve adequate viral suppression. I felt the importance to ask - why ALHIVs are lagging behind, what has been done so far to change this narrative, and how can we do better?

Chapter 2.

Background

The Federal Republic of Nigeria commonly referred to as Nigeria, is a country in West Africa. It is a democratic secular country, bordered by Benin in the west, Chad and Cameroon in the east and Niger in the north, and a coastline that lies on the Gulf of Guinea in the Atlantic Ocean. (Nations Encyclopaedia, 2018). Nigeria was colonised and controlled by the British Empire through the 19th century, it gained independence on October 1, 1960, and adopted a new constitution in 1999 after nearly 16 years of military rule. (Graham, 2009). This brought about a transition to civilian rule, which remains the system of government practiced in the country till date. Nigeria is Africa's most populous nation and 7th most populous country in the world: with a population of about 186 million inhabitants, it represents a key regional player in West Africa, and accounts for 47 percent of West Africa's population. (World Atlas, 2018). Nigeria also has one of the largest populations of youth in the world. (World Bank, 2017). World Bank Statistics has the birth rate in Nigeria as of 2016 at 39.2/1,000 people, crude death rate as of 2015 at 12.766/1000 people, and total adult literacy rate as of 2008 at 51.078 (percent for people ages 15 and above). (World Bank, 2016). Nigeria has 36 states, and a capital city – the Federal Capital Territory. Over 500 languages are spoken in Nigeria, with the majority being the Hausa/Fulani, the Yoruba, and the Igbo. (Chekpemoi, 2017).

The healthcare delivery system in Nigeria consists of a network of primary, secondary, and tertiary facilities. ("Health Care Delivery System", 2016). It is a concurrent responsibility of the three tiers of government in the country. The Federal Government's role is mostly limited to coordinating the affairs of federal health tertiary institutions such as Teaching Hospitals and Federal Medical Centres. State Governments manage affairs of secondary health institutions such as Government Hospitals, while the Local Government controls the affairs of primary health care such as Primary Healthcare Centres and Dispensaries, (FMoH, 2018). Despite Nigerian's strategic position in Africa, and its huge economy, it remains highly underserved in the health care sphere. (Welcome, 2011). Nigeria's health systems are fragile owing largely to poor political will, evidenced by poor coordination and implementation of health

services, inadequate resources such as health facilities and pharmaceuticals, inadequate and decaying infrastructure, inequity in resource distribution and access to care, plus a very deplorable quality of care that is even worse in the rural areas and hinterlands. (Enebulele, 2013).

Chapter 3.

HIV in Nigeria: Overview and Burden

The USAID ranks Nigeria as the country with second largest number of people living with HIV globally - second only to South Africa. (USAID, 2017). Accounting for about 13 percent of the global HIV/AIDS burden, the HIV epidemic continues to take a staggering toll on Nigeria's public health and socio-economic status. (Kharsaney and Karim, 2016). The first two cases of HIV in Nigeria were diagnosed in 1985 in Lagos Nigeria and reported in 1986. This first report sent the country into panic and disbelief and was seen by some as just a ploy by the Americans to discourage high-risk sexual behaviours. (Eze, 2009). The U.S. Government, through the President's Emergency Plan for AIDS Relief (PEPFAR), currently assists more than 600,000 Nigerians with life-saving HIV therapy, which is about 90 percent of the people living with HIV/AIDS in the country. (USAID, 2018). HIV/AIDS treatment and access to antiretroviral agents depends highly on foreign aid. Mbachu, Okoli, Onwujekwe and Enabulele (2017) write that development partners and donor agencies have until recently, solely driven prevention and treatment of HIV/AIDS, particularly the provision of antiretroviral drugs (ARVs). According to Avert Nigeria, (2018) Nigeria is far off from meeting the UNAIDS global target of enrolling 90% of people diagnosed with HIV into care. In 2017, an alarming statistic reported only about 33% of all people living with HIV to be receiving treatment was recorded. Of the people on HIV treatment, only 24% had achieved viral suppression in 2016. (UNAIDS AIDSinfo, 2018) Although Nigeria adopted the 'test and treat' policy in 2015, which recommends individuals with positive HIV diagnosis to initiate treatment immediately, there is still a shortfall in meeting this target. Nevertheless, several coordinated efforts to scale up HIV/AIDS treatment has allowed for enrolments of up to 212,000 more people on ARVs between 2016 and 2017. (UNAIDS, 2017)

Nigeria also has in place punitive laws that take a toll on efforts to contain the HIV/AIDS epidemic. In 2014, Nigeria's president Dr. Goodluck Jonathan signed a bill that criminalised same-sex relationships in the country. According to *Chapter 21- Offences against morality* of the **Criminal Code Act Chapter 77 - Laws of the Federation of Nigeria 1990**, section 214 – “any person who has carnal knowledge of

any person against the order of nature; or permits a male person to have carnal knowledge of him or her against the order of nature is guilty of a felony, and is liable to imprisonment for fourteen years”, while Section 225A & 225B states that “persons trading in prostitution or who live on the earnings of prostitution shall be liable to imprisonment for two years. (Nigerian Criminal Code Act, 2014). Although Nigeria has no laws preventing healthcare workers from providing health services to sex workers, the criminalising law makes it difficult for individuals to disclose that they are sex workers to healthcare workers. (Global network of sex work projects, 2015). Punitive legal environments, stigma, and discrimination based on sexual orientation and gender identity, together with high levels of physical, psychological, or sexual violence against the LGBTQ community impedes sustainable national responses to HIV in Nigeria. (Human Rights Watch, 2016).

Chapter 4.

Adolescent HIV

Global Situation

Adolescents and young people represent a growing share of people living with HIV worldwide. Naswa and Marfatia (2010) describe the adolescent stage of growth as a phase of physical growth and development that is accompanied by sexual maturation often leading to intimate relationships. This crucial and challenging stage of rapid growth and sexual maturation is characteristic of a period where youths and adolescents are most adventurous, and may experiment with sex and drugs, which places them at an increased risk of contracting HIV as well as other sexually transmitted diseases. (Mgbachi, 2019).

According to UNICEF DATA (2018), about 1.8 million adolescents between the ages of 10 and 19 were living with HIV globally in 2017 and adolescents' account for about 5 percent of all people living with HIV. Adolescents aged 15 to 19 accounts for an estimated 16 percent of new adult HIV infections worldwide. (UNICEF DATA, 2018). UNAIDS (2016) documents that adolescents (10–19) are the only age group in which AIDS-related deaths are not decreasing, and that in 2015, an estimated 29 adolescents acquired HIV every hour leading to about 250,000 [180,000–340, 000] new HIV infected adolescents, of which 65% occurred among adolescent girls. Globally, in 2017, adolescent girls accounted for two thirds of all new HIV infections among adolescents. (UNICEF, 2018).

Adolescent HIV in Nigeria

In 2012, NACA (2017) documented that Nigeria was estimated to have about 160,000 ALHIVs with 73,000 being males and 90,000 females. HIV prevalence among ALHIVs aged 15-19 was estimated to be 2.9% while specific HIV estimates were not available for children aged 10-14 years. HIV prevalence in Nigeria also varies considerably by region and age. For instance, the prevalence among females aged 15-19 ranged from 1.3% in South Eastern Nigeria to 4.3% in the South Southern part of the country. (NACA, 2017).

NACA also documented that Nigeria lost about 11,000 adolescents to AIDS-related deaths in 2013, and another 17,000 became infected with HIV in the same year. (NACA, 2017). Local studies on modes of HIV transmission estimates that although sexual transmission accounts for about 80% of HIV transmission in Nigeria's general population, evidence suggests that vertical transmission may account for a fairly high proportion of HIV infection among ALHIVs. (NACA, 2017).

Some reported drivers of the adolescent HIV epidemic in Nigeria include high-risk sexual behaviours such as multiple and concurrent sexual partnerships, intergenerational sex, sexual coercion, low risk perception, and transactional sex. (NACA, 2017). Female adolescents who are married may also be exposed to increased risk of HIV infections from their husbands as they tend to have much older husbands (mean age difference, 5–14 years) and engage in frequent unprotected sex as most common HIV prevention strategies such as abstinence or condom use are often not realistic. Additionally, married adolescents have relatively little access to educational and media sources of information. Most of these factors reduce their bargaining power for safe sex within the marriage. (NACA, 2017; Clark, Brice and Dude, 2006). HIV High-risk behaviours shown by adolescents may often be exacerbated by socioeconomic conditions like poverty, gender inequalities, gender-based violence, and HIV-related stigma. In addition, many of Nigeria's common religious and cultural practices such as child marriage, female genital mutilation, and widow inheritance increase the risk of adolescent HIV infection. (NACA, 2017). Furthermore, substance use is increasingly prevalent among Nigerian adolescents - with alcohol, cigarette and marijuana constituting as “gateways” to experimenting with harmful drugs or substances. Experimenting with illicit substances has been suggested to dampen inhibitions and may increase sexual risk taking or reduce ability to negotiate for safe sex. (NACA, 2017).

Naswa and Marfatia (2010) argue “adolescent HIV/AIDS is a separate epidemic that needs to be managed distinctively from adult HIV.” (p. 1.) This is pivotal to the UNAIDS 90-90-90 targets to end HIV, and most importantly keys into the 2030 agenda for Sustainable Development Goal 3 - to ensure healthy lives and promote well-being for all at all ages, including target (3.3) that aims to end the AIDS epidemic by 2030. (SDG, 2015). Although ALHIVs do not constitute Nigeria's Key HIV population, together with women, young children and orphaned/vulnerable children they make up “other groups” who are also most affected by HIV in Nigeria. (Avert, 2018).

Chapter 5.

UNAIDS 90-90-90 Targets

Following the 2015 deadline for the targets and commitments in the 2011 Political Declaration on HIV and AIDS, a final target was desperately needed to drive progress towards bringing the AIDS epidemic to an end, promoting accountability, and uniting diverse stakeholders in a common effort. (UNAIDS, 2014). While previous targets worked towards achieving incremental progress in the HIV/AIDS response, the aim in the post - 2015 era was nothing less than to see the end of the AIDS epidemic by 2030. In December 2013, the UNAIDS Programme Coordinating Board called on UNAIDS to support country- and region-led efforts to establish new targets for HIV treatment scale-up beyond 2015. In response, stakeholder consultations on new targets were held in all regions of the world and at the global level. Stakeholders assembled in a variety of thematic consultations focused on civil society, laboratory medicine, paediatric HIV treatment, adolescents and other key issue areas. The 20th International AIDS Conference which held on 20-25 July 2014 in Melbourne Australia was notable for the launch of the UNAIDS 90-90-90 campaigns with a target of eliminating the AIDS epidemic by 2020. (UNAIDS, 2014) These new, final, ambitious, but achievable targets are as follows:

- By 2020, 90% of all people living with HIV will know their HIV status.
- By 2020, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy.
- By 2020, 90% of all people receiving antiretroviral therapy will have viral suppression.

Chapter 6.

Literature Review

6.1. The Science of Continuous Quality Improvement (CQI)

According to Fernandez, Rozanski, Rathmell, & Merrill (2014), quality as a health care issue is a relatively new concept and is the extent to which health services for individuals and populations increase the likelihood of desired health outcomes and remain consistent with current professional knowledge. O’Neil et al. (2011) describe continuous quality improvement (CQI) as a set of methods for healthcare improvement that originally stemmed from industrial process improvement approaches and is considered as having a complex heritage and thus no consensus definition of the term currently exists. A study by Fernandez et al. (2014) writes that CQI is an outgrowth of “total quality control” – a movement that spread from the business sector to health care in the 1980’s, and reiterates that the origins of CQI may be traced to the work of American physicist Walter Shewart’s in 1920s which included a ‘plan-do-study-act’ (PDSA) cycle. This PDSA work was further developed by American engineer William Edwards Deming in 1950s and was then referred to as the Deming Cycle. (Fernandez et al., 2014). According to Shortell, Bennett and Byck (1998), CQI represents a philosophy of continual improvement of the processes associated with providing a good service that meets or exceeds customer expectations. In public health, CQI is considered a vital technique used to manage processes and output performance as a means of strengthening accountability for public funds. (Poterfield, Marcial, Brown, Throop, & PIna, 2017).

According to Izudi et al. (2018), CQI is a science for improving quality of health services and a tool for achieving the UNAIDS 90-90-90 HIV targets - it uses routine data to improve processes and systems of health service delivery to attain program goals and improve quality of patient care. CQI measures current program performances and compares it with the standard requirements. It follows four basic steps that include – Problem Identification; Root Cause Analysis (RCA); Developing Solutions, and Making an Aims Statement; and Implementation of Improvement Changes. (Izudi et al., 2018). These basic CQI steps are further elaborated on in the methods section.

6.2. Getting to 90-90-90 through CQI

A study by Dougherty et al. (2018) writes that CQI methods is a proven approach to enhancing program performance, and a priority for HIV programs in many countries. Quality improvement strategies have been successfully implemented to improve quality and coverage of healthcare in facilities and provide a framework to support community-based interventions. (Horwood et al., 2015). A case in point is a study by Izudi et al. (2018) at Katooka health Center located in Mid-Western Uganda where approximately 70% of adolescents were non-retained in care and low retention of HIV-positive adolescents is a major problem not only in this particular center but also across multiple HIV programs in Uganda. A CQI project that utilized context specific, integrated, adolescent-centered interventions were successfully implemented. Izudi et al. (2018) analyzed data for retention, identified and prioritized gaps; analyzed root causes (which included stigma and discrimination, difficult health facility access, and missing scheduled appointments) and implemented site-specific improvement changes using the PDSA cycle. This process significantly improved retention from 29.3% in May 2016 to 90% in May 2017.

Similarly, in a study by Okoth (2018) conducted at the Elizabeth Glaser Pediatric AIDS Foundation in Western Kenya, a baseline assessment on the quality of HIV care was carried out on 6300 adolescents as a means of enhancing viral suppression among adolescents through service delivery CQI approaches. A quality assessment tool to measure adolescent HIV service delivery per the ministry of health guidelines was developed and HIV service providers were sensitized on how to correctly use this tool to access if each adolescent received the nationally recommended service in their last clinical visit. The facility CQI team came up with plans to address the indicators that scored poorly and found that adolescent viral suppression rates went from 76% before CQI to 100% after CQI.

In another study across seven districts in Malawi, a CQI project that sought to increase the ART adherence and strengthen viral suppression in ALHIVs developed an approach based on the successful model of teen clubs introduced by the Baylor International Paediatric AIDS Initiative (a globally recognized intervention model piloted in Uganda in 2013 that empowers HIV-infected adolescents through a network of peer-support groups). The model supported dedicated support groups and teen clubs offering

fully disclosed ALHIVs a safe and nurturing space to build supportive relationships, increase their self-esteem, and develop/ reinforce good habits. This intervention led to an 83% viral suppression rate in the two-year period of teen club enrolment compared to only 67% of suppression among ALHIVs on ART at similar supported health facilities in same districts without teen clubs. (Management Sciences for Health, 2018).

6.3. Challenges to attaining the UNAIDS 90-90-90 targets for adolescents in Nigeria

According to Sam-Agudu et al. (2017), of the estimated 1.75 million ALHIV in sub-Saharan Africa, approximately 240,000 are living in Nigeria, which represents the second highest burden of adolescent HIV globally. In 2013, an estimated 11,000 deaths occurred among Nigerian ALHIV, representing 9.2% of AIDS-related deaths among all African adolescents. Sam- Agudu et al. (2017) cited poor retention in HIV/AIDS care, loss to follow up (LTFU), poor adherence to ART and poorly coordinated transition from paediatric to adult HIV care as top-contributing factors leading to increased morbidity and mortality among Nigeria's ALHIVs.

Similarly, NACA (2017) identified gaps in ALHIV treatment support, and care to constitute drug stock outs, inadequate numbers of health care personnel dedicated to HIV treatment, care, and support, loss to follow-up experienced during the transition from paediatric to adult clinical services, and treatment services that are not very youth friendly due to the limited capacity of service providers and/or negative provider attitudes towards service provision for ALHIVS. Furthermore, reluctance of parents/guardians to disclose their child's HIV status to their child/ward especially to very young adolescents (aged 10-14) and low treatment literacy among ALHIVs results in negative implications for treatment adherence e.g., trivialising ART treatment by making adolescents believe their medications are just multivitamins fails to help them see the importance of ART adherence. Additionally, NACA documents that health care practices requiring all PLHIV to pay hospital/clinic administrative costs, consultation fees, and for certain drugs sometimes including ARVs further worsens the financial strain on the families of ALHIVs and hinder access to quality care, and support services. (NACA, 2017).

Although studies have shown that support groups promote higher levels of social cohesion, psychosocial support, and treatment adherence, very few support groups exist

for ALHIVs and available ones are mostly attached to secondary and tertiary health care facilities making accessibility difficult. (NACA, 2017). Also, according to NACA, the existing comprehensive sexuality education curriculum targeted at adolescents does not address the specific sexual and reproductive health needs and vulnerabilities of ALHIVs. Nigeria's current laws and guidelines on the permitted age of consent for access to sexual and reproductive health services including HIV treatment, hinders the ability of ALHIVS under 18 years to access these essential services independently. (NACA, 2017).

Ojikutu et al. (2014) in a retrospective cohort study that explored the quality of HIV care and treatment in adolescent and paediatric patients receiving ART in Nigeria aimed to determine the association between quality of care with HIV related mortality, lack of retention in care and loss to follow up. The authors concluded that quality of HIV care and treatment among Nigerian ALHIVs are well beyond global standards and emphasized the importance of prioritizing high-quality care in ALHIVs in order to improve ART outcomes, lower loss to follow-up rates, and decrease mortality in the target population. (Ojikutu et al., 2014).

In another study that evaluated the differences in stressors and coping strategies among Nigerian adolescents based on HIV status, Folayan et al. (2017) recruited a comparative group of adolescents living without HIV infection to highlight any differences in the context of the presence or absence of HIV infection. This study was developed to explore the main sources of mental stress and describe the coping strategies used, if any, to mitigate stressors for ALHIVs in Nigeria. Folayan et al. (2017) argue that ALHIVs struggle with several issues relating to their HIV status, including disclosing their HIV status to others, choosing partners, practicing safe sex, adhering to HIV treatment and living with the stress and trauma of being diagnosed with HIV infection. Combined with concurrent presence of other HIV-related stressors such as stigma and discrimination they are further predisposed to psychological distress, which may be expressed through problematic behaviour, including poor treatment adherence, risky sexual practices, and the use of recreational drugs.

Mgbachi (2019) writes, "Factors that contributed to the lingering HIV crisis in adolescents and young people were identified" (P.1) and they include negative attitudes of providers towards adolescents and young peoples' sexual activities, issues with

confidentiality and bias, and poor access to youth-friendly services with specially trained sensitized health care workers, as well as socio-cultural norms about sex and poor health-seeking behaviour among adolescents.

Stigma and discrimination remain a major challenge in battling the ALHIV epidemic in Nigeria. (NACA, 2017). A Meta-analysis of 64 studies conducted in different settings by Odimegwu, Akinyemi and Alabi (2017) demonstrated significant effects of HIV-stigma on mental health, quality of life, use of health services, and physical health of PLHIV including ALHIVs. Manifestations or expression of stigma is influenced by sociocultural, political, and economic factors all of which translates into different forms of inequalities in access to HIV care, treatment, and support. (Odimegwu, Akinyemi and Alabi, 2017)

Chapter 7.

Purpose and Objectives

The purpose of this study is to describe how CQI initiatives are used in identifying factors responsible for inferior ART treatment outcomes among ALHIVs in the IHVN supported treatment sites in Abuja Nigeria, and to show how these simple and cost-effective initiatives help to reach the UNAIDS 90-90-90 targets through improving ALHIV ART outcomes. The study objectives include:

1. To analyze innovations, processes and outcomes of several quality improvement initiatives to strengthen adolescent viral suppression within IHVN supported sites in Abuja Nigeria
2. To distil lessons learned from identified factors responsible for inferior ALHIV ART outcomes and implemented CQI initiatives in order to make recommendations that would further strengthen these initiatives and improve quality of care.

Chapter 8.

Methods

This study is a secondary review of cross-sectional descriptive analysis of innovations, processes and outcomes of several CQI Initiatives to improve care of ALHIV in the IHVN supported treatment sites in Abuja Nigeria including Bwari General Hospital, Garki Hospital Abuja, Gwarinpa General Hospital, Kubwa General Hospital, Maitama District Hospital, University of Abuja Teaching Hospital, Asokoro District Hospital, Karshi General Hospital, National Hospital Abuja, and Nyanya General Hospital.

At each participating treatment facility, quality of care evaluation data consistently showed that viral load (VL) suppression rates among ALHIVs were well below the expected 90%. This led to the generation of a list of adolescents who had non-suppressed VL (HIV viral loads ≥ 1000 copies/ml) after at least 6 months on ART either by using electronic medical records or through a manual retrospective chart review conducted by the CQI team at participating facilities. Non-suppressed adolescents were then contacted to return to care using pre-consented details in their patient profiles such as phone numbers of themselves or their parents or legal guardians/care givers. The IHVN adapted model for CQI - an approach that has been in practice for about five years but has not been formerly documented was then initiated to identify and bridge identified gaps in achieving viral suppression for each adolescent contacted to return to care at participating sites. This approach (further elaborated on below) deploys change concepts in measured PDSA cycles known as 'small tests of change' to improve the poor performing areas and involves the use of an intervention-tracking tool sheet to track and report progress. (See Appendix 1 for an example of a CQI intervention sheet.)

Additionally, personal discussions held with the IHVN CQI team revealed common causes of poor ALHIV viral suppression within the IHVN supported treatment sites and as part of routine CQI exercise, five different IHVN supported treatment sites were visited in team with the IHVN CQI clinicians including National Hospital Abuja, Asokoro District Hospital, Maitama District Hospital, University of Abuja Teaching Hospital, and Gwarinpa General Hospital. At these facilities I took a convenient sample of ALHIVs attending support group meetings or clinic appointments (who consented

personally or consent obtained from their caregivers) and they were interviewed. Each of the patients interviewed were asked – if they knew why they were placed on daily medication; if they had missed clinic or ARV pick up appointment, how many times within the last 6 months if they answered yes, and reasons for missing appointment; if they attended a day or boarding school; if they lived with their parents and reasons if not; if they have been transitioned to adult clinic from pediatric clinic services and what their experiences were. A review of the captured information indicated that issues identified confirmed the assessments made by the CQI team prior to the visits and were mostly consistent with the reviewed literature.

Each IHVN model of CQI initiated at participating sites followed four major steps per standard CQI requirements including:

Problem statement: which involves a concise description of the issue to be addressed that identifies the gap between the current (problem) state and desired (goal) state of a process. The problem statement in this case is that – many ALHIVs accessing care and treatment at IHVN supported facilities within Abuja Nigeria have inferior health outcomes and lower viral suppression rates that are well below the expected 90%.

The Root Cause Analysis (RCA) – a technique that seeks to identify the origin of a problem using specific steps and helps determine - what happened, why it happened, and what to do to reduce the likelihood that it will happen again. In this phase root causes of poor ALHIV suppression are exhaustively analysed- each identified root cause is subjected to further scrutiny until a satisfactory response was obtained and these were then grouped into thematic areas depending on identified causes such as, stigma and discrimination related root causes including issues with disclosure of HIV status; health services related root causes including poorly coordinated transition from paediatric to adolescent clinic services; challenges with adherence to ART; and others including economic hardship, inadequacies in social support, poor health literacy, etc.

Developing Solutions and making an aims statement – this phase answers the question: “What are we trying to accomplish?” and involves developing solutions for improvement and practical measures that are prioritized based on feasibility. It also involves creating an aims statement – an explicit description of desired outcomes expressed in a measurable and time-specific way, which in this case is - a need to

respond to low HIV viral suppression among ALHIVs through initiating multiple QI intervention strategies to bridge gaps identified and ensure adolescents are not left behind in the 90-90-90 targets.

Implementation of Improvement Changes - where practical change ideas developed are tested using the PDSA cycle- a process used in documenting tests of change that involves developing a strategy to test the change (Plan), executing the test (Do), observing and learning from the consequences (Study), and determining what modifications should be made to the test (Act). PDSA forms the basis of a monitoring cycle that tracks practical measures, innovations and outcomes. It helps to simplify implementation, monitoring, and evaluation of improvement changes during CQI.

Analysis

Using the CQI intervention tracking sheet (see Appendix 1.) consisting of intervention start and end date, major reasons identified for non suppression through RCA, viral load result showing non suppression with dates, interventions given, repeat viral load post CQI with dates etc. intervention progress was tracked by the participating facility CQI team and easily reported to the central CQI team at the IHVN headquarters in Abuja.

Although several CQI interventions along with multiple PDSA cycles were run across the different participating treatment facilities, this study focuses on describing only outcomes of successful PDSAs. A detailed example of a specific IHVN CQI approach conducted at Asokoro District Hospital is however shown in Appendix 2.

Ethical Considerations

Ethical approval for the use of retrospective data and dissemination of results from routine IHVN CQI program data was obtained from the Simon Fraser University Research Ethics Board (SFU-REB) (2018s0721]. Approval and waiver of consent was also obtained from the Institute of Human Virology Nigeria (IHVN) since this was a retrospective use and analysis of de-identified data.

Chapter 9.

Findings

Through the RCA phase of CQI interventions at the IHVN supported treatment facilities in Abuja Nigeria, common issues identified to be responsible for poor ALHIV ART outcomes and viral suppression rates well below the expected 90% are listed below. It is important to note how these factors confound and compound each other. Stigma, discrimination, economic hardship, and lack of HIV status disclosure are all a function of poor adherence to treatment.

Issues with HIV status disclosure to the patients by caregivers: this was found to be chief among all factors leading to viral non-suppression in all participating facilities across multiple IHVN sites. In an attempt to protect their children and wards from discrimination and stigma, and to maintain privacy of the family's HIV status, most parents and caregivers failed to disclose the HIV status of many ALHIVs to them. Of all the adolescents interviewed, the majority had no idea why they had to take a medication on a daily basis or attend monthly or bimonthly clinic follow up visits. Many were made to believe by their parents or care givers that they had some sort of chronic disease for which they needed daily medication, or their ARVs were multivitamins to keep them healthy or smart.

Poor adherence to ART: treatment naïve ALHIVs who have unsuppressed viral load are by definition insufficiently adherent to their treatment regimens. This was commonly encountered across all participating facilities. As ART adherence is a principal determinant of virologic suppression, poor adherence often resulted in sub-therapeutic plasma ART concentrations, facilitating treatment failure, drug resistance to one or more drugs in a given regimen, and possible cross-resistance to other drugs in the same class.

Poorly coordinated transition from paediatric to adult clinic services: Nigeria's Federal Ministry of Health provides little guidance on transitioning from paediatric to adult HIV care. Hence, transitioning ALHIVs to adult care consequently varies widely across healthcare facilities in Nigeria, and pose many challenges for many IHVN

supported treatment facilities. Poorly coordinated transitioning often left ALHIVs ‘feeling lost’ which in turn tends to worsen poor retention in care and increased the rates of loss to follow up.

Economic hardship: financial challenges are among some of the issues identified. These included issues with nutrition, transportation and even accommodation and safety. Challenges with affordability of hospital/clinic administrative costs, and payment for treatment in case of opportunistic infections or other health related costs were also common. Additionally, parents or caregivers of ALHIVs who are living with HIV may often suffer job or income loss due to the illness or multiple sick days.

HIV/AIDS-related stigma: Unfair and unjust discriminatory treatment of an individual based on their real or perceived HIV status, is a serious threat to the success of ALHIV care and treatment programs at IHVN supported treatment sites. ALHIVs not only battle with community level stigma, but also self and internalised stigma that result in poor self-esteem and feelings of worthlessness.

Table 1. Indicates the successful outcomes of practical change ideas or “small tests of change” developed through CQI interventions at participating treatment sites to bridge these identified gaps.

Table 1. Shows findings from several successful PDSAs run across all IHVN participating facilities in Abuja, root cause analysis identified, change ideas tested and outcomes of these interventions.

Major Problems Identified Following RCA	Change Ideas Tested “Small Tests of Change”	Outcomes of Tested Change Ideas
Issues with disclosure of HIV status to child/ward	<ul style="list-style-type: none"> • Forum of caregivers of unsuppressed ALHIV was formed to understand and address major obstacles to disclosure. • Joint age appropriate disclosure (partial or full) with health worker and Parents/Guardians. • Re-orientation of health workers and clinicians on age-appropriate disclosure. 	ALHIVs who had full disclosure adopted a more positive living attitude, participated better in their own health care, and showed improved adherence to ARTs.
Issues and Challenges with Adherence to Antiretroviral Therapy	<ul style="list-style-type: none"> • Re-orientation of health workers, clinicians and parents on proper regimen, dose (based on clients weight) and frequency of ART. • Fast tracking clients in school uniform for clinical review, laboratory investigation and drug pickup to allow them not have to choose between classes and clinic. • Changing clinic time for ALHIV to after official work hours and weekends. • Pairing a suppressed ALHIV with a non-suppressed ALHIV for treatment support and as a role model. • Use of home-based directly observed therapy by treatment supporters, caregiver or parent. • Teaming up with knowledgeable and compassionate teachers in boarding school environments to provide safe and confidential spaces for ALHIV to take their ARVs. • Use of a standard scripts (language tested for understanding, non-harmful and non-judgmental) to improve quality of adherence counseling. This is because different cadres of health care workers often conduct adherence counseling. • Use of a rapid psychological assessment tool to understand mental states of ALHIVs. 	Improved Adherence to ARTs, less missed clinician review and ART pick up appointments.
Poor transition from pediatric to adult services.	<ul style="list-style-type: none"> • Re-orientation of health workers in 	Better retention to care, reduced amounts of loss to

Major Problems Identified Following RCA	Change Ideas Tested “Small Tests of Change”	Outcomes of Tested Change Ideas
	<p>adult and pediatrics of the experience of ALHIV who are more likely to drop out of treatment when transferred to adult section when not prepared.</p> <ul style="list-style-type: none"> • Assess readiness of ALHIV for transfer to Adult HIV services prior to transfer. • Introduce a transition process in the facilities that allow ALHIV to return to the pediatric section until ready to transfer to Adult HIV services. 	<p>follow up, less missed clinic and ARV pick up appointments.</p>
HIV/AIDS related stigma	<ul style="list-style-type: none"> • Leveraging on existing adolescent and caregiver support group meetings to provide health education, on stigma aversion techniques and where and how to seek help when stigmatized. • Develop and deploy a curriculum on ALHIV well being to guide/standardize support group activities pertaining to stigma mitigation and confidence building. • Use of peer mentorship for psychological support. (Buddy system) • Improve proxy drug pick up process for ALHIV in boarding houses and in day school to provide more confidentiality. 	<p>Increased psychosocial support, well-being, self-esteem, self-worth, and confidence among ALHIVs. Improved retention in care, and reduced amounts of loss to follow up. Also fewer cases of missed clinic and ARV pick up appointments.</p>
Economic hardship	<ul style="list-style-type: none"> • Improve assessment of ALHIV for economic barriers to treatment by introducing a snap tool on living conditions (accommodation, safety, transportation and nutrition status) • Linking deserving ALHIV with available social services and support groups and to the National Orphan and Vulnerable Children (OVC) programs that are run in their local community. 	<p>Many ALHIVS reported increased economic, nutritional and psychosocial support. Retention in care improved, and cases of loss to follow up reduced. There were also fewer cases of missed clinic and ARV pick up appointments.</p>

Chapter 10.

Discussion

Attempts to address the needs of ALHIVs are burdened with many challenges that are magnified in Nigeria and the rest of sub-Sahara Africa where HIV prevalence is high, and resources are scarce. This report summarizes successfully completed QI approaches documented by IHVN in strengthening viral suppression among ALHIVs. The call to compile these interventions was guided by a need to document IHVN's practical, innovative and adolescent friendly approaches that strengthen ALHIV care and treatment. These initiatives range from clinic-based approaches, to addressing social issues, and mainly adopt strategies recommended by the WHO, as well as evidence based and successful measures from other Sub-Sahara Africa settings and globally.

Adolescent transition to adult care defined by Sam-Agudu et al (2017) as “the purposeful, planned movement of adolescents and young adults with chronic physical and medical conditions from child-centered to adult-oriented health care systems” is pivotal in the provision of psychological support that helps ALHIVs deal with anxieties and anger issues, and provides them with easily accessible information such as access to/navigation of medical services, importance of adherence to treatment, health education on disease states and on sexual and reproductive health services. ALHIVs are already burdened with stress related to visiting the hospital and taking drugs regularly, thus abrupt transitions to adult clinic services mostly leave them feeling lost and requiring social support. IHVN's current strategy of conducting transition sessions in batches that address the phases of transition from Paediatric-to-Adolescents and Adolescents-to-Adult clinics has proved ingenious in addressing the ALHIV crisis.

Poor adherence to ART is commonly encountered in the treatment of ALHIVs. A variety of factors including medication formulation, frequency of dosing, drug toxicities and side effects, age and developmental stage, as well as psychosocial, behavioural, and socio demographic characteristics of adolescents and caregivers are associated with non-adherence. IAC either for the adolescent alone or joint IAC with caregiver is one of the most evidence based and successful strategies in strengthening ALHIV viral suppression rates globally (Nasuuna et al., 2018). Joint IAC sessions create an

important avenue to discuss identified issues leading to poor adherence, and a chance to counsel the parents/caregivers privately on pertinent issues such as disclosure of HIV status. The importance of disclosure of the HIV status of an adolescent using age appropriate, caring and supportive approaches, and how disclosure can help them adopt a positive living attitude and participate in own care is often stressed at these sessions.

HIV/AIDS related stigma and discrimination remains a challenge to effective HIV testing, disclosure of sero-status, retention in care, and adherence to treatment for ALHIVs. Peer support activities such as support groups, buddy system, and peer-to-peer counselling ensures a source of empathic support and a forum to share positive coping strategies especially from own experience as well as aversion techniques and where and how to seek help when stigmatized. Furthermore, research has shown that peer support can improve health outcomes, linkages, adherence, viral suppression, retention and psychosocial wellbeing. (Men, 2018). Peer support models can also provide young peer supporters with opportunities for capacity building leadership development, and youth-led advocacy, which helps them combat the negative effects of self-stigma and peer pressure. (WHO, 2018). Youth Friendly Clinic Services fosters confidentiality, culturally appropriate care, and integrated services that ensure easy non-stigmatizing access for ALHIVs. It goes a long way to mobilize and support health care providers to deliver services that meet ALHIV specific needs.

This report has several limitations. First is the challenge with finding relevant literature. As QI initiatives are relatively new especially around HIV care, not many publications around ALHIV viral suppression are available. Difficulties were also encountered in obtaining documented information on ALHIV interventions from IHVN. Although implemented, many QI initiatives reviewed in this report are poorly documented and difficult to access. This made it difficult to find sufficient details on specific interventions and outcomes, or to identify relevant documents in the grey literature. Additionally, finding relevant grey and peer reviewed literature on Nigerian ALHIVs in general was also a challenge, thus highlighting the gaps in research, knowledge and documented studies around HIV/AIDS in Nigeria and even worse for ALHIVs. I believe that this issue indicates a persistent problem in the area of Nigeria's HIV/AIDS practice and research, in that the majority of programs and projects are not well documented and never make it to publication whether in grey or peer-reviewed literature. Furthermore, this review did not include qualitative data to appreciate lived experiences of the extent

to which change ideas and initiatives documented in this report led to successful outcomes. Nonetheless, the findings of this review demonstrate the critical role of QI interventions, which are manageable, inexpensive, and evidence-based approaches that are highly underutilized in HIV health care settings in resource constrained settings.

Chapter 11.

Recommendations

1. As ALHIVs contribute the highest percentage of HIV/AIDS related deaths in Nigeria in 2017, more rigorous research and evaluation of projects serving adolescents in Nigeria is required. This will help to further unpack the identified factors responsible for poor ALHIV outcomes in order to accordingly address underlying factors and create interventions that work across multiple levels. For instance, the term “economic hardship” needs to be further broken down to better understand how certain factors such as challenges with transportation, accessibility of treatment facilities, nutritional challenges, etc. intersect with or impact economic hardship. Similarly stigma and discrimination needs be further analysed to gain deeper insight into how community norms, religious practices and governmental policies affect this factor.
2. With Nigeria contributing about 13% of the global HIV burden, there is a need to improve available literature and fill the knowledge gap on Nigerian PLHIVs including ALHIVs. Efforts should also be increased to achieve consistencies in ALHIV data for the purposes of accountability, and in order to accurately describe and tackle the epidemic.
3. Because ALHIVs at the IHVN supported facilities have unique needs than adults and other populations living with HIV, this project also calls for intense efforts in ameliorating the factors that lead to poor viral suppression among this population in order to help achieve the 90-90-90 targets. CQI efforts should be doubled to:
 - Assist parents and caregivers who struggle with disclosing HIV status to their wards.
 - Provide accessibility to resources promoting adolescent health literacy.
 - Increase the level of ALHIV economic and social support.
 - Ensure lower pill burden and simplified administration as much as possible to help with ART adherence challenges.

4. Successful QI practices from other settings can be replicated to further strengthen viral intervention in IHVN. For instance, the successful teen clubs model introduced by the Baylor International Paediatric AIDS Initiative in Uganda proves to be ingenious in helping ALHIVs cope better with stigma and other life stressors.
5. ALHIVS at IHVN supported sites will benefit more from holistic and multidisciplinary approaches by donor agencies that not only ensure ART efficacy, but also tackle greater socio-economic factors that drive the HIV epidemic.
6. As CQI is becoming more popular in global healthcare practices, there is a need for more consistency in the application and reporting of CQI methods in order to achieve to achieve better efficacy of these interventions.

Chapter 12.

Conclusion

ALHIVs are burdened with many challenges, which are magnified in Sub-Saharan Africa where HIV prevalence is high and resources are limited. This report details strategies that are consistent with the need to assess and improve adolescent viral suppression through incorporating innovative techniques and demonstrates the critical role of CQI initiatives in ensuring ALHIVs are not left behind in the UNAIDS 90-90-90 targets.

Chapter 13.

Reflections

The purpose of this capstone is to address the major competency **Global Health 1 (GH1)** that involves Identifying, defining, and critically analyzing historical, current and emerging issues in global health and a reinforcing competency **Core Competency 11 (CC11)** Gender, Culture, and Social Location – which involves recognizing how gender, ethnicity, race, class and other markers of social location are related to health outcomes, applying basic concepts, skills, and strategies required for community engagement and empowerment among diverse communities.

This project represents a very life changing part of my MPH journey. It culminates my experiences of medical practice in HIV primary care, knowledge gained through my MPH classroom and experiential learning and the hands-on public health practice experience I gathered during my practicum year at IHVN. I feel like this capstone provides me with a platform to demonstrate my mastery of public health knowledge, theory and skills, and especially in the HIV/AIDS area of research where my passion lies.

During my MPH program, I have found a new passion in academic writing and in research through the numerous papers I have turned in as projects and assignments in the last 6 terms. I think that this capstone represents the peak of my academic writing as a graduate student and paves a way for many more papers and research that I have been motivated to delve into. I can confidently say that I have been freshly inspired and I look forward to my new career as a public health practitioner and HIV/AIDS researcher.

References

- Avert (2018) HIV AND AIDS IN NIGERIA. *Global information and education on HIV and AIDS*. Retrieved from <https://www.avert.org/professionals/hiv-around-world/sub-saharan-africa/nigeria>
- Chekpemol, J. (2017) What languages are spoken in Nigeria? *Society, World Atlas*. Retrieved from <https://www.worldatlas.com/articles/what-languages-are-spoken-in-nigeria.html>
- Clark,S., Bruce, J., Dude, A. (2006) Protecting Young Women from HIV/AIDS: The Case Against Child and Adolescent Marriage. *International Perspectives on Sexual and Reproductive Health; International Family Planning Perspectives, 2006, 32(2):79–88*
- Dougherty, G., George, A., Johnson, C., Rondinelli, I., Walker, L., and Rabkin, M. (2018) Building Quality Improvement Capacity for HIV Programs in Sub-Saharan Africa: An Innovative, Mixed Method Training Course. *Journal of the Association of Nurses in AIDS Care*. DOI: 10.1016/j.jana.2018.04.013
- Enabulele, O. (2013) My Assessment of Nigeria's Health Sector performance at 53. *Sahara Reporters*. Retrieved from <http://saharareporters.com/2013/09/30/my-assessment-nigerias-health-sector-performance-53-dr-osahon-enabulele>
- Eze J.I, (2009) HIV/AIDS Epidemic in Nigeria (Ph.D. thesis) *University of Glasgow*. Retrieved from <http://theses.gla.ac.uk/642/1/2009EzePhD.pdf>
- Fernandez, V.E., Rozanski, M.J., Rathmell, J.P., & Merrill, D.G. (2014) Quality Assessment and Improvement and Patient Safety in the Pain Clinic. *Practical Management of Pain*. (Pages 57-77) Science Direct <https://doi.org/10.1016/B978-0-323-08340-9.00006-2>
- Federal Ministry of Health (2018). Departments and Units. Retrieved from <http://www.health.gov.ng/>
- Folayan, M.O., Cáceres, C.F., Sam-Agudu, N.A. Odetoyinbo, M., Stockman, J.K.,Harrison, A. (2017) Psychological Stressors and Coping Strategies Used by Adolescents Living with and Not Living with HIV Infection in Nigeria. *AIDS and Behaviour* doi.org/10.1007/s10461-016-1534-3
- Global network of sex work projects. (2015) Nigeria. Retrieved from <https://www.nswp.org/country/nigeria>
- Graham, k. (2009). Nigeria: Colonization. *Nigeria*. Retrieved from <https://hj2009per6nigeria.weebly.com/colonization.html>

- Healthcare Delivery System In Nigeria and the Imperatives of Change. (2016) *Point Blank News*. Retrieved from <http://pointblanknews.com/pbn/articles-opinions/healthcare-delivery-system-nigeria-imperatives-change/>
- Horwood, C., Butler, L., Barker, P., Phakathi, S., Haskins, L., Grant, M., ... Rollins, N. (2017). A continuous quality improvement intervention to improve the effectiveness of community health workers providing care to mothers and children: a cluster randomised controlled trial in South Africa. *Human Resources for Health*, 15(1). doi:10.1186/s12960-017-0210-7
- Human Rights Watch (2016) Nigeria: Harsh Law's Severe Impact on LGBT Community. *Human Rights Watch*. Retrieved from <https://www.hrw.org/news/2016/10/20/nigeria-harsh-laws-severe-impact-lgbt-community>
- Izudi, J., Mugenyi, J., Mugabekazi, M., Muwanika, B., Spector., V.T., Katawera, A., and Kekitiinwa, A. (2018) Retention of HIV-Positive Adolescents in Care: A Quality Improvement Intervention in Mid-Western Uganda," *BioMed Research International* <https://doi.org/10.1155/2018/1524016>.
- Kharsaney A.B.M., and Karim Q.A. (2016). HIV Infection and AIDS in Sub-Saharan Africa: Current Status, Challenges and Opportunities. *The Open AIDS Journal* Doi 10.2174/1874613601610010034
- Management Sciences for Health (2018). Teen clubs help retain adolescents in HIV care and treatment. MALAWI: DISTRICT HEALTH SYSTEM STRENGTHENING AND QUALITY IMPROVEMENT FOR SERVICE DELIVERY. Retrieved from https://www.msh.org/sites/msh.org/files/cdc_-_teen_club_brief_revised.pdf
- Mbachu, C., Okoli, C., Onwujekwe, O., and Enabulele, F. (2017). Willingness to pay for antiretroviral drugs among HIV and AIDS clients in south-east Nigeria. *Health Expectations* <https://doi.org/10.1111/hex.12612>
- Men. A. (2018) Improving Patient Antiretroviral Therapy Retention through Community Adherence Groups in Zambia. *PEPFAR Solutions Platform*. Retrieved from <https://www.pepfarsolutions.org/solutions/2018/1/16/decongesting-art-clinics-in-zambia-and-improving-patients-retention-through-community-adherence-groups-mrbtk>
- Mgbachi, I. (2019). HIV/AIDS and the Nigerian Adolescent. *Health Think Analytics*. Retrieved from <http://healththink.org/hiv-aids-in-adolescents-and-young-people-in-nigeria/>
- NACA (2017). National HIV Strategy For Adolescents and Young People. *National Agency For The Control Of AIDS*. Retrieved from <https://naca.gov.ng/national-hiv-strategy-adolescents-young-people/>

- Nassuna, E., Kigozi, J., Bariye, L., Muganzi, A., Sewankambo, N.K., and Nakanjako, D (2018) Low HIV viral suppression rates following the intensive adherence counseling (IAC) program for children and adolescents with viral failure in public health facilities in Uganda. *BMC Public Health*. <https://doi.org/10.1186/s12889-018-5964-x>
- Naswa, S., and Marfartia, Y.S. (2010) Adolescent HIV/AIDS: Issues and challenges. *Indian Journal of Sexually Transmitted Diseases and AIDS*. doi: 10.4103/2589-0557.68993
- Nations Encyclopaedia. (2018) Nigeria. Africa. Retrieved from <http://www.nationsencyclopedia.com/economies/Africa/index.html>
- Nigerian Criminal Code Act. (2014) Criminal Code Act Chapter 77 - Laws of the Federation of Nigeria 1990. Retrieved from <http://www.nigeria-law.org/Criminal%20Code%20Act-Tables.htm>
- Ojikutu, B., Higgins-Biddle, M., Greeson, D., Phelps, B. R., Amzel, A., Okechukwu, E., Kolapo, U., Cabral, H., Cooper, E., ... Hirschhorn, L. R. (2014). The association between quality of HIV care, loss to follow-up and mortality in paediatric and adolescent patients receiving antiretroviral therapy in Nigeria. *PloS one*, 9(7), e100039. doi:10.1371/journal.pone.0100039
- Okoth, E. (2018). Enhancing viral suppression among adolescents, through service delivery quality improvement approach in Western Kenya. Power point presentation at the 2nd International Workshop on HIV Adolescence. Cape-Town, South Africa . Retrieved from http://regist2.virology-education.com/presentations/2018/2HIVAdol/104_okoth.pdf
- O'Neill, S.M., Hempel, S., Lim, Y., Danz S.M., Foy R., Suttorp, M.J., Shekelle, G.P., and Rubenstein, L.V. (2011) Identifying continuous quality improvement publications: what makes an improvement intervention 'CQI'? *Quality and Safety*. doi: 10.1136/bmjqs.2010.050880
- Porterfield, D.S., Marcial, L.H., Brown, S., Throop, C and Pina, J (2017). Evaluation of a Quality Improvement Resource for Public Health Practitioners. The Public Health Quality Improvement Exchange. *Public Health Reports*. doi: 10.1177/0033354916689609
- Sam-Agudu, N. A., Pharr, J. R., Bruno, T., Cross, C. L., Cornelius, L. J., Okonkwo, P., ... Ezeanolue, E. E. (2017). Adolescent Coordinated Transition (ACT) to improve health outcomes among young people living with HIV in Nigeria: study protocol for a randomized controlled trial. *Trials*, 18(1). doi:10.1186/s13063-017-2347-z
- Shortell, S.M., Bennett, C.L., & Byck, G.R. (1998). Assessing the impact of continuous quality improvement on clinical practice: what it will take to accelerate progress. *The Milbank quarterly*. 76 4, 593-624, 510 .

- Sustainable Development Goals (2015). Knowledge Platform. Retrieved from <https://sustainabledevelopment.un.org/?menu=1300>
- UNAIDS (2014). Press statement. Global leaders commit to ending the AIDS epidemic in cities by 2030 Retrieved from <http://www.unaids.org/en/resources/documents/2017/90-90-90>
- UNAIDS AIDSinfo (2018). NIGERIA. Retrieved from <http://aidsinfo.unaids.org/>
- UNAIDS (2017). REFERENCE. Retrieved from http://www.unaids.org/sites/default/files/media_asset/20170720_Data_book_2017_en.pdf
- UNAIDS (2016) Prevention Gap Reports. Retrieved from https://www.aidsdatahub.org/sites/default/files/highlight-reference/document/UNAIDS-2016-prevention-gap-report_en.pdf
- UNICEF DATA (2018) Adolescent HIV Prevention. Retrieved from <https://data.unicef.org/topic/hivaids/adolescents-young-people/>
- USAID (2019) Global Health Retrieved from <https://www.usaid.gov/nigeria/global-health>
- World Atlas. (2017). Religious Beliefs in Nigeria. Society. Retrieved from <https://www.worldatlas.com/articles/religious-beliefs-in-nigeria.html>
- World Bank. (2017) Nigeria at a glance. The World Bank in Nigeria. Retrieved from <http://www.worldbank.org/en/country/nigeria>
- WHO (2018) WHO Africa. *HIV/AIDS*. Retrieved from <https://afro.who.int/health-topics/hivaids>
- WHO (2018). Providing peer support for adolescents and young people living with HIV. *HIV/AIDS*. Retrieved from <https://www.who.int/hiv/pub/paediatric/peer-support-for-plhiv/en/>

Appendix 1

Photo Showing a CQI Intervention Tracking Tool.

CQI INTERVENTION FOR UNSUPPRESSED ADOLESCENTS									
START DATE:									
NAME OF FOCAL PERSON:									
CLIENT ID	AGE/SEX	CONTACT NUMBER/ADDRESS	MAJOR REASONS FOR UNSUPPRESSED VL (if any)	STATUS DISCLOSURE (YES/NO)	WHOM DOES CLIENT LIVE WITH (BOTH PARENTS, FATHER, MOTHER OR OTHERS (SPECIFY AND GIVE REASON FOR NOT LIVING WITH PARENTS))	TYPE OF SCHOOL ATTENDED (DAY/ BOARDING)	VL RESULT/DATE	REPEAT VL DATE/RESULT	INTERVENTION GIVEN/DATE IAC for adolescent alone, IAI for adolescent & caregiver, group mentoring/counselling, participation in adolescent support group etc)

Appendix 2

Details of a CQI Intervention for an IHVN supported treatment facility- Asokoro District Hospital in Abuja Nigeria.

ASOKORO DISTRICT HOSPITAL

7TH SEPTEMBER 2018
AKC LEARNING SESSION
PRESENTATION

PROBLEM STATEMENT

- Review of the facility indicator report shows viral load suppression rate of 40% amongst pediatric and adolescent clients in care between September 2017 and may 2018

Major root causes of the problem

- Poor adherence
- Inadequate counselling
- Knowledge gap on importance of adherence
- Multiple / no caregivers

AIM STATEMENT

- To improve viral suppression rate in children less than 15 from 40% to 70% between June 2018 and November 2018

PLAN

Change Idea: improving viral load suppression amongst unsuppressed pediatric & adolescent clients through care givers forum

WHO – Pediatric CQI team, care-givers of unsuppressed pediatric and adolescent clients

WHERE- Asokoro District Hospital

WHEN- 1st June – 30th November 2018

HOW

- A line list of unsuppressed pediatric and adolescent clients in care would be generated
- Care givers would be tracked via phone call and invited to a care-givers forum with the pediatric CQI team.
- Poor viral load suppression of their wards would be discussed, challenges resulting in poor viral suppression identified and intensified adherence counseling commenced.

DO

- A line list of unsuppressed pediatric and adolescent clients was generated by the QI lead
- The M&E officer extracted the phone number from the open MRS and tracking of the caregivers was done by the mentor mothers who informed the caregivers of the forum.
- The ART clinician also informed caregivers of unsuppressed children who brought

STUDY

- A line list of **81** virally un-suppressed pediatric clients was generated ; their phone numbers were obtained and tracked.
- Of the 81 care givers tracked, **38** of the children and their care givers were successfully tracked and attended the caregivers forum where they were seen by the CQI Committee during the intervention period.
- During the intervention period, **13** clients with their caregivers were seen on their clinic appointment days and offered individualized counseling on the poor viral suppression state of their ward.

STUDY cont'd

- All 51 clients commenced Intensified adherence counseling over a three month period and scheduled for a repeat viral load test by November 2018
- No client was switched to 2nd line as poor adherence majorly was the elicited cause of treatment failure.
- Another cause of treatment failure was Non disclosure and the care givers were advised on the importance of disclosure and how it aids adherence.

Study Cont'd

S/N		
1	Total number of unsuppressed pediatric and adolescent	81
2	Total number of clients that participated in care giver's forum	38
3	Total number that commenced Intensified Adherence Counseling	51
4	Total number of clients whose regimen was changed	0
5	Total number of clients switched to a new regimen	5
6	Total number of clients for repeat viral load after 3month IAC	51

ACT

- To re-track the remaining 30 clients with unsuppressed viral load & their caregivers via phone call or as they present to clinic for review.
- To monitor IAC sessions commenced for unsuppressed clients over the three month period
- To ensure repeat viral load test for unsuppressed clients who have completed IAC