IMPACT OF SOCIAL DETERMINANTS OF HEALTH ON ANTIRETROVIRAL THERAPY AMONG ADOLESCENTS AGED BETWEEN 10 TO 19 YEARS LIVING WITH HIV IN BORO DIVISION IN SIAYA COUNTY

BY

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ALWH	Adolescents Living With HIV
ART	Antiretroviral Therapy
cART	combination Antiretroviral Treatment
COVID-19	2019 novel coronavirus
CSDH	Commission on Social Determinants of Health
ERC	Ethics and Review Committee
FCDRR	Facility Consumption Data Report and Request.
HCW	Health Care Workers
HEADDSS	Home environment, Education, Activity, Drug use, Depression Sexuality, and Suicide
HIV	Human immunodeficiency virus
IRS	Internal Revenue Service
JOOUST	Jaramogi Oginga Odinga University of Science and Technology
JOOTRH	Jaramogi Oginga Odinga Teaching and referral hospital
KENPHIA	Kenya Population-based HIV Impact assessment
KES	Kenyan Shillings
LTFU	Lost to Follow Up
NACC	National AIDS Control Council
NACOSTI	National Commission For Science, Technology & Innovation
NASOP	National AIDS and STI Control Programme
NIH	National Institute of Health

PITC	Provider Initiated Counseling and Testing
PLHIV	People Living with HIV
PRIME	Promoting Retention Among Infants and Mothers Effectively
PWID	People Who Inject drugs
RNA	Ribonucleic acid
SCDP	Siaya County Development Plan
SDOH	Social determinants of health
STI	Sexual Transmitted Disease
TB	Tuberculosis
UNAIDS	United Nations Programme on HIV/AIDS
UNICEF	United Nations International Emergency Fund
US	United States
USA	United States of America
VL	Viral Load
VLS	Viral Load Suppression
WHO	World Health Organization

DEFINITION OF TERMS

Adherence:	Keeping all medical appointments and taking HIV medicines every day and exactly as Prescribed.
Uptake of ART:	Early initiation to those diagnosed and found eligible after screening who initiated ART.
Viral load suppression:	The act of ART reduces the amount of HIV in the body (viral load) to levels below 400cp/ml which keeps the immune system working and prevents illness.
Retention of ALHIV:	The length of time ALHIV remains in treatment
Universal ART:	The strategy to initiate ART in all HIV-infected children and adolescents irrespective of their clinical or immunological stage.
Option B+:	Prevention of vertical transmission approach for expectant mothers living with HIV in which women are immediately offered treatment for life regardless of their CD4 count.
Lost to follow up:	The act of ALHIV stopping HIV treatment and related services after twenty-eight days or more of starting treatment ART.
Universal test and start policy:	The strategy to initiate ART in all HIV-infected children and adolescents adolescents irrespective of their clinical or immunological stage

ABSTRACT

Siaya County is one of the five high HIV burden counties in Kenya, with a prevalence of 19.3% among adolescents aged 10-19 years. Evidence suggests that social determinants of health contribute disproportionately to the health outcomes among patients, which can be addressed by reducing health inequities. However, there is limited data in Kenya regarding how social determinants of health affect adolescents living with HIV (ALHIV). The main objective of this descriptive cross-sectional study was to assess the impact of social determinants of health on the uptake of ART therapy, determining its impact on viral load suppression and its outcome on retention among ALHIV aged between 10 to 19 years in Boro Division Siaya County. A purposive sample of 300 was obtained using Krejcie and Morgan table. Quantitative data were summarized using descriptive and inferential statistics (α=0.05), where univariate and multivariate analyses were performed using SPSS version 22, and frequencies were generated for categorical variables. Qualitative data were subjected to thematic analysis. Of the 300 participants, 151 (50.33%) were aged 10-14 years while 157 (52.33%) were female. Being aged 15-19 years (OR = 3.25; p = 0.021), female (OR = 1.87; p = 0.003), recipient of financial support (OR = 3.872; p = 0.001), or living near a health facility (OR = 2.653; p = 0.041) all affected ART utilization. A majority; 195 (65.0%) achieved viral load suppression (<400 copies/ml) and forgetting to take medication was associated by most as the reason for non-suppression at 7 (25.9%). Also being aged 15-19 years (OR = 1.31; p = 0.001), secondary school level of education (OR = 2.194; p = 0.042), recipient of financial support (OR = 2.094; p = 0.023), living nearer the health facility (OR = 1.892; p = 0.032), taking less than 15 minutes to reach the health facility (OR = 2.084, p = 0.003), waiting time of less than 1 hour (OR = 1.824) or utilization of public transport to reach the health facility (OR = 2.862, p = 0.043) were associated with the likelihood of viral load suppression. Furthermore, being aged 15-19 years (OR = 4.08, p = 0.001), female (OR = 2.093, p =.005). secondary school level of education (OR = 3.093; p = 0.002). recipient of financial support (OR = 2.231; p = 0.024), living nearer the health facility (OR = 1.846; p = 0.015), use of public motorcycle/bicycle to reach the health facility (OR = 1.236; p = 0.021). taking less than 15 minutes to reach the health facility (OR= 2.084, p =0.005) or waiting time is less than 1 hour (OR= 2.653; p = 0.042) all affected retention to ART. Distance from the health facility, long waiting time, level of education, being older (15-19years), being a recipient of financial support, and utilizing public means of reaching the health facility were SDOH that were greatly associated with utilization of ART, viral load suppression and retention to treatment. Understanding these SDOH and mitigating them will help foster individualized services towards ensuring uptake of ART services, HIV viral load suppression, and retention of ART services. Findings from this study will be shared with the County's department of health and the respective health facilities to help boost the efforts toward adolescent HIV management locally.

CHAPTER ONE: INTRODUCTION

1.1 Background

The phrase "social determinants of health" (SDOH) refers to aspects of the environments in which people are born, raised, educated, employed, engage in leisure activities, attend places of worship, and age that have an effect on a range of health, productivity, and quality-of-life outcomes and risks. Through behavioral impact and restricted access to healthcare and preventative measures, social and physical variables such as these can trigger unhealthy or dangerous behavior, increasing the likelihood of contracting an infectious disease like HIV. Health disparities are growing despite advancements in global health throughout the 20th century. A growing body of data argues that eliminating health disparities necessitates addressing the social determinants of health, which include income, education, employment, political empowerment, and other variables. The World Health Organization Commission on Social Determinants of Health (CSDH) has identified several SDOH, including child care, literacy, profession, sexual equality, health care, shelter, and wealth.The CSDH also emphasized the SDOH's considerable influence on social change advocacy, social initiatives to lower HIV prevalence, and health monitoring. .

At the health system level, universal testing for SDOH are practical and allow institutions to uncover unmet essential needs that would otherwise go undetected. SDOH tests were combined with clinical screenings at four outpatient primary care clinics at New York-Presbyterian Hospital. Integrating SDOH testing with clinical screening was critical for developing provider buy-in and ensuring the sustainability of SDOH detection. Despite certain limitations, universal screening for SDOH enabled New York-Presbyterian Hospital to uncover unmet requirements in order to enhance public health. . According to Heisler *et al*. (2019), Health plans are well positioned to successfully address SDOH since they receive the vast majority of health-care dollars in the United States.

In order to better understand how social determinants of health (SDOH) and health inequities are experienced by primarily African American, HIV-positive Mississippians, a study on the disproportionate burden of HIV-related inequities borne by African Americans in the US South has emphasized the role of SDOH in shaping social patterning of illness. The following conclusions were reached in 2015 using grounded theory and in-depth interviews (n = 25) at an urban and rural site: (1) lack of a supportive structural environment; (a) societal discourse that reinforces HIV stigma; (b) a

dearth of psychosocial assistance and HIV education; (c) a dearth of financial and social resources; and (2) the availability of family support for coping. .

In order to give epistemology insights on the experiences of African Americans living with HIV in the rural southern United States, a meta-analysis was carried out in 2015. Social determinants of health were identified as upstream contributors to health care obstacles, subpar health outcomes, diminished quality of life, and health inequities, and patterns among them were found. The goal of the meta-synthesis was to identify and compile themes describing SDOH characteristics in particular qualitative articles. Among the nine themes that emerged were: enduring poverty, experiencing unemployment, missing work, lacking transportation, enduring stress, feeling socially isolated, needing social support, battling drug misuse, and lacking access to adequate health care. .

Given the enormous increase in the survival of people living with HIV (PLHIV) after the introduction of combination antiretroviral therapy (cART), no change in PLHIV self-rated health has been found in Australia since the introduction of cART. Some of the primary issues still confronting PLHIV in the post-cART era have been identified as difficulties in obtaining job or reaching financial stability..

A descriptive cross-sectional, correlational study conducted in 2019 among Colombian women with HIV revealed that women with limited social standing had a substantially higher probability of poor treatment adherence, and the majority of social determinants variables measured had a significant effect on adherence. . A more in examination of black women with HIV infection caused by heterosexual contact revealed that they accounted for 47 percent of all women living with confirmed HIV and 41 percent of deaths among women with diagnosed HIV in the United States that year. SDOH has been linked to an increased risk of death in HIV patients. Black women aged 18-34 years and 35-54 years who resided in counties with the lowest quartile of poverty had a decreased risk of death. In comparison to black women who lived in counties with the highest quartile of health insurance coverage, the mortality risk for black women aged 18-34 years and black women aged 35-54 years who lived in counties with the lowest two quartiles of health insurance coverage was lower for black women aged 18-34 years and black women aged 35-54 years. .

Observations made by educators in the South African public sector on SDOH demonstrated an impact on HIV transmission. Regardless of gender, a research conducted to provide information to preventive programmers found that teachers with higher incomes and educational backgrounds had

lower HIV prevalence than teachers with lower incomes and less education. Researchers discovered a link between instructors' socioeconomic position, gender, and HIV . Given the serious threat that HIV/AIDS poses in sub-Saharan Africa, poverty is a major factor in the spread of the human immunodeficiency virus (HIV). . Social determinants, such as occupation, the severity of the disease, and living in rural areas, seemed to have a significant association with the poor disease outcome, according to a retrospective study that collected Tb and HIV data from Jimma University Teaching Hospital, Southwest Ethiopia, for the period of September 2010 to August 2012. Younger age groups between 25 and 34 years (47.3%), females (58.2%), daily workers (40%) and Muslims were shown to have higher rates of Tb/HIV co-infection mortality (54.5 percent). Single and double bedrooms were found in 43.6 and 41.8 percent of research participants, respectively, and there was no power or water in the home in 25.5 and 23.6 percent of dead study members .

The main SDOH barriers to epidemic control in Sub-Saharan Africa are poverty and food insecurity. Those living with HIV/AIDS are especially vulnerable to this. In a study that looked at the experiences, causes, and effects of food insecurity and hunger among people living with HIV/AIDS in Suba District, Kenya, on the shores of Lake Victoria, several themes related to food insecurity and ART were identified. The first was an increase in hunger or appetite after beginning ART, the second was a worsening of ART-related side effects, and the third was a lack of adherence to ART due to hunger, food insecurity, or the need to work in the agricultural sector .

Siaya County has 89% of its population living in rural areas and 11% in urban areas. 65.3% of the population was under 24. This type of settlement is due to the rural nature of the county's economy and the lack of infrastructure and socioeconomic services in urban areas due to slow urbanization. The county's GDP per capita in Kenyan shillings (KES) is 94,714. .

The HIV/AIDS pandemic poses a significant challenge to the development of the country. Siaya County is considered to have a high incidence of HIV as well as a high burden due to the county's HIV prevalence rate of 16.3 percent . Among the various SDOH drivers of HIV in Siaya County are cultural beliefs and practices, Alcohol and substance abuse, Poverty, distance to the health facilities, and attitude of the health service providers among others . Findings from this research will inform efforts to end the AIDS epidemic by the year 2030 and will also assist program innovators,

implementers, policymakers, and decision-makers better engage youngsters in the AIDS response and other health initiatives.

1.2 Problem statement

Young teenagers and adolescents make up an increasing percentage of HIV-positive persons globally. They make up roughly 5% of all HIV-positive individuals and 10% of adult HIV infections, respectively. Around 1.5 million (88%) of the approximately 1.7 million adolescents living with HIV worldwide—who only have access to life-saving ART medications in fewer than 25% of cases—do so in sub-Saharan Africa. . There were an estimated 460,000 [260,000-680,000] new HIV infections among young people aged 10-24 in sub-Saharan Africa in 2019; of these, 170,000 [53,000-340,000] were adolescents aged 10-19 . This trend is mirrored in Eastern and Southern Africa, where every day 332 young people, ages 10 to 19, get HIV . This trend is mirrored in Eastern and Southern Africa, where every day 332 young people, ages 10 to 19, get HIV .

The majority (roughly 70%) of the 1.8 million adolescents with HIV (ALWH) between the ages of 10 and 19 were vertically infected as a result of mother-to-child transmission and are switching from pediatric, adolescent, to adult care. . Additionally, increased access to pediatric ART has improved perinatally infected children's chances of survival and increased the number of adolescents living with HIV. . However, around the world, ALWH face substantial challenges with living healthily, which requires them to attend clinic appointments with their HIV care providers (i.e., be retained in care) and adhere to stringent ART regimens. Adherence to ART plays an essential role in regulating viral replication, preserving health, and reducing viral transmission. ALWH have the lowest rates of sticking with HIV care and adherence to ART, compared to people of any other age group. .

Since the introduction of ART, mortality in all other age groups has been declining; nevertheless, adolescent population mortality has been rising, with AIDS becoming the primary cause of death in Africa and the second world wide among adolescents . This is despite the global growth of ART coverage. This rise is mostly driven by mortality in Sub-Saharan Africa, which is home to 90 percent of the world's HIV-infected children . In Kenya, Siaya County has the second-highest HIV incidence and mortality rates. At least half of all deaths in people aged 10 to 19 are among adolescents. .

There is a lack of data about the effect that SDOH has on the uptake, adherence, and retention of ALWH, particularly in sub-Saharan Africa . Interventions to retain young people in HIV treatment

and care need to be developed, implemented, and evaluated immediately. Previous comprehensive studies, however, have revealed scant and conflicting evidence of the efficacy of programs targeting children and adolescents. .

1.3 Objectives

1.3.1 Broad objective

To investigate the impact of social determinants of health among Adolescents Living with HIV (ALHIV) on Antiretroviral Therapy aged between 10 to 19yrs on ART in Boro Division

1.3.2 Specific objectives

1. To assess the impact of social determinants of health on the uptake of ART by ALHIV.
2. To determine the impact of social determinants of heath on viral load suppression by ALHIV.
3. To assess the impact of social determinants of health on retention of ALHIV on ART.

1.4 Research questions

1. What is the impact of social determinants of health on the uptake of ART by ALHIV?
2. What is the impact of social determinants of heath on viral load suppression by ALHIV?
3. What is the impact of social determinants of health on retention of ALHIV on ART?

1.5 Justification

Deaths from AIDS are decreasing overall, except for among adolescents (10–19 years old). . To guarantee healthy lives and promote well-being for all people of all ages is a particular target of the 2030 Agenda for Sustainable Development. One of the particular targets under this objective is to put an end to the AIDS pandemic by the year 2030 . Adolescents are the most at-risk population for treatment dropout and AIDS-related death, and their numbers among the world's HIV positive population are rising rapidly. Interventions to retain young people in HIV treatment and care need to be developed, implemented, and evaluated immediately .

There are some worries that the existing methods of HIV care delivery give insufficient attention to the challenges faced by children, their families, and health services in managing the social determinants that regulate the health, development, and psychological well-being of children and youth growing up with HIV in sub-Saharan Africa . The significance of social, economic, environmental, and cultural variables in determining health outcomes for numerous health disorders has been well discussed. However, the influence of these determinants on infectious disease

morbidity and mortality, especially tuberculosis/HIV co-infection, is rarely discussed. The global trends and health implications of HIV, viral hepatitis, STIs, and TB remain important and critical public health issues. The disproportionate cost of HIV-related disparities suffered by Africans increases the significance of SDH in determining social disease patterns. Despite considerable attention, SDOH is disregarded in federal HIV biomedical policy .

Although 20th century global health has improved, health disparities have worsened. The SDOH includes factors such as income, education, employment, political empowerment, and others, and there is growing evidence that addressing these issues will help reduce health inequities. Knowledge of the SDOH and the ability to take personal and community-based action constitute what is known as "critical health literacy" . There is mounting proof that, relative to medical care, social determinants of health play a much larger role in influencing patient outcomes. To comply with the Internal Revenue Service's (IRS) requirements for community benefit, nonprofit hospitals are implementing strategies to address social needs. Human immunodeficiency virus has infiltrated the adolescent populace, and Health Care Workers will be caring for children who are HIV positive or at danger of being infected. We need recognize that it is a perinatal transmission, hazardous sexual activity, and injectable drug use that puts an adolescent at risk for HIV infection, not their sexual orientation, ethnicity, or gender. Parents and their adolescents need and expect a Health Treatment Worker (HCW) to give care and counseling for the diseases and difficulties that adolescents confront .

1.6 Significance

In terms of socio-demographics, route of HIV acquisition, sexual and drug misuse history, clinical and immunologic state, psychosocial development, and preparedness to adhere to medicines, adolescents living with HIV constitute a varied population. This study attempts to influence when to start ART, what ARV drugs to employ, and how to sustain gain after viral suppression. Social determinants of health have led to major developments in public health practice and study. Understanding socioeconomic determinants of health has helped many government agencies and segments of society advocate for health equity. This study will contribute to the development of increased knowledge and understanding of primary consideration public health conditions from the standpoint of SDOH. It will also make it possible for investigators, policy-makers, and professionals to convene in order to analyze data, review policies and interventions, and formulate lessons learned.

The findings of this study may be of use to the Ministry of Health as policymakers create and put into effect informed policies with the goal of reducing the HIV prevalence among ALHIV and ensuring that individuals who require treatment are able to receive it without any obstacles. The findings of this study may be helpful to caregivers, health care professionals, and nonprofit organizations in the development of strategies for guaranteeing uptake of ART, retention in treatment, and subsequent viral load suppression (VLS) at varying levels of implementation.

1.7 Limitations and delimitations of the Study

During the research and analysis of the data, the following steps were followed to minimize the effects of bias and other types of error:Selection Bias: All ALHIV were given equal opportunity in participating in the study.

1. Measurement Bias: The questionnaires were pretested to reduce insensitive measures of biases
2. Information Bias: Each data collector was educated about the research and the questionnaire and the Checklist. They received a copy of translations of terminologies used in the study to ensure uniform interpretation.
3. Recall bias: Data collected were entered within 24 hours for each participant.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Adolescence is a transitional stage between childhood and adulthood characterized by considerable bodily and psychological changes that may be difficult or upsetting. According to the World Health Organization, adolescents are those between the ages of 10 and 19 years . Even though the HIV epidemic has been going on for decades, there has been a considerable rise in the number of ALHIV across the globe, with the biggest burden being in Sub-Saharan Africa. According to a survey published by UNICEF in 2015, it was anticipated that 1.8 million adolescents throughout the globe were living with HIV, and of them, 1.4 million (approximately 80 percent) belong to Subsaharan Africa . Similarly in 2018, the same impact is being experienced in Kenya, with an estimated 4.7% HIV prevalence among young people aged 10-19 years . HIV prevalence among youth 10–19 years old in Siaya County is 19.9 percent, the third highest in the Nyanza region behind Homabay and Kisumu. The county has experienced better uptake visa vie outcomes over the years from spirited collaborative efforts between the IP and the county government. Data shows significant improvement in VLS rates overall among adult Male at 94% and Women at 98%. However, this isn't the same among children recording a cumulative VLS of 86% . The County recorded an estimated 1,116 total HIV-related Deaths at end of 2019 of whom 16.8% were among Adolescents aged 10-19 years .

Improvements in survival have been related to more effective disease control with ART. Many ALHIV, however, struggle with acceptance of their HIV diagnosis, making effective care difficult. Many additionally deal with the mental health challenges of poverty, STDs, co-infection, abuse, psychiatric disorder, and drug use. Non-compliance with ART therapy is on the rise because of a lack of resources to meet the specific demands of this group . To be successful in providing care to ALHIV, such barriers need to be identified and overcome To provide the best possible care for people living with HIV/AIDS, it is important to have a firm grasp of the issues that affect their psychological health and the specific requirements of ALHIV as they mature .

ALHIV not identified in infancy commonly goes undetected until later . PITC at health institutions is advised for high-HIV-prevalence environments, although it's uncertain whether it's practicable with limited SDOH screening . Health disparities are growing despite advancements in global health throughout the 20th century. There is growing evidence that addressing the SDOH is necessary for

decreasing health inequalities. A piece by explains why HCW and policy implementors must be trained on possible ways in which to promote access to services in a robust and friendly approach targeting adolescents by addressing their social determinants.

A customized tool has been developed to understand in detail adolescent health determinants, through a structured engagement utilizing a HEADDSS assessment tool. The tool mainly asses Home environment, Education, Activity, Drug use, depression Sexuality, and Suicide . Validation of HEADSS assessment tool has been approved for utilization in the US and found to be very effective in identifying SDOH issues associated with access to ART. However, limited data of such a kind is available in sub-Saharan Africa over its impact on the uptake of a similar service. Challenges faced by ALHIV have a major impact on quality of life and end up being barriers to uptake of ART, clinic attendance, and poor treatment outcome .

2.2 Social determinants of health on ART uptake

All PLHIV, regardless of CD4 cell level, are now encouraged to start on ART . Nevertheless, there are obstacles to PLHIV receiving ART, and they vary widely from country to country, particularly in terms of socioeconomic status and the structure of healthcare delivery. . Similar to this, socioeconomic factors are recognized as a major contributor to health inequality in high-income nations . Access to testing, treatment, and retention in care, as well as PLHIV survival, might be hindered by demographic and socioeconomic characteristics in the context of HIV infection. These variables may have an even bigger influence on ART access discrepancies as we move towards the age of universal ART for all PLHIV . Evidence suggests that nations with universal health care coverage, such as Italy, several SDOH, such as female gender, people who inject drugs (PWID), low educational attainment, and unemployment, have a significant impact on both ART access and results Saracino *A et a*l. (2018).

Because of more effective and well-tolerated therapies, HIV survival rates have increased significantly over the past ten years. However, these advancements are not equally dispersed within the region or between regions of the world. In Africa, having HIV and continuing ART medication is a difficult situation. Three categories of difficulties were discovered by a qualitative systematic study of the factors impacting decision-making among PLWH in Africa: obstacles related to the health care

system, poverty, stigma, and unforeseen life events, as well as self-efficacy and social, financial, and practical assistance, are among the first three .

Black people in South Africa, as in many other African countries, are disproportionately denied access to formal services due to systemic and societal inequalities. Children in sub-Saharan Africa who are born HIV positive or who are infected by the virus as they grow up often face financial barriers to receiving care. . Similarly, increased asset ownership, specifically familial holding of seven or more tangible assets, was associated with higher odds of self-reported adherence among economically deprived adolescents living with HIV in Uganda. The investigation also found that youth's use of the ARV regimen was influenced by their distance from the nearest health center. Youth who lived closest to a clinic were much more likely to claim perfect adherence. In addition, the application of the composite equity scores revealed that adolescents with greater economic advantage in terms of household asset ownership, financial savings, and caregiver employment had a better likelihood of attending care. .

An evidence-based HIV response being implemented in Kenya in accordance with the Kenya AIDS Strategic Framework (II), indicate that major responsibility for building appropriate institutions and prioritizing interventions and investments in the delivery of HIV/AIDS and other health services rests with county governments under the devolved system of governance. An estimated 80 percent of adults and 68 percent of children were receiving ART as of the end of 2019, falling short of the 95 percent objective set by UNAID. Disparities in the attainment of the ambitious program aims to eliminate AIDS are at least in part attributable to a drop in external funding without an increase in domestic resources .

Stigma, denial, poor services, and a lack of financial resources were all mentioned as SDOH barriers to receiving HIV care by HIV-infected women leaving Nairobi's maternity wards, according to a study that sought to assess rates and co-factors of receiving HIV care. Health education, counseling, free treatments, and compassion were all identified as reasons why care was appealing . These data imply that interventions targeting economic and social disparities may be advantageous to promoting ART uptake among economically challenged youth, particularly in the country of Kenya .

2.3 Social determinants of the heath of HIV on viral load suppression

Unsuppressed viral load (VL) in patients on ART occurs when therapy fails to suppress a person's VL to fewer than 400 RNA copies/ml. This condition is linked to lower rates of survival as well as increased rates of HIV transmission . Many HIV-infected children who begin ART from infancy survive to adolescence, frequently with complicated treatment needs, thanks to the effective scaling up of screening and treatment of newborns with HIV . However, significant physical, psychological, and physiological changes accompany adolescence and have an impact on health-related behavior. Treatment for HIV is no exception to the general trend that adolescents have trouble sticking to their drug regimens over the long run. .

Comparable findings were found in a study titled "Structural Determinants of ART Use, HIV Care Attendance, and Viral Suppression among Adolescents and Young Adults Living with HIV in the United States." Young people were less likely to use ART if they lived in more disadvantaged areas, which were determined by a composite score derived from 2010 Census indicators such as the percentage of economic hardship, the percentage of people receiving government aid, the percentage of female-headed homes, the percentage of jobless workers, and the percentage of people with HIV .

The association between racial and ethnic groups and illness prevalence, namely HIV, has been thoroughly documented . According to research by Feller & Agins in 2017, PLWH of color and PLWH of Hispanic origin are less likely to attain VLS and have higher AIDS-related death rates than whites . The association between overall survival rate and social behaviors was a significant SDOH targeted at minimizing HIV continuum of care disparities, notably racial . Monitoring SDOH may be a good clinical method for identifying ART therapy failure risks .

Treatment adherence, VLS, and continued use of therapeutic services are all greatly aided by patient knowledge and an informed caregiver . A cross-sectional study among HIV-positive adolescents in Cambodia found that SDH factors associated with viral non-suppression included being 17 years old, duration on ART for more than nine years, having a CD4 count of >672, having a relative as the main caregiver, and not believing there is a cure for AIDS. The chance of viral non-suppression remained considerably greater among adolescents with an initial VL of >628 RNA copies/mL who received HIV care and treatment from an adult ART clinic as opposed to an adolescent ART clinic .

2.4 Social determinants of health on retention to ART services

Significant decreases in HIV-related morbidity and death have been attributable to advances in HIV care and improved access to ART . To fully reap the advantages of ART, however, constant participation across the HIV cascade is required. Care discontinuity and treatment interruption may result in medication resistance, opportunistic infections, and mortality, as well as increasing the risk of HIV transmission. Strategies that prevent persons from abandoning HIV therapy are crucial for maximizing treatment results . Unfortunately, ALHIV continues to confront many retention issues at all cascade phases .

In a study examining the association between SDOH and subsequent retention in HIV care in a clinical cohort in Ontario, Canada, Rachlis et al. (2017) found that SDOH was associated with discontinuous care when Indigenous ethnicity, Canadian birth, unemployment, hazardous drinking, and drug use were present. Being a heterosexual man and being unmarried and younger were linked to gaps in care and discontinuous care . Similar circumstances can be found in Africa, where strong cultural and ethnic traditions, disparate socioeconomic statuses, and low levels of educational attainment are evident as significant barriers to the continuation of HIV-related services, particularly for ALHIV .

Loss to follow-up in sub-Saharan Africa threatens ART retention. People designated as lost to follow-up may have self-transferred to another HIV treatment program or died. . Socio-demographic factors, HIV disclosure, awareness of partner HIV status, self-reported pre-ART education, and knowledge of Option B+ as an intervention to increase retention in the program were found to be associated SDOH factors to retention of HIV-infected women in a case-control study conducted in Malawi. . The following factors were shown to contribute to Lost to follow up (LTFU) in a comparable study codenamed "PRIME": There were many SDOH factors that contributed to women discontinuing ART, including a long waiting time, lack of support from husbands or family members, a lack of transportation, financial difficulties, social stigma, and a false belief that they were healthier than they actually were .

In a program evaluation and development study on the ART Treatment Service in South Africa, Lawn et al. (2006) found that the rates of LTFU and late deaths were low, which showed a high rate of treatment response and cohort retention. On the other hand, the extremely high pretreatment and

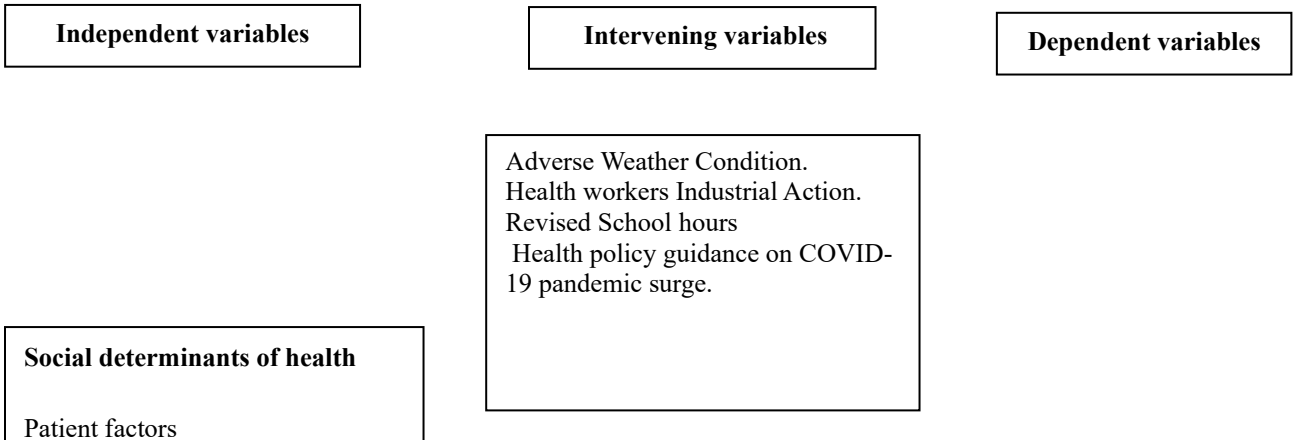
early death rates suggest that people are starting ART regimens much too late and with far too much immune system damage. Some people got into the ART program late because they had to wait to get health care, because the health system was slow, or because the treatment criteria weren't good enough .

Progress in avoiding new infections and expanding access to life-saving ART and support services for the PLHIV have contributed to a decrease in HIV-related morbidity and mortality in Kenya as a consequence of scaling up HIV treatment programs. At least 1.5 million Kenyans were estimated to be living with HIV as of the end of 2019, with an additional 41,416 new infections recorded and 20,997 deaths attributed to the virus . In Kenya, scaling up ART therapy since 2004 has avoided about 733,600 AIDS-related deaths by 2019. Retaining patients in these programs is difficult. With the universal test and start approach, 12-month ART retention has dropped from 92.4% in 2013 to 83.3% in 2019. AIDS-related mortality accounted for 17% of the overall attrition was associated with age of between 10-19-year-old ALHIV between 2013 and 2019. Understanding LTFU and mortality determinant variables is critical for targeting program interventions .

A research aimed to evaluate incidence rates and risk factors for LTFU among HIV-infected and HIV-exposed children in a major HIV treatment program in Western Kenya found a significant prevalence of LTFU among susceptible children, especially the HIV-exposed. These findings imply age and caregiver support are SDOH for LTFU if HIV-infected or HIV-exposed children are unwell or hungry .

2.5 conceptual framework

Figure 1: Conceptual frame work



Characteristics
Age of HIV acquisition
Education Level
Religion
Distance from health facility
Disclosure status
Means of reaching the facility
health facility Waiting time.
Care giver factors
Family income
Health Systems factors
Attitude
Cadre
Infrastructure

ART uptake
Viral load suppression
Retention on ART

CHAPTER THREE: METHODOLOGY

llect, analyze, and display data. Design, region, population, sample bility, validity, and ethics are key.

oss-sectional design with both quantitative and qualitative methods tionnaires and key informant interviews) to compare ALHIV patients mostly about SDOH and how it affects ALHIV getting ART, VLS, and staying in care. Data was collected from six facilities in the Alego-Usonga Sub-county Boro Division (Boro dispensary, Nyadhi dispensary, Segere dispensary, Ndere Karuoth dispensary, Kadenge ratuoro and Kaluo Health center).

3.3 Study Area

Siaya County is in Nyanza. It covers 2,530 km2 of land and 1,005 km2 of water. It borders Busia, Vihiga, Kakamega, Kisumu, and Homa Bay counties. It's part of Lake Victoria (the third largest fresh water lake in the world). It's between 0º 26′ S to 0º 18′ N and 33º 58′ and 34º 33′ E. The study was conducted in Alego Usonga Sub-County. It comprises 623.50km2 and borders Gem, Ugenya, Ugunja, Bondo, Rarieda, and Bunyala sub counties. .

It has a population of 224, 343 of which 105, 906 are males (47.3) and 118,433 females (52.7) . Six wards serve as the Sub-Administrative County's divisions (Usonga, West Alego, Central Alego, North Alego, and South East Alego) ***Appendix.1***. Boro Division covers an approximate size of 180.1 km2 across three wards namely North Alego, Central Alego, and West Alego with a population of approximately 47,455 people . Siaya County is a high-incidence and high-burden county, with an HIV prevalence of 16.3% . Adolescents between the ages of 10 and 19 living in Alego Usonga sub-county have the highest incidence of HIV at 4.1%, the highest mortality rate at 2.1%, the lowest retention on ART at 88.6%, and the lowest VLS at 87.6% (KDHIS 2020).

3.3.1 Ecological Conditions

The county spans Lower Midland zones 1-5. (LM). Lower parts of Boro Division are midland d zone LM3 and upper parts are low-midland (LM2 and LM3). Sub-humid and humid zones with reliable rain .

3.3.2 Climatic Conditions

Long rains fall between March and June and brief rains fall between September and December, creating a bimodal rainfall pattern in the County. Alego Usonga's low-lying regions, which receive less rainfall, are ideal for cultivating cotton and other drought-resistant crops .

3.4 Target Population

There were 993,165 people in Siaya County, with 471,669 men and 521,496 women (47 percent male/ 53 percent female) with an annual growth rate of 1.7 percent . 65.3 percent of the population, who make up the majority of the population, are people under the age of 24. In Siaya County, 89 percent of the population resides in rural areas, and just 11 percent lives in the county's urban areas, according to population distribution by urban and rural habitation. This trend of habitation is ascribed to the rural-based nature of the county's economy and the inadequate socioeconomic and basic infrastructure in urban regions as a result of sluggish urbanization. .

Adolescents aged 10-19 years are experiencing an increased surge of new infections. This without doubt mirrors the same within the county having been ranked second after Homabay County for the highest incidence rate amongst the aforementioned age group . Also, given the high mortality rate noted among adolescents between the ages of 10 and 19 with HIV-related Mortality accounting for 50% of the death rate within this age group, informed the purpose study . The study population was composed of all ALHIV enrolled on ART for more than one year in selected six facilities with the highest number of in Boro division; Karuoth dispensary, Nyadhi dispensary, Boro dispensary Segere dispensary, Kadenge and Kaluo health centers .

3.5 Sample design

3.5.1 Sample size determination

Convenience sampling was employed to obtain 300 subjects available and willing to participate. All ALHIV patients who visited the clinic for the duration of the study and met the eligibility requirements were enrolled. Up until the necessary sample size was attained, recruitment took place every day (Monday through Friday) between 8 am and 4 pm.

3.5.2 Inclusion and exclusion criteria

The following selection criteria had to be met by each adolescent who was counted and recruited in order for them to be included for the study.

I. Adolescents aged between 10 to 19years.
II. HIV positive and using ART for at least a year.
III. An adolescent who had issued assent and or caregiver has accorded the same informed consent.
IV. Adolescents receiving services at selected health facilities.

For Key informant interviews following the criteria of selection included;

I. A clinical officer, Nurse, Peer educator Adherence counselor, or HTS counselor working directly with the ALHIV within the selected health facilities.
II. The above staff should have been in contact with ALHIV for a minimum of six months.

For this study, we excluded ALHIV on ART with no informed consent /assent and Key informants with limited contact of fewer than six months with ALHIV within the selected facilities.

3.5.3 Sampling procedure

The study targeted all ALHIV enrolled at the selected facilities based on the above inclusion criteria and willingness to give informed consent. There were 1410 ALHIV who have been on ART for more than a year and are eligible for the fore mentioned study. A samp1e size of 300 from a population of 1410 was arrived at using *Krejcie and Morgan* table shown in Appendix 3. Purposive sampling was used on the selected respondents. ALHIV and their caregivers who confirmed interest in the study were allocated interview dates. Short text messages were then sent out to those as reminders to avail time and themselves for the interview. On the interview date, each was then given a separate questionnaire administered to them (ALHIV) one for each. They were then separated and directed to

separate rooms/areas. For each of the six sites, a total of six key informant interviews were conducted. This was followed by a compilation of data for further correlation with data from respondents.

3.6 Data collection

Each ALHIV and/or their caregivers provided written informed consent before any primary data were obtained from the sampled ALHIV. This entailed the administration of a structured questionnaire, based on his/her ability to read and write, as well as preference, and was allocated 25-30 minutes to fill the form and return it. Otherwise, the questions were read out by a research assistant and answers written down. Respondents were interviewed separately in a separate room to ensure anonymity. Personnel at the medical facilities were interviewed as part of a series of semi-structured deliberations. Those who dealt with ALHIV on a daily basis were the most important sources of information. A trained Psychological counselor was engaged during the entire process to assess and mitigate any form of psychological trauma caused by the questions asked during the interview. The findings were then summarized and tabulated for ease of analysis and presentation.

3.7 Instrument Reliability and Validity

To ensure the validity of the questionnaire, we conducted a pilot study at six health facilities in Boro Division with 24 ALHIV volunteers who were not enrolled in the main study. Cronbach's Alpha Reliability Test was used to measure the questionnaire's reliability. The pre-test indicated issues that needed to be addressed. It was decided that the study instruments' data was valid by performing a Content Validity Analysis, which assesses how closely the data collected by the instruments corresponds to a given topic or concept. Additionally, the researcher consulted with his or her superiors and sought the advice of specialists in the relevant subject.

3.8 Data analysis

The data were analyzed using both statistical and content analysis methods. Descriptive and inferential statistics were used in statistical analysis. While inferential statistical analysis provided a chance to thoroughly examine the data, descriptive statistical analysis helped to describe the variables in their settings. The quantitative data, which included demographic information and construct assessment, was summarized using measures of central tendency and dispersion, such as mean, standard deviation, frequencies, and percentages. The associations between the variables were

investigated using chi-square, correlation, and regression analysis. Identification of themes and codes was required for the content analysis of the qualitative data. For statistical analysis, an SPSS and Excel combo was preferred.

3.9 Ethical considerations

This Proposal was developed and approved under the supervision of Jaramogi Oginga Odinga University of Science and Technology (JOOUST) board of postgraduate studies. Thereafter it was submitted for Ethical approval to Jaramogi Oginga Odinga Teaching and Referral Hospital Ethics Review Committee. Upon approval, clearance was sought from the National Commission for Science Technology and Innovation (NACOSTI) and department of health Siaya county before starting data collection. Written and informed consent forms were obtained, with an option to withdraw at any time given to the participants and assent sought from the children and parents/guardians of minors. The study participants were provided with a surgical facemask while observing the recommended social distancing as a means of preventing transmission of COVID-19 to or from the interviewer and or participants.

CHAPTER FOUR: RESULTS

4.1 Introduction

The study's results and analysis are presented in this chapter. Subsections and sections divide the chapter. Demographic information such as age, gender, level of education, religion, source of income, distance estimation from the health facility, common ways of reaching the health facility, time to reach the health facility, and waiting time in the health facility has been presented first. After demographic findings, study objectives and hypotheses-based research findings are presented. A combination of descriptive and inferential statistics have been used to present the findings. The data in the form of tables, frequencies, and percentages were described and summarized using descriptive statistics.

Inferences and conclusions were drawn with the aid of inferential statistics. The hypotheses were tested statistically using binary logistic regression analysis. In particular, the logistic regression analysis was used to evaluate the influence of social determinants of health over ALHIV retention on ART in Boro Division, the influence of social determinants of health over ALHIV VLS, and the influence of social determinants of health over ART uptake by ALHIV. The data were examined using SPSS version 22 (Statistical Package for Social Sciences).

4.2 Demographics

4.2.1 Demographic and other characteristics of the respondents

The population of 300 clients, or a response rate of 100% among study participants, provided the data used in this investigation. Given that the trained research assistant personally gave the questionnaire, it was noticed that all of the variables were correctly filled in. Slightly more than half; 151 (50.33%) of the participants were between the ages of 10 and 14, while 149 (49.67%) were between the ages of 15 and 19. Women made up more than half of the participants; 157 of them (52.33%), compared to 143 men (47.67%).

Additionally, the findings indicate that nearly half of the participants—143, or 47.67 percent—were protestants, followed by 77, or 25.67 %, and 75, or 25 %, of Traditionalists and Roman Catholics, respectively. In contrast to the majority, just 94 participants (31.33 %) received income from relatives or family members; 207 participants (69.0 %) had none.

Towards key informant interview, the study utilized all the cadre working in the comprehensive care centers with Distance to the health facility was described as far by 165 (55.0%) of the participants and only 75 (25.0%) considered it to be near. Walking was the most common means of reaching the health facility (266; 88.67%); only 33 (11.0%) used the public motorcycle/bicycle to reach the health facility. The time taken to reach the health facility by most participants was 15-30 minutes (132; 44.0%) while 76 (25.33%) participants took more than 3 hours. Only 43 (14.33%) of the participants took under 15 minutes to reach the health facility. On the other hand, the waiting time in the facility was 1-2 hours for the majority (120; 40.0%), although 94 (31.33%) participants considered waiting time to be less than 1 hour. The demographic characteristics of the clients were summarized in Table 4.1.

Table 4.1: Demographic characteristics of study participants

Indicator	**Freq, n**	**%**
Age (years)		
10-14	151	50.33
15-19	149	49.67
Gender		
Female	157	52.33
Male	143	47.67
Highest Level of Education completed		
Primary	255	85.00
Secondary	44	14.67
Tertiary/College	1	0.33
Religion		
Non-believer	4	1.33
Other	1	0.33
Protestant	143	47.67
Roman Catholic	75	25.00
Traditionalist	77	25.67
Sources of Income/Living		
Income remittance from relatives/family members	94	31.33
None	206	69.00
Distance estimation from the health facility		
Near	75	25.00
Far	165	55.00
Very Far	60	20.00
Common means of reaching the health facility		
Personal motorcycle	1	0.33
Public motorcycle/bicycle	33	11.00
Walking	266	88.67
Time is taken to reach the health facility		

<15mins	43	14.33
>1hrs	49	16.33
15-30mins	132	44.00
30mins-60	76	25.33
Waiting time in the health facility		
1-2 hrs	120	40.00
2-3hrs	62	20.67
Less than 1hr	94	31.33
More than 3 hrs	24	8.00

4.2.2 Demographic and other characteristics of the Key informant interviews

There were five subpopulations cadres interviewed namely, clinical officers, nurse counselors, peer educators, HTS counselors, and adherence counselors. Of whom, peer educators accounted for the majority (35.46%) and had the highest average years of experience. The findings indicated that 7 (36.84%) participants who took part in the key informant interview, undertook adolescent package of care technical training in line with the care and management of adolescents. In addition, 11 (42.31%) indicated that ART enrollment and treatment, adherence, and Retention were the majority roles in the ART program aligned to the subpopulation cadres. The representation of all subpopulations is depicted in table 4.2 and the pie chart in figure 2:

Table 4.2: Demographic characteristics of Key informant interview participants by cadre

Cadre	**Freq,n**	**(%)**
Clinical Officer	2	15.38
Nurse counselor	2	15.38
Peer educator	5	35.46
HTS counselor	2	15.38
Adherence counselor	2	15.38
Training on HIV care and management of Adolescents.		
None	3	15.79
Communication skills, basic counseling skills	2	10.53
Operation triple zero (OTZ)	2	10.53
Adolescent package of care (APOC)	7	36.84
Advanced HIV management	3	15.79
Adherence counseling	2	10.53
Role in the ART program		
ART enrollment and Treatment	11	42.31
Adherence and Retention	11	42.31
eMTCT Services	2	7.69
HIV Testing and Counseling	2	7.69

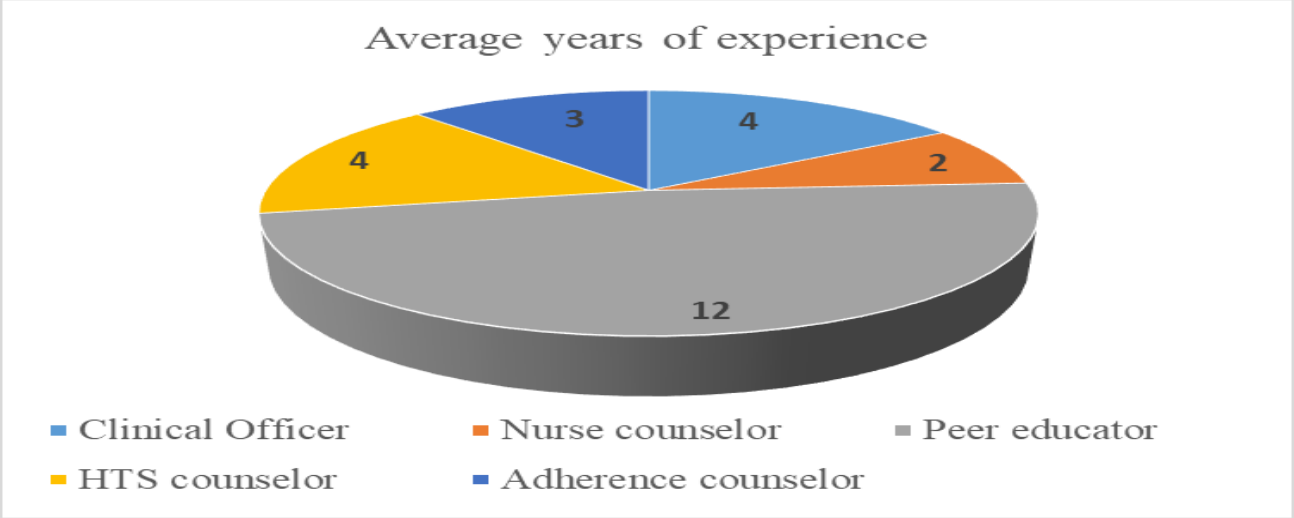


Figure 2: Pie chart on average years of experience for Key informant interview participants.

4.3 Impact of social determinants of health on the uptake of ART by ALHIV

A total of 243 (81.0%) participants did not know when they started ART after their HIV test. Of those who knew, 47 (15.67%) started ART within 1-7 days, while 9 (3.0%) started ART between 2 weeks to 4 weeks. The study found out that 247 (82.3%) of the participants discovered their HIV status in early childhood as compared to 53 (17.7%) discover it during adolescence. In addition to knowing HIV status, starting ART was mainly contributed to by caregiver/parent; 237 (79.0%) as demonstrated in Table 4.3.

Table 4.3: Uptake of ART by ALHIV

Indicator	Freq, n	(%)
No. that knew their HIV status		
No	0	0
Yes	300	100.0
Means of discovering HIV status		
VCT.	32	10.67
Health care worker	126	42.00
Parent /Care giver	135	45.00
Partner tested and Discovered to have HIV	2	0.67
Signs and symptoms	5	1.67
Means of acquiring HIV		
I don't Know	133	44.33
Mother to Child	149	49.67
un-occupational Exposure	18	6.00
Period of discovering HIV status		

During Adolescent	53	17.67
Early Child hood	247	82.33
Other family members, that are HIV infected		
I don't Know	21	7.00
No	192	64.00
Yes	87	29.00
Time is taken to start ART		
2 weeks to 4 weeks	9	3.00
Day to one week	47	15.67
Four months and above	1	0.33
I don't Know	243	81.00
Persons contributed to you starting ART		
Caregiver/Parent	237	79.00
Health care worker	46	15.33
Friends.	4	1.33
Self-effort.	11	3.66

A summary of the logistic regression analysis and associated factors influencing utilization of ART by ALHIV in Boro indicates that; older 15-19 years ALHIV were about 3.25 times more likely to utilize ART than younger ALHIV (OR = 3.25; $p = 0.021$). Furthermore, the results indicate that the female ALHIV were about 1.87 times more likely to utilize ART as compared to male ALHIV (OR = 1.87; $p = 0.003$). Again, the results indicate that the ALHIV with income remittance from relative's/family members were about 3.872 times more likely to utilize ART as compared to ALHIV without any source of income (OR = 3.872; $p = 0.001$). Moreover, the findings indicate that the ALHIV who estimate the distance from the health facility to be near were about 2.653 greater likelihood to utilize uptake of ART as compared to male ALHIV who estimate the distance from the health facility to be very far (OR = 2.653; $p = 0.041$).

Also, the findings indicate that the ALHIV who took less under 15 minutes to reach the health facility were about 4.218 times likely to utilize ART in comparison to ALHIV who took between 30 minutes to 1 hour to reach the health facility (OR = 4.218; $p = 0.046$). Finally, the results show that the ALHIV whose waiting time is less than 1 hour were about 3.054 times more likely to utilize uptake of ART as compared to the ALHIV whose waiting time is between 2-3 hours (OR = 3.054; $p = 0.018$). As demonstrated in Table 4.4, there was no statistically significant correlation between ALHIV uptake of ART and religion, level of education attained, or common method of accessing the medical institution.

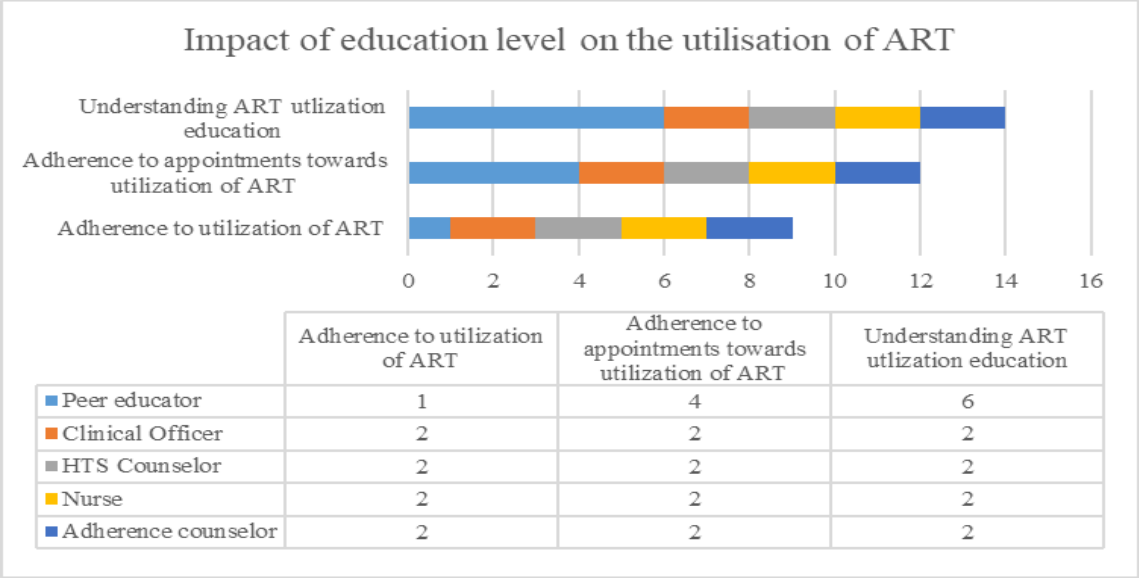
Table 4.4: Odds ratio estimates for the general uptake of ART by ALHIV

			95% Cl	
Main Effect on Uptake of ART	**Odds Ratio**	**p-value**	**Lower**	**Upper**
Age category				
10-14 years	1			
15-19 years	3.25	0.021	0.504	4.470
Gender				
Male	1			
Female	1.87	0.003	0.180	2.431
Highest Level of Education completed				
Primary	1			
Secondary	2.46	0.056	0.209	3.752
Tertiary/College	1.12	0.062	0.301	2.264
Religion				
Roman Catholic	1			
Protestant	4.53	0.053	0.193	6.827
Non-believer	0.763	0.082	0.650	1.983
Traditionalist	2.84	0.421	0.051	3.129
Other	0.821	0.052	0.584	1.397
Sources of Income/Living				
Income remittance from relatives/family members	3.872	0.001	0.872	4.982
None	1			
Distance estimation from the health facility				
Far	1			
Near	2.653	0.003	0.087	3.187
Very Far	0.067	0.041	0.421	1.040
Common means of reaching the health facility				
Personal motorcycle	1			
Public motorcycle/bicycle	1.562	0.055	0.018	2.955
Walking	0.317	0.057	0.813	1.925
Time taken to reach the health facility				
>1hrs	1			
<15mins	4.218	0.046	0.052	5.096
15-30mins	2.396	0.005	0.117	3.942
30mins-1h	1.732	0.021	0.009	2.682
Waiting time in the health facility				
More than 3 hrs	1			
2-3hrs	1.684	0.024	0.925	2.068
Less than 1hr	3.054	0.018	0.128	4.818
1-2 hrs	2.931	0.04	0.398	3.894

IV.3.1The impact of education level on the utilization of ART.

The majority of key informant interview participants, as shown in figure 3, indicated that understanding ART utilization education was one of the major benefits of education level on using ART for ALHIV. This was observed across all subpopulation cadres, as shown by the verbatim sample below:

As I attend to the adolescents, I understand that the ones with higher education like secondary schools adolescents have easier understanding of health talks towards starting ART, unlike the little children that are relying on their caregivers or parents (An adherence counselor).



	Adherence to utilization of ART	Adherence to appointments towards utilization of ART	Understanding ART utlization education
Peer educator	1	4	6
Clinical Officer	2	2	2
HTS Counselor	2	2	2
Nurse	2	2	2
Adherence counselor	2	2	2

Figure 3: Impact of education level on the utilization of ART

IV.3.2 The impact of distance from the health facility on the uptake of ART.

In a summary of coded thematic benefits of distance from the health facility, 14 (100%) key informant interview participants reported that the time taken to reach the facility, unlike appointment keeping, had a substantial impact on distance from the health facility towards ART usage (figure 5).

It's a long way from home to the clinic. When I'm in shape, it takes me an hour to walk to this place. If I'm not quick, it could take me up to an hour and a half. Make a note of this: most of the teens who come to our clinic are from my neighborhood! (An adherence counselor)

I can't always walk this far when I'm not feeling well. I need to pick up some medication for several teenagers from my neighborhood who were late and missed their appointment! (A peer educator)

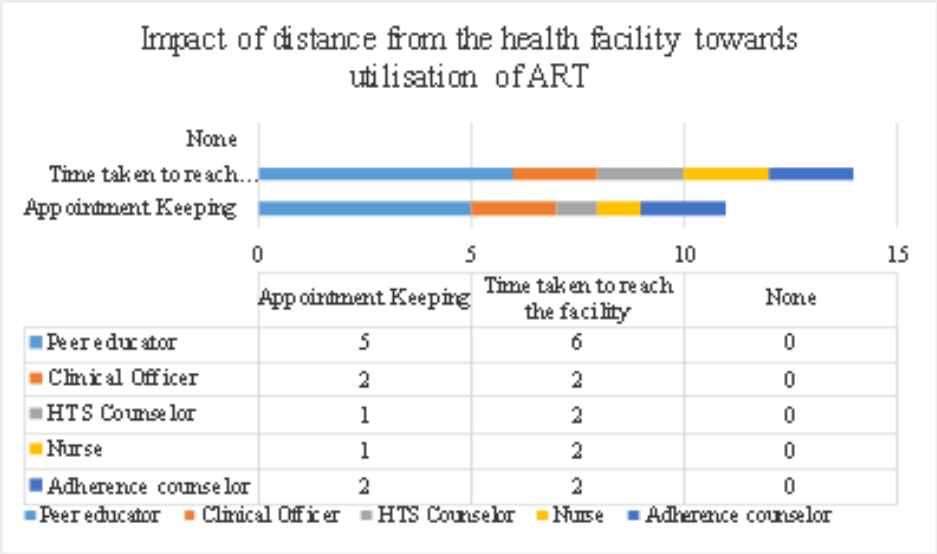


Figure 4: Impact of distance from the health facility towards usage of ART

4.4 Impact of social determinants of health on viral load suppression by ALHIV

The results indicate that most of the ALHIV; 156 (52.0%) did not know when their last VL test was done and that only 70 (23.33%) and 50 (16.67%) had their last VL test 6 months ago and 1 year ago respectively. Moreover, most of the participants; 195 (65.0%) had a VL copies fewer than 400 cp /ml of blood compared to 26 (8.67%) whose VL copies range between 400 to 1000 copies / Microliter of blood. The study also found out that a majority of those who had >400 cp/ml of blood 7 (25.9%) failed to get support from family and forgot to take Medication well as reasons for not achieving recommended VL as highlighted in Table 4.5.

Table 4.5: Viral load suppression by ALHIV in Boro Division

Indicator	Freq, n	(%)
Period last VL test was taken		
A year ago	50	16.67
3 months ago	15	5.00
6 Months ago	70	23.33
I don't Know	156	52.00

More than 1 year ago	8	2.67
Not done	1	0.33
VL copies tested		
between 400 to 1000 copies / Microliter of blood	26	8.67
I don't Know.	78	26.00
Less than 400 copies / Microliter of blood	195	65.00
More than 1000 copies / Microliter of blood	1	0.33
Reasons for VL failure (VL>400cp/ml)		
Forgot to Take Medication well	7	25.90
Lack of Transport fare/Distance	1	3.70
Stigma and disclosure issues	2	7.40
Health Care worker related	1	3.70
I was using traditional medicine	4	14.80
I failed to get support from my family	7	25.90
I was not happy with the services in this clinic	1	3.70
Others: I was sick.	5	18.50
Having Caregiver/ Treatment supporter		
No	9	3.00
Yes	291	97.00
Relationship with the Caregiver/ treatment supporter		
Parent	249	83.00
Relative	41	13.67
Sibling	9	3.00
Spouse	1	0.33

A summary of the logistic regression analysis and associated factors influencing VLS indicates that the older; 15-19 years of ALHIV were about 1.31 times more inclined to be VLS as opposed to younger ALHIV, (OR = 1.31; $p = 0.001$).

Moreover, the results indicate that the ALHIV whose highest level of education is secondary were about 2.194 times likely to be virally suppressed as opposed to ALHIV whose level of education is Tertiary/college, (OR = 2.194; $p = 0.042$). Additionally, the results indicate that the ALHIV with Income remittance from relative's/family members were about 2.094 times likely to be virally suppressed as opposed to ALHIV without any source of income, (OR = 2.094; $p = 0.023$). Moreover, the findings indicate that the ALHIV who estimate the distance from the health facility to be near were about 1.892 likely to be virally suppressed compared to those who estimated the distance from the health facility to be very far, (OR = 1.892; $p = 0.032$)

The results show that the ALHIV whose common means to reach the health facility is public motorcycle/bicycle were about 2.862 times likely to be virally suppressed as opposed to ALHIV

whose means to reach the facility was walking, (OR = 2.862, p = 0.043). Furthermore, the findings indicate that the ALHIV who took less than 15 minutes to reach the health facility were about 2.084 times likely to be virally suppressed unlike ALHIV who took between 30 minutes-1 hour to reach the health facility, (OR = 2.084, p = 0.003). Finally, the results show that the ALHIV whose waiting time is less than 1 hour were about 1.824 times more likely to be virally suppressed as opposed to the ALHIV whose waiting time is between 2-3hrs, (OR = 1.824, p = 0.002). However, at least at the 5% level of significance, there was no statistically significant correlation between VLS by ALHIV and either gender or religion Table 4.6.

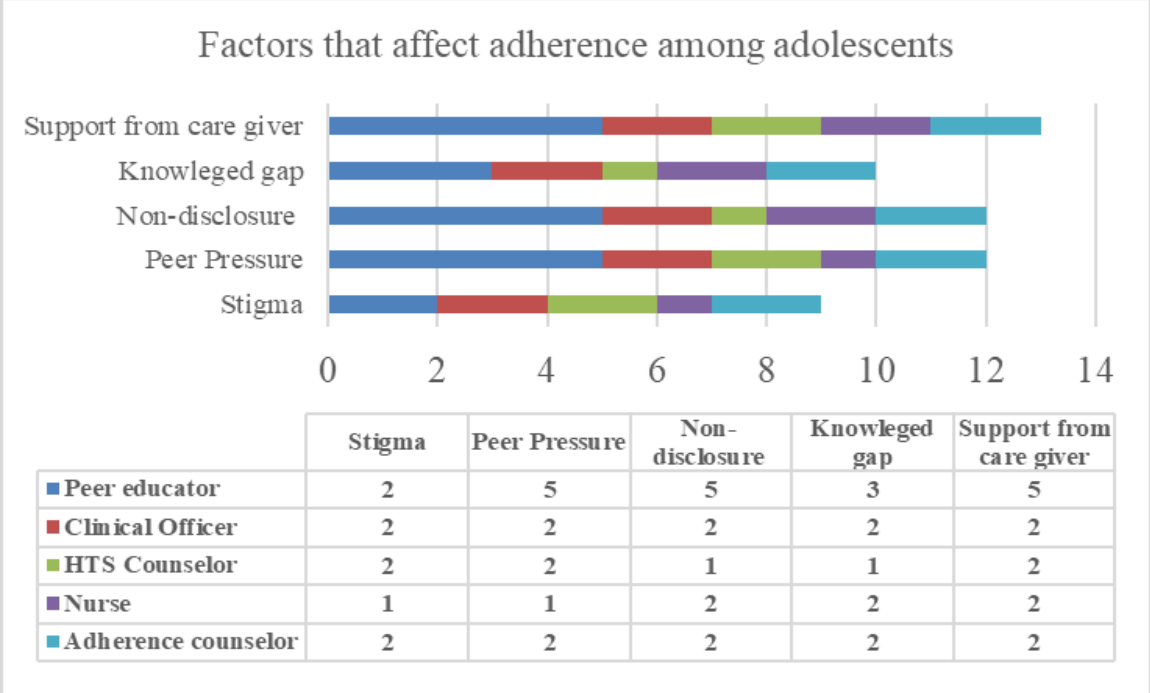
Table 4.6: Odds ratio estimates for the general Viral Load Suppression by ALHIV

VSL			95% Cl	
Main Effect	**Odds Ratio**	**p-value**	**Lower**	**Upper**
Age category				
10-14 years	1			
15-19 years	1.31	0.001	0.236	1.426
Gender				
Male	1			
Female	2.094	0.431	0.432	1.982
Level of Education completed				
Primary	1			
Secondary	2.194	0.042	0.413	1.945
Tertiary/College	0.427	0.002	0.802	2.093
Religion				
Roman Catholic	1			
Protestant	0.035	0.062	0.214	1.924
Non-believer	0.821	0.321	0.931	1.231
Traditionalist	0.237	0.215	0.284	1.983
Other	0.129	0.084	0.538	1.835
Sources of Income/Living				
Income remittance from relatives/family members	2.094	0.023	0.913	3.892
None	1			
Distance estimation from the health facility				
Far	1			
Near	1.892	0.032	0.926	3.053
Very Far	0.924	0.005	0.762	1.396
Common means of reaching the health facility				
Personal motorcycle	1			
Public motorcycle/bicycle	2.862	0.043	0.835	3.987
Walking	0.973	0.026	0.376	1.635
Time taken to reach the health facility				
>1hrs	1			

<15mins	2.084	0.003	0.983	3.094
15-30mins	1.935	0.001	0.185	2.942
30mins-1h	1.045	0.047	0.894	2.084
Do you have a Care giver/ Treatment supporter?				
No	1			
Yes	3.46	0.002	0.946	4.762
Waiting time in the health facility.				
More than 3 hrs	1			
2-3hrs	0.856	0.018	0.835	1.935
Less than 1hr	1.824	0.002	0.237	2.894
1-2 hrs	1.034	0.032	0.458	2.073

4.4.1. Factors that affect adherence among adolescents.

The results also show that among various thematic reasons mentioned, support from caregivers was identified by the majority 13 (92.86%) of respondents as the main factor affecting adherence among ALHIV as highlighted in figure 5 below.



	Stigma	Peer Pressure	Non-disclosure	Knowleged gap	Support from care giver
Peer educator	2	5	5	3	5
Clinical Officer	2	2	2	2	2
HTS Counselor	2	2	1	1	2
Nurse	1	1	2	2	2
Adherence counselor	2	2	2	2	2

Figure 5: Factors that affect adherence among adolescents

4.5 The impact of social determinants of health over retention of ALHIV on ART

According to the results, only 120 (40.0%) of the participants have ever stopped taking their ART medications compared to 180 (60.0%) who have not stopped. Of those who had ever stopped, the majority; 101 (87.17%) had stopped for only less than 1 week followed by 14 (11.67%) who had stopped for between 1 week to 1 month as demonstrated in Table 4.7.

Table 4.7: Retention of ALHIV on ART

Indicator	Freq,n	(%)
Ever stopped taking your medications		
No	180	60.00
Yes	120	40.00
Duration of time for stopping the medication		
2–12months	5	4.17
1week–1 month	14	11.67
Less than 1-week	101	84.17
Reason for stopping the medication		
Religious beliefs	3	2.50
Forgot to take ARV	84	70.00
Developed toxicity/side effect	2	1.67
Attitude of HCW	2	1.67
I was using traditional medicine	2	1.67
Lack of Transport fare/Distance	9	7.50
Other:	2	1.67
Pill burden	12	10.00
I failed to get support from my family	4	3.33
Too busy	2	1.67
Stigma and disclosure issues	2	1.67

A summary of the logistic regression analysis and associated factors influencing retention findings indicate that the older; 15-19 years ALHIV were about 4.08 times likely to adhere to retention to care as opposed to younger ALHIV, (OR = 4.08, p = 0.001<0.05). Furthermore, the results indicate that the female ALHIV were about 2.093 times likely to adhere to retention to care unlike male ALHIV, (OR = 2.093, p =.005<0.05). Moreover, the results indicate that the ALHIV whose highest level of education is secondary were about 3.093 times more likely to adhere to retention to care as opposed to ALHIV whose level of education is none, (OR = 3.093; p = 0.002).

The results indicate that the ALHIV with Income remittance from relative's/family members were about 2.231 times likely to adhere to retention to care as opposed to ALHIV without any source of income, (OR = 2.231; p = 0.024). Additionally, the findings indicate that the ALHIV who estimate the distance from the health facility to be near were about 1.846 times likely to adhere to retention to care as opposed to ALHIV who estimate the distance from the health facility to be very far, (OR = 1.846; p = 0.015). Again, the results show that the ALHIV whose common means to reach the health facility is public motorcycle/bicycle were about 1.232 times likely to adhere to retention to care unlike ALHIV whose means to reach the facility is walking, (OR = 1.236; p = 0.021).

Furthermore, the results show that the ALHIV who spent less than 15 minutes to reach the health facility were about 2.084 times likely to adhere to retention to care as opposed to ALHIV who took between 30 minutes- an hour to reach the health facility, (OR = 2.084, p = 0.005). Finally, the results show that the ALHIV whose waiting time is less than 1 hour were about 2.653 times likely to adhere to retention to care as compared to the ALHIV whose waiting time is between 2-3hrs, (OR= 2.653; p = 0.042). However, as shown in Table 4.8, there was no statistically significant correlation between religion and ALHIV retention to care, at least not at the 5% level of significance.

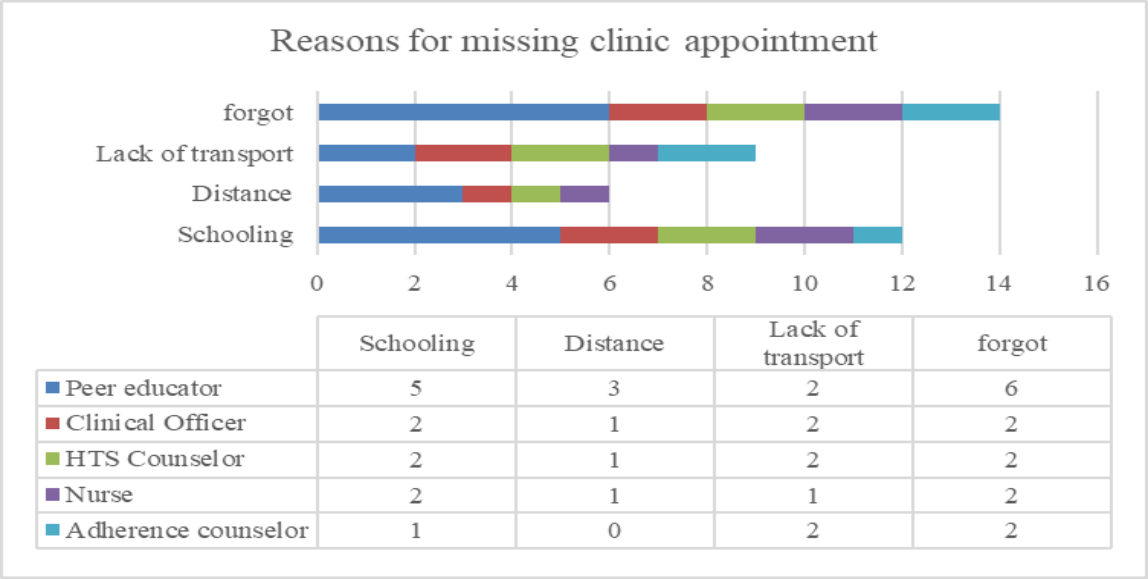
Table 4.8: Odds ratio estimates for the general Retention of ALHIV

			95% CI	
Main Effect on Retention on ART	**Odds Ratio**	**p-value**	**Lower**	**Upper**
Age category				
10-14 years	1			
15-19 years	4.08	0.001	1.234	5.976
Gender				
Male	1			
Female	2.093	0.005	0.936	3.126
Level of Education completed				
Primary	1			
Secondary	3.093	0.002	1.432	4.832
Tertiary/College	1.043	0.004	0.873	2.093
Religion				
Roman Catholic	1			
Protestant	2.894	0.052	0.983	3.824
Non-believer	1.428	0.062	0.684	2.563
Traditionalist	0.885	0.864	0.984	1.956
Other	0.673	0.074	0.852	1.695
Sources of Income/Living				
Income remittance from relatives/family members	2.231	0.024	0.965	1.429
None	1			

Distance estimation from the health facility				
Far	1			
Near	1.846	0.015	0.948	2.085
Very Far	0.967	0.038	0.913	1.958
Common means of reaching the health facility				
Personal motorcycle	1			
Public motorcycle/bicycle	1.236	0.021	0.983	2.015
Walking	0.986	0.003	0.892	1.058
Time taken to reach the health facility				
>1hrs	1			
<15mins	2.084	0.005	0.936	3.378
15-30mins	1.342	0.021	0.884	2.084
30mins-1h	1.025	0.03	0.058	2.914
Waiting time in the health facility				
More than 3 hrs	1			
2-3hrs	1.034	0.003	0.874	2.965
Less than 1hr	2.653	0.042	0.836	3.347
1-2 hrs	2.045	0.031	0.925	3.087

4.5.1 Reasons given by KII participants for adolescents missing appointments.

Summary findings indicated that a majority 14 (100%) key informant interview participants attributed forgetting as the main reason for ALHIV missing appointments as indicated below from the thematic responses in figure 6.

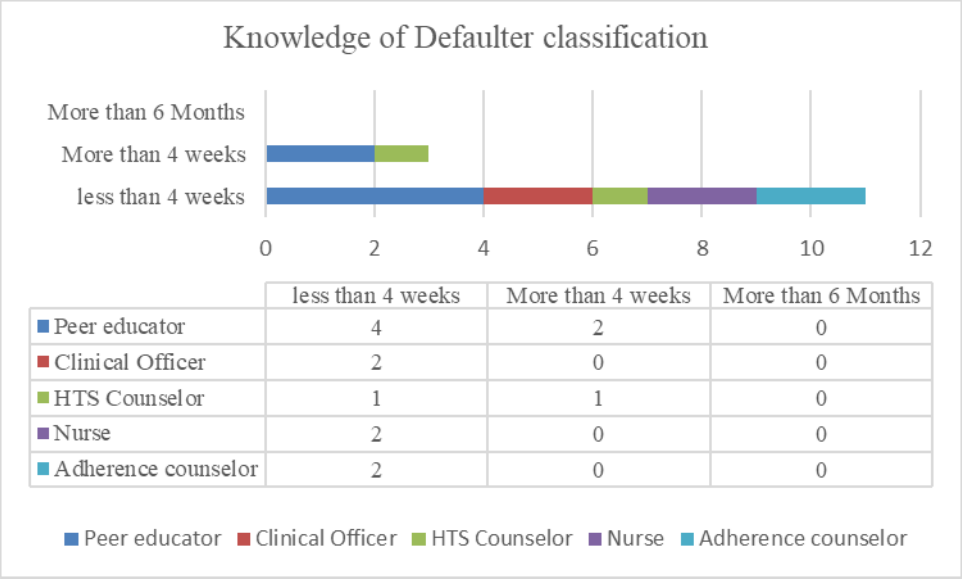


	Schooling	Distance	Lack of transport	forgot
Peer educator	5	3	2	6
Clinical Officer	2	1	2	2
HTS Counselor	2	1	2	2
Nurse	2	1	1	2
Adherence counselor	1	0	2	2

Figure 6: Reasons for missing clinic appolibtments

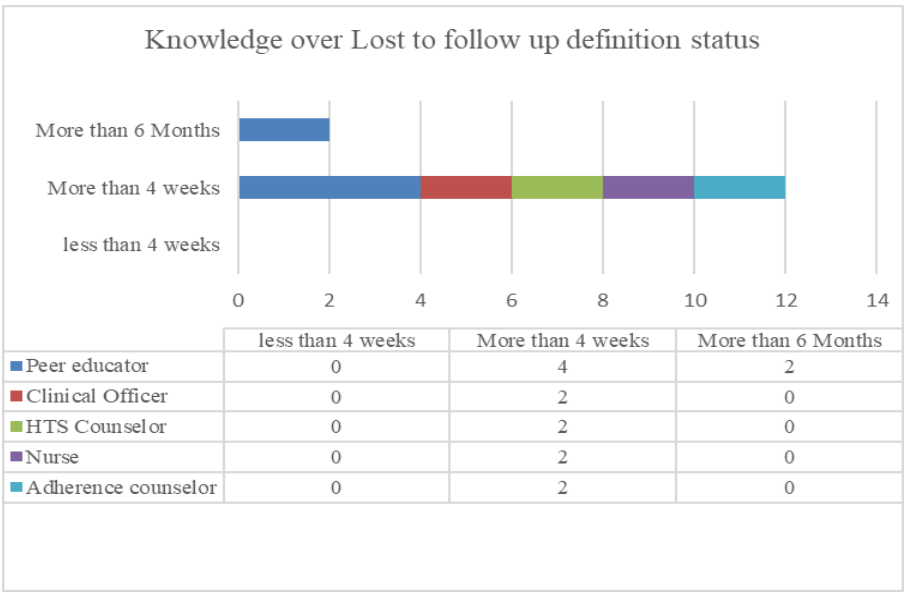
4.5.3 Knowledge of defaulter and lost for follow-up (LFTU) classification among KII participants.

The results also show that different subpopulations' perceptions on what a defaulter and a lost to follow-up are in the context of retention to ART were revealed. The majority of key informants understood the definition of a defaulter and lost to follow up, with 11 (78.57) and 12 (85.71) as shown in figures 7 and 8..



	less than 4 weeks	More than 4 weeks	More than 6 Months
Peer educator	4	2	0
Clinical Officer	2	0	0
HTS Counselor	1	1	0
Nurse	2	0	0
Adherence counselor	2	0	0

Figure 7: Knowledge of defalter definition status



	less than 4 weeks	More than 4 weeks	More than 6 Months
Peer educator	0	4	2
Clinical Officer	0	2	0
HTS Counselor	0	2	0
Nurse	0	2	0
Adherence counselor	0	2	0

Figure 8: Knowledge of defaulter definition status

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This section provides an in-depth discussion of the findings, elucidating the factors that correlate to SDOH on the various variables under study, as well as the relationship with clients and health professionals. A thorough understanding of these determinants is thus critical for the development of

health interventions that will not only improve understanding of ALHIV but also foster long-term intervention measures.

5.2 Socio-demographic characteristics as an impact of social determinants of health

This study recorded a slightly higher number of participants aged 10-14 years (50.33%) than those aged between 15-19 years (49.67%). This aligns with a KENPHIA 2018 report estimate that indicated a steady decline in HIV national prevalence of 1.1% among 10–14 year-olds as opposed to 0.8% among 15–19-year-olds . This finding in children aged 10 to 14 years can also be ascribed to the fact that the study was undertaken in Alego-Usonga, one of the sub-counties in Kenya with enhanced access to HIV testing services, which has improved access to children and adolescents living with HIV .

Both male and female participants aged 10-19 years had slight marginal differences of between 50.3% and 49.7% respectively. This contradicts a 2012 report from the United Nations Programme on HIV/AIDS, which said that the majority (58 %) of HIV patients in Sub-Saharan Africa were females. Additional recent studies conducted locally on HIV among ALHIV portrayed by KENPHIA depict contrary reports estimating female are 67% .

According to the study's findings, the majority of participants considered the facility to be far and too far (75%). This corresponds with similar findings in the study which also indicated that the majority of the participants; (86%) took more than 15 minutes as compared to only 14% who reached the facility in less than 15 minutes. Nyangue*so et a*l. (2018) in Spatial equity in devolved healthcare: geospatially exploring local disparities in maternal healthcare uptake after devolution in Kenya, attributed lower prospects by devolved healthcare in realizing spatial health equity without improving the quality and comprehensiveness of primary health services in Siaya County. In a similar vein, Alego Usonga is emphasized as the biggest sub-county with the least amount of infrastructure, including healthcare facilities.

The study's results showed that 69 %, who were mostly children aged 10 to 14, had no other source of income despite not receiving any remittance from parents or relatives. This is in accordance with Section 56 of the Employment Act, which forbids hiring anyone under the age of 13. While people between the ages of 16 and 18 are regarded as employable, children between the ages of 13 and 16 are permitted to work in "light labor." .

It was established that 88.8% of participants preferred walking unlike using a motorcycle whether personal or public as a means of reaching the facility. Despite the county having an elaborate road network system that connects the major towns, accessibility to rural facilities remains a challenge with minimal impact vested from the county government. This is highlighted in the 2019-2021 annual development plan indicating only 700 km of major earth roads have been opened, and graded. This also agrees with a comparable study in Siaya County on the examination of spatial accessibility to maternal health facilities. According to the derived travel times, 26 % and 67 % of the estimated 46,332 pregnant women could reach any facility within one and two hours, respectively, while walking, with the percentage decreasing by 7 percent and 20 percent when considering motorized referral means, particularly during adverse weather. .

5.3 Impact of social determinants of health on the uptake of ART by ALHIV

All ALHIV included in the study knew their HIV status. This is consistent with a similar study conducted in Nigeria on the admission of HIV status by affected children, which found that admission was connected with age above 10 years, and 63.9 % of caregivers cited the children's ability to understand as the primary reason for Knowledge of HIV status . This also conforms with guidance on age-appropriate disclosure for children and adolescents for full disclosure set at 8 - 13 years as highlighted in the 2018 ART treatment guideline. This is mostly due to the fact that most youngsters at this age understand more about HIV and have learnt about it as part of their formal education at school .

Findings from this study revealed that despite knowing their HIV status, most of ALHIV (81.0%) did not know when they started ART after their HIV test. In a similar study in South Africa, low self-efficacy due to insufficient knowledge, stigma, and limited abilities in communicating about sex, sexuality, and HIV and AIDS related to low levels of sexual reproductive health communication between caregivers and their children . Studies on how instructional digital storytelling can improve HIV/AIDS knowledge and perception among English-speaking Nigerian youngsters in rural regions have found similar results .

Also, noted was that of those ALHIV who knew the date started on ART, a majority started ART within 1-7 days This corresponds with similar findings in a study on lessons learned for test and start in an ART program after decentralization in Uganda. According to Kiwuwa-Muyingo *et a*l. (2020),

the decentralization of ART alongside Option B+ roll-out in primary healthcare facilities among younger persons and women commencing ART, uptake in the Lablite program in Uganda climbed from 53% to 83 % throughout the time it took to start. This adheres to national recommendations on universal test and treat (UTT), which stipulate that all PLHIV are eligible for ART regardless of CD4 cell count or percentage, WHO clinical stage, age, pregnancy status, or comorbidities. Also said is that ART should begin as soon as the patient is ready, preferably within two weeks of being diagnosed with HIV, unless they have cryptococcal meningitis or TB meningitis .

Furthermore, results from the study found that in addition to knowing HIV status, starting ART was mainly contributed to by caregiver/parent (79.0%). A study by Biru *et al*. (2017) on the role of informal caregivers in the uptake of ART, as compared to reports by other recipients indicated nearly three-fourths of caregivers' reports contributed to ART uptake, unlike other recipients. Similarly, a descriptive research on Identifying obstacles to the start of ART and adherence in PMTCT mothers in Zambia shows partner support was a necessary precondition to ART initiation and a predictor of better uptake and sustained adherence . The findings also support Kenyan policies that encourage male participation in ART treatment for HIV-positive pregnant women .

Notable observation from the findings indicated that older ALHIV; 15-19 years were about 3.25 times likely to utilize uptake of ART as compared to younger ALHIV. These findings concur with those from a similar study by Chaila *et al*. (2022) on evaluating youth in Zambia and South Africa's acceptance and utilization of a community-level combined HIV prevention program that includes UTT. Seventy percent of 15 to 19-year-olds were more likely to consent to a Community HIV preventative trial and had little caregiver dependence, compared to younger adolescents. This is also consistent with the 2018 Kenya ARV treatment recommendations, which state that individuals aged 15 or older and emancipated minors can offer informed consent for HIV-related therapies .

The results also indicate that the female ALHIV were about 1.87 times likely to utilize uptake of ART as opposed to male ALHIV. This is in contrast to a second research that overanalyzed the association between stigmatization of health professionals and HIV counseling and testing uptake and usage of non-HIV health services: the experience of male and female sex workers in Kenya. 72% of FSW and 54% of MSW reported experiencing at least one of seven assessed kinds of stigma from HCW impacting use of ART, according to the research . On the other hand, this does not agree with the

findings by Plourde *et al*. (2020) that traditionally, most funding has gone to teenage girls and young women, with just a few strategies specifically aimed towards adolescent males and young men (ABYM).

Findings from the study indicate that the ALHIV with Income remittance from relative's/family members were about 3.872 times more likely to utilize uptake of ART. These results are consistent with those of Casale and Crankshaw (2015), who examined how South African child caregivers viewed the impact of social financial backing on children's wellbeing and found that financial assistance from caregivers was protective of the health and psychosocial end results of the children. Separate research on the challenges to asthma management among urban families, caregivers, and children reveals that environmental control is mostly constrained by financial restrictions. This made it difficult to execute home environmental cleanup operations, demonstrating the strain associated with treating a chronic condition .

The study found that the ALHIV who estimate the distance from the health facility to be near were about 2.653 times more likely to utilize uptake of ART. Similar results were found in a study examining the relationship between the distance between a household and a clinic and the uptake of mother-to-child HIV transmission prevention therapeutic strategies in rural Zambia. This study found that the chance of initiating a PMTCT regimen was highest within 1.9 kilometers of the institution and subsequently decreased further out. However, every kilometer decrease was associated with PMTCT regimen uptake . Analogous to this research by Kohler *et al*. (2019) It was discovered that the per-kilometer distance between maternal domicile and the nearest facility providing delivery services was linked with a 7% drop in facility delivery uptake among HIV-positive expectant mothers. In contrast to the preceding, a separate study on the impact of stigma on HIV testing decisions for gay, bisexual, queer, and other men who have sex with men in urban areas found perceived self-stigma to be highly associated with facilities closer to the participants, resulting in major choices to seek testing in different areas.

According to the findings, ALHIV who arrived at the health facility in less than 15 minutes were around 4.218 times more likely to use uptake ART. According to a study Kanara *et al*. (2019) investigating the relationship between distance to an HIV ART clinic and ART uptake among TB patients in Cambodia. Bivariate analysis showed that HIV ART uptake was half as frequent when the VCCT site was more than 15 minutes from the TB clinic. The ALHIV waiting period of less than

1 hour also affects ART uptake. A study assessing psychosocial and mental health obstacles experienced by rising adolescents with HIV and support systems assisting their positive coping emphasized the considerable waiting time at the HIV clinic . Other comparable research by Dzan*si et al.* (2020) and Kum*ar et a*l. (2018) also echo similar sentiments over inconvenient long waiting times as a leading barrier to the ART uptake amongst ALHIV seeking treatment services.

5.4 Impact of social determinants health on viral load suppression by ALHIV

The results indicate that most of the ALHIV did not know when their last VL test was done and that only 23.33% and 16.67% had their last VL test 6 months and 1 year ago, respectively. A paucity of reagents and inadequate financing at the Kenya Medical Research Institute (KEMRI) in Kisumu have led to underutilization of viral-load testing devices, according to a July 28th, 2021 story in the Daily Nation . Similarly, a letter dated 7th April 2022 by the Acting Director-General of Health acknowledges disruption of VL testing among PLHIV while guiding over the interim resumption of VL testing. Children and adolescents between the ages of 0 and 19 who have not had a VL in the last six months are among the most vulnerable categories .

Most of the ALHIV had a VL copy of fewer than 400 copies /ml depicting a suppression rate of 65.0%. This is slightly above the KENPHIA report of 2018 indicating that ALHIV VLS status is on an upwards trend at 61.0%, but still below the WHO target of 90% as estimated by participants aged 10 -19 years included in the survey . Also of importance to mention is that Mwangi and van Wyk (2021) in a study examining the parameters influencing viral suppression in adolescents receiving ART medication in Homa Bay County showed that the prevalence of viral suppression among these adolescents was much higher than the national average in 2016.

Among the reasons for not achieving the recommended VL copies as highlighted by a majority of the respondents included; failure to get support from family and forgetting to take medication. It was shown that adolescents who received psychosocial support in adolescence were less likely to experience re-emergent negative feelings and more likely to maintain their VLS, according to a study by Gita*hi et a*l. (2020) on perinatally Active family support helps buffer against unfavorable life events related with ART uptake and adherence, Nakan*di et a*l. (2022) attributed living with a family member, having a primary caretaker with a regular income, living or speaking with family members regularly, and reporting excellent family support were linked with VLS.

The older ALHIV aged 15-19 years were about 1.31 times likely to be virally suppressed as opposed to their younger counterparts. Similar studies conducted by Gitahi-Kamau *et al*. (2020) on determinants of ART medication adherence among older ALHIV in Kenya depicted that ALHIV perinatally infected 16-19 years old in treatment had higher self-efficacy and to be virally suppressed. These findings concur with those of a study conducted in Ethiopia at a Public Health Institute looking at VLS rates among teenagers who had their HIV VL tested. A high VL was observed in 64 % ages 10 to 14, according to the research. This depicted an increased rate of VL failure among children . In contrast, Van Wyk *et al*. (2020) found that VLS was strongly connected with younger ages 10 to 14 years, with an emphasis on poor VLS among 15 to 19 year older and pregnant teenagers..

Also of importance to mention is that ALHIV whose highest level of education is secondary were 2.194 times likely to be virally suppressed as opposed to their counterparts whose level of education is Tertiary/college. According to Bertoli *et al*. (2016) life in tertiary institutions is characterized by changes in emotions, society, and body. At this period of development, susceptible people are more likely to participate in unsafe drug and alcohol usage, unprotected sex, and other risky activities. He adds that higher education institutions do not serve as a barrier between students and the possibility of contracting an STD and pursuing HIV treatment. In another contrast, a study on what makes HIV-positive children and teens take their medicine in rural Tanzania found that the VLS was lowest among secondary school-going teens (46%) and highest among other school-going age groups (92%). Logistic regression showed that secondary school teenagers spend too much on playing with friends. Most saw taking their treatment tablets in front of their classmates as inappropriate owing to bad reactions from them and unfavorable school caretakers.

Additionally, the results indicate that the ALHIV with Income remittance from relative's/family members were more likely to be virally suppressed as compared to ALHIV without any source of income. Similar findings have been recorded by Nakandi *et al*. (2022) in a study towards understanding patterns of family support and its role in VLS among ALHIV in southwestern Uganda. According to the study, emotional, physical, and financial support from immediate family to thrive and take medications daily and timely was associated with VLS among the majority of ALHIV participants. Also in a separate study investigating the impact of economic strengthening on improving VLS, Bermudez *et al*. (2018) identified that economic insecurity has the potential to bolster health outcomes, such as VLS.

According to the study findings ALHIV who estimated the distance from the health facility to be near were 1.892 times likely to be virally suppressed. These findings are consistent with a research on home distance to a clinic and VLS among adolescent PMTCT clients in rural Zambia. The likelihood of PMTCT regimen adherence was highest within 1.9 km of the institution and decreased further away. Every kilometer decrease was related with increased PMTCT adherence and lower viremia. (OR 0.90, 95% CI 0.82 to 0.99) . The study found that viral suppression was 2.862 times more prevalent among ALHIV who traveled by public motorcycle/bicycle as opposed to those who walked. Similar findings by Mukumbang et al. (2017) in a research examining variables impacting retention in care of ART clients in Kabwe District, Zambia indicated that travel distance and cost of transportation influenced access to the facility and medicine. The aforementioned findings are consistent with this study's findings that ALHIV patients who arrived at the health institution within 15 minutes were about 2.084 significantly more likely to have viral suppression than those who arrived between 30 minutes to 1 hour.

Study finding show that a waiting time of less than 1 hour was associated with a 1.824 times likelihood of viral suppression as compared to that of between 2-3hrs, among ALHIV. Similar findings by Dzan*si et a*l. (2020) over evaluating Treatment adherence promoters and inhibitors among HIV/AIDS patients taking ART medication in Ghana revealed that the extended waiting time encountered by PLHIV at each clinic visit was one of the adherence inhibitors underlined as important. Additional findings from a key informant interview revealed that the facility's less HCW attending to clients contributed significantly to the same(Van Wyk *et al.*, 2020)

5.5 Impact of social determinants of health over retention by ALHIV on ART

According to the results**,** less than half (40.0%) of the participants had ever stopped taking their ART medication with the majority; 101 (87.17%) having stopped for less than 1 week. These findings resonate with the current ART situation especially pediatric Dolutegravir formulation scarcity post-optimization from Efervirenz as indicated in the local dailies . A research assessing a report on increasing HIV care retention among adolescents and adults in low- and middle-income countries made similar points, noting that children (10-19 years) had 59 percent greater attrition than adults . However, this is in contrast to a separate report by Zano*ni et a*l. (2016) on a meta-analysis of the care continuum for adolescents with HIV in South Africa that indicated 83% of ALHIV were retained in

care. The chosen works of literature contained primary data reports from South African cohorts and epidemiology for kids (10–19 years old) at any stage of the HIV continuum of care.

The findings indicate that older; 15-19 years of ALHIV were about 4.08 times more likely to adhere to retention as opposed to their counterparts. This contrasts with findings from Nyakato *et a*l. (2022) in a study determining older adolescents had a high risk risk of loss to follow-up (LTFU) shortly after ART and a high risk of virological failure, especially those starting treatment during pregnancy, according among pregnant and non-pregnant adolescents aged 15 to 19 years who were starting ART in South Africa.. Similar findings were made by MacKenzie *et a*l. (2017) when they examined the likelihood of attrition from care for ALHIV in the age category of 15 to 19 years compared to ALHIV in the age group of 10 to 14 years (OR 2.14; 95 percent CI 1.12, 4.11)

Female ALHIV were found to be approximately 2.093 times more likely than male ALHIV to adhere to retention in care. This contradicts similar findings in a study identifying Adolescent HIV mortality and loss to follow-up in a global cohort collaboration. According to the study, females, particularly those receiving therapy after the age of graeter than 15, had a greater risk of LTFU due to infection acquired during adolescence . Additional results agree with this study's findings, as cited by Plourde *et a*l. (2020) that infrastructure improvements have historically been apportioned toward adolescent girls and young women, with a limited number of strategies designed explicitly to reach adolescent boys resulting in a majority being LTFU.

Notable findings also indicate that the ALHIV whose highest level of education is secondary were about 3.093 times more probable to adhere be retained to care as compared to others. These findings echo a study on the urgent need for research on HIV-positive youth and adolescent adherence and retention in care. The study found that the young key population (YKP) faced individual and environmental hurdles, with low High school attendance serving as a barrier to retention . A quasi-experimental research that evaluated Kenya's national primary education HIV intervention in an effort to determine the effect of post-primary education programs on HIV treatment adherence came to similar conclusions. The study's findings showed that even if Kenya's current educational investments are sufficient, a considerable number of ALHIV students drop out once they reach high school, with the majority not pursuing a secondary education .

Income remittance from relative's/family members contributed 2.231 times to retention to care as compared to no source of income among ALHIV. As a rejoinder, results also indicate that the ALHIV whose common means to reach the health facility is public motorcycle/bicycle were about 1.232 times more probable to adhere to retention to care as compared to ALHIV whose means to reach the facility was walking. These results are consistent with a research that used financial journals to analyze how HIV-positive pregnant women and new moms in PMTCT in Malawi made their financial decisions. According to the study, economic stimulation (ES) measures can deal with financial obstacles to ART treatment retention and adherence (R&A) in PMTCT programs. Although inflows and outflows had a minor but substantial impact on adherence, always adherent individuals showed better inflows and outflows, suggesting a link between higher retention and stable economic conditions . A mobility study of young women who exchange sex for money or goods utilizing google found similar results. Education and career possibilities, aggression, lack of autonomy, social, sexual, and family financial support, and poverty were factors in increased LTFU among adolescent sex workers . A research by Mesic *et al*. (2019) on ART adherence and retention in HIV care among ALHIV found that walking to the appointment site and being jobless predicted missed clinic visits.

Furthermore, research shows that compared to ALHIV who evaluated the distance from the health institution to be extremely distant, those who estimated it to be close were roughly 1.846 times more prone to adhere to retention in care. A comparable study on how caregivers manage children's access to and retention in HIV care in urban Zimbabwe was conducted by Busza *et al*. (2014) and discovered a variety of facilitators and barriers that carers encounter. The study found that the biggest obstacle to retention in ART was the distance to the facility and the associated transport expenses. In contrast to the findings, a study in Kenya that looked at variables impacting adolescent key populations' (AKP) access to HIV and sexual and reproductive health services found that most AKP had low retention rates while attending closer facilities and would prefer distant facilities instead due to discrimination associated with key populations and allied services .

It's important to note that research shows that ALHIV who arrived at the health institution in under 15 minutes were around 2.084 substantially more prone to adhere to retention in care than ALHIV who arrived at the facility in between 30 and 1 hours. The findings resonate with a study by Sterdt *et al*. (2014) On determinants of children and teenagers' physical activity, attitude toward health care personnel and services affected punctuality to health facilities. Punctuality was a sign of favorable

resonance to health care services, while absenteeism and lateness were linked to negative impressions of children and adolescents' HIV services retention. Similar sentiments were mentioned by Dow *et al.* (2018) in a study over-analyzing mental health intervention for Tanzanian ALHIV indicating, that punctuality in group sessions evaluated by the extent to which young people report using new support networks, improving connections with peers and caregivers, reducing stigma, improving retention, and feeling more confident to live honorably and in accordance with their ideals.

Study findings indicate that ALHIV whose waiting time is less than 1 hour were about 2.653 times more probable to adhere to retention to care as opposed to the ALHIV whose waiting time was between 2-3hrs. These results are comparable to those of Nabukeera-Barungi *et al.* (2015) who reported Short waiting times were among the issues that were most important to the various facilitators of ART treatment adherence and retention in care for ALHIV in peer support groups Also, in a separate study on assessing transitioning barriers and facilitators to adult clinics regarding, congestion and long waiting times were expressed as the leading barriers to transitioning adolescents to adult clinics and the leading cause of attrition

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This research reveals that among ALHIV, using ART, suppressing viral load, and retaining ART treatment were all significantly and positively linked with being female. The results also demonstrate that, in comparison to other people, caregivers made a significant contribution to the use of ART. The use of ART was strongly correlated with the closeness of the health facility and a waiting time of less than one hour at the health facility, according to SDOH.

In addition, the study concluded that despite the majority of ALHIV being virally suppressed (65%), the largest impact of SDOH on failing to attain the necessary VL copies was the inability to obtain financial support from family/caregivers and forgetting to take ART. Using a public motorcycle/bicycle as a popular mode of transportation to reach the health facility, with a time taken to reach the facility of less than 15 minutes and a waiting time of less than one hour at the health facility were also identified as SDOHs for VLS.

The study indicated that less than half of the participants (40 %) had ever discontinued using ART, with inconvenient schooling schedules listed as the primary cause. Among the SDOH, being older at 15 to 19 years of age, having secondary schools with the highest level of education, and living closer to a health center were also found to be highly linked with retention to ART among ALHIV. Religion as an SDOH had no significant effect on ART uptake, VLS, or ART retention during the whole research.

6.2 Recommendations

1. Through its basic and secondary schools, the Ministry of Education should contribute more effectively to increasing awareness and promoting the health of its HIV-positive pupils.
2. Adolescent anti-retroviral clinics in Siaya County might benefit from implementing a diversified service delivery model (DSD) and task shifting to reduce wait times for patients.
3. Clinical teams at the facility should enhance drug pickup outside the facility for clients who come from far in existing Program models for flexibility and patient-centeredness.

4. Organizations supporting ALHIV services in Siaya County should institute Interventions addressing adherence and retention by incorporating adolescent-friendly services to mitigate late clinic arrival and LTFU.

5. Organizations that assist ALHIV should implement interventions that strengthen and stabilize economic life, such as revenue activities and participation in village banks, in order to encourage and support family income.

6. The County Government of the Siaya department of health through the office of the county director of health should support sustainable Interventions that address geographic and transportation barriers toward ART uptake and retention among ALHIV. HIV care should be decentralized to address concerns about distance and transportation expenses.

7. To encourage treatment adherence during ART therapy in children and adolescents, healthcare personnel at the facility should focus on strategies to remind both the client and caregivers about drug schedule.

8. ALHIV treatment providers should implement organized home visits by adolescent community workers in order to tackle disclosure within families, the availability of resources, and support from caregivers' social networks.

6.3 Suggestions for further study

1. Similar research should be conducted in an urban setting and compare the finding, given it was carried out in a rural setup.

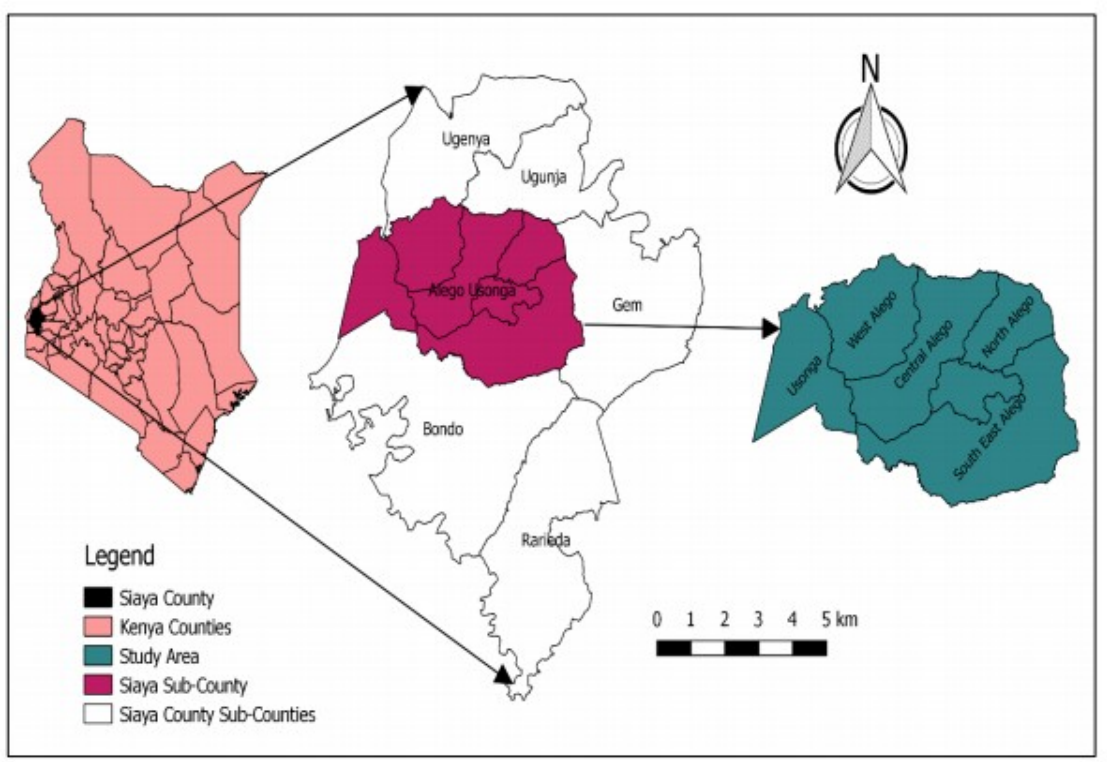
2. Future observational research over a similar broad objective but for pregnant and breastfeeding adolescents, as a measure of appealing to male partners' involvement towards ensuring Adolescent women remain engaged in ART care.

3. To further understand the link between adolescent psychosocial well-being and caregiver social support in similar groups, researchers should continue to study possible social mediating factors and statistically analyze their direct and indirect impacts.

REFERENCE

APPENDICES

Appendix I: Showing a map of Kenya, Siaya County and Alego Usonga Sub county



Appendix II:A Map showing Boro Division in Alego Usonga Subcounty.

Appendix III: Krejcie and Morgan Table

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

Appendix iv: Informed consent form for caregivers

Title: Impact of Social determinants of health on Antiretroviral Therapy Among Adolescents Aged 10 - 19 Years Living with HIV in Boro Division in Siaya County.

Patient's Study Identification Number: …… **Date:** …….

Investigator: Dan Muchi
Student, Master of Public Health, School of Health Sciences
Jaramogi Oginga Odinga University of Science and Technology
Tel Number: - 0723- 114245

Supervisors: Dr. Daniel Onguru
School of Health Sciences
Jaramogi Oginga Odinga University of Science and Technology

Dr. Sidney Ogola
KEMRI/CGHR, Kisumu

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We are requesting you and your child to kindly participate in this research study. The purpose of this consent form is to provide you with the information you will need to help you decide whether to participate in the study or not. This process is called 'Informed Consent'. Please read this consent information carefully and ask any questions or seek clarification on any matter concerning the study.

Introduction: Adolescents living with HIV are faced with numerous Social Determinants of Health challenges that affect their overall wellbeing and treatment outcome. Understanding these determinants will aide in developing high impact interventions to help them cope with the challenges during and after adolescences.

Benefits: The results of the study will be shared with Health Care Providers, Implementing Partners and Stockholder's dealing directly or directly with Adolescent for any intervention required to assist your child. The results will as well help other adolescent facing similar challenges.

Risks: There will be no risks to you or your child during the study. There will be no invasive procedures carried out in the study. Refusal to participate will in no way jeopardize the treatment of your child in any way.

Voluntariness: The study will be voluntary. There will be no financial rewards to you for participating in the study. One is free to participate or withdraw from the study at any point. Refusal to participate will not compromise your child's care in any way.

Confidentiality: The information obtained about you, your child and your family will be kept in strict confidence. No specific information regarding you, your child or your family will be released to any person without your written permission. We will, however, discuss general overall findings regarding all children assessed but nothing specific will be discussed regarding you or your child. We will also, not reveal the identity of you or your child in these discussions.

Questions: If you ever have any questions about the study or about the use of the results you can contact the principal investigator, Dan Muchi by calling: 0723-114245 If you have any questions on your rights as a research participant you can contact the Jaramogi Oginga Odinga Teaching and Referral Hospital Ethics Research Committee (JOOTRH-ERC) by calling:

Consent Form: Participant's Statement:

I ---------- having received adequate information regarding the study research, risks, benefits hereby AGREE / DISAGREE (Cross-out as appropriate) to participate in the study with my child. I understand that us participation is voluntary and that I am free to withdraw at any time. I have been given adequate opportunity to ask questions and seek clarification on the study and this has been addressed satisfactorily.

Parent's / Guardian Signature: **Date:** ……

I ---------- having read and understood the study research explained above. Anything that wasn't clear to me was explained so I could understand it. If I have any other questions later, I can have these answered too. I understand that I don't have to help with the project even if my parent(s) or guardian(s) say that it is all right. Even if I decide to do the things I will be asked to do, I can change my mind later and that will be OK. I have decided I want to help with the research.

Childs Signature/ Thumb print: **Date:** ……

I …… declare that I have adequately explained to the above participant, the study procedure, risks, and benefits and given him/her time to ask questions and seek clarification regarding the study. I have answered all the questions raised to the best of my ability.

Interviewer's Signature: …… Date: …….

Appendix v: Questionnaire for adolescents living with HIV

Section A: Demographic characteristic.

1. Name of respondent (optional)……
2. Age (in Complete Years) ……
3. Sex ☐ Male ☐ Female ☐ Other (specify)……
4. What is your religion?

   Roman Catholic ☐ Traditionalist ☐ Muslim ☐

   Protestant ☐ Non-believer ☐ Other ☐

5. Level of Education

   None ☐ Primary ☐ Secondary. ☐

   Tertiary/College ☐ University. ☐

   .
6. Marital Status (to those above 18years)

   Single ☐ Married ☐ Widowed ☐

   Divorced/Separated/abandoned. ☐

7. Employment status (to those not in school)

   Unemployed. ☐ Self-employed. ☐ Salaried Employed. ☐

8. If employed (Self and /or Salaried), in which sector of the economy is it

   Public/government sector ☐ Religious organization ☐

   Informal/Jua kali ☐ Agriculture ☐

   Private Sector/NGO/CBO ☐

9. What is your Average monthly /income?
10. If unemployed, what are your sources of income/living?

    Donation. ☐ Income remittance from relatives/family members ☐
    None. ☐

11. How do you estimate the distance of your home to this facility?

Less than 5 Km. ☐ About 5 Km. ☐ Over 5 Km. ☐

12. What is your most common means of reaching the health facility?

Walking. ☐ personal motorcycle ☐ public motorcycle/bicycle ☐

Private car. ☐ public van/bus/car. ☐

13. How long does it take you to reach the hospital using the said means?

<15mins ☐ 15-30mins ☐ 30-1hr ☐

>1hrs ☐

Section B. Uptake of ART

1. Do you know your HIV Status?

Yes. ☐ No. ☐

2. If yes what is your HIV status?

Positive. ☐ Don't Know. ☐

Negative. ☐

3. If Positive, how did you discover that you have HIV?

VCT. ☐ A friend told me. ☐

Signs and symptoms. ☐ Partner tested and discovered to have HIV. ☐

Health care worker. ☐ Parent /Care giver. ☐

4. When did you discover about your status? (years)

Early Child hood. ☐ Adulthood ☐

During Adolescent ☐

5. Do you know how you acquired HIV?

Mother to Child. ☐ Un-occupational Exposure. ☐

Vertical transmission. ☐

6. From your last HIV Test, how long did you take to start ART?

   Day to one week. ☐ 2 weeks to 4 weeks. ☐

   1 Months to 2 months. ☐ Four months and above. ☐

7. Are you the only person in your family that is HIV infected?

   Yes. ☐ No. ☐

8. Who contributed to you starting ART?

   Self-effort. ☐ Friends. ☐

   Caregiver. ☐ Health care worker. ☐

Section C. Retention

1. Have you ever stopped taking your medications?

   Yes ☐ No ☐

2. If yes, for how long did you stop taking your medication?

   Less than 1-week ☐ 1week–1 month ☐ 2–12months ☐

3. What might the reason for stopping your medication?

   Forgot to take ARV ☐ Developed toxicity/side effect ☐

   Lack of Transport fare/Distance ☐ Pill burden ☐

   Too busy ☐ Religious beliefs ☐

   I was using traditional medicine ☐ Stigma and disclosure issues ☐

   I failed to get support from my family ☐ Attitude of HCW ☐

   I was not happy with services in this clinic ☐ Others (specify)….

4. Is ART prescribed in combination treatment?

   Yes ☐ No ☐

5. How long do you usually take in the hospital during each visit?

   less than 1hr ☐ 1-2 hrs ☐ 2-3hrs ☐

   More than 3 hrs ☐

6. How would you rate waiting time at this hospital/CCC?

   Excellent ☐ Good ☐ Poor ☐

   Don't Know ☐

7. How do health workers usually handle you every time you go for your clinic?

   Good ☐ Is average, depends with health worker ☐

   They handled me badly (stigmatized) ☐

8. Have you ever missed scheduled appointment for the past ≥3 consecutive months routine visit?

   Yes ☐ No ☐

9. What is the reason for missing clinic appointment?

   Forgot to take ARV ☐ Developed toxicity/side effect ☐

   Lack of Transport fare/Distance ☐ Pill burden ☐

   Too busy ☐ Religious beliefs ☐

   I was using traditional medicine ☐ Stigma and disclosure issues ☐

   I failed to get support from my family ☐ Attitude of HCW ☐
   I was not happy with services in this clinic ☐ Others (specify)….

10. Did any Health care worker contact you?

    Not contacted ☐ I was contacted by a phone call ☐

    They visited me at home. ☐

I was sent an SMS ☐

Section D. Viral Load Suppression

1. When was your last viral load testing period?

☐ 3 months ago 6 Months ago ☐ 1 Year ago ☐

Not tested ☐ Others specify☐ None ☐

2. If None, state the reason/s not tested?

Forgot ☐ Religious belief ☐

Lack of Transport fare/Distance ☐ Stigma and disclosure issues ☐

Too busy ☐ Health Care worker related ☐

I was using traditional medicine ☐ Others (specify)….

I failed to get support from my family ☐

I was not happy with services in this clinic ☐

3. In your last viral load testing how long did you take to receive your results, specify in weeks?

One Week ☐ Four Weeks ☐

Two Weeks ☐ More than Four Weeks ☐

4. What was your last viral load copies tested?

Less than 400 copies / Microliter of blood `☐

Less than 1000 copies / Microliter of blood ☐

More than 1000 copies / Microliter of blood ☐

5. For results and more than 1000 copies above, what is the probable reasons for not achieving the recommended viral load results?

Forgot to Take Medication well ☐ Stigma and disclosure issues ☐

Lack of Transport fare/Distance ☐ Health Care worker related ☐

Too busy ☐ Others (specify)….

I was using traditional medicine ☐ Religious belief

I failed to get support from my family ☐

I was not happy with services in this clinic ☐

6. What is your current viral load testing period today?

6 months ☐ 12 Months ☐

18 Months ☐ Others specify (Months) ☐

7. Did you receive any notification from the Health Facility/CCC about your viral load results?

Yes ☐ No ☐ I don't Know ☐

8. If Yes, how were you Notified?

They visited me at home. ☐ I was sent an SMS/Called ☐

I was informed of it in my next appointment visit ☐

I was contacted through my care giver ☐

9. Did you receive any health education at the Health Facility/CCC over your Viral load results?

Yes ☐ No ☐ I don't Know ☐

10. How would you rate the level of communication and information you received at the Health facility/CCC?

Excellent ☐ Good ☐ Average ☐

Poor ☐

Don't Know ☐

11. Ask the patient to bring all their pills from the last follow-up visits. Calculate how many pills should be remaining based on the previous prescription date and amount prescribed, and compare to how many pills are actually remaining.

Missed Doses per Month		
For Once daily Dose	For Twice daily Dose	Adherence
1 dose	1-3 doses	Good ☐
2-4 doses	4-8 doses	Inadequate ☐
>5 doses	> 9 doses	Poor ☐

12. With the above results do you believe you will be able to achieve the recommended viral load status as required?
    Yes ☐ No ☐ I don't Know ☐

Appendix vi: Oboke mar thuolo mar donje e nonro moa kuom janyuol kod rawere (Questionnaire for adolescents living with HIV in Dholuo)

NYING NONRO: LUASI MAR NGIMA ROWERE MAENKIND HIGNI 10-19 E WI YIEN MAKWEYO KWIRI E KIND ROWERE MODAK GIKUTE MAG AYAKI E I BORO DIVISION, SIAYA COUNTY.

Namba mar siri mar rawere mantie e nonro…… Tarik…….

Jatend nonro: Dan Muchi
Student, Masters of Public Health Sciences
Jaramogi Oginga Odinga University of Science and Technology
Tel Number0723114245

Nyapara: Dr. Daniel Onguru
School of Health Sciences
Jaramogi Oginga Odinga University of Science and Technology

Nyapara mar ariyo: Dr Sidney Ogolla
KEMRI/CGRH, Kisumu

Thuond weche mag nonro: Wakwayi mondo ichiw yie Mari mondo nyathini marawera okonywa etimo nonro ni. Otas mawachiwoni en mar miyo janyuol kod nyathine osom mowinjore yaka oket kogno ni oyie bedo achiel kuom joma biro bet e nonro kata otamore.

Weche matut e wi nonro:

Nyithindo marowere mahikgi chakre 10-19, to odak gi kute mag ayaki kale mangeny kalure gi ngimagi mar chieth. Nonro ni en mar konyo yudo aduoke koa kuom rawere kata janyuol mabiro miyogi yudo kata loso chenro mar konyogi e ndalo mar bedo rowewere kod ngima bang mano.

Rach kata hinyruok mage manie wi nonro:

Onge rach moro amora mantie e wi nonro ni. Okchuni niyie mondo idonje nonro, en yiero mari kendo onge ngama biro kwedi ka ok idonje kendo nyathi biro yudo chieth kaka pile.

Kuom yie mari: Nonro ni en chiwruok kendo onge pesa kata mich moro amora michiwo

Kano siri mari: Wach moro amora mowuok kuomi gi nyathini kata familia ni ibiro ket e yor apanda. Onge wach mor amora ma ibiro nyis ngatangata kaok oyudo rusa koa kuomi e yor andike. Wan kaka jotim nonro wabiro bedo gituak e wi gik mawayudo kuom nyithindo manie nonro.

Penjo: kapo ni in kod penjo e wi nonro kata duoko bang nonro,inyalo tudri gi jatend nonro ma en: Dan Muchi namba sime: 0723114245

Oboke mar yie donjo e nonro(janyuol)

An……., bang somo kendo yudo tiegruok e wi nonro, Ayie ni Eeh Kata adagi ni Ooyo

Seyi mar janyuol/jarit…….. ***Tarik……***

An……. bang somo kendo winjo weche mag nonro kaka oseler e oboke mokwongo,gino mor amora mane okodonjona osepimna oro an gi winjo. ka an gi penjo moro amora kata bange bende abiro yudo duoko. Winjona en ni ok ochuno mondo akony e nonro kata ka janyuol kata jarit owacho ni nikare. Anyalo loko pacha ewi nonro

Seyi mar rawera……... ***Tarik……***…….

An……asingora ni atiego kendo apimo ni joynyuol gi rowere ber, rach nonro kendo amiyo gi thuolo mar penjo duto e wich nonro kendo amiyo gi duoko mowinjore e nonro

Seyi mar jatim nonro…….. ***Tarik……***

Section A:Weche mag aluora ni.

1. Nyingi(kihero):……
2. Higni: ……
3. In nyako kose woyi:?

   woyi ☐ nyako ☐ mamoko ☐
4. Dini:

   Catholic☐ jachieth ☐ jaislam ☐ roho msalaba ☐ mamoko ☐
5. Rang'iny mar somo ?

   Piraimari ☐ sekondari ☐ Kolej ☐ Mbalariany ☐
6. Keny ni jahiga 18>

   pok okenda/kendo ☐ *osekenda /kendo* ☐ *chi/jaod liel* ☐ *wasewere* ☐
7. Yor tich ni jogo maok ni e skul?

   Ok ondika ☐ Andikra kenda ☐ Ondika ☐
8. Ka ondiki kata indikri kendi, itiyo e migape mage?

   Sirkal ☐ Jua kali ☐ Weche mag pur ☐ Migao ☐

9. Yuto ni e dwe en pesa adi ? ……

10. Ka ok ondiki, yore ni mar yuto kata dak a Kanye?

    Chiwo ☐ Anyuola ☐ Onge ☐

11. Bor mawuok dala nyaka osiptal room nade?

    Matin ni km abich ☐ Maromo km abich ☐ Mohingo km abich ☐

12. Itiyo gi yore mage chop e ospital?

    Gach ndara ☐ Apiko ☐ Tielo ☐

13. Ikawo kinde marom nade chopo e osiptal kitiyo gi gik mifulo e namba?

    Matin ne dakika 15 ☐ kind 15mins-30mins ☐ dakika 30-saaachiel ☐
    >saa achiel ☐

Section B. Yor yudo chieth

1. Bende ing'eyo chal mari mag kute mag ayaki?

   Eeh ☐ Ooyo ☐

2. King'eyo chalni chalo nade?

   An gi kute ☐ Aonge go ☐ Akia ☐

3. Ka in gi kute, nifwenyo nadi?

   Nadhi kar pim ☐

   Osiepna nowacho na ☐

   Naneno ranyisi mar kute ☐

   Jaoda no pim tonowachni en gi kute ☐

   Daktache ne owachona ☐

   Janyuol/jarit nowachona ☐

4. Nifwenyo karang'o ni in gi kute mag ayaki?

   Nafwenyo kanyathi ☐ Kang'amadwong ☐ Karawera ☐

5. Bendo ing'eyo kaka neni gamo kute gi

   Nayudo koa kuom mama ☐ Yore mamoko ☐ Eyor tich ☐

6. Kanene osepimi pimo mogik mar kute, nikao ndalo marom nadi yaka ichako yath?

Chieng'no nyaka wik achiel ☐ Wige ariyo nyaka wige ang'wen☐

Due achiel nyak dweche ariyo ☐ Dueche ang'weni kadhi nyime ☐

7. In kendi e yie anyuola ni ema in gi kute?

Eeh ☐ Ooyo ☐

8. Ng'ama nene omiyo ichak chieth mari mar kute mag ayaki?

An awon ☐ Osiepe ☐ Janyuol/jarit ☐ Daktache ☐

Section C. Lurok gi chieth maber

1. Bende isegalewo ni muonyo yath?

Eeh☐ Ooyo☐

2. To ka eeh,iselewo marom nadi imwonyo yedheni?

Matin ni wik☐ Wik achiel nyaka dwe☐

Dweche ariyo nyaka dweche apar gariyo ☐

3. Ang'o manedimi ilew maokimwonyo yath?

Wiya nowil☐ Achiedh nadi mikelo gi yath☐ Bor mar osuptla☐

Yien mang'eny ☐ Dich☐ Weche mag lemo☐ Natiyo gi yiend nyaluo☐

Luoro kod akwede☐ Ok na mor gi chenro mag osuptal☐

Ne okayudo sir koa kuom familia Kit daktache matiyo e osiptal

4. Yien mag kute mag ayaki, gibiro koriwgi kanyakla?

Eeh☐ Ooyo☐

5. Ikaw kinde marom nadi e osuptal sama idhi e clinic?

<saa achiel☐ Saa achiel nyaka seche ariyo☐

Seche ariyo nyaka seche adek☐ Mohingo seche adek☐

6. Ibiro keto rapim mari mar rito saa e osuptalni machalo nadi

Ber kabisa☐ Ber☐ Rach ☐

Akia☐

7. Dakteche rangi e rang'iny mane seche midhiye clinic

Maber☐ Maber ber☐ Marach☐

8. Bende iselewo e clinic e dwech adek mokalo

Eeh ☐ Ooyo ☐

9. Ang'o momiyo nilewo e clinic?

Wiya nowil gi Tarik ☐ Nakoso pesa ☐ Nadich ☐

Natiyo gi yedhe nyaluo ☐ Weche mag lemo ☐

Achiedh nadi mag yath ☐ Akwede kod yangruok ☐

Nokayudo sir koa kuom janyuol Kit daktri marach Mamoko

10. Bebde nitiere jachieth mor amora manomanyi?

Nokomanya ☐ Nomanya ☐ Nolima e dala ☐

Ne o orna ote machuok ☐

Section D. Thiro kute mag ayaki

1. Nopim rembi mogik karang'o king'iyo kute mag ayaki?

Dweche adek mokalo ☐ Dweche auchiel mokalo ☐

Higa achiel mokalo ☐ Nokopima ☐ Mamoko ☐

2. Ka ne oknopima, ang'omiyo?

Wiya nowil ☐ Nadich ayinya ☐ Nakoso pesa mar dhi osuptal ☐

Weche mag lemo ☐ Luoro kod akwede ☐ Natiyo gi yiend nyaluo ☐

Ne okayudo sir koa kuom family ☐ Ok na mor gi chenro mag osuptal ☐

Weche mag daktari ☐ Mamoko ☐

3. Ka nene opim pek mar kute mag ayaki e rembi, nokawi thuolo maromo nadi yaka iyudo duoko?

Juma achiel ☐ Jumbe ariyo ☐ Jumbe ang'wen ☐

Moloyo jumbe ang'wen

4. Kipimo mar kute mag ayaki ne gin adi?

Duoko matin ni mia ang'we n ☐ Duoko matin ni alufu achiel ☐

Makola alufu achiel ☐

5. Kapek mar kute ne ng'eny mohingo alufu achiel, iparo ni ang'o momiyo ne okiyudo duoko mowinjore?

   Wiya nowil gi muonyo yath maber ☐ Akwede kod luoro ☐

   Koso pesa mar dhi osuptal ☐ Bor mar osuptal ☐

   Nadich ☐ Natiyo gi yiend nyaluo ☐

   Ne okayudo sir koa kuom familia ☐

   Ok nomor gi chenro mar osuptal ☐ Weche mag dakteche ☐

   Mamoko ☐

6. Onego bed ni ipimo pek mar kute mag ayaki e rembi kendo karang'o?

   Bang' dweche auchiel ☐ Bang' higa ☐ Bang'higa achile gi nus ☐

   Mamoko ☐

7. Bende nene iyudo ote moramora koa e osuptal kalure gi duoko mari

   Eeh ☐ Ooyo ☐ Akia ☐

8. Ka eeh, ote ni nene iyude e yo mane?

   Nolima e dala ☐ Ne o orna ote machuok ☐

   Ne ogona simo ☐ Ne owachna ka nene adok e osuptal odiechieng' machielo ☐

   Ne o or janyuol/jaritna ☐

9. Bende nene iyudo puonj moro amora kowok e osuptal kalure gi duoko mari?

   Eeh ☐ Ooyo ☐ Akia ☐

10. Inyalo keto e rapim weche mag tudrok e kindi gi osuptal nade?

    Ber kabisa ☐ Ber ☐ Ber matin ☐

    Rach ☐ Akia ☐

11. Kwa jatuo mondo oyie okel yath modong' maneoago e clinik ne mogik. Kwan ni onego bed ni odong'gi adi kaluore gi manene omiye e osuptal, kaka omuonyo tokod yath modong'

Ndalo milewo mwony yath e dwe		Luo chike mag yath

Kuom yedhe mimuonyo dichiel	Yedhe mimwonyo diriyo	
Aselewo achiel	Aselewo dichiel nyaka madhi adek	Ber
Aselewo diriyo nyaka dingw'wen	Aselewo ang'wen nyaka aboro	Ber ber
Mohingo abich	Aselewo mohingo ochiko	Rach

12. Kaluwore gi duok mamalogo, be iparo ni ibiro yudo dwoko makare mar pek mar kute mag ayaki kaka chik mar chieth dwaro?

Eeh ☐ Ooyo ☐ Akia ☐

Ero uru kamano

Appendix vii: Key informant interview guide for HCWs

Facility. _____ Date of Interview _____

Introduction of the study and consenting process

Background information of Study

I will start by asking you some basic information about you.

1. What is your Cadre?

   Clinical Officer ☐ Nurse ☐ Adherence Counselor ☐

   HTS Counselor ☐ Treatment Navigator ☐ Peer educator ☐

2. What specific training have you received in relation to HIV care and management of Adolescents? …….

3. How many years of experience do you have in the ART field? …….

4. What is your role in the ART program in this clinic?

   HIV Testing and Counseling ☐ ART enrollment and Treatment ☐

   Adherence and Retention ☐ eMTCT Services ☐

5. What is the ART initiation procedure in this facility?

   Testing, Counseling, initiation & follow up. ☐

   Counseling, Testing, Counseling, Initiation & Follow-up ☐

   Initiation, Counseling & follow-up ☐

   Counseling, Testing, Counseling, Retesting, Counseling, Initiation & Follow up ☐

6. In general, how would you rate adherence levels in this clinic?
   Probe whether?

   Very good ☐ Good ☐ Fair ☐ Poor ☐
   Reasons given:……
   ……

7. Probe for percentages and measures used to determine adherence levels and how they monitor adherence in the facility.
   Pill count. ☐ Clinic appointment Visits. ☐ Viral load Level. ☐ Other; _
   .
8. Please give me your opinion on the following issues;

   How does Education Level affect uptake of ART? …….

   ……

   How does gender affect uptake to ART? …….

   ……

   How does age affect uptake of ART? …….

   ……

   How does distance from Health Facility affect uptake of ART? …….

   ……

   How does Mode of HIV Acquisition affect uptake of ART? …….

   ……

9. In regard to HIV care and treatment in this clinic, which costs are covered by the clinic and which ones are not?

   Probe on lab tests ☐ OI treatment and drugs ☐ Hospitalization ☐

10. How does a patient's education level affect adherence to ART? …….

11. How does a patient's education level Clinic Appointments? …….

12. Do you Manage patient's clinic appointments?

    Appointment Diaries ☐ Reminders (Test/ Messaging) ☐

    Special days for Specific age's ☐ First Track services for Children and Adolescents ☐

13. What are the reasons given by those adolescents who do not keep appointment?

    Schooling ☐ Care giver engaged ☐ Forgot ☐ Distance/Funds for Fare ☐

    Work related ☐

14. What mechanisms are in place in the clinic to ensure patients Keep their appointments?

    Reminders (Test/ Messaging) ☐ Home visitation ☐ Physical /Defaulter Tracing ☐

    Case discussion for those who don't honor appointments ☐

15. Which patients do you consider as defaulters? *Why*? …….

    ……

16. Which patients do you consider as lost-to-follow up? *Why*? …….

    ……

17. From your experience what are some of the factors that affect adherence among adolescents? (Probe for factors that may lead to both near perfect or poor adherence) …….

    ……

Thank you

Appendix viii: Letter of approval from JOOUST Board of Postgraduate studies.

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

BOARD OF POSTGRADUATE STUDIES

Office of the Director

Tel. 057-2501804
Email: bps@jooust.ac.ke

P.O. BOX 210 - 40601
BONDO

Our Ref: H152/4174/2019

Date: 7th June 2021

TO WHOM IT MAY CONCERN

RE: DAN MUCHI – H152/4174/2019

The above person is a bonafide postgraduate student of Jaramogi Oginga Odinga University of Science and Technology in the School of Health Sciences pursuing Master of Public Health. He has been authorized by the University to undertake research on the topic: ***"Impact of Social Determinants of Health on Antiretroviral Therapy among Adolescents Aged between 10 to 19 Years Living with HIV in Boro Division in Siaya County".***

Any assistance accorded him shall be appreciated.

Thank you.

JARAMOGI OGINGA ODINGA
DIRECTOR BOARD OF
POST GRADUATE STUDIES
DATE .....
P. O. BOX 210 - 40601 BONDO

Prof. Dennis Ochuodho
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

Appendix ix: Letter of approval from ERC

COUNTY GOVERNMENT OF KISUMU
DEPARTMENT OF HEALTH

Telephone: 057-2020801/2020803/2020321
Fax: 057-2024337
E-mail: ercjoorth@gmail.com

When replying please quote

IERC/JOOTRH/480/21
Ref: .....

JARAMOGI OGINGA ODINGA TEACHING & REFERRAL HOSPITAL
P.O. BOX 849
KISUMU

Date....26th August, 2021

To: Dan Muchi

Dear Dan,

RE: REQUEST FOR ETHICAL APPROVAL TO UNDERTAKE A STUDY TITLED: IMPACT OF SOCIAL DETERMINANTS OF HEALTH ON ANTIRETROVIRAL THERAPY AMONG ADOLESCENTS AGED BETWEEN 10-19 YEARS LIVING WITH HIV IN BORO DIVISION IN SIAYA COUNTY.

This is to inform you that ***JOOTRH IERC*** has reviewed and approved your above research proposal. Your application approval number is ***IERC/JOOTRH/480/21.*** The approval period is ***26th August, 2021 – 26th August, 2022.*** This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***JOOTRH - IERC***.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***JOOTRH - IERC*** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***JOOTRH - IERC*** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to JOOTRH - ***IERC***.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

In case the study site is JOOTRH, kindly report to Chief Executive Officer before commencement of data collection.

Yours sincerely,

INSTITUTIONAL ETHICS REVIEW COMMITTEE
26 AUG 2021
JOOTRH

for **NANCY MAKUNDA-SECRETARY**
JOOTRH-IERC
KISUMU

Appendix x: Research Permit from NACOSTI

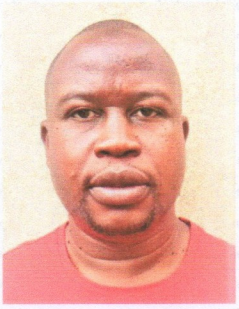
REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **231896**

Date of Issue: **06/September/2021**

RESEARCH LICENSE



This is to Certify that Mr.. Dan Muchi of Jaramogi Oginga Odinga University of Science and Technology, has been licensed to conduct research in Siaya on the topic: IMPACT OF SOCIAL DETERMINANTS OF HEALTH ON ANTIRETROVIRAL THERAPY AMONG ADOLESCENTS AGED BETWEEN 10 TO 19 YEARS LIVING WITH HIV IN BORO DIVISION IN SIAYA COUNTY. for the period ending : 06/September/2022.

License No: **NACOSTI/P/21/12773**

231896

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix xi: Letter of approval from Siaya County department of Health and sanitation.

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF SIAYA

DEPARTMENT OF HEALTH AND SANITATION

All Correspondence should be addressed to:
Chief Officer
Email: siayachd@gmail.com
In reply please quote:

County Health Administration Unit
P O Box 597 – 40600
SIAYA

Our Ref: CGS/CHD/RESEARCH/VOL.IV(131)

14th September, 2021

The Sub-County Medical Officer of Health
Alego-Usonga Sub-County
SIAYA COUNTY

IMPACT OF SOCIAL DETERMINANTS OF HEALTH ON ANTIRETROVIRAL THERAPY AMONG ADOLESCENTS AGED BETWEEN 10 TO 19 YEARS LIVING WITH HIV IN BORO DIVISION IN SIAYA COUNTY

Mr. Dan Muchi pursuing a Master Degree at Jaramogi Oginga Odinga University of Science and Technology has received authorization from Jaramogi Oginga Odinga Institutional Ethics Review Committee vide Ref: IERC /JOOTRH/480/21 and National Commission for Science , Technology & Innovation vide License No: NACOSTI/P/21/12773, to conduct the above referenced study in our County.

Specific objectives

i. To assess the impact of social determinants of health on the uptake of ART by ALHIV in Boro Division.
ii. To determine the impact of social heath determinants over viral load suppression by ALHIV in Boro Division.
iii. To assess the impact of social determinants of health over retention of ALHIV on ART in Boro Division

The Study will deploy both quantitative and qualitative methods during data collection.

This is to notify you that the Research has been approved by the office of the undersigned. Kindly accord him necessary support.

Thank you.

COUNTY DIRECTOR OF HEALTH
SIAYA COUNTY
16 SEP 2021
P.O. Box 597-40600,
SIAYA.

Dr. Felix Tindi
County Pharmacist
Siaya County

Copy to:
1. CECM – Health and Sanitation
2. Ag. Chief Officer of Health