FACTORS INFLUENCING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG YOUTH IN MERU COUNTY. A CASE OF MERU TEACHING AND REFERRAL HOSPITAL

BY

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DECLARATION

This Research project is my original work and has not been submitted for a degree in any other university or college for examination or academic purposes.

Signature: ……..Date:……

This research project has been submitted for examination with my approval as the University Supervisor.

Signed…… Date ……

DEDICATION

ACKNOWLEDGEMENT

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ABBREVIATIONS AND ACRONYMS

ART – Antiretroviral Therapy

ARV - Antiretroviral drugs

FBO- Faith Based Organizations

ART - Antiretroviral Therapy

HBM- Health Belief Model framework

HIV/AIDS - Human Immuno-deficiency Virus/Acquired Immuno-deficiency Diseases Syndrome

METRH - Meru Teaching And Referral Hospital

MOH- Ministry of Health

NACC – National AIDS Control Council

PLWHIV - People living with HIV/AIDS

TRA- Theory of Reasoned Action

UNAIDS – United Nations Program on HIV/AIDS

WHO – World Health Organization

ABSTRACT

The Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) have become one of the major health problems in many countries in the world. The disease is widely spread in low and middle income developing countries. The HIV pandemic is one of the most serious health crises the world faces today. Globally, there was an estimated 33 million people living with HIV by the end of 2007 and more than 25 million people since 1981 have died from AIDS. In 2007 there were 2.7 million new infections and 2 million HIV-related deaths. Non-adherence issues have been common especially in sub-Saharan African countries. It is not known why the clients find it hard to reach the recommended near perfect adherence levels of or above 95 per cent and therefore there is need to establish this. If the clients' issues are not extensively addressed, there might be a possibility of clients in developing viral resistance. The critical factors that influence adherence fall into four main categories: Clients factors such as active drug or alcohol use, age, sex, cultural beliefs and ethnicity; medication for regimen such as dosing complexity, side effects, number of pills, food restrictions; provider-client relationships such as attitudes, beliefs and system of care/service delivery such as long distance travel, inconvenient appointments. The purpose of this study was to establish the factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county based on a case of Meru Teaching and Referral Hospital (METRH). The target population for this study composed the 12 doctors, 76 nurses and 206 patients living with HIV/AIDS in Meru County. A sample population of 167 was arrived at by calculating the target population of 294 with a 95% confidence level and an error of 0.05. Data was analyzed using Statistical Package for Social Sciences (SPSS Version 21.0). Multiple regression analysis was used to establish the relations between the independent and dependent variables. The study sought to establish the client factors influencing adherence to ART antiretroviral therapy) among youth in Meru County. Further the study sought to establish the medication factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. The study also sought to establish the provider-client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. Again, the study sought to establish the stigma and discrimination factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. The study concluded that client factors had the greatest effect on the Adherence to ART, followed by provider-client factors, then medication factors while stigma and discrimination factors had the least effect to the Adherence to ART and that all the variables were significant. The study recommends that people living with HIV should be encouraged not to continuously use alcohol which disrupts antiretroviral therapy. The study recommends that the manufacturer should focus on the complexity of dosage such that one pill which contains all the requirements can be manufactured in order to reduce the dosing complexity which is highly believed to have discouraged youth from antiretroviral therapy. The study finally recommends that the county government of Meru should organize for a road show to sensitize its residents on the effects and importance of adhering to ART.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

The Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) have become one of the major health problems in many countries in the world. The disease is widely spread in low and middle income developing countries; such as South Africa, Botswana, and other Sub-Saharan African countries (Jointed United Nations programme on HIV / AIDS (UNAIDS), 2011). However, the introduction of Antiretroviral Therapy (ART) brought dramatic changes to the lives of people (UNAIDS, 2011). People living with HIV have started to live longer and AIDS related deaths have also been declining due to the availability of the ART programme. Since 1995, around 2.5 million deaths have been averted in low and middle income countries due to increased access to ART (UNAIDS, 2011).

ART requires a high level of adherence to minimize treatment failure and viral resistance (Mukui et al., 2016). There is a very strong relationship between adherence and virologic failure; an adherence level of more than 95% may lead to 22% virologic failure, an adherence level between 80% and 95% level may result in a 61% treatment failure and less than or equal to 80% adherence may have a treatment failure of 80% (UNAIDS, 2011). The shift to the use of antiretroviral therapy (ART) for treating HIV and AIDS has led to increasingly complex drug regimens (Su et al., 2016).) These drug regimens present significant challenges to both patients and health care providers with respect to adherence. Without adequate adherence, antiretroviral agents are not capable of suppressing HIV replication owing to insufficient concentrations of drugs in the blood, and may lead to difficulties suppressing plasma viral load (Phelps et al., 2010). In addition to being associated with poor short-term viral response, poor adherence to ART accelerates development of drug-resistant HIV. Therefore, identifying and mitigating the factors that reduce adherence to combination antiretroviral agents are important for prolonged viral load suppression (Phelps et al., 2010).

The HIV pandemic is one of the most serious health crises the world faces today. Globally, there was an estimated 33 million people living with HIV by the end of 2007 and more than 25 million people since 1981 have died from AIDS. In 2007 there were 2.7 million new infections and 2 million HIV-related deaths (WHO, 2009).

In the last couple of years, there has been rapid progress in scaling up Anti-Retroviral Therapy (ART) for People living with HIV/AIDS (PLWHIV) world-wide, Sub-Saharan African being no exception (WHO, 2009). It is estimated that 44% of the people with advanced HIV infection are currently receiving ART world-wide (WHO, 2010). However, the success should not only be measured through the number of people receiving ART at a given time, but also taking into account their clients successful adherence to the treatment. The virologic efficacy of ART or high adherence level is better achieved if the client sticks to the treatment regimen of more than 95% (WHO, 2009). However, in resource poor settings this is not easy to achieve as many clients fail to adhere in the long term duration the ART is required.

The widespread accessibility of the ART has changed the course of HIV infection in developed countries with comparable benefits being observed in resource limited settings. Recent studies have shown a sharp progress in ART access globally through combined efforts of affected countries and international partners. For example, two Countries in sub-Saharan Africa that is Botswana and Namibia have reached international treatment coverage of 80% or more (UNAIDS, 2010). Phillips et al. (2016) reported tremendous increase in supply of ART in resource limited settings. This dramatic availability of ART meant that more clients in need of ART were able to access them even in the low income countries.

Sub-Saharan Africa region is by far the worst affected in the world by the epidemic. The region has just over 10% of the world population but it is home to 67% of all people living with HIV and for 75% of AIDS deaths in 2007. HIV prevalence varies considerably across this region ranging from less than 1% in Madagascar to over 26% in Swaziland (WHO, 2009). Currently there are an estimated 940,000 people (adults and children) living with HIV in Uganda .HIV prevalence was estimated to be 5.4% among adults in 2007 showing a decline from an estimated adult prevalence of 7.9% in 2001 (WHO 2009a). Increases in treatment coverage have been extraordinary in many countries of the Sub-Saharan Africa. For example in Namibia where treatment coverage was less than 1% in 2003, 88% of individuals in need were on ART by the end of 2007. In Rwanda, ART coverage increased from 1% in 2003 to almost 71% in 2007 (Guira et al., 2016).

Access to antiretroviral therapy has increased tremendously in Sub-Saharan Africa with the World Health Organization (WHO) estimates pointing to an increase from 100,000 people receiving treatment at the end of 2003 to over two millions in December 2007 representing a

20-fold increase. This has changed the clinical course of Human Immunodeficiency Virus (HIV) with significant decline in morbidity and mortality. Now the challenge has shifted from access to adherence since with increased access to antiretroviral therapy (ART), HIV has become a chronic disease where patients have to take antiretroviral drugs for a long time with substantial side effects and sometimes with complex regimens (Today, South Africa has the largest antiretroviral therapy programme in the world with a 54% coverage and with 1.5 million people on ARVs (UNAIDS, 2010). In addition to this, the pressure on government is increasing to revise their ARV policy and to treat more people earlier since the publication and active media coverage of the "Treatment as Prevention" strategy in July this year by Montaner (2011). The "Treatment as Prevention" strategy is based on research findings which showed that by expanding ARV coverage (that is, putting more people on ARVs earlier) the communal viral load will be lowered and this in turn is associated with declining numbers of new HIV infections. The strategy is based on the widely accepted principle that the concentration of viruses in the blood is a key driver of HIV transmission.

In Kenya, ART is available in all public, private and even faith based organizations (FBO) at no cost. The Government of Kenya has also put strategic measures in place where CCCs have been established all over country-wide including remote areas. This is to ensure that every client eligible for the therapy gets it. Currently more than 99% of those clients who require ART can access them in a resource limited settings. However, WHO believes that at least 3 million people needing care should be able to access ART (Montaner, 2011).

The regimen has been simplified to fewer doses, less food and fluid restrictions and is more tolerable but treatment still requires high adherence level of or more than 95%. Recent studies have shown reduced numbers of illnesses related to HIV infection worldwide from the peak of 2.1 to 1.8 million in 2009 and a slight increase in adherence rate in Sub Saharan African countries. (UNAIDS/WHO, 2011).

The critical factors that influence adherence fall into four main categories: Clients factors such as active drug or alcohol use, age, sex, cultural beliefs and ethnicity; medication for regimen such as dosing complexity, side effects, number of pills, food restrictions; provider-client relationships such as attitudes, beliefs and system of care/service delivery such as long distance travel, inconvenient appointments. Of all these, client's behavior is the critical link between a prescribed regimen and treatment outcome. The effectiveness of ART will only

fail if the client does not take medication as prescribed of refuse to take them at all (Kanters et al., 2016).

In Meru Teaching and Referral Hospital, the adherence rate is as low as 30.4% according to areport by NACC (2009) after studying the entire Meru County medical population. According to the latest released report of the Kenya Aids Indicator Survey, Kenya is among the six HIV burden countries in Africa where more than 1.6 million people are living with HIV. About 29,122 (3.3 percent) people in Meru are living with HIV/AIDS with children constituting 13 percent which translates to 3,720 of the victims living with the virus placing the county's burden to the nation at position 31. HIV accounts for an estimated 29 percent of annual adult deaths, 20 percent of maternal mortality and 15 percent of children under the age of five years according to the UNAIDS efficient and sustainable HIV responses report 2013. It is alarming the toll that has placed in the country's economy by lowering per capita output by 4.1 percent. This study will focus on Meru County seeking to investigate the factors influencing adherence to Antiretoviral therapy (ART)among the youth (Nachega, 2009).

1.2 Statement of the Problem

The antiretroviral regimen has also been associated with unbearable side effects such as neuropathy, diarrhea and headache. In addition to these, there are so many pills to be swallowed about 16-20 per day including the pills to prevent opportunistic infections. This becomes a major challenge for many HIV-positive clients. They, therefore, end- up taking few of the pills or discontinuing the whole regimen 5 in order to get relieved from the pill burden (Bhat et al., 2010). Food and fluid restrictions have also been associated with ART as compared to other medications. This makes the regimen a unique one. Clients may also find it difficult to fit the ART regimen in their life situations resulting to a lot of disruptions, stresses. Such inconveniences may make them skip some doses of the ART regimen. Various factors have been associated with poor adherence to antiretroviral therapy. These include negative attitudes towards ART, inaccessibility of the ARVs, inadequate knowledge about the therapy, poverty, cultural and religious beliefs, illiteracy and age. Therefore, such factors need to be addressed so that clients are empowered and enlightened more on the importance of maintaining high ART adherence levels and the implications of non-adherence. The problem of ART adherence has been there since its introduction in 1990s (Palitza, 2009).

Non-adherence issues have been common especially in sub-Saharan African countries. It is not known why the clients find it hard to reach the recommended near perfect adherence

levels of or above 95 per cent and therefore there is need to establish this. If the clients' issues are not extensively addressed, there might be a possibility of clients in developing viral resistance (Tosolari, 2009).

Kenya has made strides in scaling up ART. The primary goal of ART as designed by the Ministry of Health is to minimize the viral load in HIV infected patients with the purpose of promoting quality of life, as well as reducing of HIV-related morbidity and mortality. However, anecdotal evidence suggests certain problems that contribute to the default rate, for insistence (Bhat et al., 2010) indicate that some men use their partners' ART irrespective of their status and further explore that the defaulter rate is high among the youth and children under the care of the elderly. There are no much studies about adherence levels in Kenya, specifically in Meru County.

About 29,122 (3.3 percent) people in Meru are living with HIV/AIDS with children constituting 13 percent which translates to 3,720 of the victims living with the virus placing the county's burden to the nation at position 31. According to NACC, Meru County in 2011 had 1,700 new infections and the remedy towards reducing the sexual transmission of HIV counselling, testing and linkage to care and treatment need to be emphasized and encouraged as enshrined in the study by Vo et al. (2012). NACC's report further discloses that that there is need to scale up HIV testing in the county to counsel and reduce the risk of those who test negative and to link those who test positive to care and treatment programmes as well as improve adherence to ART programs. One major challenge cited by NACC is the lack of information regarding the HIV/AIDS prevalence and control in Meru County. Due to the lack of information on many areas involving the spread and control of HIV/AIDS in the county, it has been difficult to make policies to address the situation. This is the gap that this study seeks to fill.

Vo (2012) conducted a study in Kenya on patient satisfaction with integrated HIV and antenatal care services in rural while Ochieng et al. (2015) did a similar study in location but on implementation and operational research: correlates of adherence and treatment failure among Kenyan patients on long-term antiretroviral therapy. Mukui et al. (2016) studied the rates and predictors of non-adherence to antiretroviral therapy among HIV-positive individuals in Kenya focusing on the results from the second Kenya AIDS indicator survey. Also, another study by Muthiani (2010) focused on factors influencing adherence to antiretroviral therapy at Nyeri Provincial Hospital in Central Kenya. Clearly, studies focusing

on the adherence challenge factors in Kenya, and more specifically in Meru County, are few. This is why this study seeks to fill this gap in literature by studying the factors that may lead to poor adherence to ART, specifically in Meru County.

1.3 Purpose of the Study

The purpose of this study was to establish the factors influencing adherence to ART antiretroviral therapy) among youth in Meru county based on a case of Meru Teaching and Referral Hospital (METRH).

1.4 Objectives of the Study

The study was guided by the following objectives:

i. To establish the client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county

ii. To establish the medication factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county

iii. To establish the provider-client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county

iv. To establish the stigma and discrimination factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county

1.5 Research Questions

The study sought answers to the following research questions:

i. To what extent do client factors (patient's knowledge, attitudes, perceptions) influence adherence to Antiretoviral therapy (ART)among youth in Meru County?

ii. To what extent do medication factors (patient's beliefs and practices) influence adherence to Antiretoviral therapy (ART)among youth in Meru County?

iii. To what extent do provider-client factors (type of services delivered to patients receiving ARVs) influence adherence to Antiretoviral therapy (ART)among youth in Meru county?

iv. To what extent do stigma and discrimination factors (type of services delivered to patients receiving ARVs) influence adherence to Antiretoviral therapy (ART)among youth in Meru county?

1.6 Significance of the Study

It is hoped that the findings of the study will offer valuable contributions from both a theoretical and practical standpoint. From a theoretical standpoint,it is hoped that the findings generated from this study will make several contributions to both knowledge and understanding of what is one of the worst calamities to hit Kenya and the world in many years. It will also contribute to the Sociological /Anthropological understanding of non-adherence and be useful in developing interventions that will take into consideration the problems faced by people taking ARV treatment at Meru Teaching And Referral Hospital and Kenya as a whole.

It is expected that the qualitative and quantitative data collected in this study will be made available to health planners such as Ministry of Health and it is hoped that this will lead to better designed, better directed and more culturally sensitive intervention programmes to deal with Socio-cultural problems associated with non-adherence.

In addition findings will assist the Ministry of Health in efforts to develop a scheme for rational use of ARVs, and also serve as a resource for research teams developing new protocols. Some of the burning issues answered in this study may be incorporated immediately to address urgent problems that may not require scientific inquiry at Meru Teaching and Referral Hospital.

1.7 Delimitation of the Study

This study was confined to investigating factors leading to non-adherence to ART specifically in Meru Teaching and Referral Hospital. Meru Country has been selected as the study universe as it one of the areas in Kenya with low adherence levels and high HIV/AIDS prevalence. Medical practitioners and patients in the said hospital acted as the population of the study.

1.8 Limitations of the Study

The study anticipated encountering some limitations that might hinder access to information that the study sought. The respondents targeted in this study were reluctant in giving information fearing that the information being sought was used to intimidate them or print a negative image about them. For patients already suffering from social stigma, participating in this study may prove to be difficult as it might worsen their social stigma. The researcher hoped to handle this by carrying an introduction letter from the University to assure them that

the information they gave was treated with confidentially and will be used purely for academic purposes.

The other limitation was that the study was based in Meru Teaching and Referral Hospital, in Meru County. Due to the geographical factor, the study did not cover medical institutions in the County nor in the country owing to the amount of time and resources available. This study was, therefore, suffer from generalizability of the results if the nature of projects undertaken were significantly different from those in Meru Teaching and Referral Hospital such as donor funded and implemented projects.

In addition, the findings of this study were limited to the extent to which the respondents were willing to provide accurate, objective and reliable information. The researcher checked for consistency and test the reliability of the data collected.

1.9 Basic Assumptions of the Study

The study assumed that there were no serious changes in the composition of the target population that might affect the effectiveness of the study sample. This study also assumed that the respondents were honest, cooperative and objective in the response to the research instruments and were available to respond to the research instruments in time. Owing to the fact that the medical practitioners in Meru County have been on strike, the study assumed that they had returned to work by the time data collection process for this study commences. Finally, the study assumed that the authorities in the hospital granted the required permission to collect data from the staff and select patients.

1.10 Definition of Significant Terms Used In the Study

Perceptions: refers to a way of conceiving something in this case conceiving the Antiretoviral(ART).

Knowledge: This refers to the factual information a person possesses. In this context, it is the information that the patient and medical practitioners in the hospital possess as concerns Antiretoviral(ART).

Attitudes: This refers to a complex mental state involving beliefs and feelings and values and dispositions to act in certain ways, which in this case, it is the disposition towards Antiretoviral(ART).

Beliefs: These are cognitive contents in which some confidence is placed. In this context, it refers to the confidence the patients and medical practitioners place on Antiretoviral therapy (ART)to promote adherence to it.

Practices: refer to customary ways of operation or behavior. With regard to this study, it means the habitual behavior of patients towards Antiretoviral(ART).

Services: This refers to work done by one person or group that benefits another. In this context, it refers to the work done by medical practitioners in facilitating Antiretoviral therapy (ART)amongst patients.

Antiretroviral therapy: According to the WHO (2009), antiretroviral are drugs that act at different stages of the HIV life cycle to stop the multiplication of the HIV virus. In therapy to treat HIV infection, three or more drugs from the different classes of antiretroviral are used in combination. In this study, antiretroviral therapy referred to treatment of HIV infection with three antiretroviral drugs in combination which are Zidovudine, Lamivudine and Nevirapine or Efavirenz as first line combination and Truvada plus Alluvia as second line combination.

1.11 Organization of the Study

This study was organized into five chapters. Chapter one contains the introduction to the study. It presents background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the Study, delimitations of the study, limitations of the Study and the definition of significant terms. On the other hand, chapter two reviews the literature based on the objectives of the study. It further looked at the conceptual framework and finally the summary. Chapter three covers the research methodology of the study. The chapter describes the research design, target population, sampling procedure, tools and techniques of data collection, pre-testing, data analysis, ethical considerations and finally the operational definition of variables. Chapter four will present analysis and findings of the study as set out in the research methodology. The study will close with chapter five which presents the discussion, conclusion, and recommendations for action and further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter provides an extensive literature and research related to Antiretroviral Therapy. It has greatly improved the overall health of individuals living with HIV/AIDS. Several studies have reported increased virologic and immunologic effectiveness of ART and the consequent reduction in mortality and morbidity associated with HIV/AIDS Perfect adherence to HIV medications is critical for successful treatment particularly for prevention of viral replication (Shubber et al., 2016). According to Nance et al. (2016), the length and quality of life among the people living with HIV/AIDS have dramatically changed with advent of ART. Regimens have been simplified in recent years to fewer doses, less food and fluid restrictions and are generally more tolerable, but treatment regimen still requires high adherence levels of or above 95% in order to be effective. The literature review summarizes a diverse spectrum of views about antiretroviral therapy (non) adherence factors. The chapter is thus structured into theoretical, conceptual and empirical review. The study also presents the knowledge gap the chapter seeks to fulfill.

2.2 Client Factors and Adherence to ART among Youth

Most of the client factors that affect the level of adherence in HIV patients include age, financial support, level of education and social support. Recent studies have found that male sex, white ethnicity, older age, higher level of education and literacy correlate with better adherence however, depression, active drug or alcohol consumption result to poor adherence to ARV drugs (Shubber et al., 2016). Age may influence adherence. Studies have found that apart from the most elderly adherence increases with age (Van Dyk, 2010). In two studies associated with ART, adherence non-adherence showed a positive correlation with younger age (Williamson & Martin, 2010). A Lower level of general education and poorer literacy impacts negatively on some patient's ability to adhere (Shubber et al., 2016) whilst a higher level of education has a positive impact (Van Dyk, 2010; Tosolari, 2009).

Literature reveals that patients on higher incomes have less difficulty with adherence (Shubber et al., 2016; Montaner, 2011). However, poverty is an increasing feature of the face of HIV especially in the third world where many people are living below the poverty line (Grierson, et al 2009). In the Futures II study, which surveyed 924 Australian HIV positive

people, more than half of the respondents reported experiencing some difficulty in meeting the cost of daily living (Nachega, 2009). Medications and clinic visits cost money and may stress an already stretched budget. In the developing countries, there is no medical insurance or disability pension for people living with HIV infection (Montaner, 2011).

Living alone and a lack of support have been associated with an increase in non-adherence (Horsmann, 2010) and social isolation is predictive of non-adherence (Suleiman & Momo, 2016). Not living alone, having a partner, social or family support, peer interaction, and better physical interactions and relationships are characteristics of adherent patients (Treffry-Goatley et al., 2016).

Client's knowledge about the ART regimen and the understanding of the relationship between the poor adherence and build-up of resistance predicts better adherence to the ART. (Asefa et al., 2016). Mehta et al. (2016) reported that client's behavior is the critical link between a prescribed regimen and treatment outcomes. Client's knowledge and beliefs about disease and medicine can influence adherence in many ways. Understanding the relationship between adherence and disease progression, the consequences of poor adherence and impact it will have on the life of an individual client and the whole family is of vital importance. A client who is more knowledgeable about HIV, the importance of maintaining the recommended adherence levels would tend to follow all the instructions regarding medication intake as compared to the client with no such information. In addition, negative beliefs regarding efficacy of ART may also influence ART adherence behavior resulting to non-adherence (Paterson, 2010).

Additionally, a patient's beliefs about their illness and the effectiveness of medication are predictive of adherence. A patient's level of knowledge about HIV disease, a belief that ART is effective (Shubber et al., 2016) and 15 prolongs life (Treffry-Goatley et al., 2016), and a recognition that poor adherence may result in viral resistance and treatment failure (Lucas & Bengsberg, 2009) all impact favorably upon a patient's ability to adhere. Conversely, a lack of interest in becoming knowledgeable about HIV (Horsmann, 2010) and a belief that ART may in fact cause harm adversely affecting adherence

2.3 Medication Factors and Adherence to ART among Youth

ART consists of complex regimen that can include up to 20 pills with multiple dosing throughout the day and specific food and fluid related instructions. These are often difficult to

follow for majority of the clients. The higher the pill burden the lower the adherence level (Horsmann, 2010).

The development of resistance is a natural biological process that will occur, sooner or later, with every drug (Chan, 2011). The use of any antimicrobial drug forces microbes (that is bacteria, viruses and some parasites) to either adapt or die. Microbes which adapt and survive carry genes for resistance, which means that the medications which were effective before will no longer have an effect on these microbes. This natural process of resistance development has been vastly accelerated by human practices such as mismanagement of antibiotics, prescribing inferior drug regimes, treatment interruptions and non-adherence.

There are two main factors impacting on the development of drug resistance in HIV namely the high genetic variability of HIV (or its ability to mutate rapidly); and the relative "fitness" of these variations (or mutations) in the presence of antiretroviral drugs.

HIV has a very high replication (or reproduction) rate – up to ten billion new virions are reproduced daily in an untreated person's body. During this replication process of HIV, approximately five mutations are introduced every time an HI virus replicates – which is an extremely high rate of mutation (Williamson & Martin, 2010). This high rate of mutation is due to the fact that the replication of HIV is (for various reasons) an extremely error-prone process. This implies that two types of viruses are constantly being produced in the body of an untreated HIV-infected person: the original "wild type" virus, as well as some mutants – produced by the errors during replication.

The development of drug resistant viruses also depends on the relative fitness of mutants. I will illustrate this by explaining what is happening with mutants in the body of an untreated HIV infected person; a person on ARVs who optimally adheres to the medication regime; and a person who defaults and cannot reach an adherence level of at least 90% (Chan, 2011).

The majority of viruses in an untreated HIV-infected person's body will be wild-type viruses. There will also be mutants, but these mutants generally have reduced fitness because they are at a competitive disadvantage relative to the wild-type viruses. They will thus remain in the minority and their transmission rate will be lower (Lucas & Bengsberg, 2009).

When antiretroviral medications are introduced, the ecology of the virus population in the body changes dramatically. The wild-type virus will be repressed, and if the patient adheres

to the medication optimally, reproduction of the wild-type virus is severely hampered. Mutant viruses will have difficulty in surviving due to their low numbers and reduced fitness. This is the ideal point in adherence to ARVs where the viral load is undetectable and the immune system gets the opportunity to replenish itself (Wood, 2010).

But what happens if the person does not adhere to their ARVs or if an insufficient medication regime is used (for example, one drug instead of three)? The majority of the wild-type viruses will still be killed due the selective drug pressure, but viral suppression will be insufficient. Mutations will gain relative "fitness" because there are not many wild-type viruses left to compete with. Some of them may now develop an increased capacity to replicate and can develop into the dominant population in the person's body (Wood, 2010). If ARV treatment is changed to a more potent regime, the mutants will decrease again, but they are archived in memory cells and can re-emerge if ARVs to which they are resistant are used in future (Mehta et al., 2016).

The development of drug-resistant viruses has serious implications, not only for the individual, but for treatment in general. Resistance to one drug may result in cross-resistance to all other drugs in that same class. This is because ARVs in the same class target the same enzyme – and this enzyme has now changed due to mutation. It is especially in the NNRTI class of ARVs (which is part of our first-line treatment regime in South Africa) that resistance can develop extremely fast – treatment delays as brief as 48 hours may result in resistance in the case of some of these drugs (Mehta et al., 2016). Some of the drugs in the NRTI class (like Tenovovir, which is now used in South Africa in combination with NNRTIs) as well as drugs in the PI category are more "forgiving" when dosages are skipped. Drug-resistant HIV strains can also be transmitted to other people (under certain conditions as highlighted on the slide) with the consequence that the drugs will also not work for them.

The drug regimen Almost all PLWHA who are currently using anti-HIV drugs are on a regimen of 3 or more drugs (ART) (Grierson, et al., 2009). The likelihood of a patient's adherence to a given regimen declines with polypharmacy, the frequency of dosing, the frequency and severity of side effects, and the complexity of the regimen (Wood, 2010). Drug hypersensitivity is far more common in patients with HIV (Chan, 2011) and regimen associated toxicity is a common predictor of, and reason for, non-adherence across many studies (Chan, 2011; Montaner, 2011). Side effects associated with each individual antiretroviral drug are well described, and whilst not universal for every patient can be

predicted. Usually they defect after the first few weeks of therapy but for some, they persist. Anticipation and fear of side effects also impacts upon adherence (Buldeo & Gilbert, 2015).). Poor adherence has been associated with patients' desire to avoid embarrassing side effects in certain situations, for example, whilst on a date or attending a job interview (Nachega, 2009).

A typical ART combination commonly consists of three agents or drugs (Stavudine, Lamivudine and Nevirapine or Effavirenz) and usually plus other medication for prophylaxis of opportunistic infections. This can result into a high pill load, thrice-daily dosing, dietary and dosing idiosyncrasies, large capsules or tablets, and specific storage instructions. This regimen complexity significantly impacts upon a patient's ability to adhere (Castonguay, Filer & Pitts, 2016). Additional medications taken for symptomatic relief like analgesics, cough remedies and others common in patients with advanced HIV disease, further add to the pill burden and toxicity. In Uganda, the regimen requires Lamivudine, Stavudine and Nevirapine or Effavirenz as first line. Second line Stavudine, Didanosine and Kaletra or Zidovudine, Didanosine and Kaletra (Grierson et al., 2009).

2.4 Provider-client factors and Adherence to ART among Youth

A meaningful and supportive relationship between a client and a health care provider helps a client to overcome significant barriers to antiretroviral therapy adherence. This relationship plays an important role in improving adherence to prescribed ARV drugs. It is believed to be a motivating factor for adherence to ART. Trust and confidence in provider has been shown to increase the levels of ART adherence (Bhat et al., 2010).

Patient overall satisfaction and trust with the health care provider and the patient’s opinion on the provider’s competence, provider’s willingness to include the client in decision making process. Two recent studies done on client- provider relationship to show the effect of trust of the client on physician and the impact on client’s ART adherence showed that good relationship improved the adherence ten-fold when compared to those clients who had no trust on the physician (Paterson, 2010).

Although existing data is limited, aspects of the clinical setting may be associated with improved adherence. A friendly, supportive and non-judgmental attitude of the health care providers, convenient appointment scheduling and confidentiality contribute to better adherence (NACC, 2009).

Structural factors not directly related to clients or medications also play a major role in influencing ART adherence. Limited availability and accessibility of ART and health care

facilities, health care beliefs, waiting time, opening time, availability of counseling services, social, economic and psychosocial support for PLWHA plays a major role in influencing the degree of adhering to the prescribed ART regimen (MOH, 2010).

The effect that the clinic setting has on adherence should not be underestimated. Clinic characteristics that impact on adherence include: proximity to the patient's home or place of work, the expense of getting there, lengthy delays between appointments, clinic opening and closing times, long waiting times, lack of services such as child care, privacy, confidentiality, and unsympathetic or inconsiderate staff (Paterson, 2010).

Other factors that have been identified to strengthen the relationship include – perception of the provider competence, quality and clarity of communication, compassion shown by the provider and involvement of the client in the treatment decisions have identified as motivators of ART adherence. However, other factors such as inconvenience of the regimen where a client becomes frustrated by the health care provider especially in situations where misunderstandings occur, treatment becomes complex and side effects becomes unmanageable have shown to result to non-adherence (WHO, 2009).

Obtaining a prescription before a clinic visit are reported as obstacles to adherence (Paterson, 2010). For just over half of PLWHA a prescription for ART lasts for 3 months in developed countries, however 40% receive a prescription for one month and 12% for 2 months (Grierson, et al., 2009). In addition, some dispensing pharmacies will only dispense one month's medication at a time. Not all pharmacies are able to dispense anti-HIV drugs, as a result, some PLWHA attend their local pharmacy for most prescription medicine and a specific pharmacy for their anti-HIV therapy. In developing countries the story is very worrying as lengthy waits in a few hospitals that do not have extended hours may also impede adherence (Grierson, et al., 2009).

2.5 Stigma and Discrimination and Adherence to ART among Youth

Van Dyk (2010) defines stigma as a socially stereotyped category construction in which some people are labelled as carriers of discredited attributes within a particular social interaction. Stigma is composed of four components, namely, labeling differences, association with negative attributes, separation between the stigmatized person, and the society and status loss. Van Dyk (2010) suggests that for a person to be stigmatized, the person needs to have a discredited attribute. The stigma is brought about by the discredited attribute that is socially constructed as being deviant by the mainstream society. Van Dyk (2010) further

differentiates between someone discredited when his attribute is known from a discreditable person whose attribute is not known. In the case of HIV infection, due to the long incubation period of the disease, the HIV status is not visible until it progresses to AIDS. Stigma is a non-desired attribute that links a person to an undesired stereotype. Stereotypes are preconceived opinions or ideas about a person with a discredited attribute that are not based on reason or actual experience. For example, a stereotype may be a belief that all PLWHA are promiscuous people or drug addicts. Another example could be an opinion that PLWHA must be bad people who deserve their illness due to their immoral behaviour. Other stereotyped beliefs could include believing that most Africans are HIV-positive. Any discrediting characteristic such as skin color, disability or gender, could stand as a stigmatised attribute. It is not restricted to diseases. However, stigma studies have focused on diseases that are stigma prone such as HIV, leprosy and mental illness (Tosolari, 2009).).

Phelps et al. (2010) suggest that social vulnerabilities such as stigma and discrimination facilitate the spread of the HIV pandemic. HIV-related stigma emerged because those who prior to the emergence of HIV and AIDS were societally marginalized, stigmatized, or discriminated against, were found gradually and increasingly to bear the brunt of the HIV and AIDS pandemic. Palitza (2009) advocates a typological theoretical framework that organizes HIV and AIDS structural factors into four levels, namely, individual, environmental, structural and super-structural levels. Social vulnerabilities such as stigma and discrimination not only facilitate the spread of HIV but also hinder HIV treatment.

Stigma may require structural level interventions including programmatic considerations for education and social services within health care systems (Palitza, 2009). Oturu (2013) conceptualizes stigma as occurring at different concentric levels including selfstigma, familial stigma, community stigma and organizational stigma. Each type of stigma is unique and may require different strategies to tackle it. At the individual level, PLWHA may experience self-stigma. They stigmatize themselves because of the HIV infection.

A person may experience regret for engaging in risky sexual behaviour. At another level, PLWHA may experience familial stigma. This is stigma that emanates from people that are familiar with the PLWHA. These may include family, relatives or friends. Another type of stigma is community stigma, which emanates from members of the community. These members may be neighbors or strangers who discriminate against PLWHA. *Oturu* further posits that these stigma processes do not take place in a contextual vacuum; they are

influenced by the wider super-structural, structural, environmental and individual factors. A cross-sectional study which explored non-adherence factors among 221 adult PLWHA attending an ART clinic in Nigeria found that 31.9% of the respondents failed to adhere to ART due to AIDS-related stigma (Ijeoma et al., 2013)

Stigma associated with HIV and AIDS is a major barrier to ART and remains a problem Africa (Omom, 2009). Mann (1987:4) identifies three phases of the HIV and AIDS pandemic, including HIV, AIDS, and social reactions (stigma and denial). He noted that the third phase is as central to the global HIV and AIDS challenge as the disease itself. Despite international efforts to tackle HIV and AIDS since then, stigma and discrimination remain among the most poorly understood aspects of the pandemic. UNAIDS/WHO (2009) identifies stigma as a continuing challenge that prevents concerted efforts to combat HIV and AIDS. The poor understanding of how to deal with stigmatization is due in part to the complexity and diversity of stigma and discrimination, but also in part to limitations in current thinking within the field and the inadequacy of available theoretical and methodological tools (Onyango-Ochieng, 2009). PLWHA still face serious discrimination from and together with their families. AIDS-related discrimination varies from inappropriate comments to breaches of PLWHA‟s confidentiality, delay and refusal of treatment and social isolation (Omom, 2009).

Stigma and discrimination affect families caring for people living with HIV in profound and multiple ways. Current stigma frameworks, therefore, need to take cognizance of the myriad of social forces that shape the stigmatized process. Sayles et al. (2009) observe that poor self-reported access to medical care is strongly associated with HIV stigma, and could itself be as a result of the perceived discrimination and social inequities that are key to the development of stigma. Stigma and discrimination obstruct the uptake of HIV and AIDS interventions. For example, a study done in Botswana and Zambia by Charurat et al. (2010) found that stigma against PLWHA and fear of discrimination were the key reasons for the low uptake of voluntary counseling and testing to prevent mother-to-child transmission of the HIV virus.

Unless the stigma and discrimination associated with HIV and AIDS is seriously addressed, any policy of routine or mandatory testing could even be counter-productive by driving people away from health facilities if they know they will be tested. For example, many pregnant women in Malawi chose not to undergo HIV testing despite the promise of free ARV drugs because of the social stigma surrounding the virus (Mehta et al., 2016). This 39

suggests that fear of stigmatization and discrimination may prevent people from testing or getting involved in education, preventive measures and treatment services, thus making them vulnerable to HIV and AIDS infection. Perhaps, friendly support intervention programmes which are culturally appropriate should be developed to overcome the stigmatization and discriminations towards PLWHA in order to promote adherence to medication both at the health care facilities and at the community.

Williamson and Martin (2010) argue that stigma has prevented some PLWHA from enjoying the full benefits of free ARVs. Nachega (2009) examine interpersonal relationships in stigma by linking stigma to power differentials where stigmatized attribute is considered to „disempower" the individual. This view can be useful in contexts where PLWHA also have some disempowered characteristics such as being poor or uneducated. Montaner (2011) have called for concerted efforts to empower PLWHA to overcome stigma. On the other hand, Lucas and Bengsberg (2009) argue that stigmatization comes about as the society uses psychological processes designed by natural selection to avoid people with a stigmatized attribute and join forces with normal people for competition and exploitation purposes. Human beings possess cognitive adaptations designed to cause them to avoid poor social exchange partners, and avoid contact with those who are differentially likely to carry communicable pathogens

Religious or moral beliefs lead people to believe that HIV and AIDS is the result of moral faults such as „promiscuity or deviant sex" and is considered as a bad person's disease and the result of bad deeds in an earlier life so they deserve to be punished (Livi, Zeri & Baroni, 2017). Such 40 general perceptions may influence treatment preferences, pathways to care and adherence to medication. As a result of HIV related stigma, many PLWHA experience discriminatory reactions from the community because HIV is associated with loose morals, shame, and death (Horsmann, 2010).). There is an implied moral wrong that has been done by the individual that violates the usual norm, evokes fear and demands that the individual be put out and isolated (Chan, 2011)

Self-stigma inhibits PLWHA from disclosing their HIV status, seeking medical assistance or advice and so they remain in the shadows, passing the infection to others. Some PLWHA do feel shame of diagnosis and may decide not to disclose their positive status to close relatives such as parents or siblings. Factors that motivate disclosure to partners, family, and friends in the less industrialized world include length of time since diagnosis, severity of illness, a sense

of ethical responsibility to partners, social support from friends and family, minimizing stress associated with non-disclosure, and disclosure as a way to facilitate HIV preventive. The most common barriers to disclosure include fear of abandonment, fear of discrimination, violence, upsetting family members, and accusations of infidelity (WHO, 2009).

Disclosure of HIV serostatus to sexual partners supports risk reduction and facilitates access to prevention and care services for PLWHA. However, HIV prevention programmes to protect the negative partners in discordant couples in Uganda faced the dilemma of nondisclosure of HIV status for HIV positive individuals many of whom were already taking antiretroviral drugs. A study conducted to assess health and social predictors of disclosure as well as to explore and describe the process, experiences and outcomes related to disclosure among PLWHA in Eastern Uganda, found that most (69 %) of the total 1,092 respondents had disclosed their HIV serostatus to their most recent sexual partners while 31 per cent had 41 not effected HIV serostatus disclosure (Tosolari, 2009). Shubber et al. (2016), in their research in Tanzania, suggest that disclosure of HIV status may assist in stigma reduction. However, disclosure of HIV status to the community may sometimes lead to increased stigmatization of PLWHA. On the other hand, disclosures can also potentially reduce stigma and promote adherence to ART. However, it is important that disclosure be made to someone who can support and not discriminate against the PLWHA.

Physicians and social scientists argue that it is necessary to test out whether or not disclosure of condition of terminal illness is advisable under specified conditions. There is need for general awareness of the contexts in which disclosures are made and the general response that follows such disclosures (Williamson & Martin, 2010). Who disclosures are made to and how they are made can increase or reduce HIV-related stigma. There are some links, however, in that the fear of stigmatization emanates from the awareness of the society of the HIV diagnosis. It is not necessarily the shame that a PLWHA is concerned about. Rather, it is the „fear“ of the internalized and external social impact of the disclosure of the HIV status that the PLWHA is concerned about

A study conducted at Nyeri Provincial public hospital showed no relationship between adherence to ART and disclosure of HIV serostatus by the PLWHA to others (Muthiani, 2010). On the other hand, Chan (2011) examined the relationship between HIV serostatus disclosure and adherence to antiretroviral therapy and found greater adherence among PLWHA who reported greater serostatus disclosure to others. Lucas and Bengsberg (2009)

concluded that disclosure of HIV serostatus to persons other than health care workers at the infectious diseases clinic was protective against non-optimal adherence to ART.

If a woman fears disclosing her status to her husband, for example, she may have to hide her pills or may not be able to visit clinics for regular checkups. Fear of stigmatisation by a PLWHA‟s partner significantly interfered with maintaining ART adherence in Western Cape Province of South Africa (Bhat et al., 2010). PLWHA may fear to disclose to their sexual partner to avoid stigmatization, discrimination, and potential abandonment. Failure to reveal HIV status can lead to poor adherence (Rachlis et al., 2011).

A study conducted in 14 ART sites and five selected HIV counseling and testing centers across the six geopolitical zones of Nigeria revealed that only 36% of the respondents disclosed their status to their partners (Oturu, 2013). PLWHA are apprehensive of taking their drugs in public for fear of being stigmatized (Uzochukwu et al., 2009). Children can discontinue their education as a result of discrimination. Disclosing a pupil's HIV status and segregating them is a breach of the child's right. However, a pupil in Bungoma County reported that her class teacher exposed her HIV status to other children, teachers and parents leading to discrimination and stigma. The incident undermined the fight against HIV. PLWHA are still discriminated against especially in rural areas. The girl's mother said that her daughter has been on antiretroviral drugs since she was born and the action of the teacher was likely to affect the health of the daughter (Daily Nation, October 12, 2012).

Complete parental disclosure to children helps to motivate HIV-infected children to adhere to their daily medical regimen. It enables them to understand HIV infection and to make sense of disease-related experiences and the importance of adherence. However, Wood (2010) posits that many caregivers decide not to tell their children that they have HIV until adolescence, potentially impeding their cooperation with treatment. The reason why most parents choose to delay disclosing to the children their HIV serostatus is fear that the children may reveal their diagnosis, thereby simultaneously revealing maternal HIV status and exposing the family to potential stigmatisation, discrimination and prejudice. A study conducted by Wood (2010) among 75 children aged 3-13 years who are living with HIV in New York City, revealed that 40 % of caregivers and 56% of the children reported missed doses of medication in the previous one month prior to the commencement of the study.

Non-adherence to ART was significantly associated with worse parent-child communication, higher caregiver stress, lower caregiver quality of life, worse caregiver cognitive functioning, non-disclosure of HIV positive status to the child, and child stress.

2.6 Theoretical Orientation

The purpose of theoretical framework is to make scientific findings more meaningful and generalizable. Thus, this section discusses the theoretical foundation on which the study is anchored. The study will be grounded on the Health Belief Model framework (HBM) which is supported by the social- psychological model.

2.6.1 Health Belief Model (HBM)

With reference to this study, the health belief model framework (HBM) was used. HBM is a social- psychological model that attempts to explain and predict individual health behavior by focusing on the attitude and beliefs of individuals. The model was developed in the 1950s by Rosenstock with an intention to predict which individuals would or would not take specific action to avoid illness. Rosenstock assumed that to be in good health and to stay so it is an objective common to all people. The HBM is based on the three major components namely individual perceptions, modifying factors and variables affecting the likelihood of taking recommended health action. The model assumes that an individual will take health related action if that person perceives susceptibility, severity of condition, benefits in taking an action to reduce the risk and believes in being able to successfully execute the action required to produce the desired outcome without barriers (Livi, Zeri & Baroni, 2017).

With reference to the concepts introduced about the HBM, adherence can be taken to be the desired health related action or behavior that can be influenced by perceptions, beliefs, attitude of an individual. If such factors are not re-enforced or addressed, they may lead to non-adherence (Castonguay, Filer & Pitts, 2016).

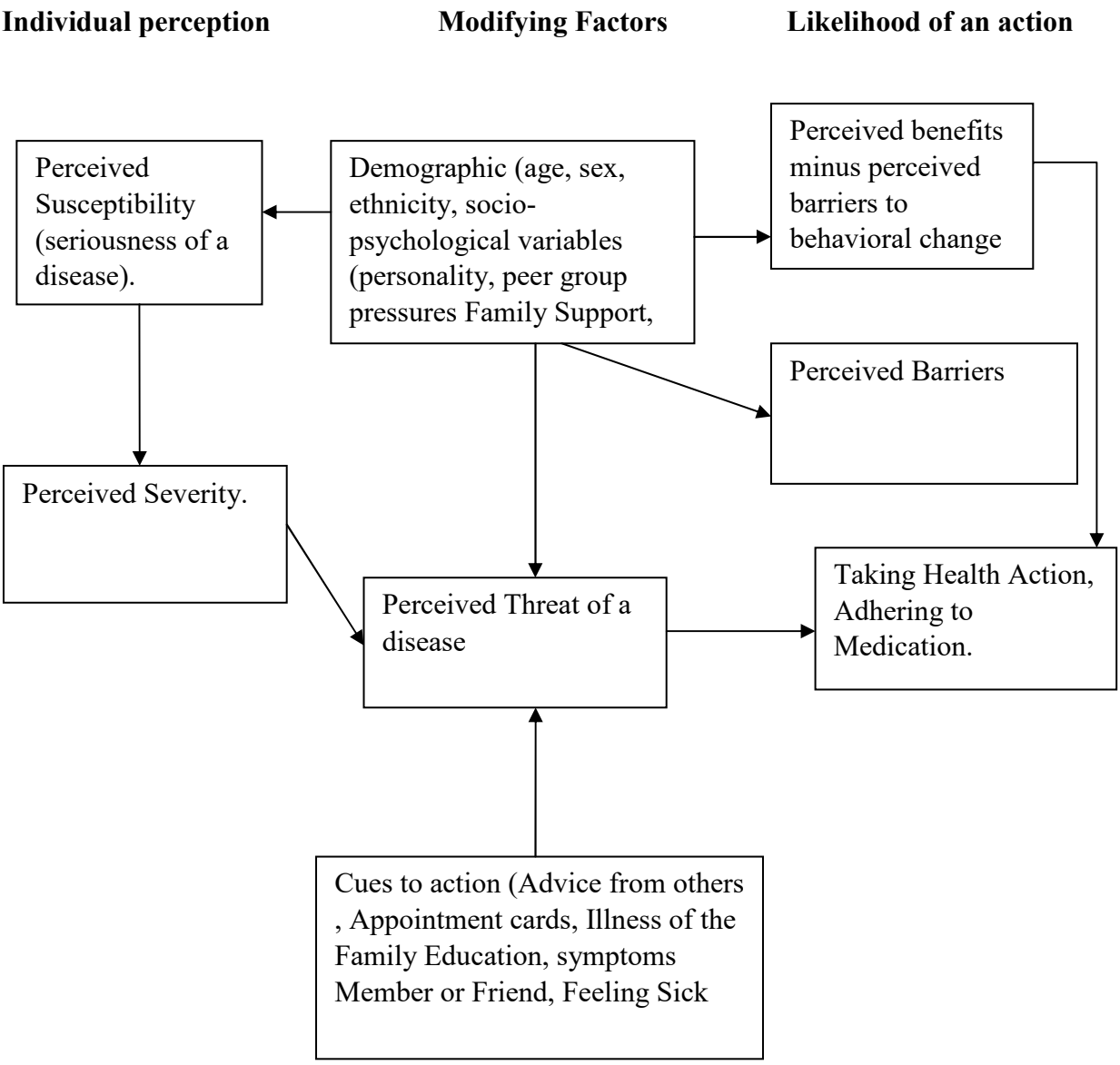


Figure 1: Relationship of the Key Concepts of Health Belief Model

a) Individual perceptions include the following variables:

Perceived susceptibility is when people believe they are at risk for a disease, they are more likely to do something to prevent it from happening and when they are not at risk of susceptibility they will do the opposite. Therefore, HIV positive client's belief that they are susceptible to AIDS when they do not take their Antiretroviral drugs well. This perception is influenced by various factors such as age, gender, or cultural beliefs (Buldeo & Gilbert, 2015).

Perceived severity refers to an individual's belief about the seriousness or severity of the disease. It also come from the beliefs a person has about the difficulties a disease would create or the effects it would have on his life in general. When the perception of susceptibility is combined with seriousness, it results in perceived threat. Knowledge and beliefs of the consequences of having AIDS include muscle wasting, skin rashes Hospitalization, loss of job and early death. This perception is likely to influence an individual to take a health action which leads to a perceive threat of deterioration (Baghianimoghaddam et al., 2010).

b) Modifying factors

Modifying factors that influence person's perceptions include demographic variables such as age, gender, marital status and ethnicity. An unmarried person may adhere better to treatment regimen than married one because of the freedom they might have to make choices and decisions (Asare & Sharma, 2012).

Socio-psychological variables;

Cultural and spiritual beliefs may encourage or hinder engaging in preventative health behaviors such as use of condom. Structural variables such as past experience, knowledge about the HIV and prior contact with it may have positive influence on adherence to ART. Other factors include economic status, communication may influence on decision and choices made by an individual on health actions according to Buldeo and Gilbert (2015).

Cues to action: These are events, people or things that move people to change behavior. Cues can either be internal or external. Internal cues include feeling of fatigue, uncomfortable symptoms or thoughts about the condition of another HIV positive client who is close. External cues that may affect adhering to drugs may be advice from others, pill taking reminders, and illness of family member of a friend as posited by Asare and Sharma (2012).

c) Likelihood of an action:

This is the behavior adapted in order to reduce threat based on the perceived benefits and barriers of the behavioral change (Castonguay, Filer & Pitts, 2016).

Perceived benefits of the action are the person's opinion of the value or the usefulness of adopting a new behavior in decreasing the risk of developing the disease or alleviating the existing symptoms well (Castonguay, Filer & Pitts, 2016).

Perceived Barriers of the action is an individual's own evaluation of the obstacles in the way of adapting a new behavior or continuing with the same behavior. Perceived barriers to adhering to ART including pill burden, food restrictions, dosing schedule, side effects and stigma may lack support from family members or friends as disease has a social stigma (Buldeo & Gilbert, 2015).

2.6.2 Theory of Reasoned Action (TRA)

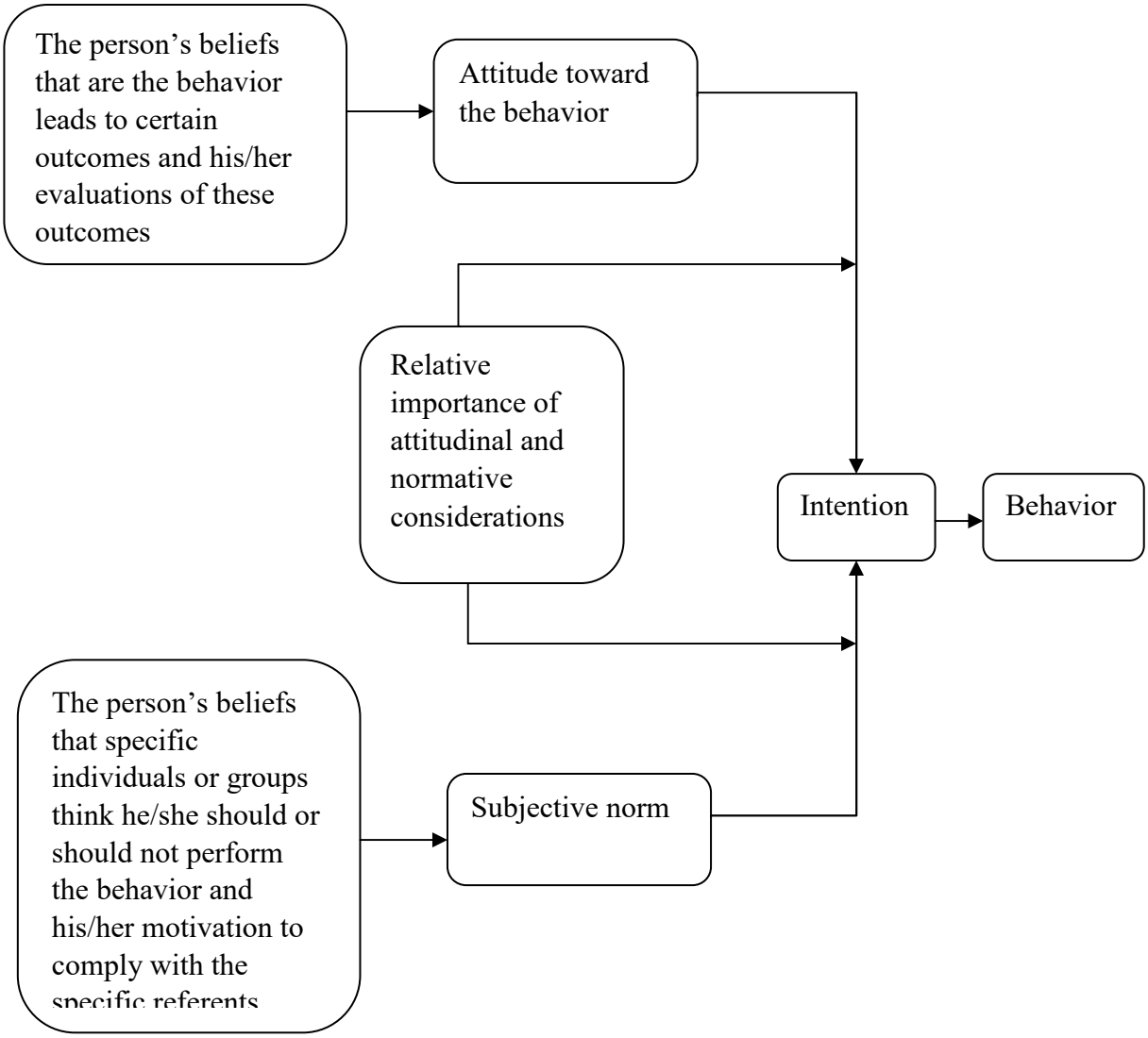
Research using the Theory of Reasoned Action (TRA) has explained and predicted a variety of human behaviors since 1967. Based on the premise that humans are rational and that the behaviors being explored are under volitional control, the theory provides a construct that links individual beliefs, attitudes, intentions, and behavior. The theory's variables and their definitions are as described by Vo et al. (2012).

A specific behavior defined by a combination of four components: action, target, context, and time (e.g., implementing a sexual HIV risk reduction strategy (action) by using condoms with commercial sex workers (target) in brothels (context) every time (time) (Tosolari, 2009).

The intent to perform a behavior is the best predictor that a desired behavior will actually occur. In order to measure it accurately and effectively, intent should be defined using the same components used to define behavior: action, target, context, and time. Both attitude and norms, described below, influence one's intention to perform a behavior (Palitza, 2009).

A person's positive or negative feelings toward performing the defined behavior. Behavioral beliefs are a combination of a person's beliefs regarding the outcomes of a defined behavior and the person's evaluation of potential outcomes. These beliefs will differ from population to population. For instance, married heterosexuals may consider introducing condoms into their relationship an admission of infidelity, while for homosexual males in high prevalence areas it may be viewed as a sign of trust and caring (Horsmann, 2010).

A person's perception of other people's opinions regarding the defined behavior is what is constitutes norms. Normative beliefs are a combination of a person's beliefs regarding other people's views of a behavior and the person's willingness to conform to those views. As with behavioral beliefs, normative beliefs regarding other people's opinions and the evaluation of those opinions will vary from population to population (Ochieng et al., 2015).



Source: VO et al. (2012).

Figure 2: Theory of Reasoned Action (TRA)

The TRA provides a framework for linking each of the above variables together. Essentially, the behavioral and normative beliefs -- referred to as cognitive structures -- influence individual attitudes and subjective norms, respectively. In turn, attitudes and norms shape a person's intention to perform a behavior. Finally, as the proponents of the TRA (Vo et al., 2012) argue, a person's intention remains the best indicator that the desired behavior will occur. Overall, the TRA model supports a linear process in which changes in an individual's behavioral and normative beliefs will ultimately affect the individual's actual behavior. In this

context, a person's intention can be used to determine if they are willing to adhere to ART. If not, the factors leading to this situation can be identified through this theory.

The attitude and norm variables, and their underlying cognitive structures, often exert different degrees of influence over a person's intention. For example, results from a study of northern Thai males revealed that men's perceptions of peer norms were the best predictor of condom use (Livi, Zeri & Baroni, 2017). Yet in a study of college females in the United States, attitudinal beliefs exerted greater influence on the intent to use condoms by sexually inexperienced females (Sayles et al., 2009). In order to develop appropriate interventions for a specific population and behavior, therefore, it is important to determine which variable and its corresponding cognitive structures exert the greatest influence on the study population (Sayles et al., 2009).

To date, behaviors explored using the TRA include smoking, drinking, signing up for treatment programs, using contraceptives, dieting, wearing seatbelts or safety helmets, exercising regularly, voting, and breastfeeding (Lucas & Bengsberg, 2009). Studies conducted in Zimbabwe applied the theory to research on condom usage by females and males (Mills, Brester & Morh, 2011). Other study populations for TRA HIV/AIDS research include women, STD clinic patients, female commercial sex workers, men who have sex with men, college students, and injecting drug users.

Some limitations of the TRA include the inability of the theory, due to its individualistic approach, to consider the role of environmental and structural issues and the linearity of the theory components (Sayles et al., 2009). Individuals may first change their behavior and then their beliefs/attitudes about it. For example, studies on the impact of seatbelt laws in the United States revealed that people often changed their negative attitudes about the use of seatbelts as they grew accustomed to the new behavior.

2.7 Conceptual Framework

The critical factors that influence adherence fall into four main categories: client factors such as active drug or alcohol use, age, sex, cultural beliefs and ethnicity; medication for regimen such as dosing complexity, side effects, number of pills, food restrictions; provider-client relationships such as attitudes, beliefs and system of care/service delivery such as long distance travel, inconvenient appointments. Of all these, client's behavior is the critical link between a prescribed regimen and treatment outcome. The effectiveness of ART will only

fail if the client does not take medication as prescribed of refuse to take them at all (Wood, 2010).

The conceptual framework of the study can be summarized in the figure 3. It shows the relationship between independent variable and dependent variable. Furthermore it also shows other factors, moderating and intervening variables that can play in and affect both independent and dependent variables in this study.

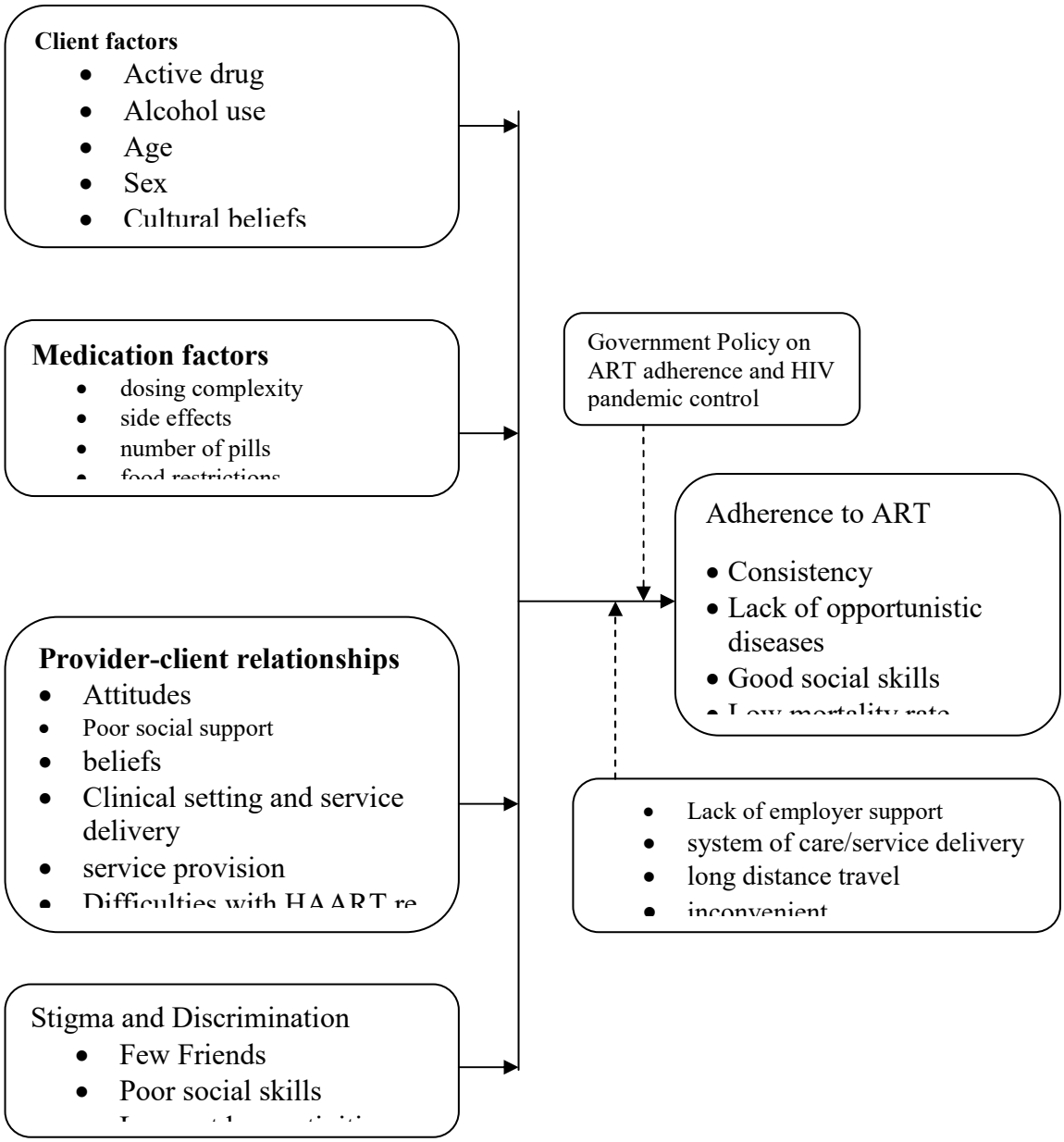


Figure 3: Conceptual Framework

2.8 Summary and Research Gaps

The HIV pandemic is one of the most serious health crises the world faces today. Globally, there was an estimated 33 million people living with HIV by the end of 2007 and more than 25 million people since 1981 have died from AIDS. In 2007 there were 2.7 million new infections and 2 million HIV-related deaths (WHO, 2009). Access to antiretroviral therapy has increased tremendously in Sub-Saharan Africa with the World Health Organization (WHO) estimates pointing to an increase from 100,000 people receiving treatment at the end of 2003 to over two millions in December 2007 representing a 20-fold increase. This has changed the clinical course of Human Immunodeficiency Virus (HIV) with significant decline in morbidity and mortality. Now the challenge has shifted from access to adherence since with increased access to antiretroviral therapy(ART), HIV has become a chronic disease where patients have to take antiretroviral drugs for a long time with substantial side effects and sometimes with complex regimens (WHO, 2009). In Kenya, ART is available in all public, private and even faith based organizations (FBO) at no cost. The Government of Kenya has also put strategic measures in place where CCCs have been established all over country-wide including remote areas. This is to ensure that every client eligible for the therapy gets it. Currently more than 99% of those clients who require ART can access them in a resource limited settings however WHO believes that at least more than 3 million people needing care should be able to access ART (MOH, 2010). The critical factors that influence adherence fall into four main categories: Clients factors such as active drug or alcohol use, age, sex, cultural beliefs and ethnicity; medication for regimen such as dosing complexity, side effects, number of pills, food restrictions; provider-client relationships such as attitudes, beliefs and system of care/service delivery such as long distance travel, inconvenient appointments. There is also the influence that stigma and discrimination has on the uptake of ART amongst HIV/AIDS patients. Of all these, client's behavior is the critical link between a prescribed regimen and treatment outcome. The effectiveness of ART will only fail if the client does not take medication as prescribed of refuse to take them at all (Wood, 2010).

With reference to this study, the health belief model framework (HBM) was used. HBM is a social- psychological model that attempts to explain and predict individual health behavior by focusing on the attitude and beliefs of individuals. Relating to the concepts introduced about the HBM, adherence can be taken to be the desired health related action or behavior that can be influenced by perceptions, beliefs, attitude of an individual. If such factors are not re-enforced or addressed, they may lead to non-adherence. Research using the Theory of

Reasoned Action (TRA) has explained and predicted a variety of human behaviors. Based on the premise that humans are rational and that the behaviors being explored are under volitional control, the theory provides a construct that links individual beliefs, attitudes, intentions, and behavior. The TRA provides a framework for linking each of the above variables together. Essentially, the behavioral and normative beliefs -- referred to as cognitive structures -- influence individual attitudes and subjective norms, respectively. In turn, attitudes and norms shape a person's intention to perform a behavior. Many studies have also been done regarding ART adherence, strategies put in place but still issues regarding ART adherence seem to be stagnating. This study is, therefore, intended to identify those factors that influence ART adherence and make recommendations so that guidelines can be provided in order to help combat the problem of non-adherence with specific reference to Meru County.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the procedures and techniques that will be used in the collection, processing and analysis of data. Specifically the following subsections are included; research design, target population and sampling, data collection instruments, data collection procedures and finally data analysis.

3.2 Research Design

The study adopted a descriptive research design. A descriptive design is concerned with determining the frequency with which something occurs or the relationship between variables (Bryman & Bell, 2011). Thus, this approach was suitable for this study, since the study intended to collect comprehensive information through descriptions which were helpful for identifying variables. Bryman and Bell (2011) assert that a descriptive design seeks to get information that describes existing phenomena by asking questions relating to individual perceptions and attitudes.

3.3 Target population

According to Sekaran and Bougie (2010), a population is the total collection of elements about which we wish to make inferences. The target population for this study composed of the 12 doctors, 76 nurses and 206 patients living with HIV/AIDS in Meru County, as shown in Table 3.1.

Table3. 1: Target Population

Category	Group	Target Population	Percentage
Staff	Doctors	12	4.1
	Nurses	76	25.9
Patients	Patients enrolled in ART	206	70.1
Total		**294**	**100.0**

Source: Meru County (2016)

3.4 Sample size and Sampling Procedures

Sampling is a deliberate choice of a number of people who are to provide the data from which a study draws conclusions about some larger group whom these people represent. The section focuses on the sampling size and sampling procedures.

3.4.1 Sampling Size

The sample size is a subset of the population that is taken to be representatives of the entire population (Kumar, 2011). A sample population of 167 was arrived at by calculating the target population of 294 with a 95% confidence level and an error of 0.05 using the below formula taken from Kothari (2004).

$$n = \frac{z^2.N.\partial_p^2}{(N-1)e^2 + z^2\partial_p^2}$$

Where; n = Size of the sample,

N = Size of the population and given as 294,

e = Acceptable error and given as 0.05,

∂p = The standard deviation of the population and given as 0.5 where not known,

Z = Standard variate at a confidence level given as 1.96 at 95% confidence level.

The sample size fits within the minimum of 30 proposed by Saunders, Lewis and Thornhill (2012).

Table3. 2: Sampling Frame

Category	Group	Target Population	Ratio	Sample Size
Staff	Doctors	12	0.57	7
	Nurses	76	0.57	43
Patients	Patients enrolled in ART	206	0.57	117
Total		**294**		**167**

3.4.2 Sampling Procedures

The study selected the respondents using stratified proportionate random sampling technique. Stratified random sampling is unbiased sampling method of grouping heterogeneous population into homogenous subsets then making a selection within the individual subset to ensure representativeness. The goal of stratified random sampling is to achieve the desired

representation from various sub-groups in the population. In stratified random sampling subjects are selected in such a way that the existing sub-groups in the population are more or less represented in the sample (Kothari, 2004). The study used simple random sampling to pick the respondents in each stratum.

3.5 Research Instruments

Primary data was obtained using self-administered questionnaires. The questionnaire was made up of both open ended and closed ended questions. The open ended questions were used so as to encourage the respondent to give an in-depth and felt response without feeling held back in illuminating of any information and the closed ended questions allowed respondent to respond from limited options that had been stated. According to Saunders (2011), the open ended or unstructured questions allowed profound response from the respondents while the closed or structured questions were generally easier to evaluate. The questionnaires were used in an effort to conserve time and money as well as to facilitate an easier analysis as they were in immediate usable form.

3.6 Pilot Testing

Pilot testing refers to putting of the research questions into test to a different study population but with similar characteristics as the study population to be studied (Kumar, 2005). Pilot testing of the research instruments was conducted using staff and patients at Meru Level 5 County Hospital since it had a similar setting. A total of 17 questionnaires were administered to the pilot survey respondents who were chosen at random. After one day the same participants were requested to respond to the same questionnaires but without prior notification in order to ascertain any variation in responses of the first and the second test. This is very important in the research process because it assists in identification and correction of vague questions and unclear instructions. It is also a great opportunity to capture the important comments and suggestions from the participants. This helped to improve on the efficiency of the instrument. This process was repeated until the researcher is satisfied that the instrument does not have variations or vagueness.

3.7 Validity of Research Instruments

According to Golafshani (2012), validity is the accuracy and meaningfulness of inferences, based on the research results. One of the main reasons for conducting the pilot study was to ascertain the validity of the questionnaire. The study used content validity which draws an inference from test scores to a large domain of items similar to those on the test. Content

validity was concerned with sample-population representativeness. Gillham (2011) stated that the knowledge and skills covered by the test items should be representative to the larger domain of knowledge and skills. Expert opinion was requested to comment on the representativeness and suitability of questions and give suggestions of corrections to be made to the structure of the research tools. This helped to improve the content validity of the data that will be collected. Content validity was obtained by asking for the opinion of the supervisor, lecturers and other professionals on whether the questionnaire will be adequate.

3.8 Reliability of Research Instruments

Instrument reliability on the other hand is the extent to which a research instrument produces similar results on different occasions under similar conditions. It's the degree of consistency with which it measures whatever it is meant to measure (Bell, 2010). Reliability is concerned with the question of whether the results of a study are repeatable. The questionnaires were administered to a pilot group of 17 randomly selected respondents from the target population and their responses were used to check the reliability of the tool. This comprises 10% of the sample size. A construct composite reliability co-efficient (Cronbach alpha) of 0.7 or above, for all the constructs, is considered to be adequate for this study (Rousson, Gasser and Seifer, 2012). Reliability coefficient of the research instrument will be assessed using Cronbach's alpha (α) which is computed as follows:

$A=k/k\text{-}1\times [1-\sum (S^2)/\sum S^2 sum]$

Where:

α= Cronbach's alpha

k = Number of responses

$\sum (S^2)$ = Variance of individual items summed up

$\sum S^2 sum$ = Variance of summed up scores

3.9 Data Collection Procedures

The researcher obtained an introduction letter from the university which was presented to each stakeholder so as to be allowed to collect the necessary data from the respondents. The drop and pick method was preferred for questionnaire administration so as to give respondents enough time to give well thought out responses. The researcher booked appointment with respondent organizations at least two days before visiting to administer questionnaires. The researcher personally administered the research instruments to the

respondents. This enabled the researcher to establish rapport, explain the purpose of the study and the meaning of items that may not be clear as observed by Best and Khan (2003).

3.10 Data Analysis Techniques

Data was analyzed using Statistical Package for Social Sciences (SPSS Version 21.0). All the questionnaires received were referenced and items in the questionnaire were coded to facilitate data entry. After data cleaning which entailed checking for errors in entry, descriptive statistics such as frequencies, percentages, mean score and standard deviation was estimated for all the quantitative variables and information presented inform of tables. The qualitative data from the open ended questions was analyzed using conceptual content analysis and presented in prose

Inferential data analysis was done using multiple regression analysis. Multiple regression analysis will be used to establish the relations between the independent and dependent variables. Multiple regressions were used because it is the procedure that uses two or more independent variables to predict a dependent variable. Since there a were four independent variables in this study the multiple regression model generally assumed the following equation;

$$\boldsymbol{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$$

Where:-

Y= Adherence to ART

β_0=constant

$\beta_1, \beta_2, \beta_3$ and β_4 = regression coefficients

X_1= Client factors

X_2= Medication factors

X_3= Provider-client factors

X_4= Stigma and Discrimination factors

ε=Error Term

3.11 Ethical Considerations

The researcher observed the following standards of behaviour in relation to the rights of those who become subject of the study or are affected by it: First, in dealing with the participants, they were informed of the objective of the study and the confidentiality of obtained information, through a letter to enable them give informed consent. Once consent was granted, the participants maintained their right, which entailed but was not limited to

withdraw or decline to take part in some aspect of the research including rights not to answer any question or set of questions and/or not to provide any data requested; and possibly to withdraw data they had provided. Caution was observed to ensure that no participant was coerced into taking part in the study and, the researcher seeks to use minimum time and resources in acquiring the information required. Secondly, the study adopted quantitative research methods for reliability, objectivity and independence of the researcher. While conducting the study, the researcher ensured that research ethics are observed. Participation in the study was voluntary. Privacy and confidentiality was also observed. The objectives of the study were explained to the respondents with an assurance that the data provided was used for academic purpose only.

3.12 Operationalization of Variables

The operationalization of variables is shown in Table 3.3.

Table3. 3: Operationalization of variables

Objectives	**Type of Variable**	**Indicator**	**Measuring of Indicators**	**Scale**	**Tools of analysis**	**Type of analysis**
To establish the client factors influencing adherence to ART antiretroviral therapy) among youth in Meru county	Independent	Client factors	• Active drug • Alcohol use • Age • Sex • Cultural beliefs • Level of education • Financial Concerns	Interval Ordinal Ordinal Ordinal Ordinal	Percentages Mean score	Descriptive statistics Regression analysis
To establish the medication factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county	Independent	Medication factors	• dosing complexity • side effects • number of pills • food restrictions • Drug Resistance	Interval Ordinal Ordinal Ordinal Ordinal	Percentages Mean score	Descriptive statistics Regression analysis
To establish the provider-client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county	Independent	Provider-client factors	• Attitudes • Poor social support • beliefs • Clinical setting and service delivery	Ordinal Ratio Interval	Percentages Mean score	Descriptive statistics Regression analysis

			• service provision • Difficulties with ART re - supply			
d. To establish the stigma and discrimination factors influencing adherence to ART (antiretroviral therapy) among youth in Meru county	Independent	Stigma and discrimination	• Few Friends • Poor social skills • Less outdoor activities	Ordinal Ordinal Ordinal Ordinal	Percentages Mean score	Descriptive statistics Regression analysis
	Dependent	Adherence to ART	• Consistency • Lack of opportunistic diseases • Good social skills • Low mortality rate	Interval Ordinal Ordinal Interval Interval	Mean score	Descriptive statistics Regression analysis

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter discusses the findings obtained from the primary instrument used in the study. It discusses the characteristics of the respondents, their opinions on the factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County based on the case of Meru Teaching and Referral Hospital (METRH). In order to simplify the discussions, the researcher provided tables that summarize the collective reactions of the respondents.

4.2 Response Rate

Out of 167 questionnaires administered as per the sample size of the study, a total of 121 questionnaires were filled and returned giving a response rate of 72.46% which is within what Chan (2011) prescribed as a significant response rate for statistical analysis and established at a minimal value of 50%. The study made use of frequencies (absolute and relative) single response questions and likert scale for matrix questions in collecting and analyzing where a scale of 5 points was used in computing the mean scores and standard deviations. These were then presented in tables as appropriate with explanations being given in paragraphs.

4.3 Background Information

The study sought to enquire on the respondents' general information including, gender, how long have you been working/visiting with Meru Teaching and Referral Hospital, their educational level and their age bracket. Their responses were as presented below.

4.3.1 Gender of the Respondents

The researcher sought to establish gender distributions of the respondents. The findings were indicated in Table 4.1.

Table 4. 1: **Gender of the Respondents**

	Frequency	**Percent**
Male	54	44.6
Female	67	55.4
Total	**121**	**100**

From the results above in table 4.1, majority of the respondents were female as shown by 55.4% while the rest were male as illustrated by 44.6%. This implies that the study was unbiased since it considered both male and female.

4.3.2 Period of working/visiting with Meru Teaching and Referral Hospital

The respondents were again requested to indicate how long they have been working/visiting with Meru Teaching and Referral Hospital. Their responses were as shown in table 4.2.

Table 4.2: Period of working/visiting with Meru Teaching and Referral Hospital

	Frequency	**Percent**
Less than 3 years	89	73.6
3 to 9 years	21	17.4
9 to 12 years	8	6.6
Above 12 years	3	2.5
Total	**121**	**100**

As per the above results, majority of respondents indicated that they have been working/visiting with Meru Teaching and Referral Hospital for a period of less than 3 years as shown by 73.6%. Further the respondents indicated that they have been working/visiting with Meru Teaching and Referral Hospital for a period of 3 to 9 years as shown by 17.4%, for a period of 9 to 12 years as shown by 6.6 % and for a period of above 12 years as shown by 2.5%. This implies that the respondents understood the subject under study and gave correct information.

4.3.3 Highest Level of Education

The respondents were also asked to indicate their highest level of education. Their responses were as shown in table 4.3.

Table 4. 3: Highest Level of Education

	Frequency	Percent
Certificate	80	66.1
Diploma	19	15.7
Degree	11	9.1
Masters	7	5.8
PhD	4	3.3
Total	**121**	**100**

From the findings, 66.1% of the respondents indicated that their highest level of education was certificate, 15.7% of the respondents indicated that their highest level of education was diploma, 9.1% of the respondents indicated that their highest level of education was degree, 5.8% of the respondents indicated that their highest level of education was masters while 3.3% of respondents indicated that their highest level of education was PhD. This implies that majority of the respondents were learnt enough to comprehend the subject under study and hence they gave correct information.

4.3.4 Age bracket

Further the respondents were required to indicate their age bracket. Their responses were as shown in table 4.4.

Table 4. 4: Age bracket

	Frequency	Percent
20-30 yrs	63	52.1
31-40 yrs	25	20.7
41-50 yrs	21	17.4
51 – 60 yrs	12	9.9
Total	**121**	**100**

The results in table 4.4 shows that, 52.1% of the respondents were aged between 20 and 30 years, 20.7% of the respondents were aged between 31 and 40 years, 17.4 % of the respondents were aged between 41 and 50 years whereas 9.9% of the respondents were aged between 51 and

60 years. Therefore, this shows that the study covered all the required age brackets hence the information obtained was accurate and reliable.

4.4 Factors Influencing Adherence to ART

The objective of this study was to establish the factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County based on a case of Meru Teaching and Referral Hospital (METRH). The study was based in the following four variables; client factors, medication factors, provider-client factors and stigma and discrimination factors.

4.4.1 Client Factors

The study sought to establish the client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. The respondents were asked to use a likert scale of 1-5 and indicate their level of agreement with various statements on the client factors influence on adherence to ART among youth in Meru County. Their responses were as shown in table 4.5.

Table 4. 5: Level of Agreement with various Statements on Client Factors

	Mean	Std. Dev.
Active drug level influence adherence to antiretroviral therapy	4.157	0.742
Continuous alcohol use disrupts antiretroviral therapy	3.826	0.843
Age of the patient determines adherence to antiretroviral therapy	3.835	0.768
Sex of the youth influence consistency of antiretroviral therapy	3.446	0.562
Cultural beliefs highly affect the antiretroviral therapy	2.570	0.617
Level of education determines good social skills in antiretroviral therapy	3.975	0.831
Financial concerns influence consistency in antiretroviral therapy	2.893	0.589

From the results above, the respondents agreed that active drug level influence adherence to antiretroviral therapy as illustrated by a mean of 4.157 and that level of education determines good social skills in antiretroviral therapy as shown by an average of 3.975.

Further the respondents agreed on the fact that age of the patient determines adherence to antiretroviral therapy as shown by an average of 3.835 and that continuous alcohol use disrupts

antiretroviral therapy as shown by an average of 3.826. However the respondents were neutral that sex of the youth influence consistency of antiretroviral therapy as illustrated by a mean of 3.446, that financial concerns influences consistency in antiretroviral therapy as illustrated by a mean of 2.893 and that cultural beliefs highly affect the antiretroviral therapy as shown by an average of 2.570.

4.4.2 Medication factors

Further the study sought to establish the medication factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. The respondents were requested using a likert scale of 1-5 to indicate their level of agreement with various statements on the medication factors influence on adherence to ART among youth in Meru County. Their responses were as shown in table 4.6.

Table 4. 6: Level of Agreement with various Statements on Medication Factors

	Mean	Std. Dev.
Dosing complexity discourages youth from antiretroviral therapy	3.727	0.785
Side effects increases mortality rate of youth in antiretroviral therapy	4.066	0.844
Number of pills discourage youth to undergo antiretroviral therapy	3.942	0.878
Food restrictions influence consistency in antiretroviral therapy	2.546	0.577
Drug resistance influence adherence to antiretroviral therapy	3.727	0.707

From the findings, the study agreed that side effects increases mortality rate of youth in antiretroviral therapy as illustrated by an average of 4.066 and that number of pills discourages youth to undergo antiretroviral therapy as shown by a mean score of 3.942. Further the respondents agreed on the fact that drug resistance influence adherence to antiretroviral therapy as shown by a mean of 3.727 and that dosing complexity discourages youth from antiretroviral therapy as illustrated by 3.727. However the respondents were neutral that food restrictions influence consistency in antiretroviral therapy as shown by an average of 2.546.

4.4.3 Provider-Client Factors

The study also sought to establish the provider-client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. The respondents were asked to indicate their level of agreement with various statements on the provider-client factors influence on adherence to ART among youth in Meru County. Their responses were as illustrated in table 4.7.

Table 4. 7: Level of Agreement with various Statements on Provider-Client Factors

	Mean	Std. Dev.
Non-judgmental attitude of the health care providers contribute to better adherence	4.107	0.854
Poor social support influence the degree of adhering to the prescribed ART regimen	3.661	0.852
Beliefs and good relationship improves the adherence	2.479	0.579
Clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence	4.041	0.860
Service provision and treatment decisions motivates ART adherence	3.752	0.849
Difficulties with ART re –supply are obstacles to adherence	2.719	0.635

From the above results the respondents agreed that non-judgmental attitude of the health care providers contribute to better adherence as depicted by a mean of 4.107 and that clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence as shown by a mean of 4.041. Again the respondents agreed that service provision and treatment decisions motivates ART adherence as illustrated by an average of 3.752 and that poor social support influence the degree of adhering to the prescribed ART regimen as shown by a mean score of 3.661. However the respondents were neutral that difficulties with ART re –supply are obstacles to adherence as illustrated by a mean of 2.719 and disagreed that beliefs and good relationship improves the adherence as shown by an average of 2.479

4.4.4 Stigma and Discrimination

Again, the study sought to establish the stigma and discrimination factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. The respondents were asked to indicate their level of agreement with various statements on the stigma and discrimination influence on adherence to ART among youth in Meru County. Their responses were as shown in table 4.8.

Table 4. 8: Level of Agreement with various Statements on Stigma and Discrimination

	Mean	Std. Dev.
Few Friends attitude of the health care providers contribute to better adherence	2.322	0.710
Poor social skills influence degree of adhering to the prescribed ART regimen	3.752	0.745
Less outdoor activities discourage youth to undergo antiretroviral therapy	4.207	0.763

As per the results in table 4.8, the respondents agree on the fact that less outdoor activities discourage youth to undergo antiretroviral therapy as shown by a mean of 4.207 and that poor social skills influence degree of adhering to the prescribed ART regimen as shown by an average of 3.752. However the respondents disagreed on the fact that few Friends attitude of the health care providers contribute to better adherence as illustrated by a mean of 2.322.

4.4.5 Adherence to ART

Finally the study sought to determine the trend of youth's adherence to ART. The respondents were requested to indicate trend of various aspects of adherence to ART for the last 5 years using a likert scale of 1-5. Their responses were as shown in table 4.9.

Table 4. 9: Trend of various aspects of adherence to ART

	Mean	Std. Dev.
Consistency	4.223	0.832

Lack of opportunistic diseases	3.860	0.830
Good social skills	3.207	0.729
Low mortality rate	4.182	0.806

From the above results, the respondents indicated that consistency has improved as illustrated by a mean score of 4.223 and that low mortality rate has also improved as depicted by a mean of 4.182. Further the respondents indicated that lack of opportunistic diseases has improved as shown by a mean of 3.860 and that good social skills has been constant over the last 5 years as shown by a mean of 3.207.

4.5 Inferential Statistics

The data presented below on client factors, medication factors, provider-client factors and stigma and discrimination factors and adherence to ART were computed into single variables per factor by obtaining the averages of each factor. Multiple regression analysis was then conducted at 95% confidence interval and 5% confidence level 2-tailed to establish the relationship between the variables. The research used statistical package for social sciences (SPSS V 21.0) to code, enter and compute the measurements of the multiple regression.

4.5.1 Multiple Regression Analysis

In this study, a multiple regression analysis was conducted to test the effect among predictor variables. The summary of regression model output is presented in Table 4. 10.

Table 4. 10: Summary of Regression Model Output

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.898	0.807	0.801	1.806

The study found that independent variables selected for the study (i.e. client factors, medication factors, provider-client factors and stigma and discrimination factors) accounted for 80.1% of the variations on adherence to ART. According to the test model, 19.9% percent of the variation adherence to Antiretoviral therapy (ART)among youth in Meru County could not be explained by the model. Therefore, further studies should be done to establish the other factors that contributed the unexplained (19.9%) of the variation on adherence to Antiretoviral therapy (ART)among youth in Meru County.

The analysis of variance results for the relationship between the four independent variables and adherence to Antiretoviral therapy (ART)among youth in Meru County is shown in Table 4. 11.

Table 4. 11: Summary of One-Way ANOVA results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1624.82	4	406.205	88.239	0.000
	Residual	534	116	4.603		
	Total	**2012.82**	**120**			

The probability value of 0.000 indicates that the regression relationship was significant in predicting the effects of client factors, medication factors, provider-client factors and stigma and discrimination factors on adherence to ART. The calculated F (88.239) was significantly larger than the critical value of F= 5.6125. This again shows that the overall test model was significant.

The Regression coefficients for the relationship between the four independent variables and adherence to ART are shown in Table 4.12.

Table 4. 12: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.884	0.223		3.964	0.0001
Client factors	0.866	0.342	0.776	2.532	0.0120
Medication factors	0.681	0.216	0.545	3.153	0.0020
Provider-client factors	0.716	0.317	0.643	2.259	0.0258
Stigma and Discrimination factors	0.543	0.136	0.431	3.993	0.0001

The established multiple regression equation for predicting adherence to ART from the four independent variables was:

$Y= 0.884+0.866X_1 + 681X_2 + 0.716X_3 + 0.543X_4 + \varepsilon$

The regression equation above has established that taking all factors into account (client factors, medication factors, provider-client factors and stigma and discrimination factors) constant at zero, Adherence to ART was 0.884. The findings presented also show that taking all other independent variables at zero, a unit increase in the client factors would lead to a 0.866 increase in the scores of Adherence to ART and a unit increase in the scores of medication factors would lead to a 0.681 increase in the scores of Adherence to ART. Further, the findings shows that a unit increases in the scores of provider-client factors would lead to a 0.716 increase in the scores of Adherence to ART. The study also found that a unit increase in the scores of stigma and discrimination factors would lead to a 0.543 increase in the scores of Adherence to ART among youth in Meru County. Overall, client factors had the greatest effect on the Adherence to ART, followed by provider-client factors, then medication factors while stigma and discrimination factors had the least effect to the Adherence to ART. All the variables were significant (p-values < 0.05).

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the researcher presents the summary, conclusion and recommendations based on the findings and interpretations of the research. Further, the researcher provides suggestions for further studies.

5.2 Summary of Findings

This section focuses on the summary of the research findings on the effect of client factors, medication factors, provider-client factors and stigma and discrimination factors on the Adherence to ART among youth in Meru County.

5.2.1 Client Factors

The study sought to establish the client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. From the results, the study found that active drug level influences adherence to antiretroviral therapy and that level of education determines good social skills in antiretroviral therapy. Further the study revealed that age of the patient determines adherence to antiretroviral therapy and that continuous alcohol use disrupts antiretroviral therapy. However the study showed that sex of the youth fairly influences consistency of antiretroviral therapy, those financial concerns fairly influences consistency in antiretroviral therapy and that cultural beliefs lowly affect the antiretroviral therapy.

5.2.2 Medication Factors

Further the study sought to establish the medication factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. From the findings, the study revealed that side effects increase mortality rate of youth in antiretroviral therapy and that number of pills discourages youth to undergo antiretroviral therapy Further the study showed that drug resistance influence adherence to antiretroviral therapy and that dosing complexity discourages youth from antiretroviral therapy. The study also revealed that food restrictions fairly influence consistency in antiretroviral therapy.

5.2.3 Provider-Client Factors

The study also sought to establish the provider-client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. From the results, the study showed that non-judgmental attitude of the health care providers contribute to better adherence and that clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence. Again the study revealed that service provision and treatment decisions motivates ART adherence and that poor social support influence the degree of adhering to the prescribed ART regimen. The study also revealed that difficulties with ART re –supply are obstacles to adherence and disagreed that beliefs and good relationship doesn't improve the adherence.

5.2.4 Stigma and Discrimination

Again, the study sought to establish the stigma and discrimination factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. As per the results the study found that less outdoor activities discourage youth to undergo antiretroviral therapy and that poor social skills influence degree of adhering to the prescribed ART regimen. However the study revealed that few friends attitude of the health care providers contribute to better adherence.

5.3 Discussion

This section focuses on the discussion of the findings relative to what previous researchers have found on the study variables. It correlates the findings with those of the previous literature and establishes where they are in agreement or they contradicted.

5.3.1 Client Factors

The study sought to establish the client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. From the results, the study found that active drug level influences adherence to antiretroviral therapy and that level of education determines good social skills in antiretroviral therapy. This correspond to Shubber et al., (2016) who claimed that a Lower level of general education and poorer literacy impacts negatively on some patient's ability to adhere whilst a higher level of education has a positive impact.

Further the study revealed that age of the patient determines adherence to antiretroviral therapy and that continuous alcohol use disrupts antiretroviral therapy. This is in line with Van Dyk

(2010) who argues that age may influence adherence where apart from the most elderly adherence increases with age.

However the study showed that sex of the youth fairly influences consistency of antiretroviral therapy, those financial concerns fairly influences consistency in antiretroviral therapy and that cultural beliefs lowly affect the antiretroviral therapy. This concurred with Grierson, et al (2009) who revealed that poverty is an increasing feature of the face of HIV especially in the third world where many people are living below the poverty line.

5.3.2 Medication factors

Further the study sought to establish the medication factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. From the findings, the study revealed that side effects increases mortality rate of youth in antiretroviral therapy. This concurs with Buldeo and Gilbert (2015) who argues that anticipation and fear of side effects also impacts upon adherence.

The study also revealed that number of pills discourages youth to undergo antiretroviral therapy. This was in line with Mehta et al. (2016) who argued that if ARV treatment is changed to a more potent regime, the mutants will decrease again, but they are archived in memory cells and can re-emerge if ARVs to which they are resistant are used in future.

Further the study showed that drug resistance influence adherence to antiretroviral therapy This was similar to Chan (2011) who argued that drug hypersensitivity is far more common in patients with HIV and regimen associated toxicity is a common predictor of, and reason for, non-adherence across many studies The study also revealed that food restrictions fairly influence consistency in antiretroviral therapy.

Furthermore the study showed that dosing complexity discourages youth from antiretroviral therapy. This correspond to Castonguay, Filer and Pitts (2016) who argued that a high pill load, thrice-daily dosing, dietary and dosing idiosyncrasies, large capsules or tablets, and specific storage instructions results to regimen complexity which significantly impacts upon a patient's ability to adhere.

5.3.3 Provider-client factors

The study also sought to establish the provider-client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. From the results, the study showed that non-judgmental attitude of the health care providers contribute to better adherence. This was in line NACC (2009) who argued that a friendly, supportive and non-judgmental attitude of the health care providers, convenient appointment scheduling and confidentiality contribute to better adherence.

Again, the study revealed that that clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence. This was similar to Paterson (2010) who argued that the effect that the clinic setting has on adherence should not be underestimated where clinic characteristics that impact on adherence include: proximity to the patient's home or place of work, the expense of getting there, lengthy delays between appointments, clinic opening and closing times, long waiting times, lack of services such as child care, privacy, confidentiality, and unsympathetic or inconsiderate staff.

Again the study revealed that service provision and treatment decisions motivates ART adherence and that poor social support influence the degree of adhering to the prescribed ART regimen. This was in line with WHO (2009) which claimed that inconvenience of the regimen where a client becomes frustrated by the health care provider especially in situations where misunderstandings occur, treatment becomes complex and side effects becomes unmanageable have shown to result to non-adherence

The study also revealed that difficulties with ART re –supply are obstacles to adherence and disagreed that beliefs and good relationship doesn't improve the adherence. This was contrary to Paterson (2010) whose two recent studies done on client- provider relationship to show the effect of trust of the client on physician and the impact on client's ART adherence showed that good relationship improved the adherence ten-fold when compared to those clients who had no trust on the physician.

5.3.4 Stigma and Discrimination

Again, the study sought to establish the stigma and discrimination factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. As per the results the study found

that less outdoor activities discourage youth to undergo antiretroviral therapy. This was similar to Williamson and Martin (2010) who argue that there is need for general awareness of the contexts in which disclosures are made and the general response that follows such disclosures.

Further the study found that poor social skills influence degree of adhering to the prescribed ART regimen. This concurred with Chan (2011) who examined the relationship between HIV serostatus disclosure and adherence to antiretroviral therapy and found greater adherence among PLWHA who reported greater serostatus disclosure to others.

However the study revealed that few friends attitude of the health care providers contribute to better adherence. This concurs with Lucas and Bengsberg (2009) who argue that stigmatization comes about as the society uses psychological processes designed by natural selection to avoid people with a stigmatized attribute and join forces with normal people for competition and exploitation purposes.

5.4 Conclusion

The study concluded that the client factors influences adherence to Antiretoviral therapy (ART)among youth in Meru County positively and significantly. From the results, the study deduced that active drug level influences adherence to antiretroviral therapy and that level of education determines good social skills in antiretroviral therapy. Further the study established that age of the patient determines adherence to antiretroviral therapy the study showed that sex of the youth fairly influences consistency of antiretroviral therapy and that cultural beliefs lowly affect the antiretroviral therapy.

Further the study concluded that the medication factors influenced adherence to Antiretoviral therapy (ART)among youth in Meru County positively. From the findings, the study deduced that side effects increases mortality rate of youth in antiretroviral therapy and that number of pills discourages youth to undergo antiretroviral therapy Further the study deduced that drug resistance influence adherence to antiretroviral therapy and that dosing complexity discourages youth from antiretroviral therapy.

The study also concluded the provider-client factors influenced adherence to Antiretoviral therapy (ART)among youth in Meru County significantly and positively. From the results, the study deduced that non-judgmental attitude of the health care providers contributes to better

adherence and that clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence. Again the study deduced that poor social support influence the degree of adhering to the prescribed ART regimen. The study also deduced that difficulties with ART re –supply are obstacles to adherence.

Again, the study concluded that the stigma and discrimination factors influenced adherence to Antiretoviral therapy (ART)among youth in Meru County positively. As per the results the study deduced that less outdoor activities discourage youth to undergo antiretroviral therapy and that poor social skills influence degree of adhering to the prescribed ART regimen. The study also revealed that few friends attitude of the health care providers contribute to better adherence. Overall, the study concluded that client factors had the greatest effect on the Adherence to ART, followed by provider-client factors, then medication factors while stigma and discrimination factors had the least effect to the Adherence to ART and that all the variables were significant.

5.5 Recommendations

The study recommends that people living with HIV should be encouraged not to continuously use alcohol which disrupts antiretroviral therapy. This can be done through specially organized seminars and workshops as well as media advertisements. This will assist the respective patients in improving adherence to ART.

The study recommends that the county government should take an initiative of providing medics to all its residents as well as sensitizing the youths on the importance of adhering to ART. This will make the pills available and easily accessible to all people hence improving consistency on adherence.

The study recommends that the manufacturer should focus on the complexity of dosage such that one pill which contains all the requirements can be manufactured in order to reduce the dosing complexity which is highly believed to have discouraged youth from antiretroviral therapy. This will improve the adherence.

Further the study recommends that the government should carry out pre-tests on the pills to make sure that before they are distributed to its residents, they are free from side effects. This will reduce the fear most of the youths have that the pills have side effects hence improving that adherence to ART.

Further the study recommends that the clinics should be set strategically where they are accessible to all the residents. This will ease keeping clinic appointments where care providers should emphasize keeping clinic appointments by caregivers, and target those who miss clinic appointments for intensive adherence counseling to avert treatment failure hence improving the adherence to ART.

The study also recommends that the health care providers should be encouraged not to be non-judgmental and instead offer the correct advice to the victims. This will create a friendly environment between the patients and the health care providers which will improve the adherence to ART.

The study finally recommends that the county government of Meru should organize for a road show to sensitize its residents on the effects and importance of adhering to ART. This will make most of the youths aware and know how important it is to adhere to ART.

5.6 Recommendations for further studies

Since this study was only limited to Meru Teaching and Referral Hospital (METRH) in Meru county, the study recommends that the same study should be done in other hospitals in all counties to establish the trend of adherence to ART as well as determinants of adherence of ART. The researcher should go ahead and determine the effect of the factors discussed in this study on adherence of youths to ART in other counties based on the respective hospitals in those counties.

The study also recommends that another study should be done on other factors not tackled in this study such as social economic challenges. The researcher should go ahead and establish the patterns of infection which have been globally depending on the social and economic conditions of the country affected, with poverty having a significant role as a social determinant of HIV/AIDS and the spread of the virus as well as access and adherence to ART.

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APPENDICES

Appendix I: Letter of Transmittal

(name)

(address)

NAIROBI.

Dear Sir/ Madam,

RE: ACADEMIC RESEARCH PROJECT

I am a Master of Arts in Project Planning and Management student at University Of Nairobi. I wish to conduct a research entitled factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru County. A case of Meru Teaching and Referral Hospital (METRH). A questionnaire has been designed and will be used to gather relevant information to address the research objective of the study. The purpose of writing to you is to kindly request you to grant me permission to collect information on this important subject from your organization.

Please note that the study will be conducted as an academic research ant the information provided will be treated in strict confidence. Strict ethical principles will be observed to ensure confidentiality and the study outcomes and reports will not include reference to any individuals.

Your acceptance will be highly appreciated.

Yours faithfully,

Name

ID

Appendix II: Research Questionnaire

SECTION A: Background Information (Please tick (√) appropriate answer)

1) Please indicate your gender: Female [ ] Male [ ]
2) For how long have you been working/visiting with Meru Teaching and Referral Hospital?
   Less than 3 years [ ] 3 to 9 years [ ]
   9 to 12 years [ ] Above 12 years [ ]
3) State your highest level of education
   Certificate [ ] Diploma [ ] Degree [ ] Masters [ ] PhD [ ]

Others (Specify) ----------

4) Please Indicate your age bracket 20-30 yrs. [ ] 31-40 yrs. [ ]
   41-50 yrs. [ ] 51 – 60 [ ]

Client Factors

5) What's your level of agreement with the following statements on the client factors influence adherence to ART among youth in Meru County?
   Where: 5-Strongly agree 4- Agree 3- Neutral
   2- Disagree 1- Strongly disagree

	1	2	3	4	5
Active drug level influence adherence to antiretroviral therapy					
Continuous alcohol use disrupts antiretroviral therapy					
Age of the patient determines adherence to antiretroviral therapy					
Sex of the youth influence consistency of antiretroviral therapy					
Cultural beliefs highly affect the antiretroviral therapy					
Level of education determines good social skills in antiretroviral therapy					
Financial concerns influences consistency in antiretroviral therapy					

6) In your view how do the above client factors influence adherence to among youth in Meru County?

_____

_____

_____

Medication factors

7) What's your level of agreement with the following statements on the medication factors influence adherence to ART among youth in Meru County?

Where: 5-Strongly agree 4- Agree 3- Neutral

2- Disagree 1- Strongly disagree

	1	2	3	4	5
Dosing complexity discourages youth from antiretroviral therapy					
Side effects increases mortality rate of youth in antiretroviral therapy					
Number of pills discourage youth to undergo antiretroviral therapy					
Food restrictions influence consistency in antiretroviral therapy					
Drug resistance influence adherence to antiretroviral therapy					

8) In your view how do the Medication factors influence adherence to among youth in Meru County?

_____

_____

_____

Provider-client factors

9) What's your level of agreement with the following statements on the provider-client factors influence adherence to ART among youth in Meru County?

Where: 5-Strongly agree 4- Agree 3- Neutral

2- Disagree 1- Strongly disagree

Non-judgmental attitude of the health care providers contribute to better adherence					
Poor social support influence the degree of adhering to the prescribed ART regimen					
Beliefs and good relationship improves the adherence					
Clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence					
Service provision and treatment decisions motivates ART adherence					
Difficulties with ART re –supply are obstacles to adherence					

10) In your view how do the above provider-client factors influence adherence to among youth in Meru County?

_____

_____

_____

Stigma and discrimination

11) What's your level of agreement with the following statements on the stigma and discrimination influence adherence to ART among youth in Meru County?

Where: 5-Strongly agree 4- Agree 3- Neutral

2- Disagree 1- Strongly disagree

	1	**2**	**3**	**4**	**5**
Few Friends attitude of the health care providers contribute to better adherence					
Poor social skills influence degree of adhering to the prescribed ART regimen					
Less outdoor activities discourage youth to undergo antiretroviral					

therapy					

12) In your view how do the above stigma and discrimination factors influence adherence to among youth in Meru County?

Adherence to ART

12) What is the trend of the following aspects of adherence to ART for the last 5 years? Where, 5 = greatly improved, 4= improved, 3= constant, 2= decreased, 1 = greatly decreased.

	1	**2**	**3**	**4**	**5**
Consistency					
Lack of opportunistic diseases					
Good social skills					
Low mortality rate					

Thank you

Appendix III: Research Work Plan

	Nov					Dec				Jan				Feb			
Activity						**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Topic conceptualisation and literature review																	
Research proposal development and writing																	
Proposal presentation and defence																	
Proposal Corrections																	
Data collection																	
Data analysis																	
Report writing																	
Presentation of Report																	
Corrections																	
Compilation and submission of final Report																	

Appendix IV: Research Budget

NO	ITEM	DESCRIPTION	QNTY	RATE	TOTAL (KSH)
A) TOOLS AND MATERIALS					
1	Biro Pens		15	20.00	300.00
2	Pencils	Steindler Pencil	15	30.00	450.00
3	Foolscaps	Ream	3	500.00	1,500.00
4	Photocopiers	Ream	6	500.00	3,000.00
5	Box File		3	500.00	1,500.00
6	Clip board		2	200.00	400.00
7	Paper Punch		1	300.00	300.00
8	Stapler		1	400.00	400.00
B) RESEARCH SERVICES					
10	Internet Services	Monthly	3	3,000.00	9,000.00
11	Telephone airtime	Monthly	3	1,000.00	9,000.00
12	Photocopying cost	Monthly	3	2,500.00	7,500.00
13	Printing cost	Monthly	3	3,000.00	9,000.00
C) MEALS AND ACCOMMODATION					
14	Meals and transport	Daily	5	1,500.00	7,500.00
D) COPY OF FINAL RESEARCH					
16	Printing	Copy	3	2,000.00	6,000.00
17	Binding	Copy	3	500.00	1,500.00
	SUB-TOTAL				
	GRAND TOTAL COST				**55,350.00**