FACTORS AFFECTING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG HIV-POSIVE YOUTHS (18-35) YRS AT MANDERA COUNTY REFERRAL HOSPITAL, MANDERA, KENYA

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ABSTRACT

With the discovery of antiretroviral therapies (ARTs), the challenges shifted from HIV/AIDS pandemic to adherence to its treatment. This study sought to establish factors affecting adherence to ARTs among HIV-positive youths at Mandera County Referral hospital due to practical challenges of ARVs adherence and the paucity of similar research in the same area of study. The study objectives were socio-demographic, socio-economic, pharmacological, and facility-related factors. It employed a cross-sectional descriptive research design. A Fisher's (1998) and Mugenda and Mugenda (2003) formulae were incorporated to derive 214 sample size. Systematic random sampling technique and the interview-based structured questionnaires generated in English and interpreted into Somali/Borana language were used to collect data. The coded data was entered into SPSS version 27.0. The quantitative data was analyzed using descriptive statistics such as pie charts, bar graphs, frequency distribution tables with percentages, and qualitative data using content analysis technique categorizing and indexing responses into common themes through narrative. The results were then presented and explained in tables and figures. The study reached 208 and found that 80.77% missed the prescribed doses and majority of them (54.8%) were 30-35yrs, 56.73% female, 79.8% unmarried and 90.38% Muslims. The highest factors of non-adherence found under (i) Socio-demographic and Socio-economic: stigmatization (92.79%) coupled with false beliefs (HIV/AIDS is the curse of God-57.2%), unemployment (80.29 %) and illiteracy/semi-literacy-65.9%, (ii) Medication related: pills-burden (84.13%), ARV doses complexity (76.92%) and side effects (83.7%)

(iii) Hospital distance: only 27.88% of the participants lives near a health facility. The Patients' privacy and confidentiality had portrayed no adherence issues. The Pearson chi-square ($\chi 2$) test at $\alpha \leq 0.05$ was used to draw statistical significance at different p-values. The only variables with $p>0.05$ were gender $X^2=3.841, p=0.052)$, *ARVS Prolong Life* **($p=0.068, X^2= 5.991$),** 'Service Waiting Time ($p=0.212, X^2= 3.841$). I recommend having adequate number of youth-friendly CCCs, provision of economic support for youth living with HIV, and reduction of dosing complexity of the ARVs.

CHAPTER ONE: INTRODUCTION

1.1 Study Background

Young people living with HIV can be classified into two different subgroups: those that are infected at birth and those who acquired it sometime during their lives (UNAIDS, 2017). Youth and adolescence are a golden age of positivity, full of opportunities in a society that goes through stages of psychosocial and physical transformation from childhood to adulthood. Adolescents and young people (AYP) typically take many risks in life thus calling for attention in addressing their needs. Despite this healthy lifestyle adjustment phase, adolescents and young adults are marginalized and neglected by health systems (WHO, 2017).

A cross the globe, by 2020, 37.7 million people worldwide were living with HIV with attendant increase in HIV-related morbidity and mortality (UNAIDS, 2021). According to Diers (2021), young people constitute about 5% of all people living with HIV and about 11% of new infections. One of the United Nations Sustainable Development Goals is to eradicate HIV/AIDS pandemics by 2030. UNAIDS has developed the Fast Track Approach to achieve this Target. The goal of this strategy is to expand funding for HIV/AIDS care and treatment programs over time in order to accelerate, scale-up, and harness the speed required to end the HIV/AIDS pandemic. (Cuadros et al., 2019). The program led to the availability of antiretroviral drugs and their use to reduce the rate of transmission of this pandemic disease. Subsequently, the problem changed from the availability of antiretroviral drugs to adherence to treatment. Adherence to the ART regimen is an important aspect of Highly Active Anti-Retroviral Therapy (HAART) success. Failure to comply with HAART results in poor suppression of viral load, increased CD4 cell destruction, and progressively impaire and lower the immune function. It can also lead to resistance to antiretroviral drugs. Several studies have shown that adherence levels greater than 95%

provide tremendous benefits (Dolamo, 2018). While adherence to ART has shown positive outcomes among PLHIV, its non-adherence occurs globally in both high- and low-income settings countries. Globally, the rates of ART default ranged from 12.1%-Europe, 32.7%-Americas, and in Africa 39.4%-79.4% (van Teijlingen, Randall & Kirkpatrick, 2020).

The study demonstrated the existence of regional HIV prevalence and incidence with young adults making up 82 percent of all infections in sub-Saharan Africa. This rate is the world's highest, leading in an increase in availability of antiretroviral drugs, which is changing the course of infection in third world countries in Africa (Barr-DiChiara and Harrison, 2021). The Eastern and Southern African regions were among the worst hit in 2017, with 800,000 new HIV infections and 19.6 million people living with HIV (Martin, 2017). There still exists a great challenge of adherence to antiretroviral and newly acquired HIV/AIDS infections (UNAIDS 2020 report). The study conducted in Africa has explored the non-adherence rate of 39.4-79.4% (Lawn & Bekker, 2018). Study done in western Ethiopia also showed that discrimination and stigmatization, fear of disclosure of HIV, financial stress, forgetfulness, religion (spiritual therapy), deficiency of social support, drug side effects, alternative HIV treatment are barriers to HIV treatment (Zalalem, 2018)

East Africa is no exception. The impact of HIV/AIDS is the same as in other parts of Africa. Kenya has been dealing with the fallout related to HIV since its discovery. With the invention of antiretroviral (ARV) drugs, HIV/AIDS has been dramatically transformed from a known deadly infection to chronic disease that is not necessarily fatal. In Kenya, 45% of the population is under the age of 15, and 19% are youth (KNBS, 2019). Although the prevalence of HIV infection among HIV positive people in Kenya appears to have decreased and stabilised, the estimated incidence is 36 000 yearly, with young adults and adolescents accounting for about 50% of the incidence (National HIV Estimate, 2020).

The significant increase in HIV infection among young people in Kenya has resulted in rise in HIV infection and therefore need the use and adherence to antiretroviral drugs, as this is essential for a healthy as well as ill-free life within Kenya (UNAIDS, 2019). The Kenya National Strategic Plan for HIV/AIDS was unveiled by the President's Office and National AIDS Control Council (NACC) in October 2000. The plan outlines a multi-sectoral strategy to control and battle up HIV/AIDS with a focus on five major areas—prevention and promotion,

treatments, continuity in support and care, evaluation and research, socioeconomic impact reduction, HIV management, and treatment co-ordination. It has been demonstrated that pursuing these goals will considerably lower the prevalence of HIV infection (KNBS, 2018).

For example, Kenya has an estimated 6% prevalence of HIV/AIDS in 2014, with 880,620 new HIV cases reported annually. In 2018, this reduced to a prevalence of 4.9% with approximately 52,800 new infection yearly (National HIV Estimate, 2018). This decrease has been attributed to availability and use of ARVs. The government has taken the initiative to make antiretroviral drugs available at zero cost in all government departments, religious organizations, and most private sectors (KDHS, 2019). Comprehensive Care Clinics (CCCs) have been set-up in every County to ensure all eligible patients access the ARVs. This is achieved by increasing awareness and accessibility of ARV drugs (KNBS, 2016). This, in turn, increases adherence to ART, which in turn reduces mortality, hospitalization costs, and the incidence of other opportunistic infections (OIs) (NASCOP, 2016). Despite many steps taken by government of Kenya to ensure ARVs availability, its adherence remain low. The study done in Kiambu, Lusigetti Sub-county Hospital shows 53% adherent rate to ARVs which is significantly low based on more than 95% adherence rate recommended by WHO (Malek & Lars, 2021). Another study done 2020 in Lodwar, Kenya, stated that only 45.4% of the PLHIV who responded had been on ART for last 5 years prior to the study. 63.4% had ever failed to adhere and 51.1% had not adhered in the month prior to the study. (Here and Cariuki, 2020).

Mandera County has also been experiencing the challenges of adherence to ARVs contributed highly by beliefs and stigmatization (Muathe, 2020). According to Mandera County HIV Implementing Partners Online Reporting System (HIPORS), the latest statistic shows only 32% ARV coverage in adults, 19% in children and 6% in PMTCT. These compare with the national coverage of 96.0% and 93.2% for adults and children respectively (KENPHIA, 2018). Out of this total County ARV coverage, only 31% has shown viral suppression. This means the other 69% is not adhering to ARVs for the reason that it stands for unsuppressed viral load (HIPORS, 2021).

1.2 Problem Statement

Since the invention of antiretroviral therapy (ART), mortality from AIDS significantly reduced, shifting the challenge to adherence to treatment. Due to multiple daily doses of some antiretroviral therapies, as well as other side effects and requirements, like dietary restrictions, this compliance has become difficult and has raised concern among countries (WHO, 2017).

As per the 2009 census of population, there have been 0.3% of individuals living with HIV/AIDS in North Eastern Kenya. The percentage of people living with HIV/AIDS in the population approached 3 percent in 2015, which indicates a 2.97 percent rise in overall HIV/AIDS cases between 2009 and 2015. (Kenya HIV Estimates 2015). 3,385 persons were HIV positive as of the end of 2015, with young people accounted 19% of those who were infected (Kenya HIV/AIDS County Profile 2020).

As per the 2016 Kenya HIV County Profile, Mandera as one of the North Eastern part had the population of 697,922 with 52% of them being male, 48% female and 22% youths between (18-35) years. The prevalence of HIV in Mandera is about 0.3% while the national prevalence stands at 4.9% (Mandera County Case Report, 2022). Mandera County government together with other stakeholders spent Kshs14.9m just on HIV patients' care in order to achieve above 95% ARV coverage. Despite the efforts, the latest statistic shows 32% ARV coverage in adults, 19% in children and 6% in PMTCT and 31% viral suppression and the inverse is true indicating poor adherence to ART (HIPORS, 2021). Mandera County Referral hospital (MCRH) is located in Mandera East Constituency at Mandera town. It has both inpatient and outpatient with comprehensive services. As at April, 2023, 613 HIV-positive clients are in its Comprehensive Care Clinic (CCU) record with a proximately 70% youths. Out of these, an estimate of only 45% go to the facility for their weekly and monthly refills for ARV (Mandera County Referral Hospital, CCU/H Record, 2022).

1.2 The Study's Purpose

The study's aim was to determine the factors which influence youths (18-35) yrs. with HIV/AIDS who has been attending Comprehensive Care Clinic (CCC) at Mandera County Referral Hospital (MCRH), Mandera, Kenya, on adhering to antiretroviral medication. This study focused so much on those factors so as to address the negative impacts of HIV secondary to non-adherence to its treatment.

1.3 The Study's Objectives

1.3.1 Main Objective

To determine factors affecting adherence to antiretroviral therapy among HIV-positive youths (18-35) yrs. at Mandera County Referral Hospital, Mandera, Kenya.

1.3.2 Specific-Objectives

i. To investigate socio-demographic variables which affect adherence of seropositive youths (18-35) yrs. to antiretroviral therapy at Mandera County Referral hospital, Mandera, Kenya.

ii. To establish the socio-economic variables that affect antiretroviral therapy adherence among the HIV-positive youths (18-35) yrs. at Mandera County Referral hospital, Mandera, Kenya.

iii. To determine the pharmacological factors which affect compliance to anti-retroviral medication among HIV-positive youths (18-35) yrs. at Mandera County Referral Hospital, Mandera, Kenya

iv. To establish the facility related factors which influence adherence to anti-retroviral therapy among youths (18-35) yrs. with HIV at Mandera County Referral Hospital, Mandera, Kenya

1.4 Research Questions

i. Which socio-demographic variables affect antiretroviral therapy adherence among the HIV-positive youths (18-35) yrs. at Mandera County Referral Hospital, Mandera, Kenya?

ii. How does the socio-economic variables affect antiretroviral therapy adherence among HIV-positive youths (18-35) yrs. at Mandera County Referral Hospital, Mandera, Kenya?

iii. Which pharmacological factors affect compliance to anti-retroviral medication among HIV-positive youths (18-35) yrs. at Mandera County Referral Hospital, Mandera, Kenya?

iv. What factors related to the health facility influence adherence to anti-retroviral therapy among HIV-positive youths (18-35) yrs. at Mandera County Referral Hospital, Mandera, Kenya?

1.5 Research Hypothesis

The study's hypothesis was generated based on specific research objectives and they're:

i. There is no significant relationship among the socio-demographic variables in relation to adherence to antiretroviral therapy among youths (18-35) yrs. living with HIV.

ii. There is no significant relationship among the socio-economic variables in relation to adherence to antiretroviral therapy among youths (18-35) yrs. living with HIV

iii. There is no significant relationship among the pharmacological variables in relation to adherence to antiretroviral therapy among youths (18-35) yrs. living with HIV

iv. There is no significant relationship among the facility-related variables in relation to adherence to antiretroviral therapy among youths (18-35) yrs. living with HIV

1.6 Study Justification

This study focused on factors such as socio-demographic, socio-economic, and medications-related variables as well as health care settings which impact youths (18-35) yrs. with HIV's compliance to anti-retroviral medication as well as establishes a positive association between adherence to ARV drugs and successful viral suppression. These factors have been affecting the realization of the goals of October 2000 Kenya AIDS National Strategic Plan. This study, therefore, aimed at addressing these barriers by influencing community-based social policies to minimize stigma, increase awareness of HIV/AIDS among clients and promote socioeconomic support for active clients.

This research would also influence national antiretroviral drug manufacturing policies to improve the complexity of dosing and pill loading. This, in turn, would influence investigative policy at the national and county levels by providing prospective benchmarks that provide a foundation for exploring other undiscovered factors that might interfere with the state's vision and future goals.

Contributing to Scientific Knowledge: This research can contribute to the scientific understanding of adherence to antiretroviral drugs among young people living with HIV. By adding to the body of knowledge on this topic, the research can inform future research and improve our understanding of the complex factors that influence health behaviors.

Improving Treatment Outcomes: Understanding the factors that influence adherence to antiretroviral drugs among HIV-positive youths can help healthcare providers develop more effective treatment strategies. This can lead to better treatment outcomes, such as increased viral suppression, improved quality of life, and reduced risk of drug resistance.

Reducing Healthcare Costs: Poor adherence to antiretroviral drugs can result in increased healthcare costs due to hospitalizations, opportunistic infections, and the need for more expensive second-line or third-line medications. Identifying factors that contribute to non-adherence can help healthcare providers address these issues and reduce healthcare costs.

Improving Quality of Life: Adherence to antiretroviral medication can improve the quality of life for HIV-positive youths by reducing the likelihood of opportunistic infections and improving overall health. By identifying the factors that impact adherence, healthcare providers can develop strategies to promote medication adherence and improve the quality of life for HIV-positive youths.

1.7 The Study Scope

This study focused on factors associated with adherence to ARTs among youth (18-35) yrs. attending CCC at Mandera County Referral hospital in Mandera. This area of study was selected due to interest of the researcher based on the practical ART non-adherence issues among HIV positive youths in the aforementioned area of study. The youths were the distinguished participants of interest because of their activeness and vulnerability to contract the disease; and both male and female were involved. The researcher paid a critical attention to all these factors such as socio-demographic and socioeconomic factors, medication and facility-related factors that might hindered the adherence in order to address the gaps in ART. The study was designed to cover its objectives within a period not less than one month.

1.8 The Study Limitation and Delimitation

1.8.1 Limitation

Respondent biasness was expected: It was difficult to determine whether the respondents in the study revealed the truth, thus calling into question the validity of the data collected at Mandera County Referral hospital in Mandera.

Insecurity- the area has been facing the terror issue in the last half a decade and this created fear that it might interrupt the researcher's daily operation at Mandera County Referral hospital in Mandera.

1.8.2 Delimitation

The respondents' biasness was overcome by educating the respondents to have a clear understanding of the importance, purpose, and ethics that was followed in the research.

The insecurity issues were overcome by working with local leaders and hospital security guard to ensure safety and flow of activities.

1.9 Study Assumptions

The study assumed research participants to provide valid, accurate, and reliable information that would help refine the research conclusions.

1.10 Term Operational Definitions

Youths: Young people from 18 to 35 years old.

Adherence: complying strictly to Anti-retroviral therapy in order to produce the intended results.

Efficacy: is an antiretroviral medication's capacity to have the desired impact.

Comprehensive-Care Unit: an outpatient setting at Mandera Referral hospital which provides a multidisciplinary approach to fulfilling the requirements of HIV/AIDS patients who come to the center.

Factors affecting ARV adherence: These are elements which can help or hinder an antiretroviral program's success or failure respectively.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The primary objectives of this research study, which are the fundamental influences on ART, were rationalized in this chapter through a review of the extant literature. These fundamental factors are referred to as "interactive parameters" by the World Health Organization (WHO), which denoted that they might have either a favorable or unfavorable effect on ARV treatment adherence. Therefore, it was important to identify the underlying factors that could affect whether a patient would be able to take their medication as needed before taking steps to improve adherence (Chesney, 2017). The dimensions of these interactive parameters were discussed below.

2.2 Socio-Demographic Factors

Theses can also be called client's factors. These include socio-demographic factors such as level of education, race, culture, gender, psychosocial factors like substances misuse, support networks and stability, melancholy, nervousness, as well as other mental issues. Those variables can positively or negatively affect adherence to ART (Baruu, 2019). Numerous studies have found that higher levels of education and literacy, older age, white ethnicity, and male gender, are associated with better treatment adherence. However, depression, anxiety, and heavy drug or substance use (e.g., alcohol) can disrupt treatment regimens and lead to poor adherence to ARV therapy (Chesney, 2019). Among these many socio-demographic factors, we just discuss a few most common ones here.

2.2.1 Age

Non-compliance to antiretroviral medications is typical problem among adolescents and children living with HIV. Inadequate adherence has been linked to a number of variables, including pharmaceutical formulation, frequency of administration, drug toxicities and side effects, child age and developmental stage, as well as psychosocial, behavioral, and sociodemographic traits of children and caregivers (Vreeman et al., 2022). Numerous studies have shown that adherence is not constant and might change throughout the course of treatment. More recently, the prevalence of non-adherence was found to rise with age, according to the U.S. Pediatric HIV/AIDS Cohort Study (PHACS). In the short- and long-term assessments, getting older reduces the probability of non-adherence by 25% and 35%, respectively (Dada et al., 2019). Age of the patients and level of

adherence are highly related, according to recent studies. A study looking at the causes of non-adherence in Tanzania demonstrated that antiretroviral medication non-adherence was connected to younger age. In comparison to children, teenagers were found to have lower adherence to ART. According to the study, adolescents' non-adherence may be related to an "intellectual immaturity" that prevents them from understanding the long-term effects of their choices. (Semvua et al., 2017)

2.2.2 Gender

Gender is another aspect that could affect adherence. A study conducted in Cameroon, found that African men are more likely than African women to experience ART failure, and that this susceptibility extends beyond issues with adherence (Njamnshi et al., 2018). Another observational research study reveals that women are less likely than men to adhere to highly active antiretroviral therapy (HAART). In comparison to males, women adhered to HAART at a median rate of 46% as opposed to 73% for men (Forrest et al., 2021)

2.3 Socio-Economic Variables

The socio-economic factors can affect the ARVs compliance in many ways. The patients' understanding of ART may have an impact on their compliance towards it. According to reports, clients with good information and awareness of their positive HIV status, the correlation amongst treatment, adherence, and effective outcomes are more likely to adhere to ART than those without clear knowledge and understanding (Peterson, 2017).

In order to compare general knowledge and comprehension of ART adherence, a study was carried out ten years ago in rural and urban parts of northern Nigeria. This study results suggested ninety percent (90%) of patients with adequate ART knowledge had a compliance rate of more than 95%, while those with insufficient ART knowledge reported to have lower levels of adherence below 50% (NDHS, 2021). In this regard, the literacy, awareness of non-adherence negative effects, knowledge of above 95% compliance need as well as relationship between therapy and compliance are vital in promoting adherence. Thus, increased adherence is the result of patients' greater understanding of the detrimental effects of non-compliance to treatment regimens on the health of sick individuals and also the close family members and wider society. Clients' understanding and knowledge about the link of compliance to treatment effectiveness also helps them adhere with treatment regimens at levels greater than 95% (Paterson, 2018).

Other socio-economic variables that may affect adherence to ART are clients' cost of living and their level of education.

2.3.1 Cost of living

Anti-retroviral therapy compliance is significantly decreased by high cost of living caused by increased level of poverty, particularly in third-world nations where a large proportion of the population lives below the poverty line. Several people who are infected struggle to pay for transportation to CCC to get anti-retroviral medications, which results in non-compliance to treatment regimen (Grierson et al., 2017)

The primary social economic element linked to non-adherence to ARV therapy is poverty. It has had a significant impact on those receiving ARV therapy. This is due to their inability to afford the balanced diet required for the management of ARV Therapy. People have been known to trade their medicines for money. Due to the distance from their homes to the clinic, many patients have had to forgo receiving care because they cannot pay the necessary fare, especially when they are ill (Kheswa, 2022). Unaffordability to purchase the recommended meal planning such as oils, vitamins like fruits and vegetables, carbohydrates and starches as well as 8 glasses of water stipulated in many food pyramids among HIV positive people are not afforded by many clients living under the poverty line (UNAIDS, 2018). To reinforce the argument, Mbeki Thambo, a former president of South Africa, has been lambasted for linking poverty to an increase in HIV infection. (Hasan, 2014). This highlights how strongly HIV/AIDS is associated with poverty. This is due to the fact that the poor are unable to manage HIV medication as effectively as the wealthy. To prevent the HIV virus from mutating and becoming resistant to treatment, antiretroviral therapy must be adhered to at levels of 90–95% which has been facing a lot of cumbersome (Uric, 2020).

According to a study done in Chennai, India, one of the main obstacles to ARV therapy adherence is the financial burden of the treatment. The documented responses to this difficulty included selling jewelry, borrowing money from friends and close family, and stopping therapy (Kerr, 2019). The world's poorest nations have the highest rates of HIV prevalence. Most of these nations are in Africa, particularly in the Sub-Saharan region. By 2017, funding for AIDS had increased from $330 million in 2007 to over $10 billion (Caroline & Irinoye, 2019). According to estimates, the economies of the nation's most severely affected by the HIV pandemic suffer losses

of 1% to 2% every year. When PLWHIV do not stick to their ARV Therapy, this has a significant influence on their economies. (Uric, 2020)

2.3.2 Level of education

Level of education is also regarded as one distinguished factor that affect adherence to HAART. A Study showed that some patients with low levels of education have poor adherence because they might not be able to read the instructions provided by health experts ((Peltzer & Pengpid, 2019). Highly educated patients adhere to treatment regimens better than uneducated ones because they can understand the doctor's recommendations. The "level of education" aspect is statistically difficult to separate from other socioeconomic factors like living conditions, the presence of ethnic or linguistic barriers, or intellectual level. It should not be blamed independently of these other aspects if the level of education is considered in treatment adherence (Moore & Graham, 2016).

2.3.3 Stigmatization

Stigma is described as "any remark, act, or thinking that devalues and disgraces a general feelings and view about self". Like everywhere else in the world, people with HIV continue to face stigma and discrimination in Kenya. Despite the efforts of activists, local, national, and international organizations to combat it, people with HIV continue to face stigma and danger to their lives and the lives of their families. Discrimination is a byproduct of stigma and involves isolating and excluding afflicted persons who are suffering from various ailments. (MacCarthy et al., 2018). Access to HIV prevention, screening, and treatment services is hampered by stigma and discrimination, endangering the lives of those who are HIV positive. Self-stigma, also referred to as "intrinsic stigmatization," is an attitude and behavior that people develop toward themselves that distinguishes them from others, whether consciously or unconsciously. It is characterized by accepting stigmatizing viewpoints and behaviors, having a negative self-perception (fear, shame, guilt), giving up on any life goals, and isolating oneself from social interactions and activities (Croome et al., 2017). Discrimination and stigma are significant factors that cause non-compliance with ARVs law. In communities like Somali, where HIV is seen as a curse from God, people living with HIV experience severe stigma, which hinders them from attending comprehensive care clinic (CCC) (Martiny, 2020). Furthermore, negative attitudes and beliefs about the effectiveness of HAART may also negatively affect adherence to ART, leading to poor adherence (Patterson, 2017).

2 .4 Pharmacological Factors

The literature on antiretroviral therapy suggests that fear of pill side effects invariably discourages clients from taking their treatments (Mehta-et al, 2016). There are many ART related effects but we discuss two important factors here.

2.4.1 ARV Side effects

Patients experiencing adverse reactions most likely terminate the treatment. The antiretroviral drugs can cause some serious side effects, including short-term effects such as diarrhea, hallucinations, nightmares, and vomiting along with prolong use impacts like metabolism as well as neuropathic pain that hinder the patients of complying the treatment. Research study abundantly shows greater levels of conformance are seen in therapies which lessen or eliminate symptoms, while treatment regimens that increase adverse side effects increase non-adherence to treatment (Chesney, Max, & Sherer, 2019). In such cases, clients often stop treatment immediately or request a replacement of the drug that causes intolerable side effects (Docelus & Georgery, 2021). Another study showed that adverse effects of ARV medications are frequent and severe, and include migraines, persistent fatigue, nausea, vomiting, and diarrhea and they significantly hinder compliance . (Charlebois et al., 2020)

2.4.2 Complexity of ARVs

Another problem with treatment adherence is the complexity of dosing in ART regimen. The complexity of antiretroviral therapy includes, among other things, the number of pills taken daily, observing the times when the medications are taken, and avoiding certain foods while taking the medications (Kitahata, 2016). The ARVs regimen involve multiple doses of the drug daily, along with some constraints, for instance, dietary limits. The dosing factor, combined with its side effects, discourages clients from continuing to take their medication, leading to ART non-adherence (Niguso & Mavhandu-Mudzusi, 2020). However, dosing issues appear to have a greater impact on ART adherence than drug pill burden. There is consensus that once daily dosing is associated with greater adherence compared to multiple daily dosing (Pitts & Goetz, 2016). There are various classes of ART medications, and they all function differently for various clients (UNAIDS, 2018). The results are better when the several classes are combined than when they are delivered separately. For all newly diagnosed HIV patients, combination therapy with at least three distinct antiretroviral medications has now become standard

practice. However, the more frequent and varied the adverse effects are, the more effective the mixture is (Sam-Agudu & Schechter, 2018).

2.5 Facility Related Factors

Certain aspects of the healthcare environment can also have important structural implications that play a significant role in the failure or success of adherence to treatment (Ministry of Health, 2017). The layout and clinical setting with comprehensive interdisciplinary care with competent and trusted clinicians such as nurses, physicians, clinical officers, pharmacists and other professional social workers such as community health workers, mental health care providers are believed to have successfully accomplish the needs of HIV positive youths. An adequate and well-functioning health facility system to meet the needs of clients such as HIV positive youths, is critical in improving compliance with ART courses. The services frequently distinguished by acceptance, availability, convenience, affordability, as well as accommodation that increase intended performance in ART compliance are typical features of such facilities (Aday Andersen, 2019).

Some additional clinical settings that have a positive impact on adherence, such as comprehensive health care services composed of youth-focused services with counselling service as one major integral function, efficiency of transportation costs, proximity to facilities, confidentiality and privacy, short waiting times for services, ease of appointments, nonjudgmental and supportive attitudes of medical professionals. Prompt access to health facilities and antiretroviral drugs, access to counseling services from qualified health professionals, with adequate economic and psychosocial support for HIV positive youths also help improve adherence to antiretroviral therapy (Ministry of Health, 2017).

Another factor affecting ART adherence is transportation costs. Some health care facilities are located far from communities in our African nations; or, a person with HIV may decide to obtain their medication from a far-off medical facility in order to escape stigma from their neighbours. Additionally, the expense of transportation increases with distance from the medical facilities. The expense of travel has a linear association with non-adherence. (Safren & Nachega, 2019). Another study in Tanzania on the predictors of partial adherence further supports this result that non-adherence is more common among low-income individuals since many people find it difficult to commute to healthcare facilities (Whiting, 2018)

2.6 Theoretical-Framework

The Health Belief Model (HBM) supplemented with a psychosocial model was employed to conduct this study (Kozier et al, 2018). HBM was discovered by Rosentok in 1950 to find out who would or wouldn't take the desired actions to prevent disease (Kozier, Wilkinson & aearb, 2018). Thus, the model explored the psychosocial factors that influence human behaviour including beliefs or attitudes that influence wellbeing. The model centered on three basic variables: personal perceptions, modifiers and variables that influence the probability of adopting the recommended healthy behaviors. It stated that an individual can adopt a prescribed health practices via perspectives like vulnerability, barriers, illness severity, health benefit of actions to mitigate risks, as well as belief in effectively execute prescribed actions so as to achieve the recommended results without barriers (Levy, Zeri and Baroni, 2017). These individual perceptual were summarized as follow; perceived susceptibility/vulnerability, perceived seriousness/severity, perceived health benefits, and perceived barriers.

Perceived susceptibility: The term "perceived susceptibility" refers to the **subjective evaluation of the likelihood of developing a health issue**. People won't alter their health habits until they perceive a risk to their wellbeing. According to the health belief model, people who believe they are prone to a certain health problem would take actions to lower their risk of having the condition. People who are believed to be less susceptible to a sickness may not believe they are at risk of getting that condition. Others may be aware that they could get the sickness, but they think it is unlikely.

Perceived seriousness/severity: The term "perceived severity" refers to a **person's subjective evaluation of the seriousness of a health issue** and its related side effects. According to the health belief model, people who think a particular health issue is significant are more likely to take actions to stop it from happening. The term "perceived seriousness" refers to perceptions of the disease's influence on social and occupational functioning as well as beliefs about the disease itself. The moment a client perceives seriousness of HIV, adherence to its medications enhanced.

Perceived benefits: The **perceived benefits of acting** are another factor that influences actions connected to one's health. A person's perception of the value or effectiveness of engaging in a behavior that promotes health in order to lower their risk of disease is referred to as perceived benefits. Regardless of the objective facts regarding the efficiency of the action, a person is likely to engage in that behavior if they believe it will lower their vulnerability to a health problem or lessen its severity.

Perceived barriers: The term "perceived barriers" refers to how a person perceives the challenges to behavior change. Barriers may have established limits in the health-promoting behavior even if a person considers a health state as serious and feels that a certain action will effectively lessen the threat. In other words, for behavior change to occur, the perceived advantages must outweigh the perceived disadvantages. The perceived inconvenience, cost, risk/adverse effects of a medical procedure, and discomfort associated with engaging in the behavior are some examples of perceived obstacles to action.

Cues to Action: These are events or experiences that motivate an individual to act. For example, a health scare may motivate an individual to act to prevent future health problems.

Self-Efficacy: This refers to an individual's belief in their ability to take a particular action. People who believe they are capable of taking a particular action are more likely to do so.

For the context of this research, taking antiretroviral medication is a prescribed health practices which may be affected by a person's perceptions, attitudes, and beliefs. Such issues may result in ART noncompliance if they are not properly handled (Castonguay, Filer & Pitts, 2016)

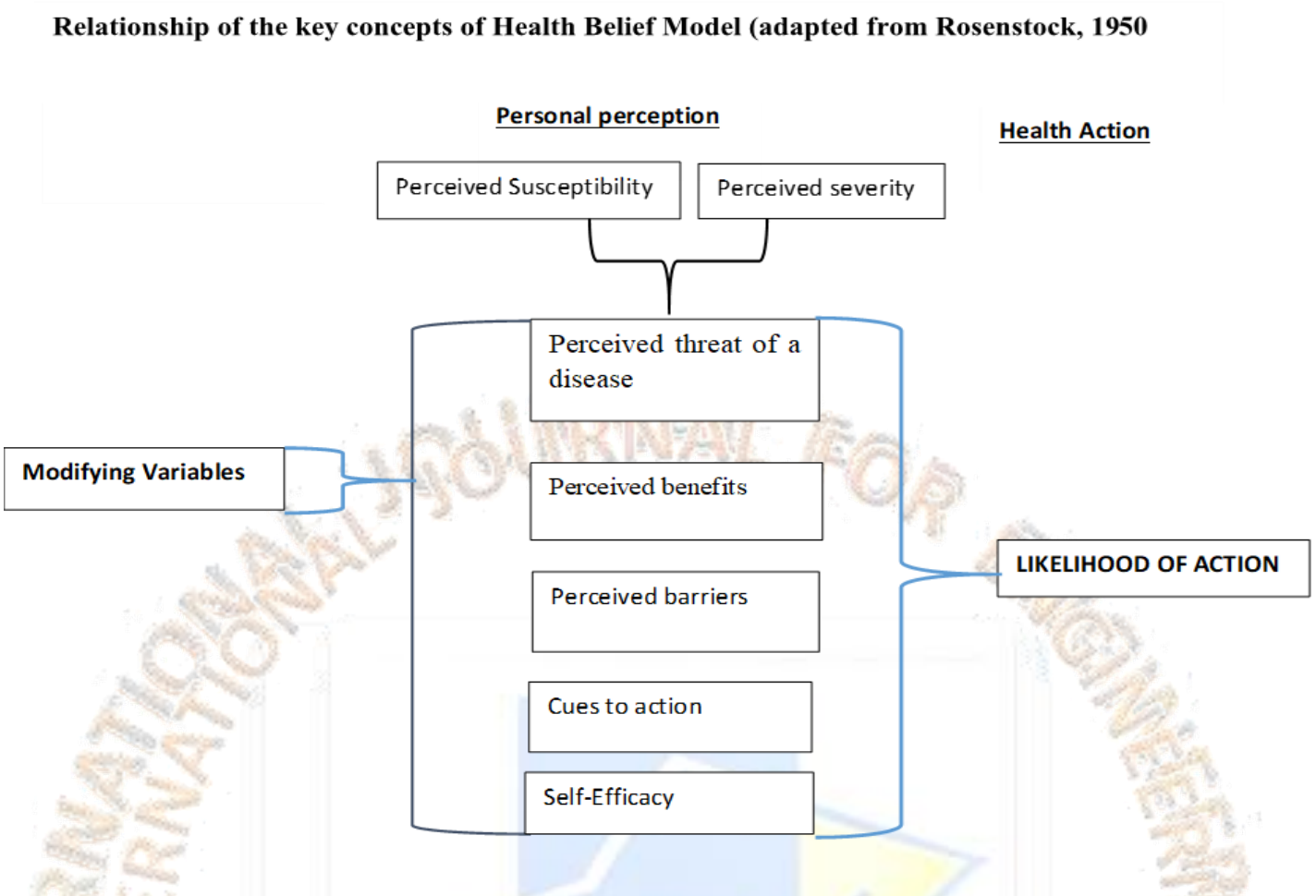


Figure 1:Health Beliefs Model (HBM)

2. 7 Conceptual-Framework

The theoretical framework given above served as the foundation for the conceptual framework shown below.

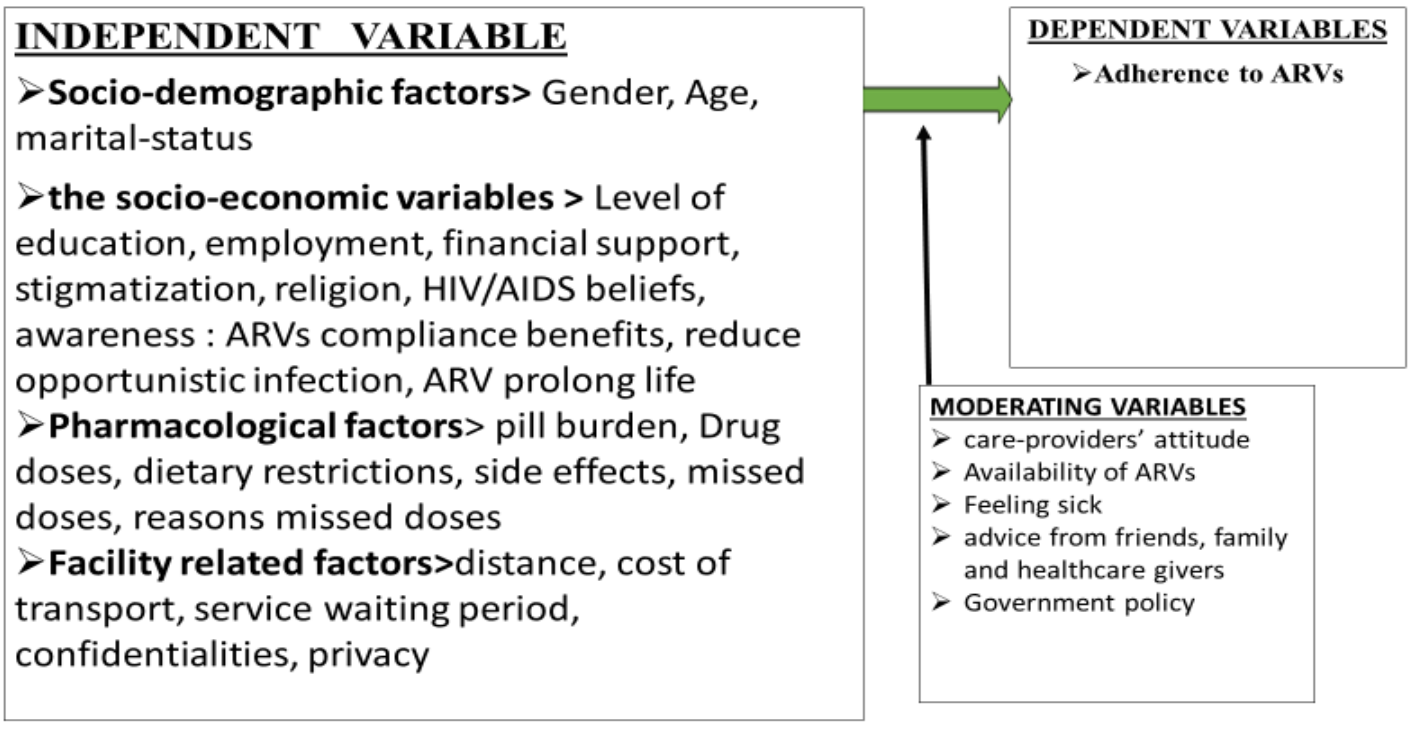


Figure 2: Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The methodological components covered in this chapter were study design, location of study areas, target groups, study populations, inclusion criteria, exclusion criteria, variables, sampling procedures, determination of sample size, data collection methods and tools, validity and reliability, data management and ethical considerations respectively.

3.2 Study-Design

This study used cross-sectional descriptive research approach to gather its data. The study was carried out between Dec 2022 and March 2023.

3.3 Location of Study Area

Mandera County Referral hospital (MCRH) is located at Mandera town, Bula-Power Sub-Location of Bula-Jamhuri location of Central-Division in Mandera-East Constituency, Mandera, Kenya. It is the main referral center across the County and has both inpatient and outpatient with comprehensive care services serving communities across the border of Kenya, Somalia and Ethiopia respectively. It has a total of 128beds and 5cots in in-patient unit comprising both male and female as well as pediatrics. However, this study was conducted on an outpatient unit, particularly at the comprehensive care clinic (CCC). To date, 613 seropositive patients have been registered in the intensive care unit with a proximately 70% youths. (Mandera Sub County Hospital, CCC Record, 2023).

3.4 Target Groups

The study focused on all HIV positive youths aged between 18 to 35yrs, visiting Comprehensive Care Clinic (CCC) at MCRH.

3.5 Study Populations

These were all HIV positive cohort of interest who gave consent to the study at Comprehensive Care Clinic (CCC) in MCRH.

3.6 The Inclusions and Exclusions Criteria

3.6.1 Inclusions Criteria

Those within (18-35) years of age, registered at CCU- MCRH and gave consent were included.

3.6.2 Exclusion-Criteria

Those who refused to consent and those who were critically ill as well as mentally incapable.

3.7 Variable

3.7.1 Independent-Variable

Socioeconomic, socio-economic, pharmacological**,** and facility-related factors were among these variables.

3.7.2 Dependent-Variable

It's adherence or non-adherence to antiretroviral therapy (ARTs)

3.8 Sampling Techniques and Procedure

This study used a systematic random sampling technique. All clients with inclusion criteria visiting the clinic during the study period were interacted. Steps involved in recruiting the participants were; i) Identify the sampling frame (415), (ii) Determine the sampling interval: 415/214(study sample size), (iii) Select the first participant randomly, (iv) Select subsequent participants using the sampling interval i.e. every 2nd client was picked to participate in the study from the first clients. The sampling process was conducted over a period of four consecutive weeks to allow enough participations.

3.9 Sample Size Determination

The target population's sample size was determined using Fisher's (1998) and Mugenda and Mugenda, (2003) formulae respectively.

The formulae> $\mathbf{n=\frac{z^2p(1-p)}{d^2}}$

n:the desired population's sample size when it's> 10,000, **z:**1.96 equivalent to confidence interval (95%), **P:**proportion of the target population that fail to adhere ARTs (**69%** i.e **0.69** Mandera County estimated non-adherence rate), **d:** the degree of accuracy **=0.05**.

This very formula has two roles; sample size calculation for population >10,000 and <10,000 respectively. Because it will be used as the standard value for determining the population's sample size for a populace less than 10,000, you must first establish the sample size for a populace greater than 10,000. Based on this, when the anticipated population is more than 10,000, then standard sample size calculation using 69% or 0.69 as the proportion of Mandera County not adhering to ARTs are as follows;

n= $((1.96^{2\ X}\ 0.69(1-0.69))\ /0.05^2 = (1.96^2\ X\ 0.2139)\ /0.05^2 = 0.8217/0.0025$

n= 338.7≈ **329** (when population is >10,000)

Since the study population in our case was below 10,000, ie 613, the aforementioned Fisher's (1998) formula was used together with Mugenda and Mugenda, (2003) formula to calculate our required sample size. The formula; **nf=**$\frac{n}{(1+(\frac{n}{N})}$, where;

nf: Required population sample size less than 10,000

n: Required population sample size greater than 10,000 10,000 i.e **329**

N: the estimated population size under study ie **613**

Therefore;

nf= 329/(1+329/613)

nf= 329/ (1+0.5367)

nf=329/1. 5367

nf=**214** (Our study's sample size)

3.10 Data Collections' Tools/Methods

The researcher set the interview-based structured questionnaires that were generated in English and interpreted into Somali/Borana language to enable better communication. The researcher then hired two assistants to aid him in data collection and trained them on criteria of collecting the data. Clients with inclusive criteria were sought and confidentiality of their identity assured. Then the literate participants were given the structured questionnaires to fill themselves while the illiterate ones were engaged in one on one interview to fill them. The administration of this structured questionnaire and interview were one on one so as to create rapport, enhance privacy and further clarify the purpose of the study. This was done over four consecutive weeks.

3.11 Validity and Reliability of Data Collection Tools

3.11.1 Validity of data collection tools

Validity is the extent to which an instrument measures what it is designed to measure and operates as it is planned to operate (Taherdoost, 2016). To ensure the validity, the researcher gave a copy of the set questionnaire to his supervisors and other external expert so that they could provide comments on its construct, content, and criterion validity. Their recommendations were then included in the final questionnaires. This ensured the instrument's accuracy.

3.11.2 Reliability of Data Collection Tools

Reliability is the degree to which a research tool produces consistent results when used in different occasions under comparable conditions (Taherdoost, 2016). To ensure this, Pretest was conducted at Garisa General Hospital involving 10% of the study sample size with eligibility criteria for the main study to test the questionnaires before the actual data collection time. The split half techniques were used to establish perfect reliability of the tools where the questions were divided into odds and even numbers. A group of twenty-one who met the inclusion criteria of the main study were recruited and the divided questions papers were administered to the same group on a weekly interval. The questionnaires were then collated and results analyzed; and any gaps identified in the questionnaires based on the responses were corrected.

3.12 Data Management and analysis

The completed questionnaires were reviewed for accuracy and clarity before processing the responses to maintain consistency. The data was then analyzed, cleansed and coded. The acquired coded data was entered into Statistical Package for Social Sciences (SPSS) version 27.0. Data analysis were done based on research specific objectives to check the correlation between among independent variables. Both qualitative and quantitative data analysis were done. The quantitative data was analyzed with the aid of computer software using descriptive statistics such as columns, pie charts, bar graphs, frequency distribution tables, and percentage. The qualitative data was analyzed using content analysis technique by categorizing and indexing of responses and other field notes into common themes through narrative. The results were then presented and explained in form of tables and figures.

3.13 Ethical Consideration

Before the actual data collection process, a formal written approval from the Mount Kenya University Ethics Review Committee/ the national commission for science, technology and innovation (NACOSTI) were obtained. Then the official permit was sought from Mandera County Referral Hospital (MCRH) management. The study participants were then recruited on a voluntary basis without compelling them. The veracity related to these study objectives were upheld by clearly explaining them and that there were no compensation or reward for participating in the study. The harmless non-invasive nature of the study was also clarified and the participants were given rooms to clear their doubts through inquiries. The participants were then given counselling as they were in the most sensitive and vulnerable stage. Both directive and non-directive techniques were employed during counselling session. That was a risk reduction counseling which aim at destigmatization and psychosocial stabilization as well as creating a positive rapport for the participants. The counselling was given to both clients and their caregivers (families) as it was an important component of youth friendly services (YFS), voluntary counselling and testing (VCT) and Prevention of Mother-Child Transmissions (PMTCT). The participants were then asked to sign the generated consent form voluntarily with the right to terminate the participation anytime or decline to answer any question. The confidentiality of the respondents was also addressed by maintaining the anonymity of the tools (questionnaires) through coding them and hiding the identity of the participants. The

anonymous information was then kept under a password protected computer software. Additionally, the research objectives' credibility was preserved throughout the study.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF RESULTS

4.1 INTRODUCTION

This chapter entails data analysis, presentation and interpretation of results in line with the study questionnaire and objectives structured with the aim of determining '**Factors affecting adherence to antiretroviral therapy among HIV positive youths (18-35) yrs. at Mandera County referral hospital'**. The questionnaires were distributed to the participants and sufficient time was given to provide sufficient information. The collated data was then cleansed and entered into version 27 SPSS according to how the questions appeared in the questionnaire and analysed. The results of analysed data was then presented and interpreted through various statistical figures and tables.

4.2 Response Rate

The study targeted 214 HIV positive clients attending Mandera County referral hospital to assess factors associated with ARV adherence. Out of the projected required sample size, a total of 208 respondents took part in the study which was rated 97.2% of the desired total sample size.

4.3 Socio-demographic factors

The researcher managed to reach 208 respondents at Mandera County Referral Hospital with different socio-demographic backgrounds. These as follow:

4.3.1 Gender of the respondents

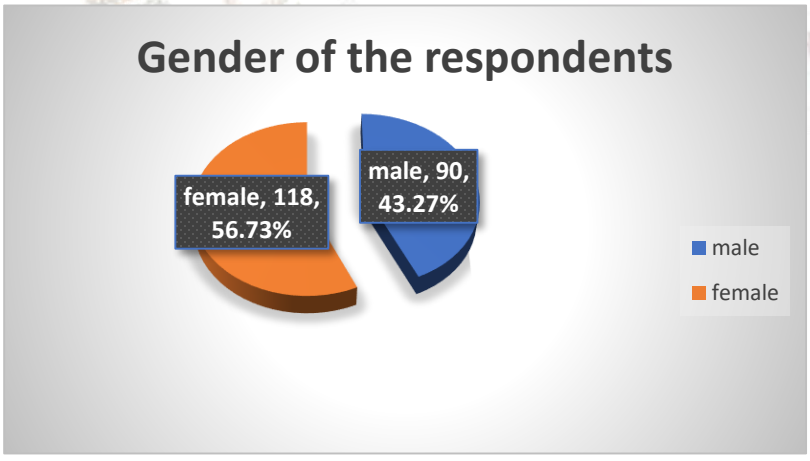


Figure 2:Gender of the respondents

The above pie chart shows that 118(56.73%) of the study participants were female and 90 (43.27%) were male.

This shows that more women were infected than male

4.3.2 Age of The Respondents

age		
Age(years)	Frequency	Percent
18-23	13	6.3
24-29	81	38.9
30-35	114	54.8
Total	208	100.0

Table 1:Age of respondents

In the frequency distribution table above, the ages were grouped for easy tallying. Out of the 208 respondents reached, 13(6.3%) were between 18-23years and 81(38.9%) of them were aged 24-29 years. Majority of the respondent who participated in the study were aged between 30-35 years; that was 114(54.8%) of the respondents

4.3.3 Marital status of the respondents

maritalstatus		
Status	Frequency	Percent
Single	115	55.3
married	42	20.2
Separated	51	24.5
Total	208	100.0

Table 2:Marital status of the respondents

The above frequency distribution table shows the marital status of the respondents based on the study findings. It shows that 115(55.3%) of the respondents were single, 42(20.2%) married, and 51(24.5%) separated.

4.4 Socio-economic factors

Several socio-economic related factors in this study that were believed to affect adherence to ARVs are as follows.

4.4.1 Respondents' level of education

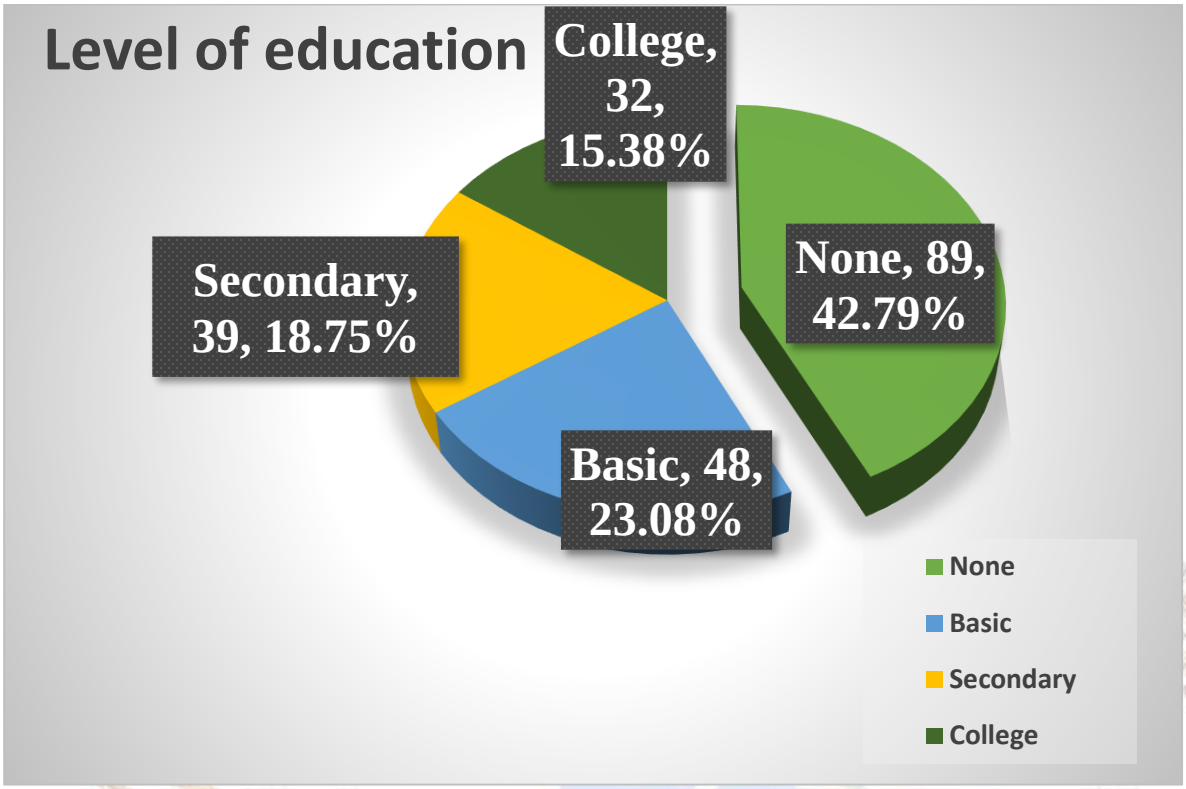


Figure 3:Respondents' level of education

The above figure shows that 89(42.79%) of the respondents had no education, 48(23.08%) had only basic, 39(18.75%) finished secondary level while 32(15.38%) reached college

4.4.2 Respondents' employment status

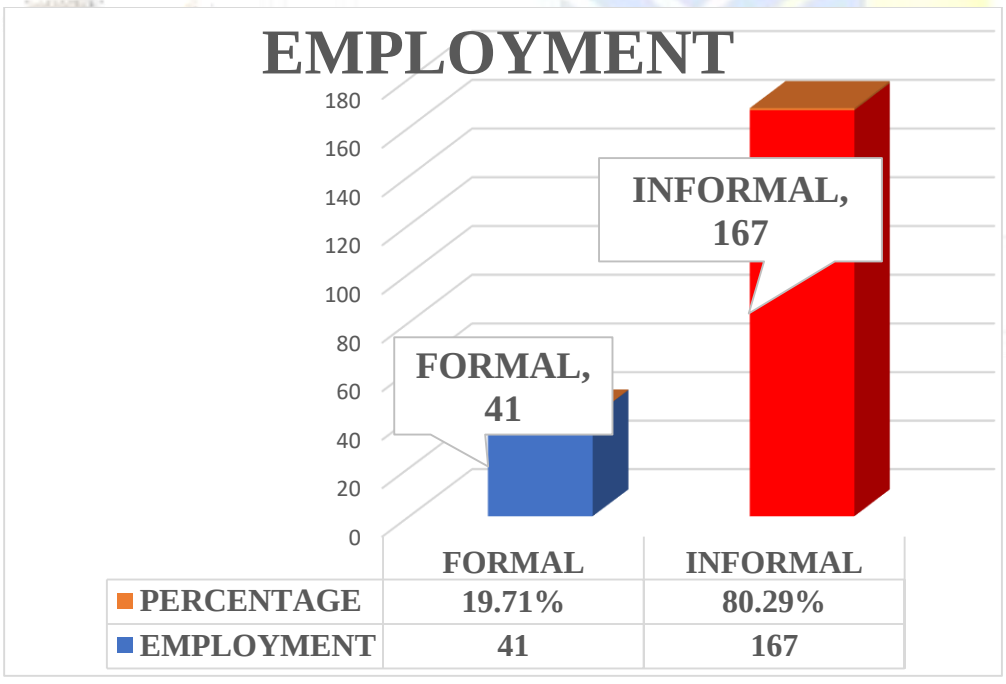


Figure 4:Respondents' employment status

The bar chart above shows that 41(19.71%) of the respondents were formally employed and 167(80.29%) were in informal employments.

4.4.3 Respondents' Financial Support

Financial Support		
	Frequency	percent
Government	38	18.3
Self	58	27.9
Family	111	53.4
NGO	1	.5
Total	208	100.0

Table 3:Respondents' Financial Support

The above frequency distribution table shows that 38(18.3%) of the respondents' financial sources were government, 58(27.9%) self, 111(53.4%) sourced from family, and 1(0.5%) from NGO.

4.4.4 Respondents' stigma

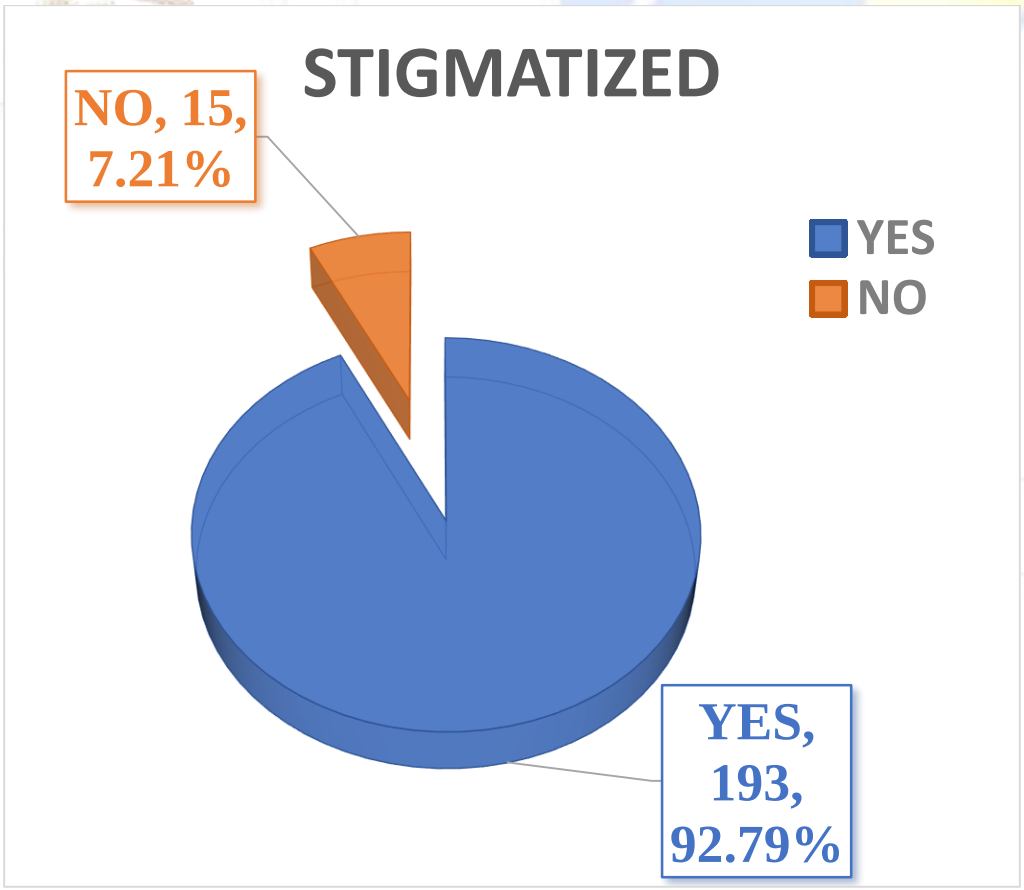


Figure 5:Respondents' stigma

The pie chart above shows that 193(92.79%) of the respondents felt stigmatized and 15(7.21%) were not stigmatized.

4.4.5 Respondents' religion

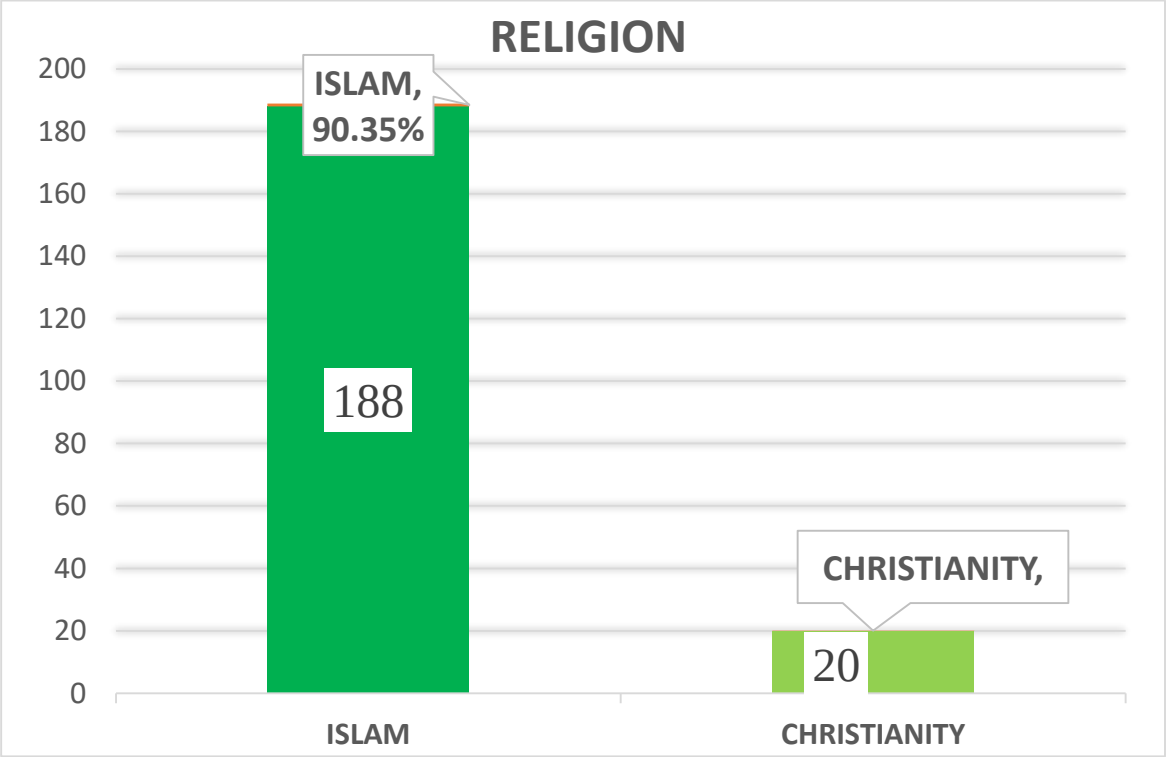


Figure 6:Respondents' religion

The bar chart above shows that 20(9.62%) of the respondents' faith were Christianity and 188(90.38%) were of Islamic faith.

4.4.6 Respondents' Beliefs on HIV/AIDS

	Frequency	Percent
God's curse	119	57.2
incurable	67	32.2
normal disease	22	10.6
Total	208	100.0

Table 4:Respondents' Beliefs on HIV/AIDS

The above frequency distribution table shows that 119(57.2%) of the respondents believed HIV/AIDS is a curse of God, 67(32.2%) incurable, and 22(10.6%) said just normal disease.

4.4.7 Awareness of Compliance Benefit

Compliance is good	Frequency	Percent
AGREE	**53**	**25.5**
DISAGREE	**105**	**50.5**
I DONT KNOW	**50**	**24.0**
Total	**208**	**100.0**

Table 5:Awareness of Compliance Benefit

Out of 208 participants, 53(25.5%) agreed with the statement "ARV Compliance is good'',105(50.5%) had disagreed with it and 50(24.0%) responded they don't know at all.

4.4.8 ARVs Reduce Opportunistic Infections

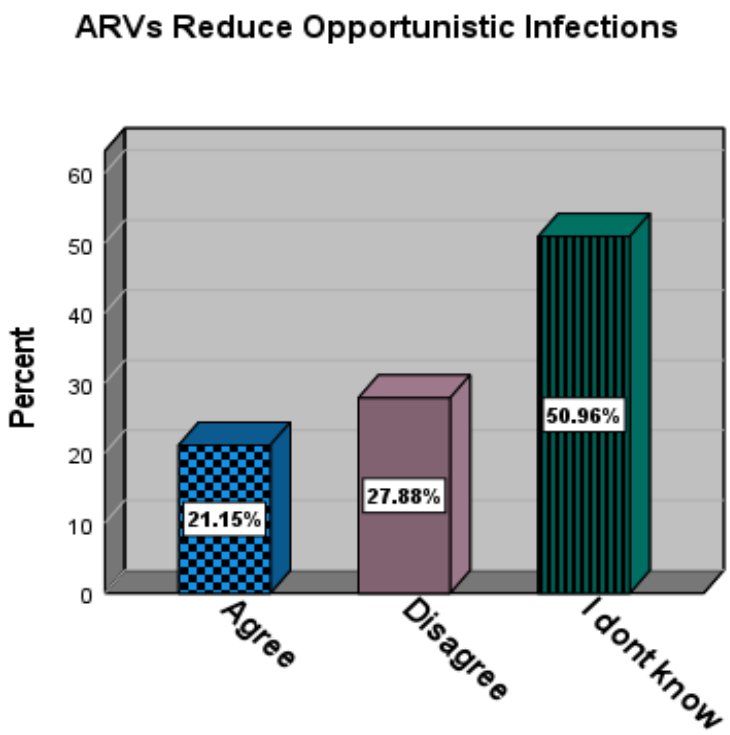


Figure 7: ARVs Reduce Opportunistic Infections

Of all the participants,44(21.15%) agreed with the statement "ARVs Reduce Opportunistic Infections'',58(27.88%) had disagreed with it and 106(50.96%) responded they don't know.

4.4.9 ARVs prolong life

ARVs Prolong Life		
	Frequency	Percent
Agree	57	27.4
Disagree	68	32.7
I dont know	83	39.9
Total	208	100.0

Table 6:ARVs Prolong Life

The table 7 above shows that 57(27.4%) agreed with the statement "ARVs prolong life'',68(32.7%) had disagreed with it and 83(39.9%) responded they don't know.

4.5 pharmacological factors

The ARV medication related factors that were believed to affect its adherence in this study are as follows.

4.5.1. Respondents' ARV pill as burden

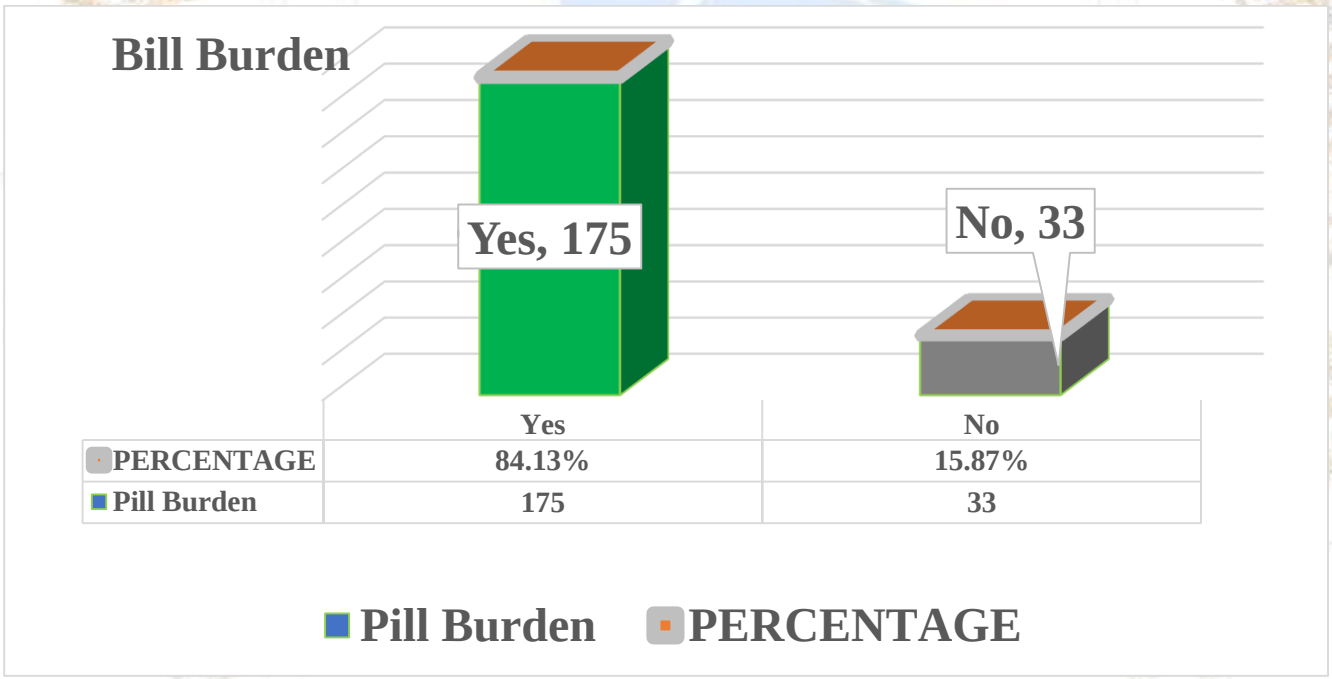


Figure 8:ARV pill burden

The figure above shows that 175(84.13%) of the respondents felt the drug pills as burden and 33(15.87%) said not burden to them.

4.5.2. Respondents' Beliefs on ARV drug dose

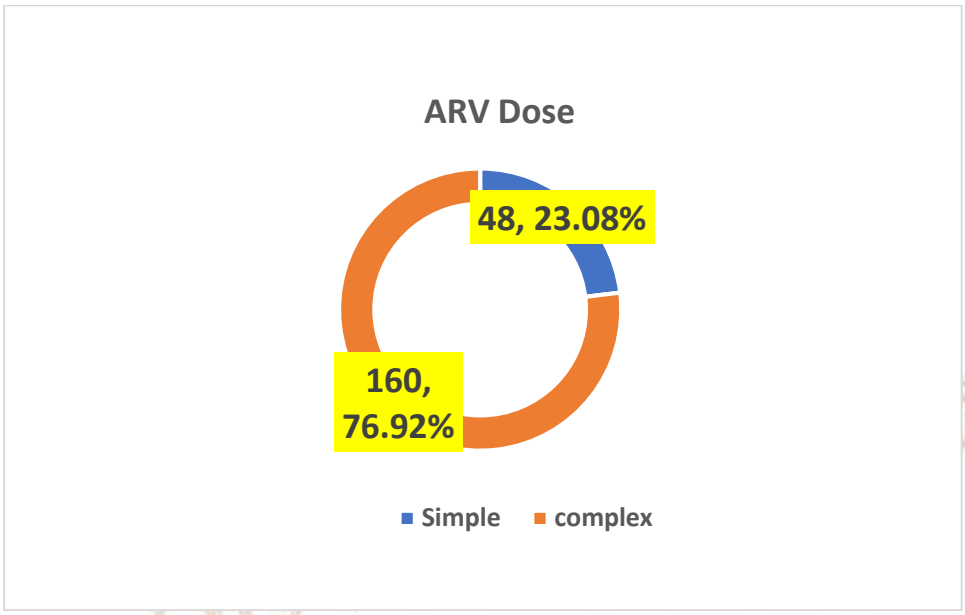
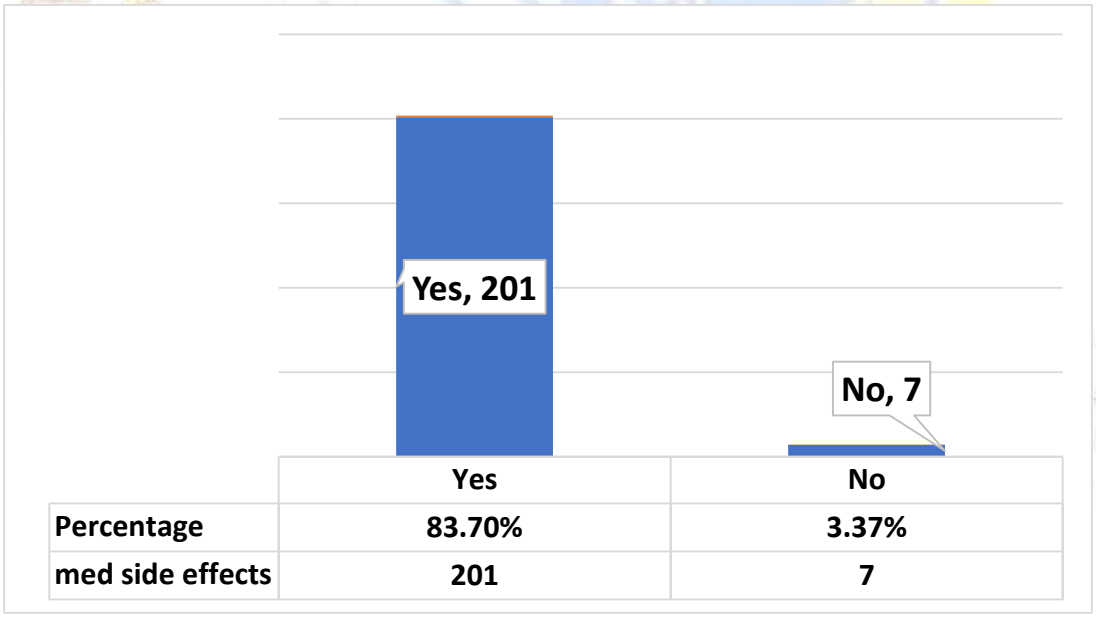


Figure 9:Respondents' opinion on ARV dose

The figure above shows that 160(76.92%) of the respondents felt the ARV dose as complex and 48(23.08%) said doses are simple.

4.5.3 Medication side effects



	Yes	No
Percentage	83.70%	3.37%
med side effects	201	7

Figure 10:Medication side effects

The figure above shows that 201(83.70%) of the respondents experienced side effects while 34(3.37%) said didn't experience side effects.

4.5.4 Missed prescribed doses

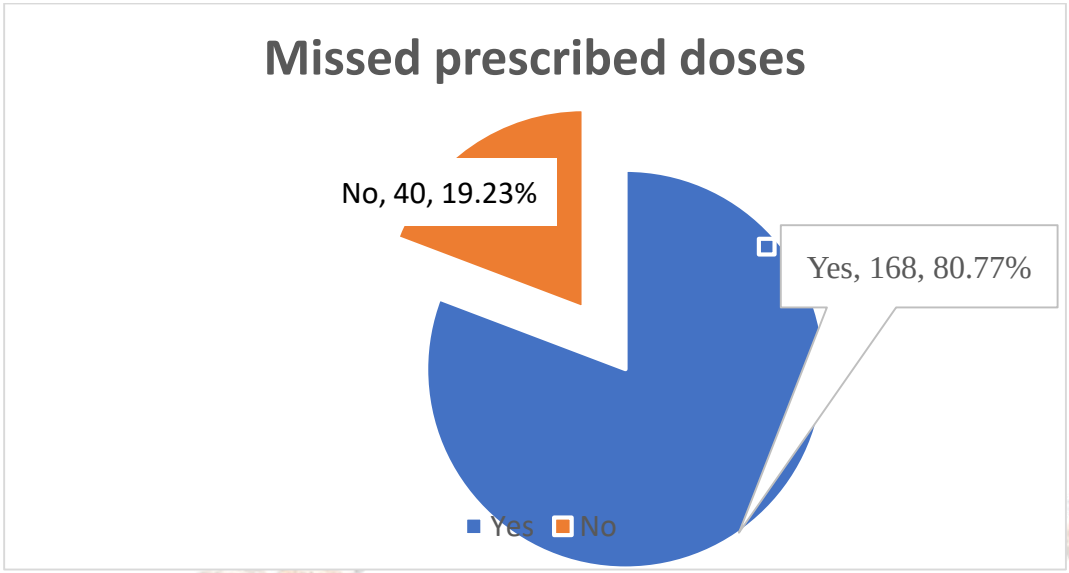


Figure 11:Missed prescribed doses

The figure above shows that 168(80.77%) of the respondents had ever missed prescribed doses while 40(19.23%) reported no missed dose.

4.5.5 Reason for missing doses

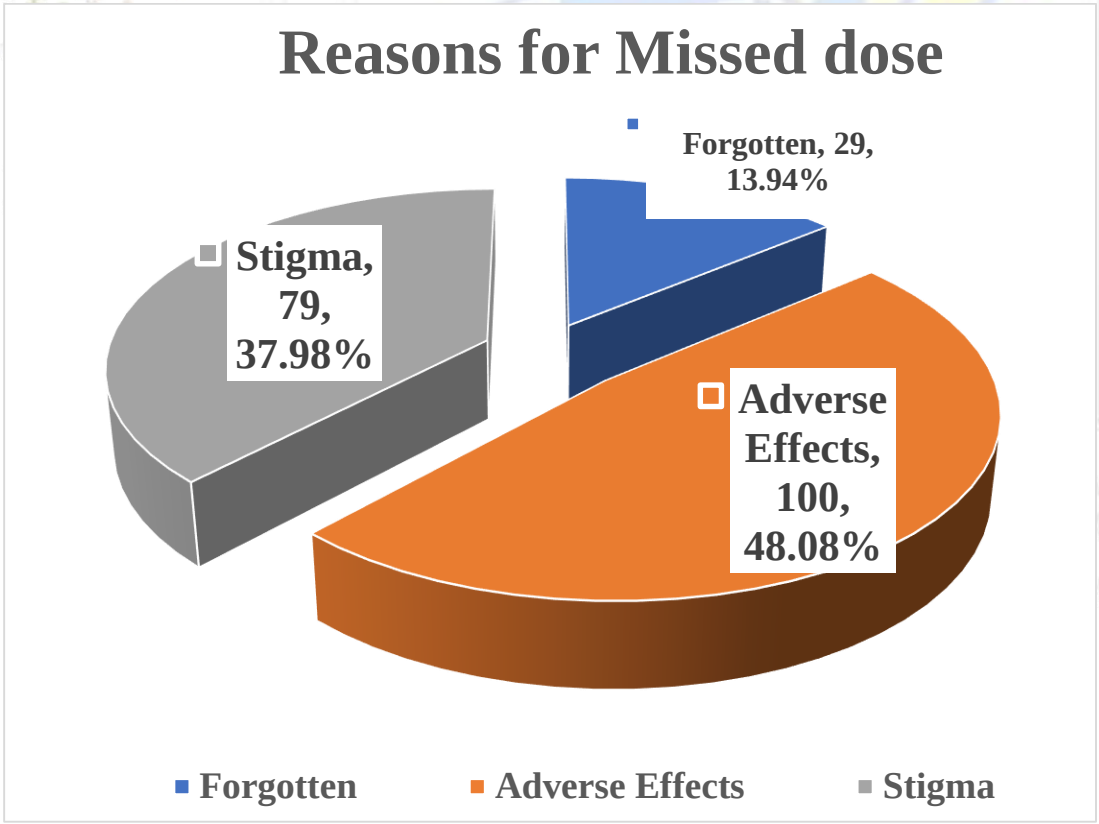


Figure 12:Reason for missing doses

The fig13. above shows 100(48.08%) of the participants missed doses due to adverse effects, 79(37.98%), and 29(13.94%) forgot the dose

4.5.6 Dietary restriction

	Frequency	Percent
Yes	**132**	**63.5**
No	**76**	**36.5**
Total	**208**	**100.0**

Table 7:Respondents' dietary restriction

The above table shows that 132(63.5%) of the respondents responded ‘’Yes’’ to dietary restriction question and the other 76(36.5%) said no dietary restrictions.

4.6 Facility-Related Barriers

In this study, the facility-related factors were believed to affect adherence to ARVs and they are as follows.

4.6.1 Hospital distance

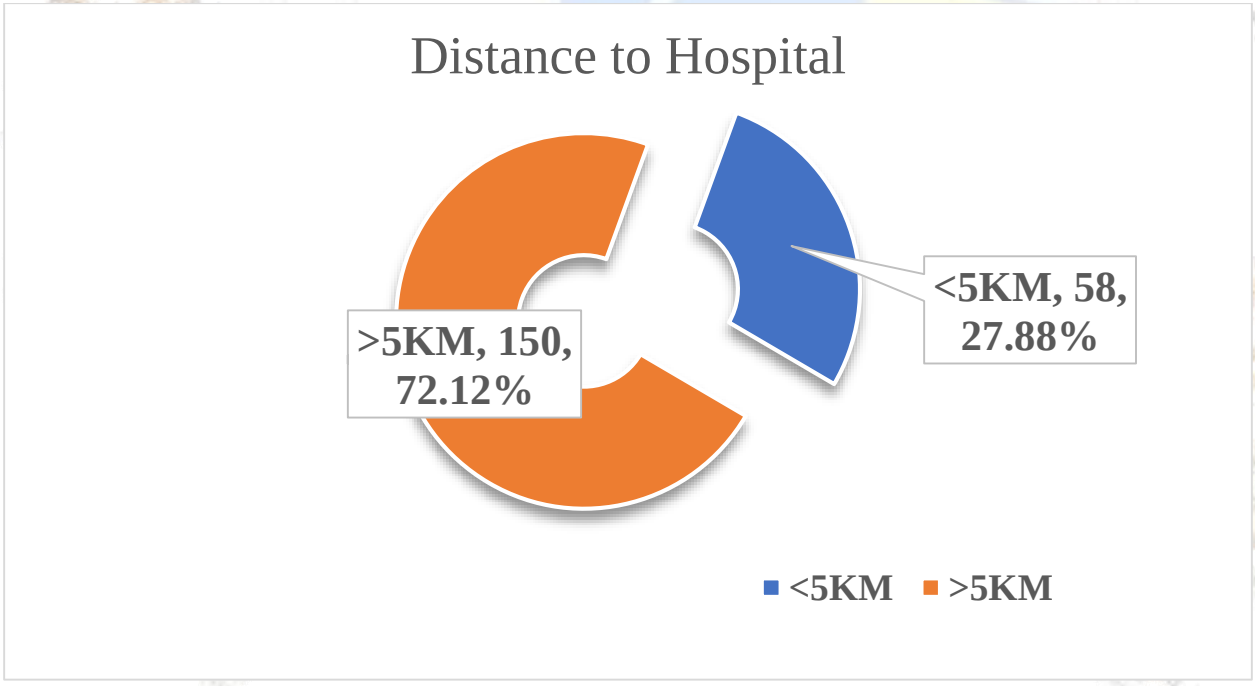


Figure 13:Distance to Hospital

The fig.14 above shows that 150(72.12%) of the respondents walked or rode for more than 5km distance to hospital while 58(27.88%) had to walk or ride for a less than 5km distance to hospital.

4.6.2 Cost of transport

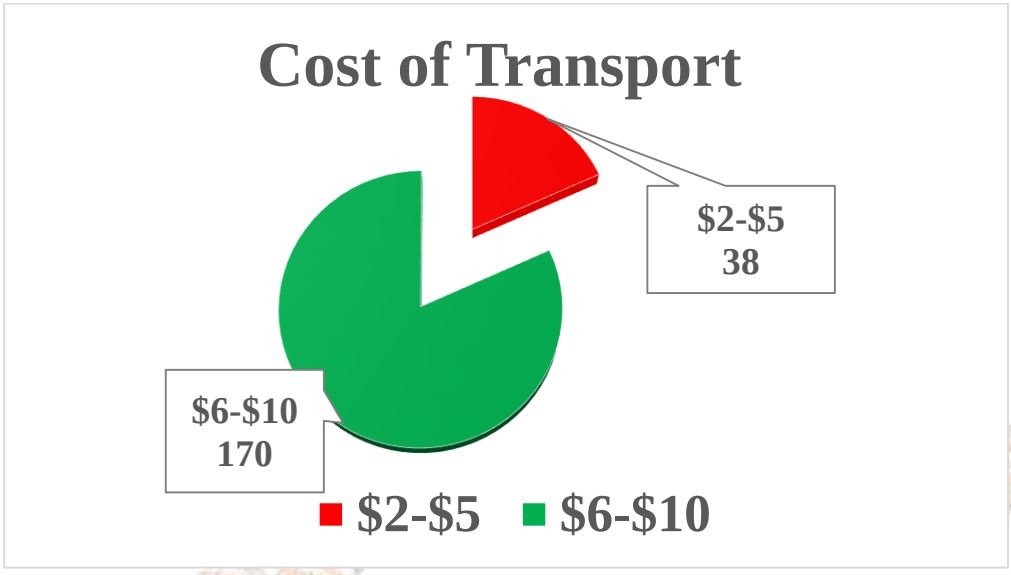


Figure 14:Cost of transport

The figure above shows that 38(18.27%) of the respondents had to pay travel fare to hospital ranging between $2-$5 while 170(81.73%) had to pay $6-$10 per trip.

4.6.3 Service waiting time

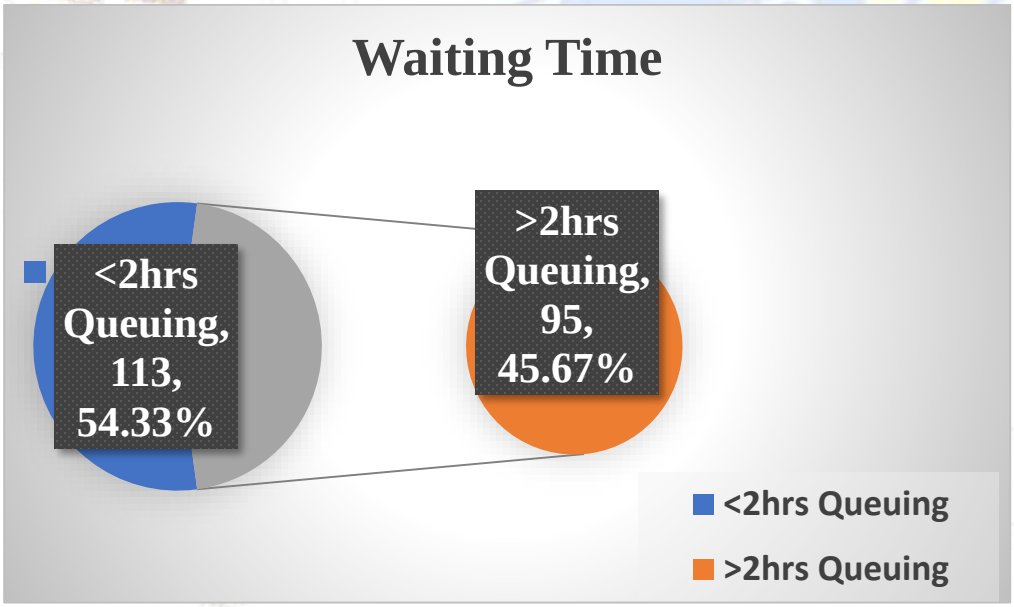


Figure 15:Service Waiting time

The fig.16 above shows that 113(54.33%) of the respondents had waiting time less than 2hours queuing at the hospital while 95(45.67%) reported to have waited more than 2hours queuing at the waiting bay.

4.6.4 Privacy at the CCC

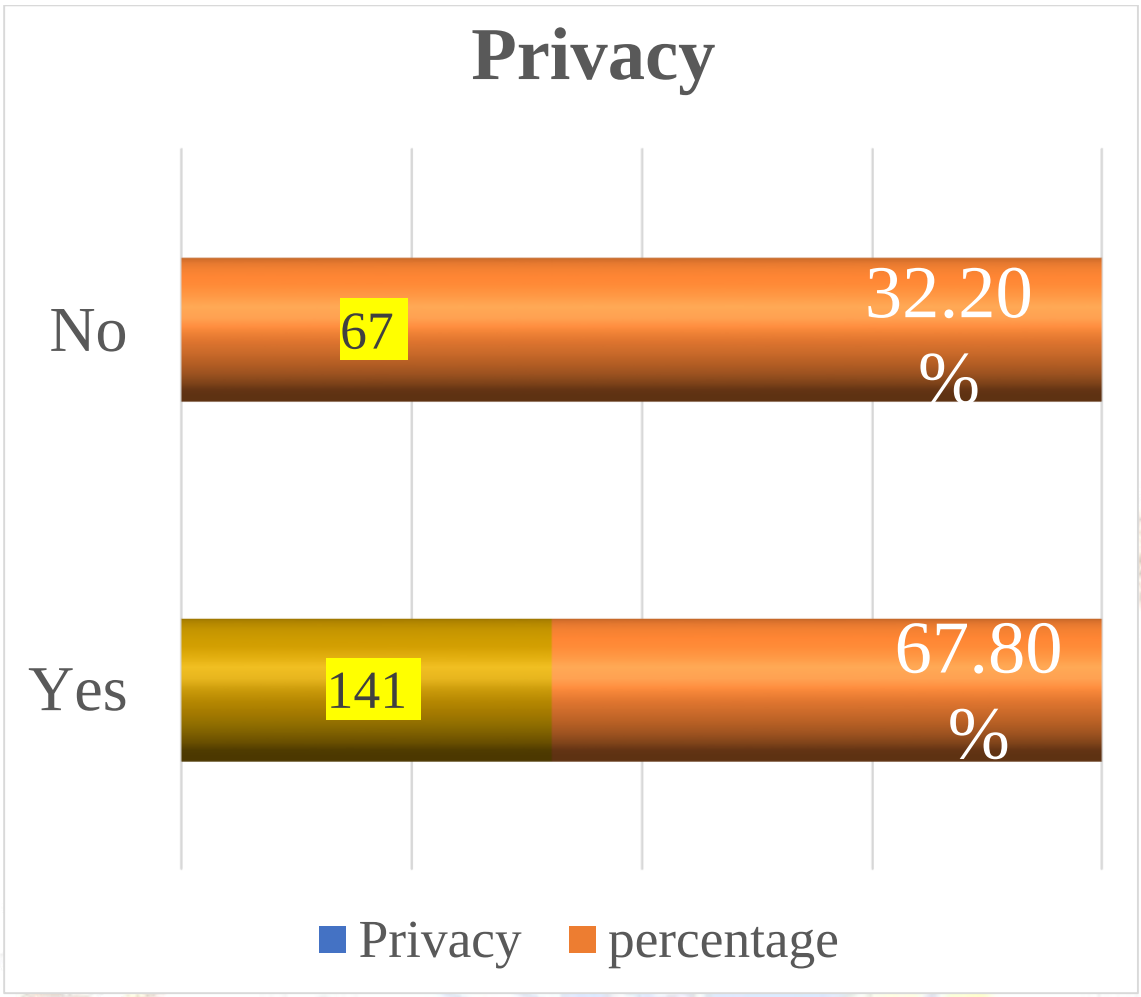


Figure 16:Privacy at the CCC

The Fig.17 above shows that 67(32.20%) of the respondents had no privacy at the CCC while 141(67.80%) reported to have had privacy.

4.6.5 Confidentiality at the CCC

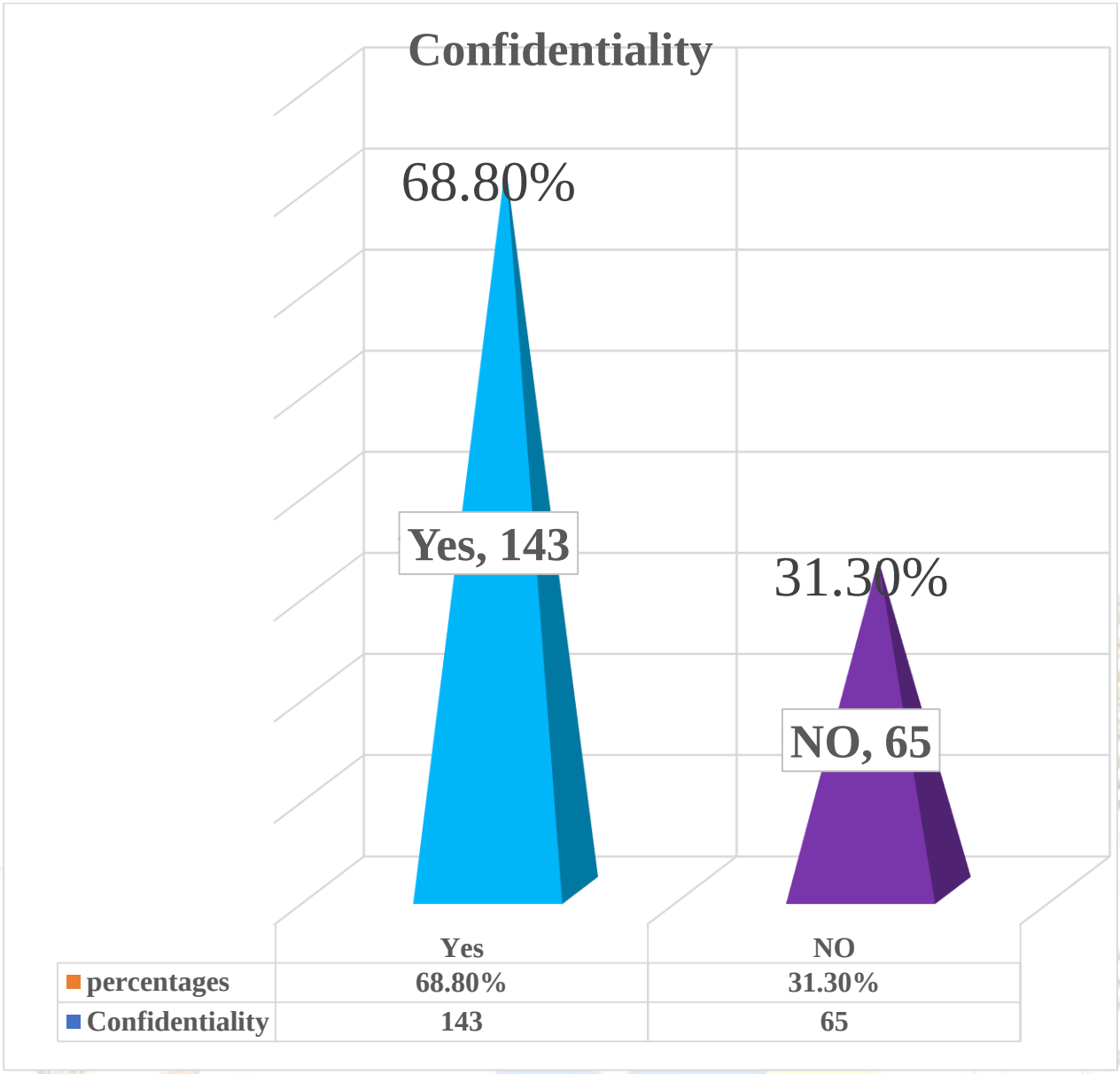


Figure 17:Confidentiality at the CCC

The Fig.18 above shows that 143(68.8%) of the respondents have had confidentiality at the CCC while 65(31.3%) reported to have had no confidentiality.

4.7 ART Adherence

The bar chart below shows the percentages of missed prescribed doses against youths age categories which in turn explain the level of adherence to ART.

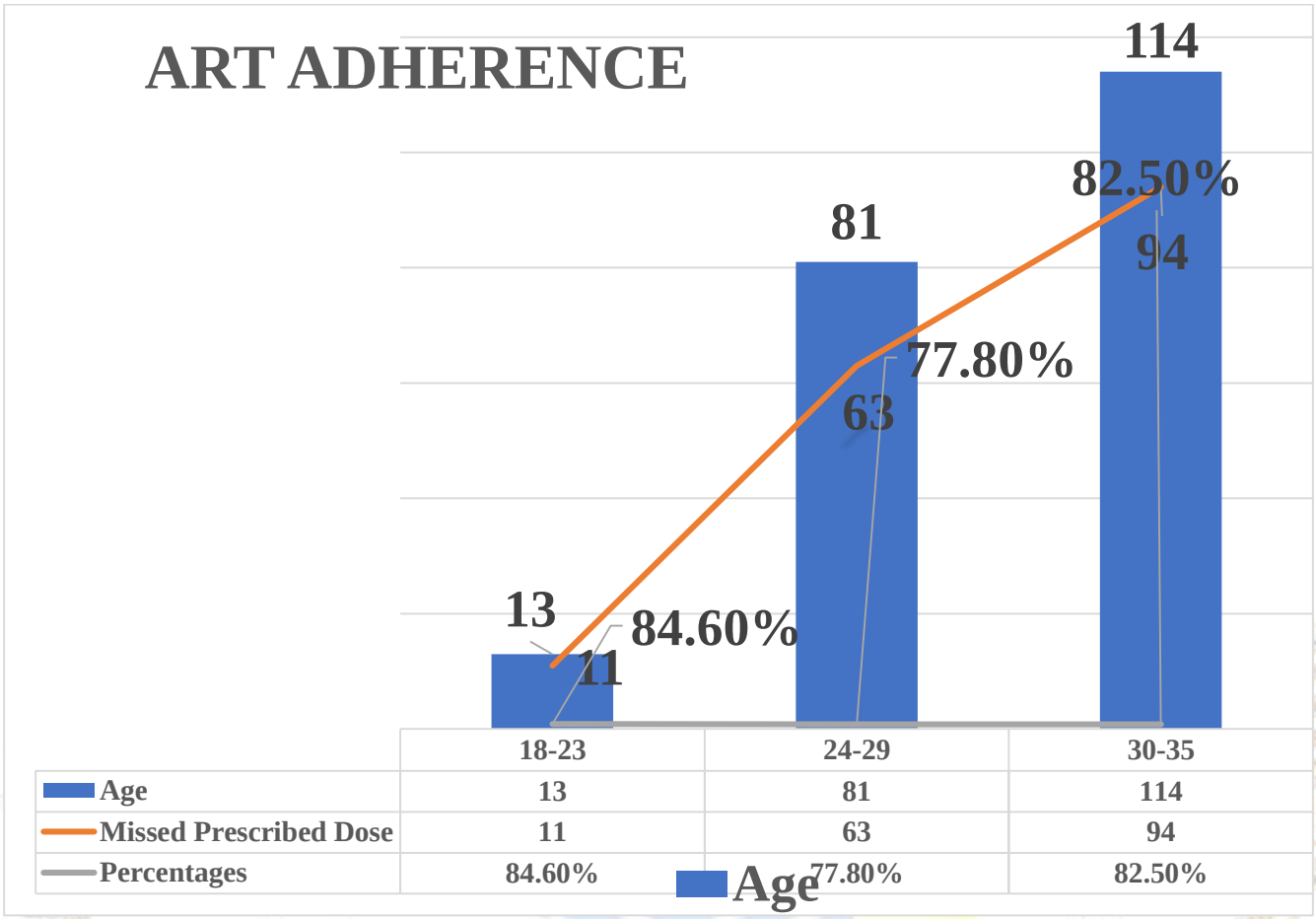


Figure 18:ART Adherence

The figure above shows that the rate of non-adherence is higher among younger youths (18-23) yrs. Out of 13 individuals, 11(84.60%) missed prescribed doses. The non-adherence rate is also higher in older (30-35) yrs. and middle age (24-29) yrs. youths with 94(82.50%) and 63(77.80%) respectively.

CHAPTER FIVE: DISCUSSION, SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter deals with the discussion of the major findings of this study, the comments of the researcher on the percentage of participants who adhered or did not adhere to ART, the inferential statistical test, summary of the study, conclusion and recommendation under the following individual characteristics: Socio-demographic factors, Socio-economic factors and pharmacological factor, as well as facility-related barriers.

After coding the collated data for computerization purpose, the SPSS version 27.0 was used to inferentially analysed. The Pearson chi-square test was used to tabulate different analysed independent variables to examine their statistical significances under each objective. This inferential statistic helps us to draw conclusions on the relationship that exist among categorical variables.

5.2 Socio-demographic Factors

The study sought to establish a client's characteristics that were believed having impacts on adherence to ART. The researcher managed to reach 97.2% (208) of the projected sample figure (214) focusing on the sole objective of the study among youths (18-35) yrs. at Mandera County Referral Hospital. The social-demographic data in this study therefore revealed that 56.73% (118) of the study participants were female and 43.27% (90) were male and majority of them, 114(54.8%), were aged 30 to 35 years and their marital status were either separated 24.5% (51), or single 115(55.3%) and the rest were married. This means the study was not biased and fairly participated in by both genders and that more women are infected than men. The study further showed that majority of the infected are single or separated which mean the prevalence is higher among these two cohorts. These two demographic variables (gender & marital status) are congruent with many past literatures. One of the comparable past study was KENPHIA survey that showed the prevalence of HIV among women is twice that in men. It stated that the prevalence of HIV among men and women are at 3.1% and 6.6% respectively and the gender disparity in the burden of HIV is even greater than thrice among (20-34) yrs. (KENPHIA,2020).

Another study showed that multiple sexual partners, inconsistent condom use and sexual debut are all associated factors with acquisition and spread of HIV infection (NASCOP, 2022). HIV prevalence has been found higher for young unmarried women compared to young married women (Kelly et al., 2018). These two later studies showed how higher is the prevalence among young and unmarried people which is supported by the high percentage of the separated respondents.

The finding is also comparable with other previous studies that suggested majority of the HIV infected in Kenya are young people. This is where the study recorded the estimated HIV incidence is about 35 000 yearly, with young adults and adolescents accounting for about 50% of it (Sewankambo et al. al., 2018). Another literature discovered that young people constitute about 5% of all people living with HIV (37.7 million) and about 11% of new infections. (Diers, 2021). Another past documentary on HIV prevalence in North Eastern stated that out of 3,385 persons who were HIV positive as of the end of 2015, young people were accounted 19% of those infected (Kenya HIV/AIDS County Profile 2020). Since the age of the patients is always linked to adherence and older age is observed to have shown greater compliance than younger age, we can confidently say that this study showed higher non-adherence to ART as majority of the respondents were young people. Another study looking at the causes of non-adherence in Tanzania demonstrated that antiretroviral medication non-adherence was connected to younger age. Adolescents' non-adherence may be related to an "intellectual immaturity" that prevents them from understanding the long-term effects of their choices. (Semvua et al., 2017)

5.2.1 Socio-demographic variables Inferential Statistics

The study reached 56.73% female,43.27% male aged 18-35 yrs. mainly of single marital status. The existence of statistical associations among socio-demographic variables using the Pearson chi-square tests were assessed and the results were summarized in the table below at $\alpha \leq 0.05$ to draw the statistical significance.

Chi-Square Tests					
Variables		**frequency**	**χ^2**	**df**	**P-Value**
Gender	Male	90(43.27%)	3.841	1	**0.052**
	Female	118(56.73%)			
Age	18-23	13(6.3%)	3.841	1	**<0.001**
	24-29	81(38.9%)			
	30-35	114(54.8%)			
Marital-status	Single	115(55.3%)	5.991	2	**<0.001**
	Married	42(20.2%)			
	Separated	51(24.5%)			

Table 8: Sociodemographic- Inferential Statistics

The Pearson chi-square test result at ***α≤0.05***(alpha level/***5%*** significant level), ***df=1***, ***χ2= 3.841*** (tabular-value) and ***df=2***, ***χ2= 5.991***(tabular-value) (***P≤0.05***) was statistically significant and the variables were associated with each other. This means the variable gender ***(P=0.052)*** is not statistically significant and therefore not associated with other variables under this specific objective.

5.3 Socio-economic factors

In this study the Socio-economic factors were believed to affect adherence to ARTs. According to the findings, the conducted study unearthed that 42.79% (89) of the population captured were illiterates and 23.08% (48) of them had no sufficient information on HIV/AIDS (Semi-literate). This signifies that majority of those affected population were uneducated and they therefore had no sufficient information about the disease hence led to non-adherence. This is analogous with the literature that found the higher levels of education and literacy, older age, white ethnicity, and male gender, are associated with better treatment adherence (Chesney, 2019) and the inverse is true.

Furthermore, the study also showed that majority of the infected population, 80.29% (167), were informally employed and that warranted 53.4% (111) of their main sources of support from the families. Since the background of the community at large is pastoralists, those living with HIV/AIDS had poor financial support which can't cater for their needs and that definitely contributed to poor adherence to ARV drugs. This is linked to poverty as socio-economic phenomenon and commensurate with study that said anti-retroviral therapy compliance is significantly decreased by poverty, particularly in third-world nations where a large proportion of

the population lives below the poverty line (UNAIDS, 2018). To reinforce the argument, Mbeki Thambo, a former president of South Africa, has been lambasted for linking poverty to an increase in HIV infection. (Hasan, 2014).

The study also exposed that 92.79% (193) of the population living with HIV/AIDS were highly stigmatized and 90.38% (188) dominated by Muslim culture. It further revealed that 57.2% (119) of them believed that HIV/AIDS is a curse from God while 32.2% (67) believed it as incurable. Since the higher proportion of the participants believed HIV/AIDS as the cures from God and they were the replica of the entire population, then this study is suggesting that the community sees any infected person as someone befallen by the curse of God and he/she is subjected to stigma of the highest order which ultimately hinders ARV adherence. The study conducted in the past stipulated that negative attitudes and beliefs regarding efficacy of HAART may negatively affect ART compliance hence poor adherence. Discrimination and stigmatizations also play greater roles in causing non-adherence to it (Paterson, 2017). Another research in the past linked the community beliefs such as HIV is the curse from GOD, with serious stigmatization and such individuals failed to attend comprehensive care clinic for the therapy because of fear inflicted by others through stigmatization (Martin,2020)

The earlier discussion in this chapter further demonstrated the gaps in the client's knowledge where 57.2% of the participants believed that HIV/AIDS is the curse from the Almighty God which has no cure. This was contributed by their high illiteracy level and primitive nature of the society. More so, discovered by the study about the social beliefs was that, away from curse and cure, many of the respondents, 50.5% (105) disagreed with the importance of ARV Compliance while a significant number 24.0% (50) knew nothing about it. These percentages are too high and are congruent with the findings where 27.88% (58), believed that ARVs can't even control opportunistic infections while 50.96% (106) knew nothing about it at all. Furthermore, the study revealed 32.7% (68) of the participants had disagreed with the statement "ARVs prolong life'' and 39.9% (83) responded they didn't know anything about it. The information on these aforementioned three social variables revealed the level of patients' ignorance regarding the importance of ARV Compliance to control opportunistic infections and prolong life, thus demonstrated insufficient clients' information on ARV and HIV/AIDS. These therefore contributed to poor adherence to ARV regimens. According to the past literature, clients who understand their

HIV status, the relationship between ARV compliance and their successful outcomes were reported to have achieved high levels of ART adherence than those who have no clear knowledge and understanding pertaining to it (Paterson, 2017).

5.3.1 Socio-economic-Inferential Statistics

The existence of statistical associations among socio-economic variables using the Pearson chi-square test were assessed and the results were summarized in the table below at **$\alpha \leq 0.05$** to draw the statistical conclusion.

Chi-Square Tests

Variables		frequency	$\chi 2$	df	P-Value
Education Level	None	89(42.79%)	3	7.815	<0.001
	Basic	48(23.08%)			
	Secondary	39(18.75%)			
	College	32(15.38%)			
Employment	Formal	41(19.71%)	1	3.841	<0.001
	Informal	167(80.29%)			
Financial Support	GOV'T	38(18.3%)	3	7.815	<0.001
	Self	58(27.9%)			
	Family	111(53.4%)			
	NGOS	1(0.5%)			
Stigmatized	Yes	193(92.79%)	1	3.841	<0.001
	No	15(7.21%)			
Religion	Islam	188(90.35%)	1	3.841	<0.001
	Christianity	20(9.62%)			
Beliefs on HIV/AIDS	God's Curse	119(57.2%)	2	5.991	<0.001
	Incurable	67(32.2%)			
	Normal Disease	22(10.6%)			
ARV Compliance is Good	Agree	53(25.5%)	2	5.991	<0.001
	Disagree	105(50.5%)			
	I Don't Know	50(24.0%)			
ARVS Reduce Opportunistic Infections	AGREE	44(21.15%)	2	5.991	<0.001
	DISAGREE	58(27.88%)			
	I DONT KNOW	106(50.96%)			
ARVS Prolong Life	AGREE	57(27.4%)	2	5.991	0.068
	DISAGREE	68(32.7%)			
	I DONT KNOW	83(39.9%)			

Table 9:Socio-economic Inferential Statistics

The Pearson chi-square test at **$\alpha \leq 0.05$**(alpha level/5% significant level), where ***df=1, $\chi 2 = 3.841$*** (tabular-value) and ***df=2, $\chi 2 = 5.991$***(tabular-value) as well as ***df=3, $\chi 2 = 7.815$ resulted in $P \leq 0.05$*** with exception of one '*ARVS Prolong Life'* where ***$p > 0.05$***. This concluded that the results were mainly statistically significant and the variables were associated with each other. However, the *P-Value* in one '*ARVS Prolong Life'* variable was found greater than **$\alpha \leq 0.05$ ($p = 0.068$)** and the result was then deemed not associated**.**

5.4 pharmacological factor

The study sought to establish the medication related factors that were believed having impact on adherence to ART. According to this research, 84.13% (175) of the infected populations who participated in the study felt the drug pills burden and 76.92% (160) felt the ARV doses as complex accompanied by dietary restriction reported by 63.5% (**132**) of the respondents. The research therefore showed that some of the medication related factors discouraged HIV positive patients from adherence to ARTs. The past literature also showed that dosing complexity and pill burden of ART regimens together with some side-effects demoralize the clients from continuing with the medications hence leading to non-adherence to ART (Niguso & Mavhandu-Mudzusi, 2020). However, another documentary added that dosing issues appear to have a greater impact on ART adherence than drug pill burden (UNAIDS, 2018).

The study also displayed 83.7% (174) of the respondents experienced ARVs side effects and that 80.77% (168) of them had ever missed prescribed doses due to the reasons such as adverse effects (48.08%), forgetting the dose (13.94%) with 37.98% having stigmatization barrier. Based on these results, the ARV adverse effects and HIV related stigmatization, altogether, are the major contributors of non-adherence to ARTs. The past literature on ARV medication regimen showed that negative side effects of ARV drug always discourages the patients on medication (Mehta et al 2016). Clients who experience some unwanted side effects were most likely to discontinue the regimen. Highly active antiretroviral therapy (HAART) can cause some serious adverse effects such as short-term reactions like hallucinations, diarrhea, vomiting and nightmares as well as long-term used effects such as metabolic effects and peripheral neuropathy which discourage clients from adhering to them (Chesney, 2019). This study is therefore supported by many past literatures. Based on this study, any clients who experienced any of those negative side effects tend to stop medications or missed doses hence non-adherence.

5.4.1 pharmacological factor-Inferential Statistics

The study analysed 6 categorical variables and The Pearson chi-square test at ***α≤0.05*** was used to draw the statistical significance

Chi-Square Tests

Variables		Frequency	df	χ^2	P-Value
Pills Burden	Yes	175(84.13%)	1	3.841	<0.001
	No	33(15.87%)			
ARV Doses	Simple	48(23.08%)	1	3.841	<0.001
	Complex	160(76.92%)			
Medication Side Effects	YES	201(96.63%)	1	3.841	<0.001
	NO	7(3.37%)			
Missed Dose	Yes	168(80.77%)	1	3.841	<0.001
	No	40(19.23%)			
Reason for Missed Dose	Forgotten	29(13.94%)	2	5.991	<0.001
	Stigma	79(37.98%)			
	Adverse effects	100(48.08%)			
Dietary Restriction	Yes	132(63.5%)	1	3.841	<0.001
	No	76(36.5%)			

Table 10:Pharmacological variables Inferential Statistics

The Pearson chi-square test at ***α≤0.05***(alpha level/5% significant level), where ***df=1, χ2= 3.841*** (tabular-value) and ***df=2, χ2= 5.991***(tabular-value) resulted in ***P≤0.05***. This inferred that the results were statistically significant and the variables were all associated with each under this objective.

5.5 facility-related barriers

Health facility also plays greater role in promoting or reducing adherence to ARTs. In line with this study, since the study was conducted at the outpatient department, it was revealed that only 27.88% (58) of the infected participants lived less than 5km away from the health facility while the rest, 72.12% (150) lived more than 5km away and travel a longer distance to health facility for treatment. Since majority of those infected people live below poverty-stricken line and infrastructures in the area such as road networks are poor, it is therefore difficult to access the facility due to transport cost and other basic needs that would automatically lead to poor adherence to ARV medications. The lowest cost of transport to and from MCRH-CCC per trip for the nearby visitors ranges from $2(kshs.200) to $5(kshs.500 and the farthest cost range from kshs.1000 and above on a linear motion. The

previous literature on similar study stated that a door step accessibility of care facility and ARV, availability of counseling services by skilled healthcare providers as well as economic and psycho-social support for people living with HIV/AIDS promotes the extents of adhering to the prescribed antiretroviral therapy (ART) while the opposite is true (MOH, 2017). Another additional study revealed that due to the distance from their homes to the clinic, many patients have had to forgo receiving care because they cannot pay the necessary fare, especially when they are ill (Kheswa, 2022). The expense of travel has a linear association with non-adherence. (Safren & Nachega, 2019). The study therefore exposed that the distance from the outpatient's department is a significant contributing factor to non-adherence to ARTs in Mandera.

However, majority of the participants,113(54.33%) reported short service waiting time less than 2hrs queuing while 141 (67.8%) agreed that there was patient's privacy at CCU, MCRH; and 143(68.8%) agreed that there was enough confidentiality. These would definitely tend to promote ARV adherence. These are comparable with study that said Patients confidentiality and privacy, short service waiting times, ease of appointments, nonjudgmental and supportive attitudes of healthcare providers impact positively on adherence (Ministry of Health, 2017).

5.5.1 facility-related Inferential Statistics

The study analysed five-categorical variables under facility-related factor and The Pearson chi-square test at $\alpha \leq 0.05$ was used to draw the statistical inferences.

Chi-Square Tests

Variables		Frequency	df	χ^2	P-Value
DISTANCE TO HOSPITAL	<5km	58(27.88%)	*1*	*3.841*	*<0.001*
	>5km	150(72.12%)			
Cost of transport	$2-$5	38 (18.27%)	*1*	*3.841*	*<0.001*
	$6-$10	170(81.73%)			
SERVICE Waiting Time	<2hrs	113(54.33%)	*1*	*3.841*	*0.212*
	>2hrs	95(45.67%)			
PRIVACY	Yes	141(67.80%)	*1*	*3.841*	*<0.001*
	No	67(32.20%)			
CONFIDENTIALITY	Yes	143(68.80%)	*1*	*3.841*	*<0.001*
	No	65(31.30%)			

Table 11:Facility-related Inferential Statistics

The Pearson chi-square test at ***α≤0.05***, where ***df=1***, ***χ2= 3.841*** (tabular-value) resulted in ***P≤0.05*** and the results were therefore statistically significant and associated. However, the P-Value in one ''Service Waiting Time'' was found greater than ***α≤0.05 (P=0.212)*** and the result was then deemed not associated.

5.6 Comments by the key informants

- A male public health officer said ***"most of the HIV positive clients have been failing to adhere to treatment because of lack of financial supports to visit health facility"***
- Another male nurse from sub-county hospital said ***"the majority of the HIV infected individuals couldn't come for their ARVs because of stigma they face from the community. The community even stigmatized their belongings including animals"***
- A female nurse at CCC said***, ''although we are trying our best to provide the best services, some of the clients still don't take the medication because of its side effects, fear of being seen taking them and their own beliefs"***

5.7 Summary of the findings

The goal of this study was to investigate, identify and obtain factors that contribute to non-adherence to ARVs among youths aged 18 to 35 living with HIV/AIDS and attending the Comprehensive Care Clinic at Mandera County Referral Hospital. To achieve this goal, this study was divided into five chapters and employed four distinct specific objectives.

In chapter one, the researcher defined adherence and many other operational terms which are significant to the objectives of the research. The statistical status of HIV/AIDS infections and adherence to it treatments at the global, regional, national and local levels were well discussed. The statement of the problem and justification were also well stipulated.

The second chapter reviewed the literatures and rationalized the specific objectives of the study and sealed with theoretical and conceptual framework of the study.

The third chapter outlined the research methodology highlighting the study design, study areas, target groups, study populations, inclusion and exclusion criteria, variables, sampling procedures, determination of sample size, data collection methods and tools, validity and reliability, data management and ethical considerations respectively.

The fourth and fifth chapters dealt with findings and discussion of the results. the structured questionnaires were formulated from the study objectives which in turn generated study variables. The study targeted 214 HIV positive clients attending Mandera County referral hospital to assess factors associated with ARV adherence and managed to reach out 208 respondents equivalent to 97.2% of the desired total sample. After coding the collated data for computerization purpose, the SPSS version 27.0 was used to analysed. The narratives were then used to report the results of the qualitative data and then compared them with some findings from other researchers who have done similar researches in the past. Then the Pearson chi square was used to test different independent variables to examine their statistical association. From the discussed results were found some important factors that contribute to non-adherence to HIV/AIDS treatments among youths (18-35) yrs. The general inferences drawn from the analysis and its discussion were summarized under the following sub-topics:

5.7.1 Socio-demographic Factors

About three variables were captured under this factor and they are age, gender as well as marital status. The study discovered that majority of the infected people 114(54.8%) are youths age (30-35) yrs., mainly female118 (56.73%) and unmarried 166(79.81%). This means the unmarried female youths are the majority of the infected participants. These inferred that socio-demographic factors are one of the main attributors of non-adherence to ART. The Pearson chi-square test at $\alpha \leq 0.05$ was used to examine the socio-demographic variables and the statistical significance drawn through the *P-Values* definition.

5.6.2 Socio-economic factors

Under this factor, about nine socio-economic variables were discussed. The illiteracy and semi-literacy levels are inseparably discussed together with employment status coupled with financial support of the patients that negatively impacted the compliance level of HIV treatments. The finding recorded that majority of the infected persons, 89(42.79%) and 48(23.08%), were illiterates and semi-literates respectively. In addition, it showed that

80.29% (167) of the participants were informally employed (i.e. not salaried) which complicated their financial support. It further documented that 188(90.38%) of the participants were Muslims coupled with primitive beliefs of 119(57.2%) about HIV/AIDS as a curse of God that subjected the majority of the infected individual, 193(92.79%), to stigmatization of the highest order The finding further showed that majority of the HIV patients, 105(50.5%), didn't understand the importance of ARV Compliance to prolong life and control opportunistic infections and thus demonstrated insufficient clients' information on ARV and HIV/AIDS. These concluded that non-adherence to ART can also be attributed to socio-economic factors. The Pearson chi-square test at $\alpha \leq 0.05$(alpha level/5% Confidence level), was used to test the socio-economic variables and the statistical significance drawn through the definition of the *P-Value* results.

5.7.3 pharmacological factor and Adherence to ARTs

As per the findings and discussion of this study, the variables of great concern under this factor are pills burden (84.13%), ARV doses complexity (76.92%), and its side effects (83.7%) coupled with dietary restriction among patients on HIV treatments. These great percentages among these variables are congruent with proportion of the patients ever missed the prescribed doses which was 80.77% of the respondents hence obstacles to adherence to ART. The Pearson chi-square test at $\alpha \leq 0.05$(alpha level/5% Confidence level), was also used to assess the pharmacological variables and the statistical significance drawn through the *P-Value* results.

5.7.4 facility-related factors

In this study there were five major important variables discussed under this objective. These are hospital distance, cost of transport, service waiting time, patient privacy and confidentiality. It was confirmed that a good number of the patients enjoyed short service waiting times (54.33%) as well as enough privacy (67.8%) and confidentiality (68.8%) at CCC, MCRH which could promote adherence to ARTs. However, majority of the patients had to travel for a long distance greater than 5km to get care from the hospital incurring transport cost greater than $10(ksh.1000) per trip. This long distance together with financial constraints further contributed to non-compliance to ARVs. The Pearson chi-square test at $\alpha \leq 0.05$ was also used to assess the facility-related variables and the statistical significance drawn through the P-Value results.

5.8 Conclusions

The general objective of this study has been achieved and the results have concluded that the highest proportion of the infected people attending Comprehensive Care Clinic at Mandera County Referral Hospital was youths especially aged 30-35 years mainly unmarried female. This research has further identified quite a number of important factors that has been hindering adherence to ARV medication by youths living with HIV/AIDS.

From the findings, the study concluded that socio-demographic and socio-economic factors such as younger age, female gender, marital status, faith, financials instability and stigmatization contributed highly to poor adherence to ART regimen. Amongst these factors, what made the matter worse was the community beliefs pertaining HIV/AIDS where they believe it as the curse from God which has no cure. This false belief was scuffled by the community level of understanding regarding HIV/AIDS and ARVs where high illiteracy level among the community led to lack of clear information about the disease and its therapeutic regimen. Ultimately, these factors led to stigmatization of the highest order which discouraged one and resulted in poor level of adherence among infected populations.

The study further concluded that the medication related factors such as ARVs side effect, pills burden and complexity of the doses highly attributed to non-adherence. This means that more than one-time ARVs daily doses which is accompanied by some serious side effects has led to poor compliance level among youths living with HIV/AIDS.

The study also concluded that health facility factors such as long distance, high cost of transport coupled with poor infrastructures too contributed to poor adherence to ART. Since the higher percentages of the infected population live below the poverty line, they can't support themselves to travel over a long distance to the healthcare facility due to transport cost. To make the matter worse, road transport is so poor in some parts coupled with insecurity issues to the extent that one could even miss vehicles for some days hence non-adherence to ART regimens. However, the study exhibited adherence promoting culture of the hospital staffs by upholding the patient's privacy and confidentiality.

5.9 Recommendation

Adherence to antiretroviral therapy requires teamwork including the healthcare providers, the patients, the community and even political leaders. This involves Individual level, community level, institutional, and policy makers. Based on study findings and conclusions, this study recommends the following to improve adherence level among youths living with HIV/AIDS:

5.9.1 Objective 1: Socio-demographic factors

The youths/adolescent's friendly services should be put every health Centre in order to address non-adherence issues among this cohort of interest

Individually, the youths should assess themselves in order to understand what motivates them to adhere and what hinders them from adhering to medication. This will help them adhere to medication and overcome the encountered barriers.

5.9.2 Objective 2: Socio-economic factors

Both National and County government should provide socio-economic support for youths living with HIV/AIDS to promote adherence to ART. The government through the ministry of youth affair should also create employment opportunity to prevent them from engaging in promiscuous behavior in exchange for money and also support the infected ones get the treatments and nutritional supports.

Communally and politically, people should address the social policy at the community level to reduce stigmatization and promote community level of knowledge and understanding regarding HIV/AIDS and ART through creation of awareness about HIV/AIDS and its therapy. All the stakeholders should take the responsibility to inform the youths and the community at large on the relationship between the negative cultural beliefs and poor adherence to ART in order to curb stigmatization.

The study also challenges the actors involved in HIV prevention to include elders in negotiating the traditions that promotes HIV/AIDS among the community to find cultural alternatives.

The MOH through the public health department to health educate the youth through seminars and workshops on the importance of ARVs adherence.

5.9.3 Objective 3: Medication related factors

The research also recommends call for national government through the ministry of health to address ARV manufacturing policy by manufacturing industries to reduce both dosing complexity and side effects to improve level of adherence.

5.9.4 Objective 4: facility-related factors

The county government should construct a CCC at every health center and improve infrastructure to enhance door step ARV accessibility for all eligible clients.

5.10 Recommendation for further research

The study recommends further operational research study that will combined factors that affect adherence to antiretroviral therapy and measures to enhance adherence to it. This is because there is paucity of study in the County regarding measure to enhance adherence to ART.

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APPENDICES

APPENDIX I: BUDGETs

ITEM	QUANTITY	UNIT COST	TOTAL
Photocopying	46	10	460/
Typing and printing	2(70)	x20+300	3400/
Bindings	2	300	600/
Internet services	-	-	5000/
Phone call services	-	-	500/
NACOSTI license fee	1		1000/
Transports	-	-	14000/
Miscellaneous	-	-	500/
Research assistant	2	5000	10000/
Publication fees	1	23000	23000/
Total			**58,460/**

Table 12:budgets

APPENDIX II: WORK PLAN

TIME(Months) / ATIVITIES	June 2021	July 2021	August-Nov. 2021	Dec. 2021	Feb. 2022	March-May 2022	June-OCT 2022	NOV-2022-FEB.2023	MARCH-APRIL. 2023
Research topic identification,	■								
Literature review		■	■						
Proposal development			■						
Concept paper submission				■					
Departmental defense					■				
Proposal review, corrections & resubmission					■	■			
School defense & corrections & resubmission							■		
Ethical Clearance, Data collection and analysis								■	
Project submission, Defense & final report									■

Table 13: work plan

APPENDIX III: CONSENT FORM

I, **IBRAHIM A. HUSSEIN**, a **Mount Kenya University** Postgraduate master degree **in Public Health (Epidemiology & Disease Control)** student, admission **number MPH/2020/61416**, wish to undertake the study entitled, '**Factors affecting adherence to antiretroviral therapy among HIV positive youths at Mandera County referral hospital'.** This study will aid me and other future researchers to comprehend that major factors which affect compliance to antiretroviral therapy among youths living with HIV attending comprehensive care clinic at Mandera Referral Hospital (MCRH) and the study will then reflect the entire Mandera County. As a researcher I therefore clarify the following:

Procedure involve: I kindly and respectfully request that you sign up to take part in this study voluntarily. Once more, simply respond to questions that are requested and avoid entering any information that could compromise your privacy. Kindly note that questionnaire composed of both open and close ended question and you are requested to give more explanation to open ended ones at will.

Duration: kindly note that filling a questionnaire may takes approximately 30minutes and the researcher beseeches for your tolerance to participate.

Termination: that any participant has right to decide to withdraw from the study midway. You have the option to end the interviews whenever you choose. If answering a question makes you uncomfortable, you can also skip it. It won't affect your personality, how you receive care at this clinic, or the benefits to which you are entitled.

Confidentiality: the privacy of the respondents will be addressed by maintaining the anonymity of the questionnaires through coding. The anonymous information will then be kept under a password protected computer software. Your identity and any other personal addresses should not be written anywhere on this questionnaire.

Potential harm: The study is non-invasive in nature and physically, socially, psychologically and spiritually harmless in anyway. The information you provide us here won't also be used against you in whatsoever.

Benefit: participating in this study may not benefit you directly but it will help us to understand the main obstacles to ARV adherence which in turn help the healthcare providers on ways to address them. And that will indirectly help other population with similar characteristics anywhere else.

Compensation: there will be no reward/allowances for willingly participating in this study as it is entirely based on voluntary participation.

Concerns: kindly note that you are free to contact the researcher or his assistants in case you have any concern, doubt or question for further clarification.

For further information, please get in touch with the investigator: **Ibrahim A. Hussein**@ email address: **ibroism2012@gmail.com or cell phone: 0721649044**. Or Mount Kenya University Institutional Ethics Review Committee (IERC) @P**.O BOX 342-01000** Thika, Kenya, Email: **research@mku.ac.ke**

Respondent's Statement/consent

I have read and understood the information provided in this document and will participate in the research voluntarily, with the right to withdraw from participation at any time.

Signature_____Date_____

Investigator's Signature. _____ Date._____

APPENDIX IV: RESEARCH QUESTIONAIRES.

Questionnaire Number: _____ Date: _____

Instructions: kindly never write your name on this paper. Since participants' privacy and confidentiality are rigorously safeguarded, please be honest in your response.

PART-I: SOCIO-DEMOGRAPHIC FACTORS.

INSTRUCTIONS: Kindly MARK [√] as appropriate;

1. What is your gender? **FEMALE** [ ], **MALE** [ ], **MIXED** [ ]

2. What age group do you belong to? 18-23 [], 24-29 [ ], 30-35[]

3. How is your marriage status? **Married[ ], separated[ ],single [ ]others[please specify**]__

PART II: SOCIO-ECONOMIC FACTORS

INSTRUCTIONS: Kindly **MARK [√]** as appropriate;

4. Which is your highest academic level? **None** [ ], **basic**[ ], **secondary**[ ], **college**[ ]

5. What is your job? **Formally employed** [ ] **unformal employment [ ]**

6. From where do you receive funding? **Self**-[ ], **Government**[ ], **Family**[ ], **NGOs**[ ], **other**[specify**]**_____

7. Have you ever been stigmatized? **No [ ], Yes [ ]**

8. Which faith do you practice? **Christianity**[ ], **Hindus**[ ], **Islam**[ ]

9. What are your belief on AIDS and HIV? **curse of God** [], **incurable** [ ], **normal disease** []

From question 10 to 11, Please kindly fill each space provided below with**; Agree, disagree or I don't know.**

10. Antiretroviral drugs compliance is good for my health_____

11. ARVs drugs reduce the chance of opportunistic infections_____

12. Proper use of ARV can prolong my life_____

PART III-A: PHARMACOLOGICAL FACTORS

INSTRUCTIONS: Kindly tick [√] one option appropriately

13. Do you think antiretroviral (ARV) pills are burden? **Yes [ ], No [ ]**

14. What is your opinion on the doses of ARV drugs**? Simple [ ] Complex [ ]**

15. Are there dietary restrictions associated with antiretroviral therapy (ART)? **Yes [ ], No [ ]**

16. Have you ever experienced medication side effects? **NO [ ] YES [ ],**

PART III-B: ADHERENCE TO ARTs

INSTRUCTIONS: Kindly tick [√] the appropriate responses:

17. Did you ever miss any prescribed dose? **Yes [ ] No [ ]**

18. If question 21 is yes, why?

A. I forgot [ ]

B. adverse effects [ ]

C. stigma [ ]

PART IV: FACILITY-RELATED BARRIERS

INSTRUCTIONS: Kindly tick [√] the appropriate responses:

19. How long do you ride or foot to the hospital from your residence? **<5km [ ] >5km[]**

20. What is the cost of transport? $2-$5 [ ] $6-$10 [ ]

21. What do you think about service waiting times? **<2hrs queuing [ ] >2hrs queuing [ ]**

22. Do the professional staffs in the clinic respect your privacy? **Yes [ ] No [ ]**

23. Do you usually get confidentiality in the Comprehensive Care Clinic (CCC)? **Yes [ ] No [ ]**

APPENDIX V: APPROVAL AND PERMISSION REQUEST LETTERS

IBRAHIM ABDULLAHI HUSSEIN,

MPH/2020/61416,

SCHOOL OF PUBLIC HEALTH,

MOUNT KENYA UNIVERSITY,

P.O. BOX 342-01000 THIKA

ETHICS AND RESEARCH COMMITTEE,

MOUNT KENYA UNIVERSITY,

P.O. BOX 342-01000 THIKA.

02ND SEPT., 2022

Dear Sir/Madam

RE: REQUEST FOR APPROVAL OF MY THESIS TO COLLECT DATA

The above subject refers:

I, **IBRAHIM ABDULLAHI HUSSEIN**, a student in **Mount Kenya University**, pursuing **Master in public health, registration number MPH/2020/61416**, hereby seek approval from your esteemed office on the research proposal titled **"Factors affecting adherence to antiretroviral therapy among HIV positive youths in Mandera County Referral Hospital at Comprehensive Care Units (MCRH-CCU)''.**

I therefore hope and look forward that you will approve my thesis and consider my request at your convenient time.

Thanks in advance

Yours faithfully,

Ibrahim A. Hussein

0721649044 or email: ibroism2012@gmail.com

Mount Kenya University

REF: **MKU/ISERC/2425**
TO: **IBRAHIM ABDULLAHI HUSSEIN**

Date: 13 October 2022

REG: **MPH/2020/61416**

Dear Sir/Madam,

RE: FACTORS AFFECTING ADHERENCE TO ANTERETROVIRAL THERAPY AMONG HIV POSIVE YOUTHS AT MANDERA COUNTY REFERRAL HOSPITAL, MANDERA, KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **1498.** The approval period is **13/10/2022 - 12/10/2023.**

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 **Mount Kenya University**
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 **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** 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 **Mount Kenya University**

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

Yours sincerely,

The Chairman
Mount Kenya University
Ethics R... committee
P. O. Box ...00, Thika

Dr. Peter G. Kirira
Chairman, Mount Kenya University ISERC

Main Campus, General Kago Road, P.O. Box 342-01000 Thika. Tel: +254 67 2820 000,
Cell: +254 720 790 796, 0709 153 000
Email:info@mku.ac.ke. Web: www.mku.ac.ke

Figure 19:MKU-ERC Approval letter

IBRAHIM ABDULLAHI HUSSEIN,

MPH/2020/61416,

SCHOOL OF PUBLIC HEALTH,

MOUNT KENYA UNIVERSITY,

P.O. BOX 342-01000 THIKA

THE MANAGEMENT,

MANDERA COUNTY REFERRAL HOSPITAL,

10TH DEC, 2022.

Dear Sir/Madam,

RE: REQUEST FOR AUTHORIZATION TO CONDUCT RESEARCH AT MANDERA COUNTY REFERRAL HOSPITAL,

I, **IBRAHIM ABDULLAHI HUSSEIN**, a student from **Mount Kenya University**, pursuing **Master in public health, registration number MPH/2020/61416** hereby seek permission from your highly esteemed office to conduct research on **"Factors affecting adherence to antiretroviral therapy among HIV positive youths in Mandera County Referral Hospital at Comprehensive Care Units (MCRH-CCU)''.** The objective of the study is to find out socio-demographic, socio-economic, medication related, and health facility factors that hinder adherence to antiretroviral therapy. The study seeks to address these hindrances by influencing policies at different levels both at local and national levels.

I wish to state that I will uphold the principles of confidentiality of the respondents and veracity as I thrive to achieve my study objectives. I also promise that I will submit a hard copy of this study at the end of the study process. Your cooperation will be highly appreciated.

Thanks in advance

Yours faithfully,

Ibrahim A. Hussein

0721649044 or email: ibroism2012@gmail.com

DIRECTORATE OF GRADUATE STUDIES

MPH/2020/61416

15th November, 2022

The Director, Research Coordination Division
National Commission for Science, Technology & Innovation
Utalii House, 8th & 9th Floor
P.O Box 30623- 00100
NAIROBI

Dear Sir/Madam,

RE: IBRAHIM ABDULLAHI HUSSEIN- REGISTRATION NO. MPH/2020/61416

The purpose of this letter is to introduce the above named student who is pursuing **Master of Public Health** in the **Department of Epidemiology and Biostatistics** in the **School of Public Health.**

The title of his research is ***"Factors Affecting Adherence to Antiretroviral Therapy Among HIV Positive Youths at Mandera County Referral Hospital, Mandera, Kenya."***

He has been cleared by the University's Ethics Review Committee (Certificate attached) and now has to proceed to the field to collect data for his research between **November, 2022 and February, 2023.**

Any assistance accorded to him will be highly appreciated.

Thank you.

Mount Kenya University
P. O. Box 342 - 01000, THIKA
Office of the Director
Graduate Studies

Dr. Samuel M. Karenga, Ph.D.
Director, Graduate Studies
Enc.

Main Campus, General Kago Road, P.O. Box 342-01000 Thika.
Tel: 020-2878 000, Cell: +254 709 153 000
Email: info@mku.ac.ke, Web: www.mku.ac.ke
Chartered and ISO 9001 : 2015 Certified Institution.
Unlocking Infinite Possibilities

Figure 20:Letter of introduction

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **341367**

Date of Issue: **08/December/2022**

RESEARCH LICENSE

MANDERA COUNTY REFERRAL HOSPITAL
15 DEC 2022
P.O. Box 7-70300 MANDERA

This is to Certify that Mr.. IBRAHIM ABDULLAHI HUSSEIN of Mount Kenya University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Mandera on the topic: FACTORS AFFECTING ADHERENCE TO ANTERETROVIRAL THERAPY AMONG HIV POSIVE YOUTHS AT MANDERA COUNTY REFERRAL HOSPITAL, MANDERA, KENYA for the period ending : 08/December/2023.

License No: **NACOSTI/P/22/22203**

341367

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

MANDERA COUNTY REFERRAL HOSPITAL
15 DEC 2022
P.O. Box 7-70300 MANDERA

Verification QR Code

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

See overleaf for conditions

Figure 21:NACOSTI License

MAP OF STUDY LOCATION

Position of Mandera Referral Hospital in relation to Map of Kenya

Figure 22:Position of Mandera Referral Hospital in relation to Map of Kenya

Location of Mandera Referral Hospital in relation to Map of Mandera County

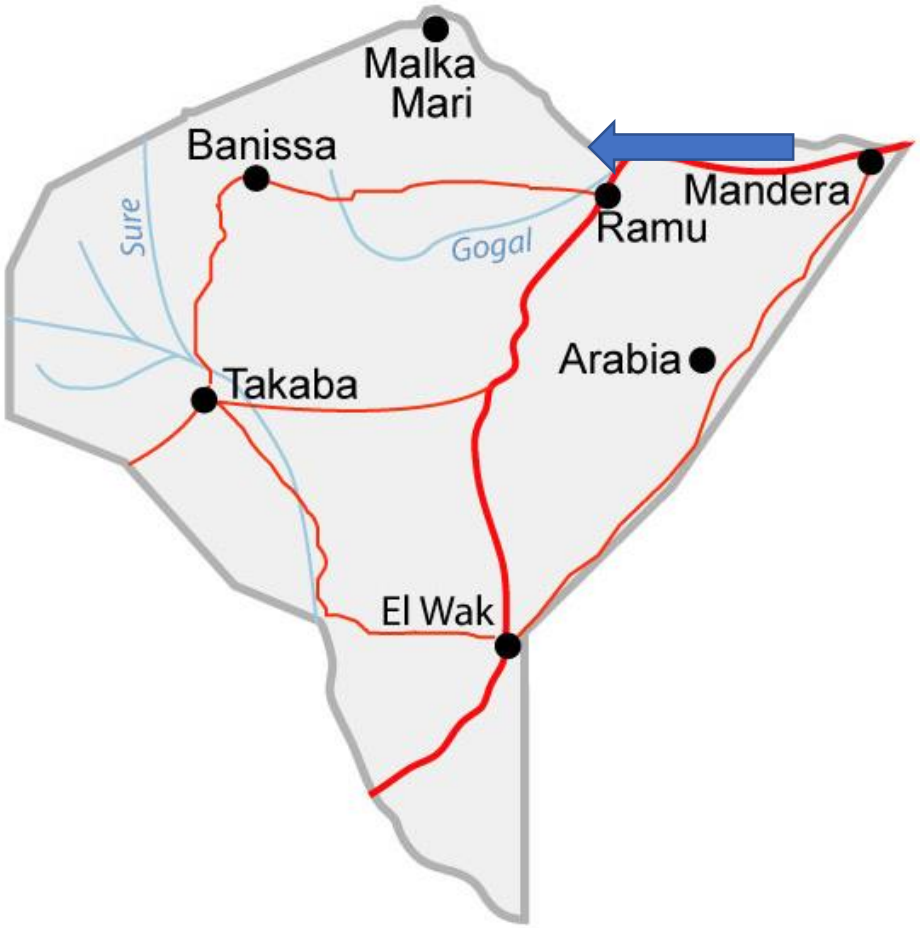

Figure 23:Location of Mandera Referral Hospital in relation to Map of Mandera County

Location of Mandera Referral Hospital in relation to Map of Mandera East Constituency

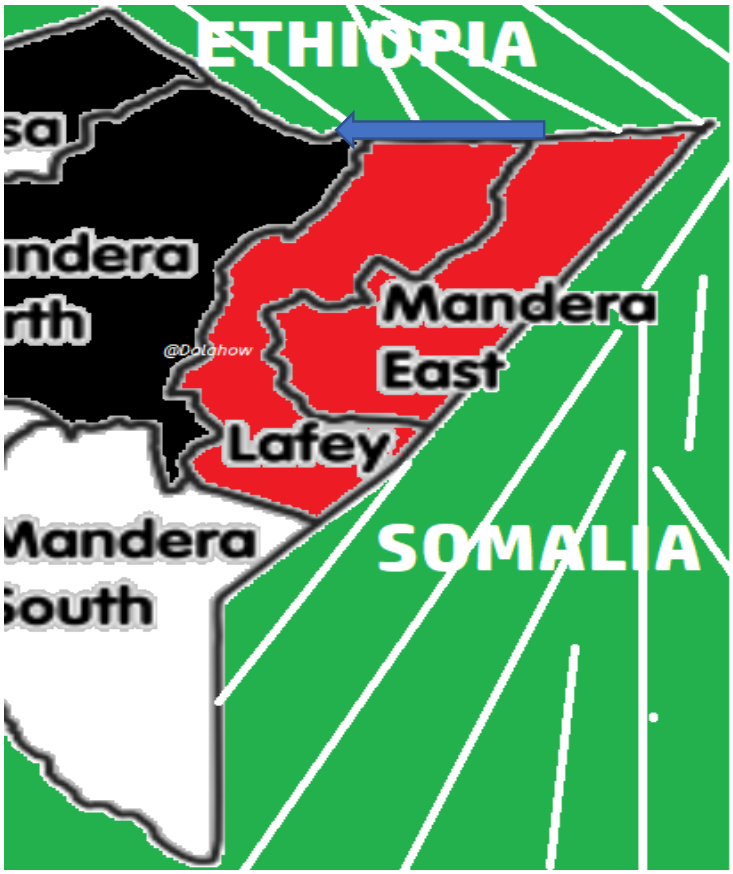

Figure 24:Location of Mandera Referral Hospital in relation to Map of Mandera East Constituency