FACTORS INFLUENCING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG YOUTH (15-24 YEARS) IN SELECTED HEALTH FACILITIES IN NYERI COUNTY, KENYA

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A Thesis Submitted to the Department of public Health, Human Nutrition and Dietetics in partial fulfillment of the Requirements for the Conferment of Degree of Master in Public Health of Kenya Methodist University

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DECLARATION

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

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RECOMMENDATION

This thesis has been submitted for examination with our approval as University supervisors

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DEDICATION

A cordial dedication to my husband, Mr. Christian Ngabirano, for the encouragement and support he has accorded to me during my postgraduate studies. It is also dedicated to my daughter for her patience all the time I was away from home during studies.

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ABSTRACT

The antiretroviral therapy combinations introduction in 1996 disrupted the natural course of the HIV/AIDS infection. In fact, ARVs induced an effective reduction in the morbidity and incidence of new cases; they have changed the prognosis of infected patients by conferring on this pathology a chronic character. However, ARV treatment requires rigorous adherence. Adherence constitutes the main factor for the success of ART, a fundamental element of the HIV infection response. The danger of low adherence is the emergence of resistance to HIV. Understanding factors that influence positively or negatively the adherence is essential to maximize viral suppression and reduce mortality. Globally, there are numerous reported cases of non-adherence. Adolescents and young people (15-24) are the epicentre of the pandemic, according to UNAIDS, with 30 percent of new HIV infections happening in this age group in 2019`. Nyeri County is one of the counties that have an emerging epidemic as evidenced by the consistent in rise in their HIV burden. The study's main objective was to determine factors influencing adherence to antiretroviral therapy among youth aged 15-24 years attending the various selected health facilities in Nyeri County. The study used a cross-sectional descriptive design and an interviewer-administered questionnaire to collect data in 3 health facilities: Karatina district hospital, Nyeri referral hospital, and Tumutumu PCEA hospital. A focus group discussion approach was incorporated as well. The participants in the research were patients that had been on ART for at least for 6 months, selected via probability sampling. The examined variables were demographic factors, economic, socio-cultural, and ART regimen factors as the independents, and adherence to ART as the dependents variable. The Statistical Package for Social Sciences (SPSS software version 25) was used for quantitative data analysis, whereas the qualitative data obtained from the open-ended questions were analysed with the aid of the conceptual content analysis and presented in quotes. Results show that the proportion of young people of the 15 to 24 years age bracket, with undetectable viral load, who are adherent is 67%. The only demographic factor which is seemed to be associated with adherence is gender (X^2=5.810, p=0.016). Economic factors such as occupation (X2=5.33, P=0.017), and balanced diet (X^2= =9.343, p=0.002) were found to be significant predictors of the viral load. Stigma (X^2 =49.811 P=0.0001), social support (X2=8.147, P=0.0004), social avoidance (X^2=13.925, P= 0.0001), beliefs such as thinking stop the ARVs (X^2=8.706, P=0.003), denial of the condition (X^2= 8.472, P= 0.004) are also good predictors of the adherence among youth. The ART regimen factors like the count of pills to swallow per day are also linked to adherence (X^2=0.0816, P= 0.04). To improve adherence to ART among youth, the study recommends that the community should provide the necessary support to young people living with HIV by banishing stigmatizing and discriminatory practices and remarks. Continuous strengthening of health education through operation triple zero (OTZ) and counselling is important for improvement of adherence.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AIDS: Acquired Immune Deficiency Syndrome

ART: Antiretroviral Therapy

ARV: Antiretro Viral

CCC: Comprehensive Care Centre

CDC: Centre for Disease Control & Prevention

HIV: Human Immunodeficiency Virus

PLWH: People Living With HIV

NACC: National AIDS Control Council

UNAIDS: Joint United Nations Programme on HIV/AIDS

WHO: World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Introduction

AIDS causes immune weakening and a range of clinical symptoms, such as opportunistic infections, lymphoproliferative neoplasms, and neurological disorders, are all indications of this illness (World Health Organization [WHO], 2016). In 2020, 37.7 million people worldwide were living with HIV, according to United Nations Programme on HIV/AIDS (United Nations Programme on HIV/AIDS [UNAIDS], 2020). The Eastern and Southern African regions were the worst hit in 2017, with 800000 new HIV infections and 19.6 million HIV-positive people. Antiretroviral therapy (ART) is projected to be used by 25.4 million HIV-positive people by 2019, with 88 percent of them virally suppressed (UNAIDS, 2020). In the same year, 460,000 young people aged 10 to 24 were diagnosed with HIV for the first time across the globe. In 2017, the total number of individuals living with HIV was. In Kenya, the number of people living with HIV/AIDS was estimated to be about one million children below 15 years were 105,200 and those above 15 years were 1,388,200. The youth between the age of 15-24 years were 184,700 (12%) (National AIDS Control Council[NACC], 2018).

There was no active drug against the Human Immunodeficiency Virus before antiretroviral drugs were discovered. Antiretroviral therapy combinations were first made available in 1996 and disrupted the natural course of this infection by inducing an effective reduction in the morbidity and incidence of new Acquired Immuno- Deficiency Syndrome cases; it has changed the prognosis of infected patients by conferring, on this pathology, a chronic character. However, Anti Retro Viral treatment requires rigorous adherence.

Adherence is defined as the degree of appropriateness between the patient's drug-taking behaviour, medical prescriptions, and recommendations (Laisaar et al., 2013). This indicates that the patient acknowledges his condition and recognizes the importance of the therapies recommended. Adherence therefore refers to intrinsic processes such as attitude and motivation of patients to follow their treatments, whether it is a drug treatment, psychotherapy, and rules of hygiene of life, additional examinations to be carried out, or even attendance at appointments.

Adherence constitutes the main factor for the success of Anti Retro Viral treatment (ART), a fundamental element of the response to Human Immunodeficiency Virus (HIV) infection. A 95% treatment adherence is necessary to achieve the therapeutic goals of prolonging life, reducing the frequency of opportunistic disorders, stopping or slowing down viral replication rapidly, and sustainably, restoring or improving the immunity of the infected person (World Health Organisation [WHO], 2018).

The danger of low adherence is the emergence of resistance to anti-retroviral (ARVs). Studies on patients who were on antiretroviral medicines and missed a dosage in a week showed drug resistance changes, according to a research conducted in South Africa (Abbas, 2013). According to research conducted in Kenya, there is a significant link between non-adherence and poor health to drugs and suppression of the virus. Further studies also showed a strong linear relationship between suppression of virus and missing doses (Talam, 2008). Furthermore, (Watt, 2009) in his study done in Tanzania, discovered that the failure to suppress the virus increased with the failure of a patient to take their drugs in a span of four weeks. Those patients who missed their dose two to four times in the same span of time had increased failure to suppress the virus and could even die as a result.

Understanding factors influencing, either positively or negatively, the adherence is important to increase viral suppression and reduce death rates. Globally, there are numerous reported

cases of non-adherence throughout the world. This challenge is most common in developing countries, where the low-income status of a state was a factor that greatly affected adherence (Bijker, et al., 2017), and good adherence was attributed to resources allocated to the health ministry (Delgado et al., 2003).

Failure to comply to the rules was discovered in the Sub-Saharan African area is affected by many factors such as, lack of awareness (Baltazary, 2011), alcohol misuse especially among men (Mbonye, et al., 2013), being healthy and having too tight working schedules that they dared not interrupt (Koole et al.,2016). Poor psychosocial well- being was also associated with increased likelihood of poor adherence, and mental health showed a tendency to affect adherence negatively among adolescents (Marima, 2011). Other factors found to influence negatively the adherence are stigma experienced or self-stigma (Hargreaves et al., 2018), fear and experience of ART side effects (Bukenya, et al., 2019).

Locally in Kenya, studies done have shown similar results as to studies from other regions of Africa. Hence, food insecurity especially among urban patients (Nagata, 2012), health facility accessibility, and perceived waiting time (Mugoh, 2017); lack of disclosure, inadequate knowledge about the role of ART, poor attitudes, and practices of the patients (Kemunto, 2017) have been found, among others, significantly associated with poor adherence.

The 95-95-95 UNAIDS targets have been a good instrument for the country of Kenya to reduce the mortality HIV/AIDS is linked to (UNAIDS, 2014). By 2030, the goals indicate that 95% of individuals living with HIV will be aware of their status, 95% of those diagnosed with HIV will get long-term antiretroviral treatment, and 95% of those on antiretroviral medication will achieve viral suppression. Worldwide in 2019, 81% of PLWHA knew their HIV status and 82% were receiving ART. Out of those on ART , 88% were virally suppressed (United Nations Programme on HIV/AIDS, 2020). In Kenya, the rates were low, viral suppression was 71.6% among those who were 15- 64 years, the adolescent group had 61.6% viral

suppression rate, lower than the other age groups (National AIDS and STI Control Programme, 2020).

To achieve the 3rd 95 in adolescents and young people, Kenya implemented a strategy called Operation Triple Zero (OTZ). It engages young adolescents as active stakeholders and partners in their health by promoting a responsive service delivery model. Young adolescents joining OTZ clubs are offered a comprehensive HIV treatment literacy package, and are empowered to be self-health managers. Further, they commit to a simple treatment goal of achieving "three zeroes"; zero missed appointments, drugs and viral load. Operation Triple Zero helps the ones participating to take care of their well-being, take control of their decisions, get support from friends and associate with friends doing pretty good (Centre for Disease Control [CDC], 2016).

According to the World Health Organization dosages, ARV drugs for adolescents include drugs drawn from different classification ; Nucleoside reverse-transcriptase inhibitors (Abacavir (ABC) 300 mg twice daily or 600 mg once daily, Emtricitabine (FTC) 200 mg once daily Lamivudine (3TC) 150 mg twice daily or 300 mg once daily Zidovudine (AZT) 300 mg twice daily), Nucleotide reverse-transcriptase inhibitors (Tenofovir disoproxil fumarate (TDF) 300 mg once daily Tenofovir alfenamide (TAF) 10-25 mg once daily), Non-nucleoside reverse-transcriptase inhibitors (Efavirenz (EFV) 400–600 mg once daily Etravirine (ETV) 200 mg twice daily Nevirapine (NVP) 200 mg once daily for 14 days followed by 200 mg twice daily), Proteases inhibitors (Atazanavir/ritonavir (ATV/r) 300 mg/100 mg once daily Darunavir + ritonavir (DRV/r) 800 mg + 100 mg once daily or 600 mg + 100 mg twice daily Lopinavir/ritonavir (LPV/r) 400 mg/100 mg twice daily) and Integrase strand transfer inhibitors Dolutegravir (DTG) 50 mg once dailyb Raltegravir (RAL) 400 mg twice daily. During prescription, special considerations are adhered to for adolescents

receiving TB therapy, prescription can changed depending on patients response to medication (World Health Organization, 2018).

In response to national County ratings in HIV prevalence, Nyeri County Government devised a strategic plan to be realized by the year 2019. The plan identified Nyeri as a medium prevalence county and established Alcoholism and drug abuse, limiting and inadequate application of laws, lack Comprehensive of HIV information, gender-Based Violence urbanization, early sexual debut among the teenagers and the young adults as key drivers of new HIV infections.

The strategic plan established as vision a HIV free county free of stigma, new infections, and deaths related to AIDS through seven strategic directions. These include reducing new HIV infections, improving health outcomes and wellness of all people living with HIV, using a human rights approach to facilitate access to services for PLHIV, key populations and other priority groups in all sectors, strengthening integration of health and community systems, strengthening research, innovation and information management, promote utilization of strategic information for research, monitoring and evaluation, increasing domestic financing for sustainable HIV Response. This study focuses most on the second strategic direction, which aims at improving health outcomes and wellness of PLWHIV. This involves increasing adherence to ART for young adolescents.

1.2 Background of the Study

More and more children infected at birth are becoming young adults and have to deal with their HIV status. Young adults are adolescents who go through some physical, mental and emotional changes. These individuals experience behaviour change and like to have romantic relationships. This is the period of adolescence and most individuals involve themselves in taking alcohol and using hard drugs (Machado et al., 2009). The UNAIDS has described

adolescents with 30 percent of new HIV infections happening in this age range in 2019, it is the epicentre of the pandemic (UNAIDS, 2020). Nyeri has a population of 782,864 people (males make up 49 percent of the population and females make up 51 percent) (Kenya National Bureau of Statistics [KNBS], 2018). In the county, HIV/AIDS is the main cause of mortality with a total of 21 428 living with HIV in the county in 2017 (NACC, 2018).

Some studies showed that adolescents and young people are special categories and the factors influencing adherence are multiple. A study carried out in Rwanda by Mutwa, (2013) found that stigma, perceived and experienced, is a barrier to disclosing the status of HIV and having their drugs with them in public places. Additionally, there is lack of privacy in the means of keeping and taking of the medicines especially for children who live in congested areas and who learn in boarding schools. According to the same study, the most significant barrier to Adherence was motivated by a desire to seem normal and avoid being identified as HIV positive individuals, as well as a desire to live a normal life free of the disease treatment regimens, or to be forced to disclose information that would cause others to treat them differently. According to another research, the lengthy distance to the clinic was the most commonly reported obstacle to adherence. And also the probability that in the course of travelling to the hospital, the individual may be seen by friends. The health facilities also experience long queues hence increasing the chance of meeting friends (Maskew et al., 2016).

In Nyeri County, there have been few research on the variables that influence antiretroviral treatment adherence. Muthiani (2010) focused his research on HIV-positive individuals in general, and he found that there was no significant difference between them and non-HIV-positive people. A study done specifically for that sensible age group (15-24 years).

The study has been carried out in 3 facilities: Karatina district hospital, Nyeri referral hospital, and Tumutumu PCEA. The choice of these facilities is based on the high volume of

patients (50% of youths attending CCC in Nyeri County are in these facilities). One facility is faith-based (Tumutumu PCEA), while the other two others are government facilities.

1.3 Problem Statement

By the end of 2019, Nyeri County has an HIV prevalence of 5.1% out of 6.8% of the country and the county has been classified under the medium incidence cluster (Ministry of Health, [MOH], 2020). Treatment initiation and continuation are Adolescents and young people, in particular, find it challenging to live with HIV in general. In fact, AIDS remains the leading cause of death among adolescents and young people in the nation, accounting for 1.4 percent of all HIV-positive adolescents and young people who die as a result of poor adherence. The best adherence to ART results in viral suppression and non-adherence can result to medication failure, rise in viral load, eventually leading to the increase in medication-resistant HIV genotype (Laisaar et al., 2013).

Sustained adherence is required for treatment effectiveness, which is a significant barrier for individuals on antiretroviral medication. The regimens are often lengthy, with varying dosage schedules, dietary restrictions, and negative side effects. As a consequence, many HIV-infected adolescent patients have a high incidence of non-adherence, which may lead to serious public health problems. The goal of this research was to find out what variables influence antiretroviral treatment adherence in HIV/AIDS male and female adolescents aged 15-24 years attending selected facilities in Nyeri County.

1.4 Justification

There have been remarkable efforts by the government of Kenya, stakeholders, and implementing partners to contain the spread of HIV. However, statistics show that every year there is a significant new infection rate, particularly in young persons. Adherence to ARV

treatment is the most important indicator of success. Drug-resistant viral strains are more likely to develop in non-adherent patients, and resistant viral strains are more likely to disseminate in the community. Between the ages of 15 and 24, adolescent and young people living with HIV are a particularly vulnerable demographic. This is an age where young people begin to attain independence and responsibility of their own health which include self-drug administration. This is the age category where individuals explore a myriad of activities including sex. Adolescents and youths living with HIV in this age category face many challenges such as stigma in relation to their health condition and peer influence which may be related to poor adherence. This research aimed to examine the variables affecting adherence to antiretroviral treatment among young individuals.

1.5 Research Questions

1. Which social-demographic factors impact adherence to antiretroviral treatment among adolescents aged 15 to 24 years in Nyeri County's chosen health facilities?

2. Which economic variables affect antiretroviral treatment adherence among youth aged 15 to 24 years in Nyeri County's chosen health facilities?

3. How do socio-cultural variables affect adherence to antiretroviral treatment among youth aged 15 to 24 years in Nyeri County's chosen health facilities?

4. Which factors related to ART treatment influence adherence to antiretroviral therapy among youth aged between 15 and 24 years in selected health facilities in Nyeri County?

1.6 Research Objectives

1.6.1 General Objective

To determine factors influencing adherence to antiretroviral therapy among youth aged between 15 and 24 years attending selected health facilities in Nyeri County.

1.6.2 Specific Objectives

i. To determine socio-demographic factors affecting youth's adherence to antiretroviral treatment aged between 15 and 24 years in selected health facilities in Nyeri County.

ii. To find out what socioeconomic factors influence adherence to antiretroviral therapy among Nyeri County youth aged 15 to 24.

iii. 3. To find out whether socio-cultural variables influence antiretroviral treatment adherence among Nyeri County adolescents aged 15 to 24.

iv. To identify ART regimen-related variables that influence antiretroviral treatment adherence among adolescents aged 15 to 24 years in Nyeri County health institutions.

1.7 Significance

The findings of this study should be able to guide and help in a number of ways:

To the community; the findings will be used to improve care and treatment, psychosocial and follow-up services offered to this category of people living with HIV.

The results will assist the Ministry of Health, as well as other policymakers and implementers, in improving programs to encourage adherence and viral suppression among young people living with HIV.

The results of the research will also add to the scientific body of information on adherence to regulations among young people.

1.8 Operational Terms

HIV, is a virus that leads to AIDS disease. This virus affects an individual's immune which helps fight against diseases and the person becomes more susceptible to infections. If left untreated, serious illnesses can develop.

Antiretroviral therapy: Antiretroviral are medicine that are administered to HIV positive patients to counter multiplication of the virus. These drugs are of different kinds and are used altogether to help suppress the multiplication.

Adherence: This refers to the process of medication to a HIV positive person to improve health and reduce multiplication of the virus. It involves the whole process from beginning the medication and taking it regularly without failure. In this study adherence was referred to the viral suppression.

Non-adherence: This refers to failing to take drugs administered by a health professional due to various reasons such as lack of funds to purchase the medicine or an own personal choice.

Youth: group aged between 15 and 24 years (UNAIDS 2013: HIV, Adolescents. And Youth)

People Living With HIV (PLWH): this simply means that people affected with HIV can go on to live good lives and continue being productive.

Adolescent: Adolescent refers to an individual who falls between the age of 10 years and 19 years. Adolescent is a transitional stage from the physical as well as psychological development arising from puberty to legal adulthood (World Health Organization, 2013). The study will adapt to this definition.

Comprehensive Care Centre (CCC): This is a facility that people who are already infected with HIV go to get medical care. This facility has a range of workers such as nutritionists, nurses and pharmacists who work as a team for the well-being of the patients. This is place

with no stigmatisation and all the patients' questions are handled well. The patients are advised on how to live healthy lives and how to take care of those around them to prevent them from getting the virus.

Socio-demographic factors: they are variables that characterize a population and include type of family, marital status and sex.

Socio-economic factors: they are variables that define the financial status of a person, such as income, employment, housing, and nutrition.

Socio-cultural factors: they are lifestyles, beliefs, values, attitudes, religious beliefs. And other cultural characteristics of a person or group of people which contribute to the specification of the population to which they belong.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Other research on antiretroviral treatment adherence among young individuals aged 15 to 24 years were discussed in this chapter. It specifically looked at demographic, economic, sociocultural, and health-related factors which influence adherence to antiretroviral treatment.

2.2 Generalities on Adherence

Adherence refers to attitudes and behaviors through which the patient's relationship to the treatment and to the prescribers of the treatment is expressed. Therapeutic adherence rather designates the degree of acceptance and agreement that defines the position of a patient vis-à-vis the execution of therapy.

2.2.1 Types of non-adherence

Ramadhani et al. (2007) describe non-adherence to therapy as a complex phenomenon that goes beyond the simple scope of medication. It can be global or focused on one aspect of the treatment. It can fluctuate over time. Finally, it can extend to punctuality for appointments, hygiene and diet recommendations or lifestyle changes requested from the patient.

a) Non adherence to medication

This is the most "classic" type of non-adherence, the most studied, and the first that comes to mind. Badahdah et al. (2011), however, include in non- adherence behaviors, drug overuse, rarely studied or considered, in this area but which, according to them, has important consequences in terms of morbidity (overdoses , drug interactions) and emergency, home or hospital consultations.

b) Non adherence to hygiene and diet recommendations

Non-adherence to hygiene and dietary measures is just as important as non-adherence to medication. It has equally serious consequences. This type of non-adherence is all the more challenging as the medical world, like the public authorities, has been emphasizing preventive and prophylactic medicine for several years. In addition, the treatment of many chronic diseases often requires following hygienic and dietary measures which are sometimes heavy or difficult.

c) Non adherence to follow up

Non-adherence to follow-up is much less studied than the other types of non-adherence. Thus, few studies have investigated the links between drug adherence and adherence to follow-up. This concept includes: attendance and punctuality at clinic appointments, the difference between the planned date of the clinic and its effective date, the performance of blood tests or any other prescribed examination

Chen et al. (2003), focus on a particular dimension of non-adherence to follow-up. This is the therapeutic break. They insist on its consequences in terms of morbidity and emergency re-hospitalization, especially in the management of chronic diseases such as HIV. The authors invite us not to confuse the "therapeutic break", which is the definitive stopping of care, which remains relatively rare in practice, and "missed appointments", even repetitive, a more frequent situation and very often allowing treatment maintenance of the therapeutic link. Some speak of a break-up after three missed appointments, others wait for eight missed appointments, others, finally, only speak of a break-up after a period of four months or even a year without any news from the patient.

2.2.2 Consequences of non-adherence

Non-adherence causes an individual, social and economic problem. Its repercussions are important on care. The importance of its consequences make therapeutic adherence a major theme of Public Health.

a) Individual consequences

The studies seeking to establish relationship between therapeutic adherence and clinical results are, most of the time, very contradictory. Some show the absence of association between adherence and clinical evolution in the medium term, others, on the contrary, insist on the serious nature, involving the vital prognosis, of such an attitude. A study of Maskew et al. (2016) show a strong statistical relation between good adherence and a decrease in viral load, in the antiviral treatment of AIDS. These results therefore justify, according to the author, the weight currently given to adherence assessment.

A study by Momanyi et al. (2017) shows that the introduction of specific care, in order to improve the regular monitoring of patients in HIV comprehensive clinic care, fulfills its primary role and makes it possible to initiate specific treatment.

Among the individual consequences of non-adherence, the majority of authors however describe relapse and resistance to medication as major consequences; which lead to frequent hospitalizations and alterations of the patient's life quality.

b) Collective consequences

For the society as we have already noted, non-adherence increases the frequency of hospitalizations. Beyond the individual consequences, these hospitalizations entail an additional cost for social security, as well as professional absenteeism with economic and social consequences. Finally, frequent hospitalization is not without consequences and the family. The collective consequences of non-adherence are very extensive, complex, and excessively difficult to assess. They are very often underestimated. However, they can be

divided into two groups: the additional economic cost and the development of resistance to treatments.

The importance of the financial additional cost represented by non-adherence no longer needs to be demonstrated. Several parameters are taken into consideration, such as the increase in the length of hospitalization, the number of re-hospitalizations, the increase in treatments, and the need for home visit to check up of the patient. The main justification for the growing interest in adherence to ART comes from the reduction in wasted time and money that its improvement could entail.

Resistance to treatment can be induced by poor adherence. This observation makes non-adherence, beyond the individual risk, a major public health problem. This risk has been known for a long time. However, the appearance of an effective treatment (triple therapy) to fight AIDS, has helped health workers to focus attention on their patients' adherence. Indeed, the effectiveness of tri-therapy no longer needs to be demonstrated (both in reducing the viral load and in rebuilding the immune system). The existence of a therapeutic non-adherence is a major cause of failure of the treatment, and of the emergence of cross-resistance, even if the non-adherence is temporary. This is a major problem of public health: strains with cross-resistance are much more difficult to treat, there is a risk of transmission of resistant strains from one subject to another.

2.3 Demographic factors influencing adherence to ART among youth

Other demographic factors that may explain the degree of adherence to ART therapy include age, gender, educational level, and marital status.

2.3.1 Age

Recent studies have shown that the age of the patients and level of adherence are closely linked. Semvua et al. (2017) showed that non-adherence to antiretroviral therapy was related to younger age in a study examining factors of non-adherence in Tanzania. It was found a decreased adherence to ART in adolescents compared to children. The study develop the idea that non-adherence in adolescents could be linked to a kind of “cognitive immaturity” which does not allow them to realize the long-term consequences of their actions. However, if the adolescent is in the immediacy, it seems difficult to affirm that it comes from any "cognitive immaturity". The fact remains that at the time when the individual enters a phase of separation-individuation, while seeking conformity to the group, the experience of disease and dependence on treatment is particularly difficult. Furthermore, according to Gitu (2012), as people become older, they are more likely to stay to ART.

In contrary, in their research of variables influencing antiretroviral medication adherence at Moi Teaching and Referral Hospital in Eldoret, Talam et al. (2008) concluded that age was not a major factor.

2.3.2 Gender

Gender is another variable that may influence adherence. Boullé et al. (2015), in their study done in Cameroon, has shown that African males are more susceptible to ART failure than women, and that this susceptibility goes beyond adherence problems. Watt et al. (2009) observed that women have fixed schedules, and since they are frequently tied to domestic duties, it is simpler for them to integrate pill-taking into their schedules, resulting in low levels of non-adherence to ART. However, Byakika et al. (2005) and Iliyasu et al. (2005) found that gender did not influence adherence to antiretroviral therapy.

2.3.3 Level of education

A low level of education for some patients makes them have poor adherence as they may not be able to read the instructions given by health officials (Shubber et al., 2016). Patients with a higher education level have better adherence as they can well read the practitioner's instructions (VanDyk, 2010). It is statistically difficult to isolate the "educational level" factor from other socio-economic factors such as living environment, the existence of ethno linguistic barriers or intellectual level. If the level of education is taken into account in therapeutic adherence, it should not be incriminated independently of these other factors.

2.3.4 Marital status

There have been studies on the connection between marital status and adherence to ART, and the results show that marital status plays a major role in predicting ART adherence. Kioko (2017) in a study done in a Kenyan rural community, found that divorced people were more adherent. Stubbs et al. (2009) found out that individuals who had spouses that were positive demonstrated better adherence compared to those who had spouses not infected with the virus.

2.4 Economic factors influencing adherence to ART among youth

2.4.1 Financial constrains

Generally, in Africa, and Kenya in particular, poverty affects all aspects of people's lives: low income, lack of access to education, health, employment, etc. Poverty is likely to have an impact on adherence to ART since financial resources may need to be diverted, where the patient/client may feel are better needed than in his/her health needs.

It should also be noted that HIV/AIDS is also a factor of poverty for the African populations who find themselves engulfed in economic issues due to the demands of the AIDS disease. Indeed, the households affected by HIV/AIDS have to cope with an increase in health expenses while the income falls with their working capacity. We understand that adherence to

the ARV treatment becomes, consequently, a big challenge the people infected and for the entire system of prevention and control of HIV/AIDS. Studies have Patients with higher income levels had less trouble adhering to their treatment plans than patients with lower income levels, according to research (Azia et al., 2016).

2.4.2 Transportation costs

Transportation costs are another determinant of ART adherence. In our African countries, health care facilities are far from populations. Or a person living with HIV may choose a remote health facility from his village for his or her supply of medication to avoid being stigmatized by his or her neighbours. And the further away the health facilities are, the higher the cost of transport is. Ramadhani et al. (2007) in their study of predictors of incomplete adherence in Tanzania, reported that there was a linear relationship between the cost of travel and non-adherence. Russell (2005) also confirms this finding that when the cost of travel increases, many people are not able to go to the health facilities hence non-adherence especially the low income earners.

2.4.3 Nutrition

Maintaining good health necessitates a healthy and well-balanced diet. If one or more nutrients are missing, the body will not be able to operate properly. The general situation of nutrition in Africa demonstrates that malnutrition is on the rise, attributable to poverty as one of the results of financial and social crises, which leads to increasing food prices.

The country of Kenya faces severe food insecurity. The country faces a number of problems which include political violence especially after election, the high amount for producing food due to expensive costs of production and low income by a large part of the population.

Thus, when malnutrition is associated with a chronic disease such as HIV/AIDS, the patient's health status deteriorates more and more. Taking ARVs requires the stomach to be full to

avoid certain side effects of these medications. The side effects of ARV drugs are greater in malnourished patients than in those with an acceptable nutritional profile (Chen, 2003).

Lack of enough food to the people greatly contributes to non-adherence as the patients cannot take the medicine without the proper diet. Lack of food causes malnutrition therefore most patients can even die due to the disease and lack of food. Enough food which constitutes a balanced diet helps to reduce many side effects associated with taking the drugs hence those who take the drugs with no food also have lower chances of survival.

2.5 Socio-cultural factors influencing adherence to ART among youth

2.5.1 Stigmatization

Stigma may be defined as any word, act, or thought that demeans and disgraces a person's attitude and opinion about themselves (MacCarthy et al., 2018). In Kenya, as every other part of the world People living with HIV continue to be stigmatized and discriminated against. Despite the efforts of advocates, international and local groups to fight it, those living with HIV continue to be stigmatized and jeopardized their lives and those of their families. Discrimination is as result of stigma and is involved with segregation and separation from the infected people living with different conditions.

Stigma and discrimination create barriers to accessing HIV prevention, screening, and treatment services, thus putting the lives of HIV-positive people at risk. Self-stigma, also known as "internal stigmatization" is developed by an individual towards oneself (in a conscious manner or not) attitudes and behaviours that mark its difference with others. It is characterized by the acceptance of beliefs and stigmatizing actions, a bad perception of oneself (shame, blame, guilt), the abandonment of any ambition in life, and the self-isolation of social relations and activities (Croome et al., 2017).

A person living with HIV/AIDS may self-stigmatize by experiencing feelings of self-loathing and shame, but the most frequent form of stigma is that which is imposed by another person. HIV-positive individuals often choose to travel to clinics that are far away from their homes in order to avoid being seen and identified as HIV-positive by others, aggravating transportation and work-related problems. Unfortunately, non-adherence to antiretroviral treatment (ART) among HIV/AIDS adolescents has increased as a result of this. The HIV stigma index 2014 is based on the findings of Kenya's first National HIV and AIDS Stigma Survey, indicates that HIV stigma and discrimination in Kenya is significant, at 45 percent, with notable differences between men and women various by regions.

2.5.2 Culture and religious beliefs

The impact of culture on health is great. It influences the way people look at diseases, the causes of diseases, the way people look at the causes of death and the kind of places where patients go to seek medical advice. These factors are all important to know about as they affect the adherence of PLWHIV. A study conducted in Nepal (Wasti et Al., 2012) showed that muslims living with HIV found it hard to take their morning medication as their culture requires them to fast during that period during some festivals. Adherence is also affected by the way an individual looks at the illness and the benefits of the drugs. Individuals that showed better adherence are those that believed that the medication is effective and would lead to improvement of health. Knowledge, beliefs and attitudes as potential determinants of adherence, they are generally assessed as part of socio-cognitive models of the study of health behaviors and disease. Rosenstock's Health Belief Model (HBM) asserts that attitudes and beliefs are major determinants of behavior. The explanation for the non-compliance by ignorance is considered very insufficient even if the experience reveals surprising errors or misunderstandings associated to treatments. What matters is the way in which the individual

weighs the pros and cons, assesses, adapts to the constraints of his illness situation and decides, according to his logic, to follow or not, faithfully, the treatment prescribed.

2.5.3 Social support from family members

The family represents a resource on which a sick person can count. Spending time with a young person living with HIV and listening to him or her is essential. It can help or make some difficult situations acceptable. According to Seeman, et al. (2001), someone may perceive a situation as stressful and do not have a reaction of anxiety and distress if they have social support. Conversely, low social support seems to be a factor of vulnerability to a stressful event. Social support refers to feelings of security that an individual feels because he or she can count on someone when misfortune happens. And (Fischer, 2002), confirms that Social support acts as a buffer, shielding the person from the worst elements of the circumstance.

Family members provide social support by encouraging the patient to take the medicine as recommended by the doctor and offering emotional support. A family that well supports their patient leads to better adherence. Being there for these individuals and accompanying them to the health facility improves their attitude and helps them accept themselves with time. (Rotheram et al., 2010).

For young PLWHIV who are on ARV treatment, parental involvement seems important for lasting behavioural changes. A family that supports the patient decreases the likely effects of the (Badahdah et al., 2011). A family that demonstrates poor emotional support leads the infected patients to have poor adherence due to lack of someone to talk to about their fears and struggles.

In brevity, the quality of social support is important, and it can serve as a psychological, and absorber resource that enables the young person affected by HIV to live better and accept the disease and treatments.

2.6 ART regimen-related factors influencing adherence to ART among youth

Treatment and disease-related factors mainly relate to the complexity of ART, HIV disease-related characteristics, and side effects of the treatments.

2.6.1 Complexity of antiretroviral treatment

The complexity of antiretroviral treatment refers to the number of pills taken per day, the respect of the hours on which the drugs are taken, the food that should be avoided while taking the drugs, among others.

According to (UNAIDS, 2018), there are different classes of ART drugs and they all work differently to different patients. When the different classes are combined, they produce better results than when they are given differently. Combination therapy with at least three different antiretroviral drugs has now become the norm for all newly diagnosed people with HIV. Nevertheless, the more effective the composition is, the more frequent and varied the side effects are.

The complexity of ART drugs require that the patient changes their eating and sleeping patterns. A study showed that patients who had fewer pills to take each day showed better adherence while those who had more pills had poorer adherence.

2.6.2 Therapeutic efficacy of the treatment

The role of treatment effectiveness is complex. Indeed, it may be the efficacy felt by the patient, the efficacy perceived by the doctor or even biological normalization. These different modes of perception often diverge

The effectiveness felt by the patient has a great influence on the adherence to treatment. It can reinforce it as well as decrease it: a patient judging himself to be healed, can try to stop the treatment. In fact, patients often cite clinical improvement as an excuse for a missed appointment which can therefore contribute as a factor of poor adherence. On the contrary, a patient not perceiving improvement can interrupt a treatment which he considers ineffective. Finally, in HIV disease, periods of clinical recovery prompt the patient, who is asymptomatic, to stop his treatment. Conversely, the perception of the risk of relapse improves adherence. A long delay in action of a drug as well as a possible resistance to first treatment is factors of poor adherence.

2.6.3 HIV disease related characteristics

The assessment of adherence is generally higher for acute diseases than for chronic diseases, especially because in chronic diseases, treatment is generally perceived as not improving or having a little beneficial effect on efforts or sacrifices to provide. For HIV disease, the asymptomatic phase may be preponderant, and the person does not feel sick. Aisa et al. (2015), observed that non-adherence is greatest among healthier patients because they perceive less concern about their disease as they get healthier in absence of clinical symptoms.

2.6.4 Side effects of antiretroviral treatment

The side effects of ARV drugs are frequent and severe, among which nausea, vomiting, diarrhoea, and fatigue that becomes chronic, migraines, etc. … and they constitute another regimen characteristic. This may be a significant impediment to compliance.

According to a research (Tessema et al., 2010), there is a connection between pharmacological side effects and non-adherence to medication. De F Bonolo et al., (2005) posits that the presence of side effects is not sufficient to explain the decrease in patient adherence. The study thinks that the ratio of perceived benefits of treatment to side effects, or deterioration in quality of life, has more weight in adherence than the isolated presence of side effects. Tessema et al.,(2010) thinks that if the patient perceives the sacrifice engendered by the treatment or its side effects as too heavy, there is more risks of not being adherent.

2.7 Theoretical Framework

The Model of Health Belief was used in this research (HBM). It was created in the 1950s as a psychosocial approach for studying health behaviour by psychologists Rosenstock (1974). Because it can explain and forecast individual changes in health behaviours, the model is one of the most frequently used models in public health research for understanding them. The HBM is made up of many interconnected states of thinking that influence adherence in diseases like HIV/AIDS. Individual views, modifying circumstances, and variables influencing the probability of adopting suggested health action are the three main components (cues to action).

Individual perceptions

These are referred to as perceived susceptibility, perceived seriousness, perceived benefits, and perceived barriers.

Perceived susceptibility

This refers to a thorough examination of the potential of a person's health suffering from certain issues (Rosenstock, 1974). Individuals who think they are at danger of developing a certain health problem will take the necessary precautions to reduce or even prevent developing the problem, according to the health belief model. A person who has done anything that puts him or her at risk of acquiring HIV is likely to seek medical help to confirm the concern.

Perceived seriousness

Perceived severity refers to a person's subjective assessment of the severity of a health problem and its potential consequences (Janz et al., 1984). People who think a health problem is serious are more likely to change their behaviour to avoid it, according to the health belief model (or reduce its severity). To put it another way, susceptibility and severity combine to create what a person sees as a disease danger. The repercussions of being infected with HIV/AIDS, which include pain, infections, disability, lifelong ARV treatment, and eventually death, are considered the perceived severity of HIV/AIDS (Dahab et al., 2008).

Perceived benefits

The perceived advantages of taking action can influence health-related behaviours. The value or effectiveness of participating in a health-promoting behaviour to reduce the risk of illness is referred to as perceived benefits (Janz et al., 1984). Because the impact is quick and visible, health behaviour that produces an immediate advantage may be regarded as highly successful. The rapid advantage of antibiotics in treating an opportunistic infection in HIV/AIDS patients may lead to the assumption that sticking to the medicine (behaviour) would result in immediate benefits**.**

Perceived barriers

These are things that a person sees as roadblocks to taking better care of themselves. Treatment may be seen as taking too long, requiring too much work, or being too difficult to get. Even if a person considers a health condition to be hazardous and believes that participating in a health-promoting activity will effectively reduce the threat, barriers may prevent them from doing so. To put it another way, the perceived benefits must outweigh the apparent barriers for behaviour change to occur (Dahab et al., 2008).Pill load, dietary restrictions, dosage schedule, side effects, and stigma are all seen as obstacles to adherence to ART.

Modifying factors

Individual factors, such as demographic, psychological, and structural variables, may have an impact on how people perceive health-related behaviours (e.g., perceived severity, susceptibility, benefits, and obstacles) (Rosenstock, 1974). Only a few demographic factors include age, sex, race, ethnicity, and education. Psychosocial factors include personality, socioeconomic status, peer and reference group influence, and so on. Other determinants include economic and cultural factors, which influence perceived seriousness, susceptibility, advantages, and obstacles, which have an indirect impact on health-related behaviours**.**

Cues to action

These are events, persons, or things that may motivate individuals to alter their behaviour or behave in a certain way. Internal and external cues are both possible. Following an unpleasant response to a drug, for example, it is probable that the patient would attribute the occurrence to one or more of their prescription medications as the cause. As a result, a patient who has already had negative pharmacological responses to a medicine may have a pre-existing assumption that ART will cause comparable side effects. About essence, the patient's

medication-taking behaviour will be affected by his or her belief in the medication's possible side effects (Munro et al., 2007)

Figure 2.1

Relationship of the key concepts of Health Belief Model (adapted from Rosenstock, 1974).

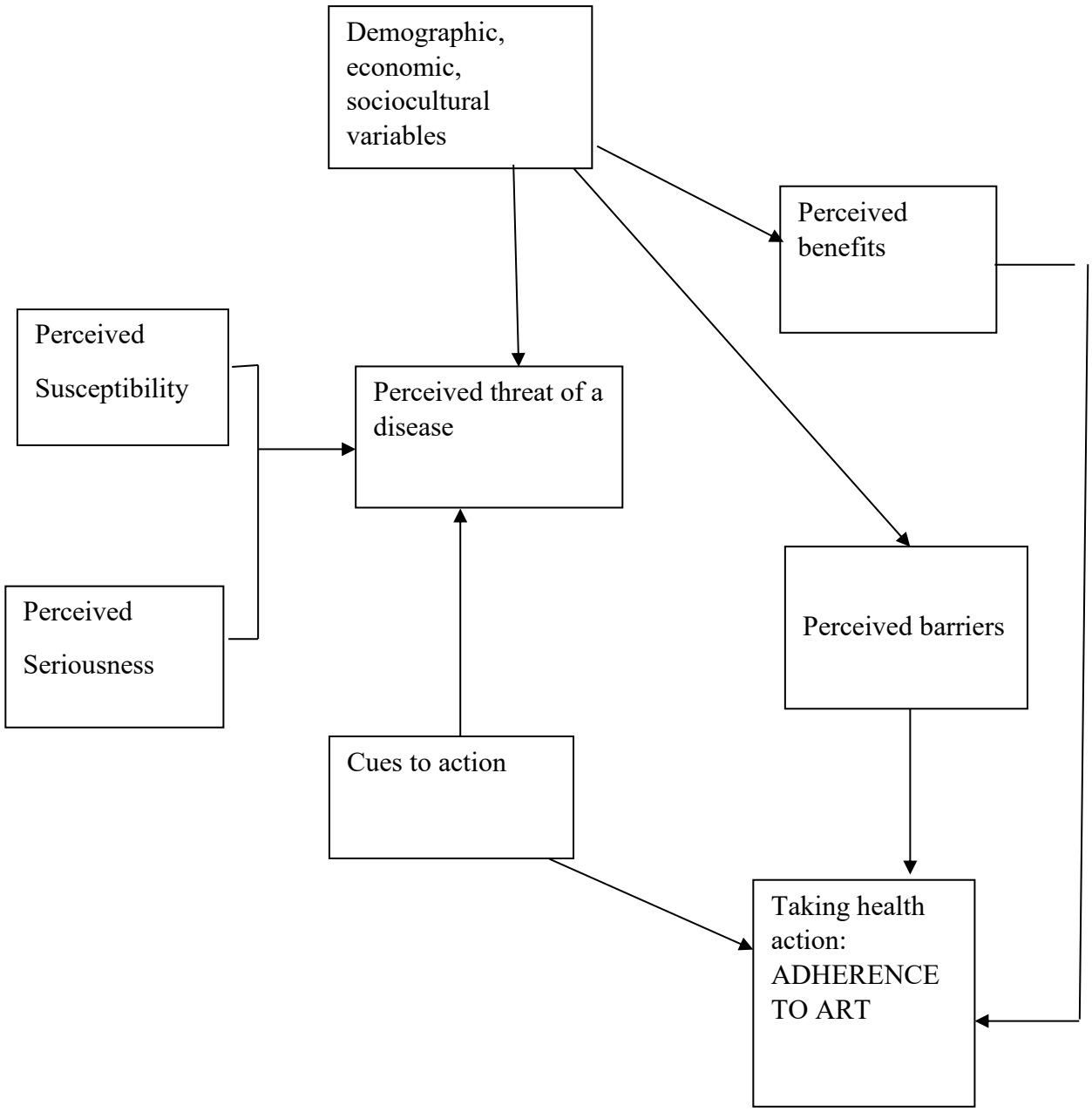
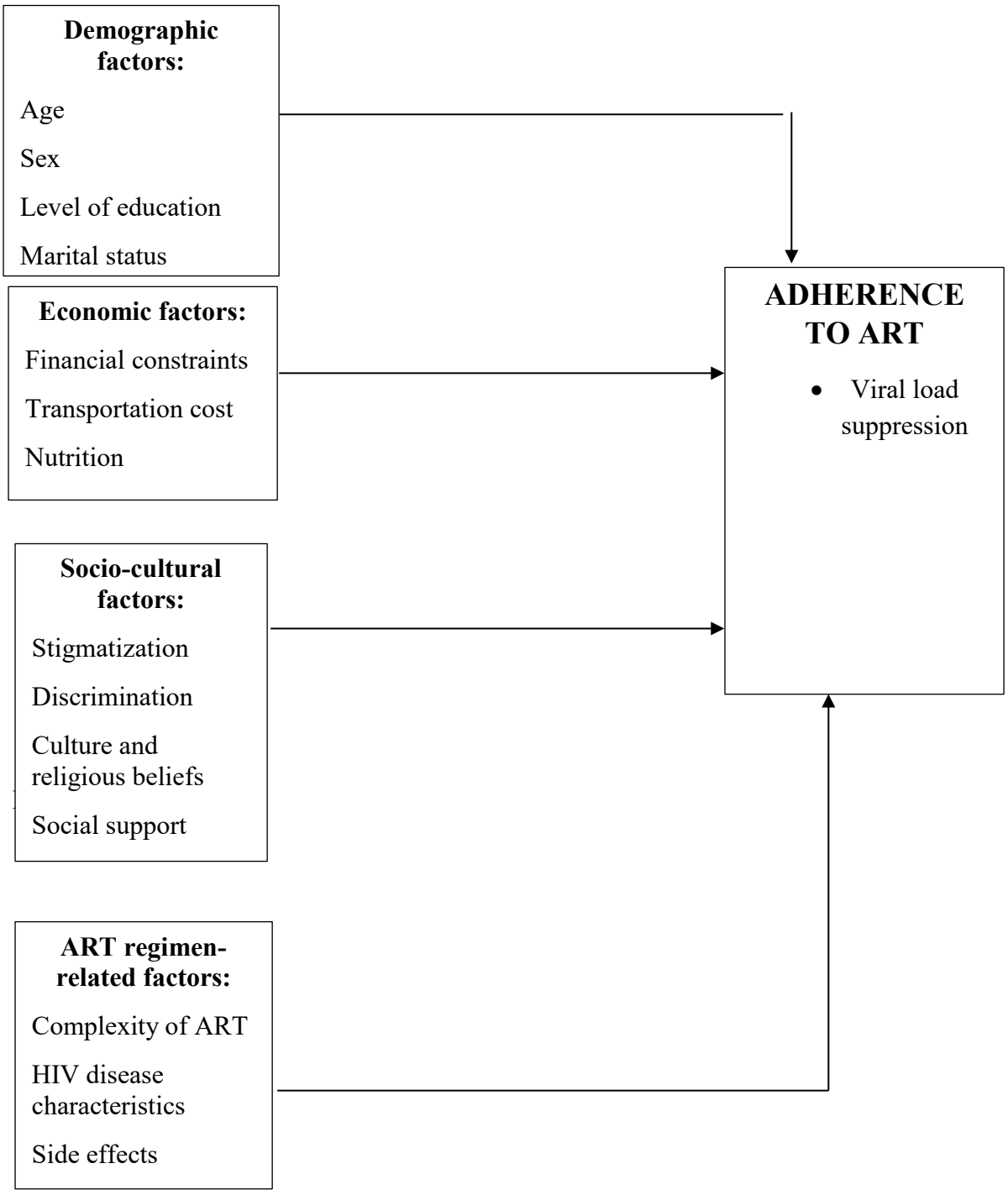


Figure 2.2.

Conceptual framework



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter focuses on the methodological components that were used in the study. The study's location, design, demographic, sampling technique, and sample size are all factors to consider determination, exclusion and inclusion criteria, methods of data collection, data management procedures, ethical considerations and data quality control, and study limitations, all being discussed thoroughly in section.

3.2 Study Area

The county of Nyeri was the focus of the investigation. It is located in Kenya's central province and is one of the country's counties. The data was collected from 3 different facilities: Karatina District Hospital, Nyeri Referral Hospital, and Tumutumu PCEA Hospital. The above facilities are both level 5 hospitals and they have a population of more than 50% of youths living with HIV attending CCC in Nyeri County. The comprehensive care centers (CCC) in Nyeri County are supported and managed by the Department of Health. The CCC offers the following free services; HIV testing, CD4 count testing, Provision of Antiretroviral drugs (ARVs), viral load testing, cervical cancer screening, cryotherapy, creatinine testing, post exposure prophylaxis, tuberculosis treatment, psychosocial counselling, adherence counselling, Positive Health, Dignity, and Prevention (PHDP), prevention mother to child transmission of HIV (PMTCT).

3.3 Study Design

The researcher performed a cross-sectional descriptive analysis to figure out what factors affect youth's adherence to antiretroviral therapy. In this kind of design the researcher collects data in a snap shot. This approach also helps to predict an outcome in quantitative study. It aids in explanation of facts and perceptions by studying a subset of a population of interest (Creswell, 2003).

3.4 Study Population

Outpatients with HIV aged 15 to 24 years old visiting the Comprehensive Care Centre at Karatina District Hospital, Nyeri Referral Hospital, and Tumutumu PCEA Hospital, who had been on antiretroviral therapy for at least 6 months, made up the study's population.

3.5 Inclusion and Exclusion Criteria

A. Inclusion Criteria

Persons living with HIV aged between 15 and 24 years on ART in the selected facilities for 6 months and beyond who were willing to participate in the study and who signed informed consents and assents.

B. Exclusion Criteria

Persons living with HIV aged between 15 and 24 years on ART treatment who did not consent to participate in the study, those who were severely sick and not able to respond and patients having communication barrier were excluded from this study.

3.6 Sample size determination

Fishers et al. (1998) formula was used to calculate the sample size.

$n = \frac{Z2\ p\ q}{d2}$

Where:

n = desired sample size

Z= Standard normal deviate of 1.96 which corresponds to 95% confidence level

P = Proportion of the target population.

d = Degree of accuracy +/- 0.05%

q = 1 – p

Therefore, $n=\frac{1.96^2*0.65*0.35}{0.05^2}$= 349.5≈ 350

The figure of 0.65 is the proportion of young people with viral suppression, thus are good adherent to antiretroviral treatment in Nyeri County (NACC, 2015 Fast-Track Plan to End HIV and AIDS among Adolescents and Young People).

The sample size of the study population is less than 10.000, and is calculated by:

$nf= \frac{n}{1+(\frac{n}{N})}$

nf= desired sample size when the study population is < 10,000

n= desired sample size when the study population is > 10,000

N= estimates of the population size

$nf = = \frac{350}{1+(\frac{350}{544})} = 227$

3.7 Sampling procedures

a. **Purposive sampling** has been used to select 3 facilities in Nyeri County, which were Karatina District Hospital, Nyeri Referral Hospital, and Tumutumu PCEA Hospital. This method of sampling is based on personal judgment, on high volume

sites; the facilities have been selected because they have a population of more than 50% of youths living with HIV attending CCC in Nyeri County.

b. **Probability proportionate to size will be used to get the sample size in each facility.**

Table 3.1

Sample size allocation for the facilities in Nyeri County

Facility	Population	Sample
Karatina sub county hospital	211	$\frac{211*227}{544}$ =88
Nyeri county referral hospital	173	$\frac{173*227}{544}$ = 72
Tumutumu PCEA hospital	160	$\frac{160*227}{544}$ = 67
Total	544	227

c. **Probability sampling** has been used to select the young people aged between 15 and 24 years who are on ART. A line list of all youths living with HIV attending their respective clinics has been made. It contained their unique codes and their scheduled return date. The subjects were selected by **systematic random sampling** from the line list. The first code has been selected randomly and an interval of 2 (K=N/n) has been used until the sample size was obtained.

d. **Sampling for Focus Group discussion**: Patients who were on the line list and who were not selected for the interview were selected randomly to form two focus group discussion. The groups were composed of 8 to 10 participants, one at Tumutumu Hospital (rural area), and another one at Nyeri Referral Hospital (urban area).

3.8 Data collection

Data was collected using interviewer-administered questionnaires and focused group discussions.

3.8.1 Interviews

On clinic days, interviews were conducted. The Comprehensive Care Centre runs youth clinics at all three hospitals. Patients on the pre-established list were called on weekends and asked whether they agreed to participate in the research after being informed of the study's aim and duration. The researcher began the interview after signing the permission form. Each interview lasted 30 to 40 minutes. Individual and face-to-face interviews were conducted, and participants were given opportunity to ask questions and clarify problems they didn't understand while going through the questions**.**

3.8.2 Focus Group Discussion

Two focus groups discussion involving young patients on ART were done in two health facilities Tumutumu PCEA Hospital and Nyeri Referral Hospital. The patients who were not selected for the interviews were asked if they would accept to participate in the focus group discussion. The group discussions were held for two hours each. Each FGD had 10 respondents. The focus of the discussion was to collect additional information about the antiretroviral treatment adherence in young HIV/AIDS patients is influenced by a variety of variables. This technique of data collection worked well since the participants were able to express their opinions on the subject under discussion. Participants were encouraged to speak openly about their own experiences. This encouraged them to open up to the other participants as well as the researcher. The specific themes that were discussed in the group were the importance of adherence, the barriers to adherence and how to address those hindrances. Notes were taken during the discussions and were summarized at the end of the each session.

The moderators stopped collecting data when they noted that no new information was materializing from the participants.

3.9 Instrumentation

Quantitative data were acquired via the use of a semi-structured questionnaire given by an interviewer. There were both closed and open-ended questions in the survey while for qualitative data, focus group discussion has been used and it contained themes related to the research topic.

3.10 Data management and analysis

The information gathered was quantitative as well as qualitative. For quantitative data, all questionnaires received were assigned a reference number, and all elements in the questionnaire were coded in Excel to make data input simpler. After data cleaning, which included checking for input errors, the data was analysed using the Statistical Package for Social Sciences (SPSS software version 25). The test of normality was conducted on continuous data, and then the mean with standard deviation or median with interquartile range was calculated, as appropriate. Data that were not regularly distributed were given as median and interquartile range, whereas data that were normally distributed were provided as mean and standard deviation, with a 95 percent confidence interval when appropriate. The demographic and clinical characteristics of the patients (viral load) were analysed and presented as frequencies and proportions. The latest viral load was used to determine the respondents' adherence. Patients with detectable viral levels were labelled as poor adherents, whereas those with undetectable viral loads were labelled as outstanding. While qualitative data was examined using a thematic analysis method based on the study topic's themes, quantitative data was evaluated using a content analysis approach. The connection between

the dependent and independent variables was determined using regression analysis, and their likelihood ratio and odd ratio were reported when applicable. For nominal data, multinomial and ordinal logistic regression analysis were employed; for ordered categorical data, the likelihood Chi-Square test was utilized if the degree of the connection was substantial, as indicated by a high P-value, and the odd ratio (OR) was not given by the basic analysis. To get the odd ratio, a multinomial generalized linear model was developed.

Finally, bivariate correlation analysis was performed, and the Pearson Connection Coefficient (r) was employed to calculate the degree of correlation between the dependent and independent variables.

The open-ended questions' qualitative data was analyzed using conceptual content analysis and presented in quotations.

3.11 Data quality control

A pre-test of the questionnaires was done to verify the validity and reliability of the responses. The pre-test took place at Consolata Mathari Hospital and 22 questionnaires were administered to young individuals attending the Comprehensive Care Centre who are between the ages of 15 and 24. A focus group session with eight people was also conducted. This provided hands-on experience with the surveys and the focus group discussion guide. The tools were put to the test in order to improve the clarity of the questions and statements, as well as the amount of time it took to perform the study.an interview and a focus group discussion. The data collected in the pre-test has not been added to the data of the study.

3.12 Ethical considerations

Approval for the Kenya Methodist University's Ethical Review Board and the National Commission for Science, Technology, and Innovation were commissioned to conduct the

research (NACOSTI). Permission was sought from the Nyeri County Department of Health Services. Informed consent and assent for respondents under 18 years old were signed by the respondents or by the parents/guardians, before data collection. The confidentiality and anonymity of the respondents were explained and observed by coding questionnaires. The aim of the study was explained to participants who were informed that their personal information would only be used for research reasons. Their participation was completely voluntary, and they had no expectation of receiving any compensation or reimbursement from the researcher. Before signing the consent document, they were given the opportunity to ask questions. The authorization noted that the participants had the right to stop the interviews at any time or decline to answer any question they were uncomfortable with, and that doing so would not harm them in any way.

3.13 Limitation of the study

Due to the sensitivity of the HIV/AIDS study subject among the participants, some may have provided misleading or half-true answers in order to create a favourable image of their low adherence level since they may believe there are punitive measures in place. By guaranteeing secrecy and privacy throughout data collection, this prejudice was minimized. They were also guaranteed of information confidentiality by using IDs rather than names.

3.14 Delimitation of the study

The researcher conducted the study within the specified period of the programme due to the set time frame and with the available resources/funds. The study was undertaken in Nyeri County, in three selected health facilities which are Karatina District Hospital, Nyeri Referral Hospital, and Tumutumu PCEA Hospital. The respondents of the study were young adolescents attending comprehensive care clinic in those three health facilities.

3.15 Assumptions of the study

It was presumed that, participants gave honest answers, which made it possible for the study to have reasonable degree of confidence.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The results and comments from the research are summarized in this chapter. The percentage of respondents who adhered or did not adhere to ART, socio-demographic, economic, and socio-cultural factors, and ART regimen-related factors affecting adherence among adolescents aged 15 to 24 years are the major variables addressed. Themes were used to report the results of qualitative data.

4.2 Data Presentation

4.2.1 Adherence to ART

The majority of the respondents have an undetectable viral load (153 respondents) which is illustrated by 67.4 % of patients with good adherence. And those who have a detectable viral load are 32.6 %.

Table. 4. 1

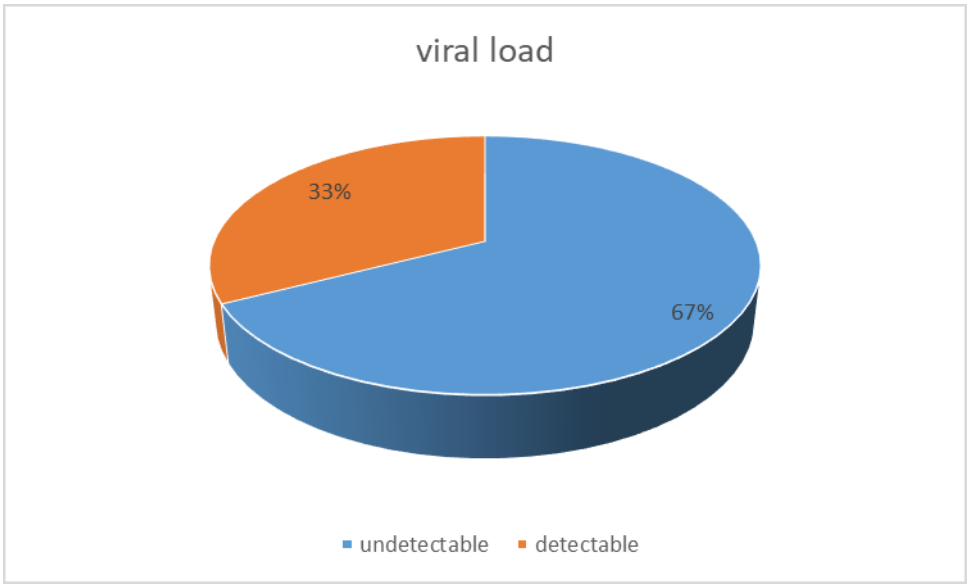
Adherence to ART

Viral load	Frequency	Percent
undetectable	153	67.4
detectable	74	32.6
Total	227	100

The majority of the respondents have an undetectable viral load (153 respondents) which is illustrated by 67.4 % of patients with good adherence. And those who have a detectable viral load are 32.6 %.

Figure 4. 1.

Rate of Adherence to ART



Undetectable viral load is In order to ensure good health outcomes and treatment success among ART patients, it is desirable. In this research, 67 percent of the participants had undetectable viral loads. However, as compared to previous studies conducted in Kenya and other countries, adherence to ART among adolescents in our research is very poor. In reality, in a research conducted in Nairobi, 95 percent of respondents were adherent to ART (Gitu, 2012), while in a study conducted by Kariuki et al. (2016), 85 percent of respondents were adherent to ART.

Given the limited ART choices available and the considerable risk of developing drug resistance associated with non-adherence to ART, the low adherence among teenagers reported in this research is cause for worry. In comparison to previous Kenyan studies, adherence in the present research was lower among the adults which varied from 82% in Kibera, Nairobi (Mommanyi, 2017), 86% in Machakos (Kioko, 2017), 43.2% in Eldoret (Talam et al., 2008), and 87% in Nyeri (Sumbi, 2010).

The observed variations in statistics on non-adherence could be attributed to differences in measuring adherence. For instance, the research from (Gitu, 2012) used the self-reported taking of medication and pill counting, while the current study used the viral load of the patients in the last 3 months to measure adherence. Non-adherence can be measured in the clinical setting using a variety of strategies, including self-reports (such as surveys, interviews, and diaries), clinical assessments, pill counts, directly observed therapy (DOT), prescription refills, biological assays, and medication event monitoring systems (Talam et al., 2008).

4.2.2. Distribution of respondents by demographic characteristics

The research included 227 young individuals living with HIV who were visiting comprehensive clinics in three Nyeri County hospitals. The goal of the research was to determine the gender, age, marital status, level of education, and age at which respondents began ART therapy. The findings are indicated in Table 4.2

Table.4. 2

Demographic characteristics of the respondents

Gender	**Frequency**	**Percent**
Female	115	50.7
Male	112	49.3
Total	227	100
Age	**Frequency**	**Percent**
15-17	68	30
18-24	159	70
Marital status	**Frequency**	**Percent**
single	215	94.7
married	2	0.9
cohabiting	8	3.5
divorced/separated	2	0.9
Total	227	100
Education	**Frequency**	**Percent**
uneducated	2	0.9
primary	24	10.6
secondary	155	68.3
diploma	32	14.1
undergraduate	14	6.2
Total	227	100
Age-ART-Start	**Frequency**	**Percent**
before 15 years	221	97.4
after 15 years	6	2.6
Total	227	100

From the results above, gender was in equal proportions in both males and females (50.7% of males, and 49.3% of females). This indicates that there are as many males as females attending comprehensive clinical care in the 3 selected hospitals. The responses ranged in age from 15 to 24 years old. The sample's median age was 18, with a minimum age of 15 and a maximum age of 24. According to the aforementioned findings, 94.7 percent of the respondents were single, while just 5.3 percent of the respondents were married, cohabiting, or had been married but subsequently divorced. The majority of the respondents (68%) had a secondary education, while 20% had a higher education. Only 12% of those polled had a poor degree of schooling. Because they were infected through HIV transmission from mother to child, the bulk of the responders (97%) began taking medicine before the age of 15 years.

4.2.3 Distribution of the Socio-Economic Characteristics of the Respondents

Table 4. 3.

Socio-economic Characteristics of the Respondents

Cost of transportation	**Frequency**	**Percent**
easy to afford	186	81.9
difficult to afford	41	18.1
Total	227	100
Cost of other medications	**Frequency**	**Percent**
easy to afford	170	74.9
difficult to afford	55	24.2
unaffordable	2	0.9
Total	227	100
Source of food	**Frequency**	**Percent**
market	135	59.5
household	89	39.2
relatives / friends	3	1.3
Total	227	100
Number of meals per day	**Frequency**	**Percent**
one meal	9	4
two meals	66	29.1
three meals	152	67
Total	227	100
Balance-food and ART	**Frequency**	**Percent**
easy to afford	189	83.3
difficult to afford	36	15.9
unaffordable	2	0.9
Total	227	100
occupation	**Frequency**	**Percent**
student	161	70.9
employed	24	10.6
unemployed	42	18.5
Total	227	100

Most of the respondents, 81%, had no difficulties to afford the transportation fees to the clinic and 74 % could afford the cost of other medications. The source of the food was the market for the majority of the respondents (59%), and 39% had their food from the household farms. The majority of the respondents, 64% could afford 3 meals per day and only 4% could not afford at least 2 meals per day. The diet was balanced for 83% of the respondents. About the occupation of the respondents, 70.9% were students, 10.6% were employed and 18.5% were unemployed.

4.2.4 Distribution of the socio-cultural characteristics of the respondents

Respondents were asked if they experienced stigma if they have social support and if they avoid friends or relatives because of the illness. They were asked if they really think they need treatment. Their answers are in table 4.4

Table 4.4.

Socio-Cultural Characteristics of the Respondents

Stigma	**Frequency**	**Percent**
No	107	47.1
Yes	120	52.9
Total	227	100
Support	**Frequency**	**Percent**
Yes	170	74.9
No	57	25.1
Total	227	100
Social avoidance	**Frequency**	**Percent**
no	180	79.3
yes	47	20.7
Total	227	100
Think to stop	**Frequency**	**Percent**
no	218	96
yes	9	4
Total	227	100
denial	**Frequency**	**Percent**
no	216	95.2
yes	11	4.8
Total	227	100

The table above shows that 52.9% of the respondents have experienced stigmatization. To the question about social support, 74.9% said to have someone in their entourage who support them. Social avoidance has been reported by only 20% of the respondents and the majority said to not avoid friends because of the treatment. The majority of the respondents, 96% do

not think that one day they should stop taking the treatment. The denial of the illness condition has been reported by only 4.8% of the respondents.

4.2.5 Distribution of ART regimen-related factors

The respondents were asked to indicate how many pills they have to swallow per day, if they feel the drug burden and if they experience side effects from the drugs. The results are summarized in Table 4.5.

Tableau.4. 5.

ARV regimen-related factors

Number-Pills	**Frequency**	**Percent**
one pill	36	15.9
two pills	140	61.7
more	51	22.5
Total	227	100
Drugs Burden	**Frequency**	**Percent**
no	161	70.9
yes	66	29.1
Total	227	100
Side-Effect	**Frequency**	**Percent**
no	185	81.5
yes	42	18.5
Total	227	100

As shown by the table, the majority of the respondents, 61%, took 2 pills per day and 22% took more than 2 pills. About the drug burden, only 29% said to feel that they take a lot of drugs. Side effects from the treatment have been reported by only 18.5%, while 81.5% of the respondents said not experiencing side effects.

4.3 Statistical Analysis of the data

The study's initial goal was to investigate into the socio-demographic variables that affect participants' ARV adherence. We looked at the following outcomes: risk of adherence, sex, age, marital status, level of education, and age of ARV initiation.

4.3.1 Socio-demographic factors influencing adherence to ART among youth

The first objective of this study was to explore the socio-demographic factors that influence the adherence of the participants on ARVs, we looked at the following outcomes as the risk to adherences, sex, age, marital status, level of education, and age of starting ARVs.

Table.4. 6.

Association between demographic characteristics and adherence

Respondents characteristics		frequency	Adherence n= 153	Non-adherence N=74	Statistic values
gender	Male	112	84	28	X^2=5.810
	female	115	69	46	P= 0.016
age	15-17	68,	48	20	
	18-24	159	105	54	P=0.369
Marital status	single	215	145	70	X^2 =6.282
	married	2	2	0	P=0.099
	cohabiting	8	6	2	
	Divorced/separated	2	0	2	
Education level	No education	2	2	0	X^2=3.17
	primary	24	16	8	
	secondary	155	103	52	P=0.530
	diploma	32	24	8	
	undergraduate	14	8	6	
Age of start medication	Before 15 years	221	147	74	X^2=2.981
	After 15 years	6	6	0	P=0.084

An almost equal number of both genders were recruited for the study. Female was about 50.7% (n=115) compared to male, 49.3% (n=112). Regarding viral load 67.4 % (n=154) of the participants, their viral load was not detectable in contrast to 33% with detectable viral load. Among those with detectable viral load, females candidates registered higher numbers of detectable viral load 62.2% (n=46) to its counterpart with only 37.8% (n=28).

Pearson Chi-Square test was carried to explore the relationship between gender and viral load, gender was found to be a significant predictor of the viral load with Pearson's X2(1)

=5.810, p=0.016 which was statistically significant. Furthermore, the likelihood ratio of Chi-square indicates a significant relationship between gender identification and the viral load LR X2=5.856, P=0.016. To further explore whether gender factor is a predictor of viral load a binary logistic regression was done, gender is positively significant (b=0.693, s.e. =0.290, p=0.017) with an (Odd ratio) OR= 2. Females are likely to have a detectable viral load. This finding is consistent with studies reporting poorer adherence among women that have significant differences identified between genders (Bonolo et al., 2013). But it is in contrast with other studies in which it was found that gender is not a predictor of adherence (Byakika-Tusiime et al., 2005, Iliyasu et al., 2005, and Talam et al., 2008). These discordant results may be due to methodological distinctions, sample differences, or sociocultural divergence.

The median age of the participants was 18 years with an interquartile range (IQR=3.0), the majority of the patients in the study were between ages 16 years and 20 years, which accounted for 70.0% (n=159). In regards to whether the age of the participants predicts adherence to ARVs, bivariate correlation analysis revealed no correlation between the viral load and the age of the participants, Pearson's correlation r=-.060, p=.369, which was non-statistically significant. Almost the majority of the candidates started ARVs before 15 years of age, around 97.4% (n=221) compared to only 2.9% (n=6) after 15 years of age. With regards to those who started before 66.5% (n=147) had undetectable viral whereas 33.5% (n=74) with detectable viral load.

Pearson Chi-square test revealed no relationship between the age of starting ARVs and the viral load, Pearson's X2 (1) =2.981, P=0.084 which was non statistically significant. A binary regression analysis was also done and the age of starting ART was a non-significant predictor of the viral load (b=20.517, s.e. 16408.73, p=.999), with OR= 8.13.

The age at the start, there were no significant predictors of adherence to the therapy. The results are similar with those of Talam et al. (2008) in Eldoret, but not with those of Iliyasu et

al. (2005) in Nigeria, who suggest that age may affect adherence, with adherence increasing with age except for the very old.

In regards to adherence and marital status, 94.7% (n=215) were singles, married and divorced/separated stood at 0.9% (n=2) each, and cohabiting 3.5% (n=8). The detectable viral load was 32.6% among the single participants, 25% among the cohabiting participants, 100% among divorced and separated participants, and 0% among married participants.

Multinomial logistic regression was carried between the viral load and the marital status. The likelihood ratio Chi-square test comparing the fit of the model with the complete set of the predictor was not statistically significant (LRX2=6.282, P=0.099). Adherence was not affected by marital status. In Uganda, Byakika et al. (2005) discovered a relationship between marital status and adherence to ARV treatment, while in Botswana, Weiser et al. (2003) did not.

Most of the candidates recruited for the study were educated about 99.1% (n=225) with an almost equal proportion of females 50.7% (n=115) and males 49.3% (n=112). Secondary education recorded the highest 68.3%, followed by diploma 14.1%, primary 10.6%, undergraduate 6.2%, and finally illiteracy account only 0.9% of the participants. In regards to viral load between both sexes, on the males' side 75.0% (n=84) the viral loads were not detected and 25% (n=28 was detected in contrast with females where 60.0% (n=69) was undetected and 40% (n=46) with a present viral component in the blood.

In regards to whether the level of education predicts the viral loads, the likelihood ratio Chi-square test LR(X2) =3.17, p=.530 was not statistically significant. The degree of education was not shown to be a significant predictor of adherence, which is in line with (Gitu, 2012) but differs with (Shubber et al., 2016), who showed that a lower level of education had a

detrimental effect on ART adherence. The findings of this research may be explained by the fact that the majority of the participants in the study had a secondary education.

4.3.2 Socio-economic factors influencing adherence to ART among youth

The second research objective was to determine Socio-economic factors that influence adherence to antiretroviral therapy.

Table 4.7.

Association between economic factors and adherence

Respondents characteristics			Adherence N=153	Non-adherence N=74	Statistic values
occupation	student	161	113	48	X^2=5.33
	employed	24	18	6	P=0.017
	unemployed	42	22	20	
transport	Easy to afford	186	127	59	$X^2 = 0.356$
	Difficult to afford	41	26	15	P= 0.550
	unaffordable	0	0	0	
Other medication	Easy to afford	170	120	50	$X^2 = 5.288$
	Difficult to afford	55	31	24	P= 0.071
	unaffordable	2	2	0	
Source of food	market	134	98	36	X^2=4.937
	Household farm	90	54	36	
	Relatives/ friends	3	1	2	P=0.085.
Number of meals	One meal/day	9	7	2	X^2= 1.27
	Two meals/ day	66	47	19	P= 0.53
	Three meals/day	152	99	53	
Balanced Diet	Easy to afford	189	135	54	X^2=9.343
	Difficult to afford	36	18	18	
	unaffordable	2	0	2	P=0.002

The main occupation in the last one month during the study was being a student, which accounts for 70.9% (n=161), followed by unemployment 18.5% (n=42) and those who were employed were 10.6% (n=24). The employment rate was similar between males and females 10.7% (n=12) in each group. In regards to unemployment 20% (n=23) of the women were not employed compared to 16.69% (n=19) of men. The viral load suppression was 75% among men in the study compared to 60% of the female.

Occupation at least in the last one month prior to the study was found to be a significant predictor of the viral load hence adherence, LR(X2) =5.33, P=0.017. Being a student was a significant predictor of undetectable viral load (b=0.761, s.e. =0.354, p=0.031) with OR=2.14, that is to say, that being a student is associated with an odds ratio of 2.14 of having an undetectable viral load compared to unemployed. Also, employment is a positive significant predictor of the viral load in contrast with unemployment (b=1.003, s.e=0.564, p=0.075) with OR=2.727. Being employed or a student is associated with an undetectable viral load compared to being unemployed. This result is similar with the findings of a research conducted in Nyeri (Sumbi, 2010), which showed a strong relationship between job status and adherence.

In regards to the cost of transport, about 81.9% (n=186) reported that they could easily afford the cost of transport, 18.1% (n=41) could afford with difficulty, and none reported not able to afford the cost of transport. The majority of those who could meet the cost of transport easily, 68.3% (n=127), had an undetectable viral load in their blood compared to 31.7% (n=59) with detectable viral load. The group who expresses challenges in getting transport, 63.4% (n=26), had undetected viral load compared to 36.6% (n=15). There were no significant differences among both sexes in regards to the affordability of the transport cost, however, about 52.7% (n=98) of females could easily meet the transport cost compared to their counterpart 47.3% (n=88).

The Chi-square test revealed that the cost of transport was not a significant predictor of the viral load among the group in the (X^2 = 0.356, P = 0.550). This finding is in contrast with other studies (Ramadhani et al., 2007 and Russell, 2005) who found that the inability to afford transport costs to the clinic contributed to poor adherence to medications. Patients attending the Comprehensive Care Centre, when they don't have a particular problem, have clinic appointments every three months for a general check-up and a medication refill. The viral load is checked every 6 months, which reduces transportation fares for some patients. From the focus group discussions, it emerged that the majority of patients in this age category are exclusively students, which means financial problems may exist. Although all the respondents were receiving the medication free of charge, additional costs incurred through travel to the facilities have implications for adherence, the discussions revealed that many patients choose health centres far from their community to avoid being seen by neighbours or their family members when they go for a refill. This generates very expensive transport costs.

Quotes: *There are days I can miss a clinic appointment due to missing transportation fares. For example, when the appointment is in the middle of the month, it's not easy to get money."*

"I am an orphan of father and mother, always asking for money to go to the hospital is not so easy. Sometimes, I go there on foot for a long distance of 2 hours, sometimes I don't go and I miss my appointments. Only my aunt knows that I am HIV positive, when she doesn't have money, I just give up because it is a secret between me and my aunt ". Missing clinic appointments is one of the major causes of non-adherence.

In the same manner as the cost of transportation, the cost of accessing the other medication was not a significant predictor of the viral load ($X^2 = 5.288, P = 0.071$) the association between the cost of other medication and adherence was statistically not significant. In fact, the ART is free of charge and most of the respondents had health insurance. According to

Ssewaya (2011), the introduction of free ARVs at public health facilities was a significant breakthrough since most PLWHA who had been left to die owing to the cost of ARVs, which were mainly accessible via the private sector, were able to receive ARVs after the cost was removed. As they stated in the focus group discussions, getting health insurance that will cover all the health care expenses is the most important and beneficial thing in the life of a person living with HIV.

The Source of food was categorized into the market, household farm, relatives/ friends, and NGO support. 59% (n=135) of the participants buy their food from the market, followed by 39.2% (n=89) from household and farm, and 1.3% (n=3) admitted that they received support from friend and relatives. There was no NGO or welfare support reported by the participants.

The multinomial logistic regression revealed that the source of food is not a predictor of the viral load LR(X2) =4.937, P=0.085.

On the subjects of meals, the number of meals the majority of the respondents, 64% could afford 3 meals per day and only 4% could not afford at least 2 meals per day. Among those who said they can afford 3 meals, 65.1% (n= 152) had good adherence, while 34.9% had a detectable viral load. For those who can afford only 2 meals, 71.2% had an undetectable viral load against 28.8% with detectable viral load. Respondents who said they can afford only 1 meal per day are only 4% and among them, 77.8% had good adherence. The statistical analysis by Chi-square revealed that the number of the meal was not a significant predictor of the viral load ($X^2 = 1.27$, P= 0.53).

The majority of the respondents reported to easily afford a balanced diet (83.2%), among them 71.4% had an undetectable viral load against 28.6% had a detectable viral load. Respondents who assumed to have difficulties affording a balanced diet are 15.9% and half of

them had a good adherence while the other half had a detectable viral load. Only 0.9% said to not afford at all a balanced diet and all of them had a detectable viral load.

The affordability of the balanced diet is a significant predictor of the viral load, the test model reveals likelihood ratio Chi-square test LR(X2) =9.343, p=0.002. That is to say, participants for whom it was easy to afford a balanced diet were at a high chance of having viral load undetected (b=1.036, s.e. = 0.3437, p=0.003) with OR of 2.819. This result was consistent with Ssewaya (2011) and Uthman (2008) findings in their research, which found that malnutrition, difficulty to get adequate and/or high-quality food, and nutrition intake of fewer than three meals per day were all linked with non-adherence to ART. In his research, however, (Gitu, 2012) did not discover a link between nutrition and adherence of factors influencing non-adherence among youth in Nairobi. Focus group discussions have shown that in general young people of this age are well-nourished because the vast majority are still under the family roof and others are in boarding school, and they can have three meals a day. However, diets are not always well balanced.

4.3.3 Socio-cultural factors influencing adherence to ART among youth

To explore socio-cultural factors that influence adherence to antiretroviral drugs (ARVs), the following areas were explored, stigma, social support, social avoidance, denial, and thought of stopping ARVs.

Table 4.8.

Association between socio-cultural characteristics and adherence

Characteristics of the respondents		frequency	Adherence N=153	Non-adherence N=74	Statistic values
Should stop ART	yes	9	2	7	X^2=8.706
	no	218	151	67	P=0.003.
Avoidance of friends	yes	47	21	26	X^2=13.925, P= 0.0001
	no	180	132	48	
Community or family support	supported	170	135	35	X^2=8.147
	Not supported	57	18	39	P=0.0004
stigma	Experienced stigma	121	57	64	X^2 =49.811 P=0.0001
	No stigma	106	96	10	
denial	yes	11	3	8	X^2= 8.472
	no	216	150	66	P= 0.004

From the study almost 52.9% (n=120) of the participant experienced stigma from being HIV positive compared to 47.1% (n=107), who did not being stigmatized. Of those who experienced stigma, 53.3% (n=64) had detectable viral load compared to only 9.3% (n=10) in the group who did not experience stigma.

Stigma was found to be a positive predictor of adherence to ARVs and a significant predictor of the viral load ((b=-2.776, s.e= 423, p=.0001) with an OR= 0.062.

Also, the Pearson Chi-square test indicates there is a significant relationship between stigma and adherence to antiretroviral drugs Pearson's X2 (1) = 49.811, P=.0001.

From focus group discussions, it clearly emerged that fear of the unknown might contribute to stigma and discrimination. Although at least one person (parent or guardian) knows their HIV status, young people revealed that HIV remains a subject they don't dare talk about after being aware of their status. Conversations on this subject are rare, even non-existent within their families. According to them, "subjects about HIV are to be avoided" Some have expressed fear of possible rejection or judgment by their extended family or small community if they disclose their status. One of the participants was stated:

Quotes*: "When my mother died, I went to live with my grandmother. She was aware of my seropositivity but her other children, my aunts, and uncles, do not know it. I'm afraid if they find out they'll start discriminating against me."*

Further, another 16 years old participant reported experiencing stigma and discrimination and had to hide his medication from his schoolmates since he studied in a boarding school. He was quoted saying;

"One day, I heard my classmate saying that those who have HIV have undergone God punishment," says a 16-year-old boy living in boarding school. "*Since then I have been hiding my medicines and I am afraid, one day, I will be caught taking them."*

Fear of rejection, discrimination and stigma from the study was shown to be a hindrance to adherence to medication among the youths interviewed in Nyeri County. The fact that the majority were school going, being in a boarding set up where privacy is a challenge, adherence to medication was seen to be hindered. This situation would force the youths to seek care from distant health facilities or even stop taking medications when in the presence of their peers in school. Hindrance to adherence among the youth in a boarding school set up was also confirmed in many other studies done in Kenya (Sumbi, 2010; Momanyi. 2017) and other countries (Mutwa et al., 2013) in Rwanda, (Semvua et al., 2017) in Tanzania and

Uganda (MacCarthy et al., 2018). The reports indicate that school attendance hindered privacy which resulted in disruption of ART adherence.

When participants were asked whether they have been supported last month by a family or community member to take their ARVs, about 74.9% (n=170) admitted to having received support; compared to only 25.1% (n=57) who said to not received social support. Among the respondents who received support, 79.4% (= 135) has a good adherence with an undetectable viral load, while 20.6% (=35) have a detectable viral load. Among those who said to not being supported, 68.4% (=39) have a detectable viral load compared to 31.6% (=18) who have an undetectable viral load.

To explore the relationship between the community support and the viral load the Pearson Chi-square test was statistically significant, Pearson X2(1) =8.147, P=0.0004.

Family members and peers provide support by assuming the responsibility of reminding the sick persons about medication, clinic visits, and also escorting them to the health facility. Family members are significant in providing monetary, clothing and food support (Nabunya et al., 2020). From the focused group discussion, the young adults pointed out that family and social support was important for the wellbeing of HIV patients. They added that care from health providers, family and HIV support groups were important in fighting stigma. Even so, some of the respondents reported not receive adequate social support and this hindered taking of medications. One of the participants stated;

> *"At home, I have my mom who reminds me every day to take medication. But when I am at school I do not have anyone to remind me because nobody else knows."*

Trust and confidence of the youth in care is reliant on the patient-health worker relationship, which then impacts ART uptake, access to care and on overall adherence (Croome et al., 2017). The importance of the health care facility more so the health care providers in

providing support to the youths was demonstrated when some of the respondents confirmed the support they received from Nyeri County Hospitals. A participant expressed that:

> *"I manage to get good adherence because of the support of my doctor. The medical team helps us a lot and cares about our health. When I do not come to my clinic appointment, they call me to inquire about my situation or a social worker comes to visit me at home. I thank them very much because if it was not them, I would already be dead."*

HIV infection tends to exclude or isolate those infected, and this phenomenon is particularly feared among adolescents who have a major need to have friends, a confidant, to compare themselves to each other, and to verify that they share commonalities between them. Actually, adolescents infected with HIV tend to feel different from their peers. They would like to talk about their HIV status but are hesitant to do so for fear of rejection or breaching the parents' recommendations, which sometimes require them to keep the strictest secret. Apart from family support, the support group creates a secure environment in which they feel comfortable enough to allow themselves to express their fears and feelings, until then to threatening to be verbalized. The use of support groups in South Africa among young people living with HIV has been documented to be useful in increasing and reinforcing adherence of patients living with HIV. Moreover, when mobile health was used to test improvement in adherence among HIV positive adolescents, it proved to be effective in increasing adherence among young people. Additionally, the study report indicated that peer-to-peer support group was thought to create a favourable environment for positive behaviour change. This was because the participants reminded each other to take medication, shared how to tackle medication adverse effects and encouraged each other on how to live normally. The output from that study depicted an improvement (6.8%) from social support, the decline in stigma and increased adherence from self-reporting (de Jager et al., 2018). From the discussion in the current

study, respondents confirmed that peer support was important in adherence. Some of the respondents contributed that:

" The support groups allow me to meet other young people living with HIV and to compare our experiences of seropositivity, to share the difficulties encountered with the drugs. At least I know that I am not the only one to endure the burden of HIV."

They were also quoted saying;

"When we talk in a group, it helps us enormously. We learn how to deal with certain situations that can come under the status of seropositivity like stigma, rejection. And that encourages us and gives us the strength to keep going."

Gardenier et al. (2010) & Rotheram et al. (2010) backed up this conclusion. According to their results, the degree of social support among PLWH who adhered to their antiretroviral treatment was considerably greater than the level of social support among non-adherents. Regarding social avoidance, only 20.7% (n=47) of the patients distant themselves from friends and community because of their illness compared to 79.3% (n=180). The viral load is detectable in 55.3% (= 26) in the group of respondents who said to avoid friends, and in 26.7 % (= 48) in the group of respondents who said to not avoid friends. The Pearson Chi-square revealed that social avoidance is a significant predictor of the viral load with Pearson X2(1) =13.925, p <0.0001.

Thinking of stopping ARVs was one of the questions asked during the study majority of the patients in the study did not think of stopping their ARVs, only 3.964% (n=9) thought of stopping their ARVs, among these 7 (77.8%) of them have detectable viral load, and 2 (22.2%) of them their viral load was not detected. The Pearson Chi-square test between thinking of stopping ARVs and the viral load was significant with Pearson x2(1) =8.706,

p<0.003. The binary logistic regression revealed that thinking of stopping ARVs was not a significant predictor of viral load and adherence (b=-.953, s.e=2.079, p=.647) with OR=0.385.

From the study, 95.2% (n=216) believed that it is essential to take their ARVs every day without any interruption compared to 4.8% (n= 11) who expressed denial. Among those who consider ARVs are important majority had undetectable viral load 69.44% (n=150) in contrast to 30.6% (n=66) with detectable viral load. The Chi-square testing association between denial and adherence was statistically significant with Pearson X2(1) =8.472, p< 0.004.

The group discussions showed that among young people who have poor adherence, some have a feeling of denial. They do not really accept having HIV, and some believe that HIV is a passing situation, therefore a curable disease and that one day they will be able to stop the drugs.

Quotes: *"I wonder why me? Because the worst part is that I am the only one living with HIV in a family of four persons. I don't understand why I have to take medicine all my life. My uncle tries to help me but sometimes I don't really want to take these drugs and I lie that I took them when not.* "

"When I feel good, I think I no longer have the virus and I stop taking the drugs. The problem is that I get sick sometimes even until I'm hospitalized."

The feeling of denial and thinking to stop ARVs have been found to be strong predictors of adherence also by (Wagner, 2004; Jani, 2002) who confirmed that greater adherence was observed in patients who believed that they need the ARV treatment for their well-being.

Denial of HIV status and the urge to stop medication are important determinants of adherence that should be taken into consideration by the count of Nyeri from the time a patient is enrolled in care. As recommended by many other studies, it is critical for the health care system in Kenya to recognize the barriers to adherence in medication faced by the youth face,

this would enable development and implementation of youth friendly strategies that would strengthen and improve clinical outcomes in all levels of HIV care continuum. Sustainable modalities to boost family, community and social support, such as peer networks are essential

4.3.4 ART regimen-related factors influencing adherence to ART among youth

The fourth goal was to discover health-related variables that affect antiretroviral treatment adherence, and the findings are shown in the table below.

Table.4.9.

Association between ART regimen factors and adherence

Regimen factors		frequency	Adherence N=153	Non-adherence N=74	Statistic values
Pill /day	One pill	36	26	10	$X^2 = 0.0816$
	Two pill	139	105	34	P= 0.04
	more	52	22	30	
Feel pill burden	yes	66	42	24	$X^2 = 0.594$
	no	161	111	50	P= 0.441
Side effects	yes	42	24	18	X^2= 0.0816
	no	185	129	56	P= 0.122

From 227 participants interviewed, the majority of the respondents 61% took 2 pills per day and 22% took more than 2 pills while 15% were taking only 1 pill per day. Among the participants who took 2 pills per day, only 25.5% had a detectable viral load compared to 75.5% who had an undetectable viral load. About drugs burden, only 29% said to feel that they take a lot of drugs compared to 71% who didn't feel any pill burden, among these, 68.9% had a good adherence with an undetectable viral load which is not far compared to the proportion of undetectable viral load among those who feel the pill burden(63.7%). Side

effects from the treatment have been reported by only 18.5% while 81.5% of the respondents said not experiencing side effects. The rate of good adherence with an undetectable viral load in this category is 57.1% for those who had side effects from the drugs compared to 69.7% among those who didn't experience side effects from the drugs.

To find a relation between the viral load and the number of pills patients in the multinomial regression showed that individuals who took one or two tablets per day had a reduced chance of having a detectable viral load than those who took three or more pills per day. Patients who take more than two tablets per day have a detectable viral load, but taking more pills per day is a positive and significant predictor of detectable viral load (b=1.232, s.e. =.474, p=0.009), with an OR (odds ratio) of 3.428. The chi-square test also shows that there is a link between the number of tablets taken and adherenceX2=0.0816, P=0.04.

Group discussions also revealed that some patients tend to miss daily doses because they feel that they are taking lots of medications.

From the study conducted by MacCarthy et al. (2018) in Uganda, a hindrance to adherence resulted from the burden of taking many medications every day, this was cited as a frustration by the youth hence leading to what is known as ' drug holiday'. From the group discussion held, the respondents expressed that they missed taking drugs daily because they felt they were many. One of the girls on the 2nd line ART treatment regimen stated that:

"*I have 6 tablets to swallow per day. Sometimes I feel overwhelmed by these pills and I only take half of it just to get some rest."*

Similar to these findings, experiences shared by the youth in Soweto, South Africa showed that the number of pills and the feeling it is a burden hindered adherence. The respondents stated that they felt fatigued or bored by taking ARVs every day. Others felt that the drugs

were too much work, were big in size, and had an awful taste, and that it was better if it was in syrup form (Hornschuh et al., 2017).

From the binary logistic regression drug burden and drug side effects were non-significant predictors of adherence to ARVS drugs, (b=-.231, s.e=.309, p=.455) with OR<1 and (b=-.543, s.e.=.351, p=.122), with OR <1 respectively. The chi-square results are ($X^2 = 0.594, P = 0.441$) for the drug burden factor, and $X^2 = 2.387, P = 0.122$) for the side effects factor. Weiser et al. (2003) in Botswana and VanDyk (2010) in South Africa have found similar results. The results may be attributable to respondents' high ART knowledge and awareness, which aligns with a South African research that showed educated HIV patients tolerating side effects and sticking on treatment. Other studies have linked adverse effects to a lack of adherence to antiretroviral therapy (ART) among HIV-positive adolescents (Denison et al., 2015). Participants in group discussions also reported the side effects of medication as a reason for the irregular taking of medication.

"*Before the drugs caused diarrhea and bowel problems. The next day I would stop them and take them back when I felt better. But thank God the doctor changed the regimen now it is better."*

However, antiretroviral monitoring and treatment are particularly complex and require a whole life medication, clinic analysis, consultation, and change of lifestyle. The focus group discussion revealed that, in addition to the burden of disease, patients must, therefore, bear a real burden of treatment.

"*It's hard to live with the disease knowing that I have to take one or two pills every day. I really feel that I am not like other children. They are in good health and I think that by stopping the drugs I could be like them"*

Some have mentioned that they miss the clinic appointments because they are tired of always consulting the doctors when they are in good health. This can sometimes hinder good adherence.

“Long waits at the hospital are wasting time when you are in good health and it is too tiring to always go to the hospital every 3 months."

In fact, people living with HIV have to report to the hospital at least once in 3 months for the medication refilling, and every six months they do a viral load test to check if the virus is detectable or not in the blood. An undetectable viral load is a good indication that the medications are well working.

During the focus group talks, it was discovered that most patients who began treatment more than three years ago had their antiretroviral medicines and regimens altered, with the most frequent reasons being related adverse effects.

CHAPTER FIVE

SUMMARY, CONCLUSION, RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the study's main findings and makes conclusions based on them. It also identifies the most important topics for future research, as determined by the results of this study.

5.2 Summary

The goal of this research was to find out what variables influence adherence to antiretroviral treatment among Nyeri County adolescents aged 15 to 24. To achieve this objective, the study was divided into chapters.

In the first chapter, the researcher first defined in the introduction the adherence to ART treatment as well as its importance for people living with HIV in general, and for young people in particular. The situation of adherence to ART has been explored on a global, continental and regional level, based on studies and researches carried out in this area. The background of the study reviewed existing statistics on adherence to ART among young people in Kenya, as well as studies already conducted on this issue. The statement of the problem gave a clear view of the issues concerning adherence to ART in young people, and the goal of the study was to identify variables affecting antiretroviral treatment adherence among adolescents aged 15 to 24 years' old who attended selected health facilities in Nyeri County. To achieve this main objective, four specific objectives have been set:

1. To determine the social-demographic variables that affect antiretroviral treatment adherence among youth aged 15 to 24 years in Nyeri County's chosen health institutions.

2. To determine the economic variables that affect antiretroviral treatment adherence among youth aged 15 to 24 years in Nyeri County health facilities.

3. To determine the socio-cultural variables that affect antiretroviral treatment adherence among Nyeri County adolescents aged 15 to 24 years old in selected health institutions.

4. To determine variables linked to antiretroviral treatment regimens that affect antiretroviral therapy adherence among youth aged 15 to 24 years in Nyeri County health institutions.

The justification of this study answered the question "why "determining the factors influencing adherence to ART among youth aged between 15 and 24 years in Nyeri County? The reasons were that adherence is known to be the most important determinant of successful ARV treatment, and statistics have shown that every year there is a significant rate of deaths among youth due to HIV.

Chapter two explained findings from other studies on adherence to antiretroviral therapy among young people aged between 15 and 24 years. It specifically looked at demographic, economic, socio-culture, and art regimen-related factors that influence adherence to antiretroviral treatment.

Chapter three highlighted methodological details that have been used in the study. The study area was Nyeri County, and data were collected from Karina District Hospital, Nyeri Referral Hospital, and Tumutumu PCEA Hospital. The pre-test was done at Consolata Mathari Hospital. The study used a cross-sectional descriptive design, and the study population was outpatient's young people living with HIV aged between 15 and 24 years attending Comprehensive Care Centre. For the sampling procedure, the researcher proceeded by 4 methods: purposive sampling to select the 3 facilities in Nyeri County, a probability proportionate to size to get the sample size in each facility, and a systematic random sampling

to select the respondents. The sample size was calculated using Fischer's method, yielding a total of 227 respondents. The research collected data via an interviewer-administered questionnaire and a focus group discussion. The study's results were evaluated and reported in the fourth chapter. The percentage of respondents who used or didn't use ART, as well as socio-demographic, economic, and socio-cultural variables that influence adherence and ART itself regimen-related factors impacting adherence among youth aged 15 to 24 years were the main variables evaluated. The results were analyzed by comparing them to past research done in the field, and qualitative data were reported using themes.

5.3 Conclusions

The general objective of this study has been achieved and the results have concluded that the proportion of young people aged between 15 and 24 years who are adherent is 67% with undetectable viral load. This adherence rate is still very low compared to adherence among adults. The only demographic factor that is found to be associated with adherence is gender: the female respondents were likely to be non-adherent than male respondents. Economic factors such as occupation and a balanced diet were found to be significant predictors of the viral load. The results from this study also depicted stigma, social support, social avoidance, beliefs such as thinking to stop the ARVs, denial of the condition to be hindrance to adherence to ART yet they were shown to significantly influence adherence among youth. The ART regimen factors like the number of pills to swallow per day are also associated with the adherence, the more the pills are the more someone is likely to be non-adherent.

5.4 Recommendations

Adherence to treatment requires teamwork, the patients, the community; all participants are vital and engaged, including health care professionals and politicians. Individual, communal, institutional, and policy suggestions will be made in this section.

At the individual level, young adolescents need to assess themselves in order to find out what motivates them to adhere and also some of the barriers that make them non-adherent to medication. This will help adolescents' patients to have a positive attitude towards adherence and deal with the barriers encountered.

The community should provide the necessary support to young people living with HIV by banishing stigmatizing and discriminatory practices and remarks.

The health care providers should provide young people living with HIV with all the information they need to take medication, nutrition, sex life with HIV, especially young girls, and future mothers; a very close follow-up is very important in order to avoid failure of adherence. In boarding schools, management should create an enabling environment to help students take drugs regularly and privately. The Ministry of Education should develop strategies and guidelines as part of school-based support systems for HIV infected youth. Acceptance of status and disclosure necessitates good preparation through counselling and support to navigate ongoing challenges due to the lifelong treatment of the HIV. As youth become sexually active, they the responsibility of disclosing their HIV status to their companions, these requires them to be equipped with specific skills to aid them handle the often complex social and sexual dynamics. The county needs to strengthen Operation Triple Zero strategy in order to realize 90-90-90 UNAID targets in young adults.

5.5 Recommendation for further research

Operational research evaluating combination interventions to improve adherence needs to be undertaken in the county since no individually directed approaches have been demonstrated significantly influence adherence.

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APPENDIX

Title of the study: **FACTORS INFLUENCING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG YOUTH (15-24 YEARS) IN SELECTED HEALTH FACILITIES IN NYERI COUNTY, KENYA**

CONSENT FORM

1.1.Purpose

My name is Huguette IRAKOZE and I'm student at Kenya Methodist University completing a master's degree in Public Health. I am here to carry out a study on adherence to ARV treatment. This research will help me to understand the major factors which influence adherence to antiretroviral treatment among young people aged between 15 and 24 years.

1.2.Procedures

I will request from you, if you accept to participate in this study, to answer to a questionnaire which contains closed and open ended questions. If you can give more explanations about your answers it would be better.

1.3.Duration

To complete this questionnaire, it will take us between 30 minutes and 1hour.

1.4.Confidentiality

Confidentiality and anonymity will be observed by coding questionnaires. Your name will not appear anywhere and there will not be any personnel identification using your name, address, phone number or national identification numbers.

1.5.Risks

Participating in this study will not harm you in any way. The answers you will give will not be used against you.

1.6.Benefits

The participation will be voluntary and no reward or payment is expected from the researcher. Taking part in this research study may not benefit you personally, but we may learn new things that will help others.

1.7.Withdrawal

You have the right to stop the interviews if you wish at any time. You can also skip a question if you feel uncomfortable to answer. It will not have any consequence on your personality, or on the way you are assisted in this clinic, or on benefits you are entitled.

1.8.Concerns

If you have any question or concern about the research, you have the right to contact the researcher or the assistant of the researcher

1.9.Consent

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above and will receive a copy of this consent form.

Signature…… Date……..

Contact of the researcher: IRAKOZE HUGUETTE 254708854711, Email: irakhugue@yahoo.fr

Contact of the HEAD OF ETHICAL COMMITTEE Kenya Methodist University: P.O.BOX 267-60200 Meru-Kenya; Tel: +25406430301

ASSENT FORM
(FOR PARENT/ GUARDIAN OF YOUTH AGED BETWEEN 15-17 YEARS)

1.1.Purpose

My name is Huguette IRAKOZE and I'm student at Kenya Methodist University completing a master's degree in Public Health. I am here to carry out a study on adherence to ARV treatment. This research will help me to understand the major factors which influence adherence to antiretroviral treatment among young people aged between 15 and 24 years.

1.2.Procedures

I will request from your child, if he/she accepts to participate in this study, to answer to a questionnaire which contains closed and open ended questions.

1.3.Duration

To complete this questionnaire, it will take between 30 minutes and 1hour.

1.4.Confidentiality

Confidentiality and anonymity will be observed by coding questionnaires. The name of your child will not appear anywhere and there will not be any personnel identification using names, address, phone numbers or national identification numbers of you or your child.

1.5.Risks

Participating in this study will not harm your child in any way. The answers he/she will give will not be used against him/her.

1.6.Benefits

The participation will be voluntary and no reward or payment is expected from the researcher. Taking part in this research study may not benefit your child personally, but we may learn new things that will help others.

1.7.Withdrawal

Your child have the right to stop the interviews if he/she wish at any time. He/she can also skip a question if you feel uncomfortable to answer. It will not have any consequence on his/her personality, or on the way he/she is assisted in this clinic, or on benefits he/she is entitled.

1.8.Concerns

If you or your child have any question or concern about the research, you have the right to contact the researcher or the assistant of the researcher

1.9.Consent

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree that my child participate in the research study described above and I will receive a copy of this assent form.

Parent/guardian

Signature …… Date……..

Contact of the researcher: IRAKOZE HUGUETTE 254708854711, Email: irakhugue@yahoo.fr

Contact of the HEAD OF ETHICAL COMMITTEE Kenya Methodist University: P.O.BOX 267-60200 Meru-Kenya; Tel:+25406430301

QUESTIONNAIRE

a. Basic information

1. Date of interview

2. Study site

3. Code of interview

4. Last viral load :

i. Detectable

ii. Undetectable

b. Socio demographic information

5. Sex / gender of the participant: male […] female […]

6. Age in years:

1. 15 years [ ]
2. 16 years [ ]
3. 17 years [ ]
4. 18 years [ ]
5. 19 years [ ]
6. 20 years [ ]
7. 21 years [ ]
8. 22 years [ ]

9. 23 years [ ]

10. 24 years [ ]

7. What is your current marital status:

1. Single

2. Married

3. Co- habiting (not married but lives with a partner)

4. Divorced/ Separated

8. What is your level of education:

1. No education

2. Primary certificate

3. Secondary certificate

4. Diploma certificate

5. Undergraduate certificate

6. Postgraduate certificate

9. At what age did you start taking ARVs?

1. Before 15 years

2. 15 years

3. 16 years

4. 17 years

5. 18 years

6. 19 years

7. 20 years

8. 21 years

9. 22 years

10. 23 years

11. 24 years

c. Influence of socio economic factors

10. What is your main occupation in the last month?

1. Student

2. Employed

3. Unemployed

11. How do you find the cost of transportation to clinic?

1. Easy to afford

2. Difficult to afford

3. Unaffordable

12. How do you find the cost of other medications?

1. Easy to afford

2. Difficult to afford

3. Unaffordable

13. What is the main source of food for your household? :

1. Purchase (market)
2. Household farm
3. Relatives / friends
4. Welfare (NGO support)
5. Other (specify)

14. How many meals do you afford to take a day?

One [ ] two [ ] three [ ]

15. How do you find the balancing of the ARVs with the required food diet?

1. Easy to afford
2. Difficult to afford
3. Unaffordable

d. Influence of socio cultural factors on adherence

16. Have you ever experienced stigma because you are on ART?

Yes [ ] No [ ]

17. Do you think that you should one day stop taking ART medication?

Yes [ ] No [ ]

18. Do you believe that you really need to take medication (expression of denial)?

Yes [ ] No [ ]

19. **Do you avoid friends or relatives because of your illness?** Yes [ ] No [ ]

20. **In the last month did you have any family or community member who supported you to take ARVs?** Yes [ ] No [ ]

e. Influence of ART regimen factors

21. How many pills do you have to swallow a day?

One [ ] two [ ] three [ ] more [ ]

22. **Do you think is too much for you?** Yes [ ] No [ ]

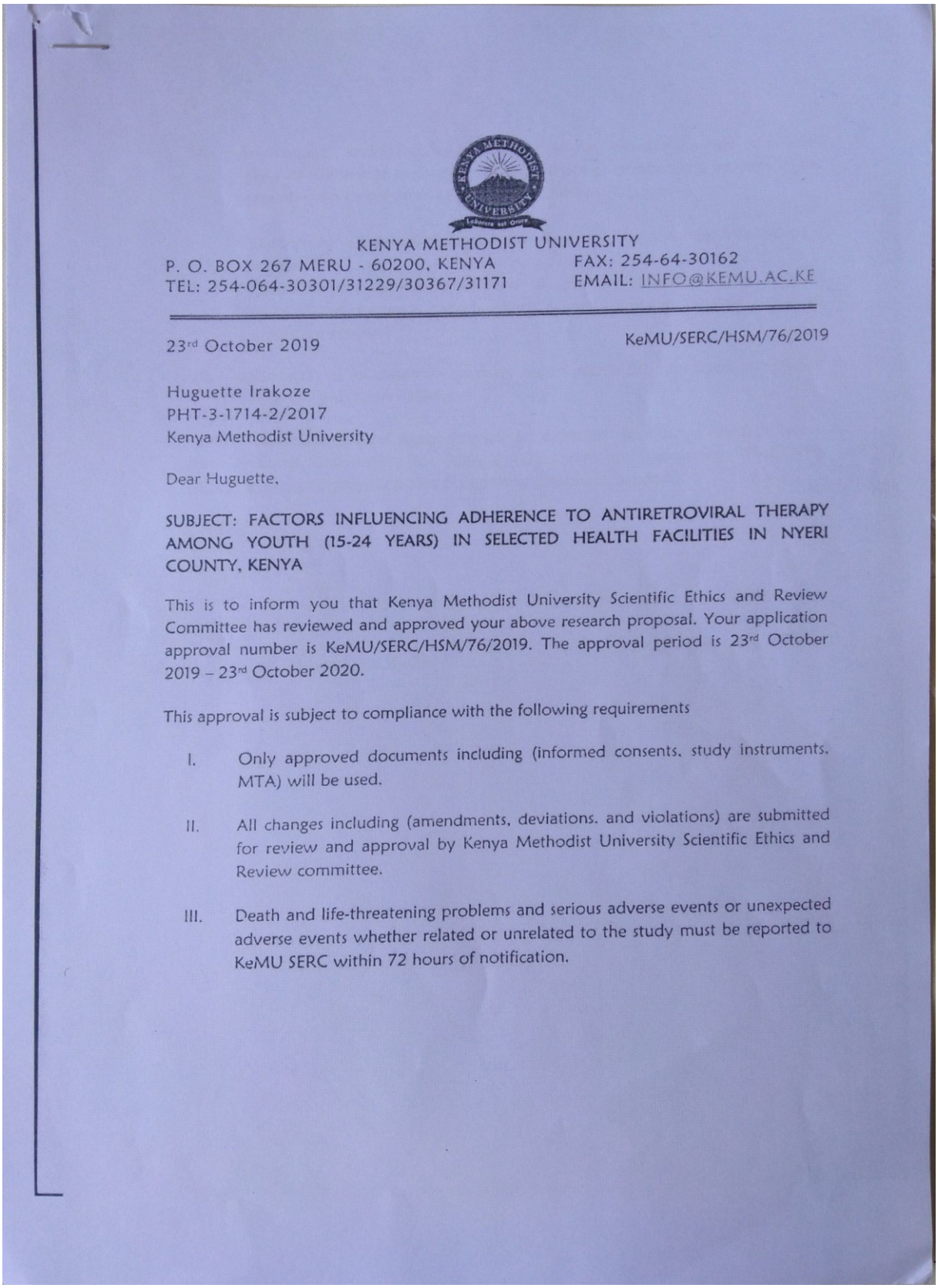
23. **Did you get side effects from ARVs drugs?** Yes [ ] No[ ]

FOCUS GROUP DISCUSSION (FGD) GUIDE

Patients who are on the line list and who will not be selected for the interview will be selected randomly to form two focus group discussion. The groups will be composed of 8 to 10 participants, one at Tumutumu Hospital (rural area), and another at Nyeri referral Hospital (urban area).

1. What do you think antiretroviral treatment is?
2. Do you think that there is any importance of taking every day the ARV treatment?
3. What is the inconvenience of stopping taking ARV drugs?
4. Sometimes, someone can miss a dose, what do you think makes someone missing treatment doses?
5. Do you think that one day you will stop the treatment?
6. Are they problems in your family, at school or at your work place that can impact your taking of ARV treatment properly?
7. Do you think financial constraints can hinder someone from taking ARV treatment properly? In which way?
8. Do you think is good to disclosure to someone else that you are HIV positive?
9. Are they any issues of stigmatization due to being on ART?
10. One needs a lot support when undergoing treatment, have you ever been supported by anyone.
11. Do you feel the burden of the disease?

ETHICAL CLEARANCE



KENYA METHODIST UNIVERSITY
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TEL: 254-064-30301/31229/30367/31171
FAX: 254-64-30162
EMAIL: INFO@KEMU.AC.KE

23rd October 2019

KeMU/SERC/HSM/76/2019

Huguette Irakoze
PHT-3-1714-2/2017
Kenya Methodist University

Dear Huguette,

SUBJECT: FACTORS INFLUENCING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG YOUTH (15-24 YEARS) IN SELECTED HEALTH FACILITIES IN NYERI COUNTY, KENYA

This is to inform you that Kenya Methodist University Scientific Ethics and Review Committee has reviewed and approved your above research proposal. Your application approval number is KeMU/SERC/HSM/76/2019. The approval period is 23rd October 2019 – 23rd October 2020.

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 Kenya Methodist University Scientific Ethics and Review committee.

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 KeMU SERC 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 KeMU SERC within 72 hours.

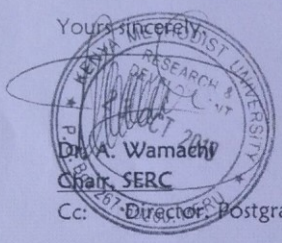
V. Clearance for export of biological specimens must be obtained from relevant institutions.

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 KeMU SERC.

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.

Yours sincerely,



Dr. A. Wamachi
Chair, SERC

Cc: Director, Postgraduate Studies

NACOSTI RESEARCH APPROVAL

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **815458**

Date of Issue: **09/January/2020**

RESEARCH LICENSE

This is to Certify that Ms.. IRAKOZE HUGUETTE of Kenya Methodist University, has been licensed to conduct research in Nyeri on the topic: FACTORS INFLUENCING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG YOUTH (15-24 YEARS) IN SELECTED HEALTH FACILITIES IN NYERI COUNTY, KENYA for the period ending : 09/January/2021.

License No: **NACOSTI/P/20/3168**

815458

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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