

**PREDICTORS OF ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG
PEOPLE LIVING WITH HIV AND AIDS AT THE QUTHING DISTRICT HOSPITAL
AND VILLA-MARIA HEALTH CENTRE, LESOTHO**

By

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DECLARATION

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I declare that **“PREDICTORS OF ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG PEOPLE LIVING WITH HIV AND AIDS AT THE QUTHING DISTRICT HOSPITAL AND VILLA-MARIA HEALTH CENTRE, LESOTHO”** is my work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.



2017/02/24

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ABSTRACT

Background: The introduction of antiretroviral drugs generated much optimism in the survival of people living with HIV. The optimism had been dissipated in the light of enormous challenge being faced by ART patients in maintaining a perfect adherence since successful treatment is dependent on the maintenance of a near perfect adherence. In the context of Lesotho, there is hardly any study done on factors influencing adherence to antiretroviral drugs yet it is widely known that adherence to ART is influenced by numerous factors. These factors could be health system related, patients related and the medication itself. The study, therefore, sought to assess the factors that affect adherence to ART and also, determine the level of adherence to ART among people living with HIV and AIDS at Quthing District Hospital and Villa Maria Health Centre, Lesotho.

Method: An analytical cross-sectional study was used to determine the predictors of adherence to ART among PLWHA who had been on ART for not less than three months before the study. The study was conducted among 382 participants between April 2016 and June 2016.

Results: A considerable number of participants were found to comply with global adherence using pill count adherence, appointment adherence, and self-report as adherence instruments. Of the 382 participants recruited for this study, the majority (63.6%) were females out of which 156 (40%) of them were married. The majority of the participants were on first line regimen (92.1%) and have been on ART for more than three years 228 (59.7%). The majority of the respondents lived in urban areas 296 (77.5%) and had formal education 343 (89.8%). The results of the study indicated global adherence to be 85.1%. The bivariate analysis showed significant relationships among all the variables. However, when subjected to multivariate analysis, three factors were significantly associated with global adherence to ART. These are: educational level ($p < 0.000$; aOR = 87.9), knowledge of HIV status of sexual partner ($p < 0.020$; aOR = .090), and ART perception ($p < 0.000$; aOR = 0.005).

Conclusion: The proportion of adherent participants in this study is sub-optimal, but relatively higher compared to most studies. A lot still needs to be done for the participants in this study

especially those living in the rural areas to ensure improvement in the sub-optimal level of adherence obtained in this study. Thus it is important that recommendation such as health education campaigns, psychosocial support and the needs of the patients be utilised to improve adherence.

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DEDICATION

In memory of my father and to my mum, with love and eternal appreciation.

To Keni-Paul and Tai-Paulina for soldering on without me and to all the People living with HIV and AIDS, who on daily basis are faced with the burden of taking antiretroviral drugs.

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List of Abbreviations

3TC	Lamivudine
ABC	Abacavir
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
AZT	Zidovudine
CD4	This refer to an antigen marker of helper/ inducer T-cells that recognises antigen bound In class II MHC protein
EDM	Electronic Drug Monitoring
EFV	Efavirenz
HAART	Highly Active Antiretroviral Therapy
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
LDHS	Lesotho Demography and Health Survey
LPV/r	Lopinavir/ritonavir
MEMS	Medication Events Monitoring Systems

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NGOs	Non-Governmental Organisations
NNRTIs	Non-Nucleoside Reverse Transcriptase Inhibitors
NRTIs	Nucleoside/Nucleotide reverse transcriptase inhibitors (NRTIs)
NVP	Nevirapine
PI	Protease Inhibitors
PLWHA	People Living with HIV and AIDS
RNA	Ribonucleic Acid
SPSS	Statistical Package for Social Sciences
TB	Tuberculosis
TDF	Tenofovir
UNAIDS	United Nations Joint Programmes on HIV/AIDS
WHO	World Health Organisation

CHAPTER 1: INTRODUCTION

1.1 Background to the investigation

Acquired immune deficiency syndrome ⁽¹⁾ (AIDS) defining death is one of the leading causes of mortality in the Sub – Saharan Africa. ⁽²⁾ In 2007, it was estimated that two-thirds of new infections occurred in Sub-Saharan Africa. ⁽³⁾ An estimated 68% of the adult population and close to 90% of children living with HIV resides in this region. ⁽³⁾ Lesotho is one of the countries in Sub – Saharan Africa experiencing the largest Human immunodeficiency virus (HIV) ⁽⁴⁾ and AIDS epidemic in the world. Research conducted in 2009 by the Lesotho Demographic and Health Survey (LDHS) estimated HIV prevalence to be 23.2 percent amongst people aged 15 years to 49 years. ⁽⁵⁾

Lesotho is a country experiencing mature epidemic with a total of new HIV infections and AIDS death converging to a level between 7.9% per annum. ⁽⁵⁾ The epidemic is in different stages of development in each district and that a different approach to addressing the epidemic in each district is imperative to stem the course of new infections and possibly deaths as a result. The increase in AIDS-related deaths typically lags behind that of new infections and converges at the same stable level over time. The Lesotho epidemic peaked in the late nineties and is stable at the moment. ⁽⁵⁾

1.2 Background information and rationale

Lesotho has an enormous burden of HIV and AIDS. In 2013, an estimated 360,000 people were living with HIV in Lesotho ⁽⁶⁾. The epidemic accounted for about 8% and 10% of female and male hospital admissions in 2013, respectively. ⁽⁶⁾ HIV is a leading cause of death among adult males (19%) and females (21%) on hospital admission ⁽⁶⁾. Approximately 21,000 new adult infections and 4000 new infections among children occurred yearly from 2008 – 2009. On the average, 11,000 women are infected yearly compared to 10,000 men. ⁽⁶⁾ HIV prevalence has stabilised in the general population. Modelling data show that HIV prevalence has declined among young women and men aged 15 – 24 years in the past six years. ⁽⁶⁾ In Quthing district, HIV and AIDS epidemic remains a serious health challenge, second only to Tuberculosis (TB), and is marked by a prevalence rate of 21.8%. About 18.8% individuals aged 15 years and above were estimated to be living with HIV in the district during the year 2009. ⁽⁵⁾ HIV and AIDS disease is a public health

problem, causing a developmental crisis in all the sectors of the economy. It has drastically affected, health, socioeconomic progress leading to a reduction in life expectancy, deepening poverty and exacerbating food shortages.^(7, 8)

The introduction of antiretroviral therapy in 1996 has had a significant impact on the way HIV and AIDS is viewed all over the world. Much as the introduction of Antiretroviral therapy ⁽⁹⁾ has not holistically cured HIV, the improvement in the quality of life, without a doubt, is important despite the presenting challenges of side effects and resistance to the medication. Antiretroviral therapy has managed to reduce mortality and morbidity, revitalised communities and changed the stereotypes that being infected with HIV and AIDS signifies death sentence rather to a chronic disease that is manageable. Lesotho initiated ART in 2004. Since then, remarkable progress has seen a rise in the sites providing ART services from 68 in 2004 to 207 sites in 2013, spread out across the ten districts. ⁽⁶⁾

In 2012, almost 23,000 new adult infections and 4,000 new infections among children occurred ⁽⁶⁾. In 2014, it was estimated that 160,200 adults (aged 15+ and 20,000 children ≤ 14 years) were in need of ART, but only 98,379 adults and children were put on ART, which represents approximately 55% coverage of ART countrywide.⁽⁶⁾ The government of Lesotho in collaboration with non-governmental organisations have carried out initiatives to ensure the availability of ARVs and other drugs for the management of opportunistic infections. The increased accessibility to ARVs needs to be supported by initiatives to maximise adherence to treatment. Critical to the successful treatment outcome in HIV patients is adherence to antiretroviral treatment. The reason being that HIV is highly mutable and requires life-long treatment. Therefore, suppression of viral load requires complete adherence to ART. Irrational use of drugs could lead to the development of resistant strains which profess a grave danger to the fights against HIV and AIDS.⁽¹⁰⁾ There is need to promote patient education and psychosocial support that will ensure people on ART adhere to treatment so as to prevent the development of resistant strain of HIV as in the case of Tuberculosis.

1.3 Statement of the problem

While the government of Lesotho and other players are determined to increase accessibility to ARVs, concrete initiatives towards adherence to ARVs need to be put in place to ensure optimal

ARV use in the community. Currently, not much research has been done on predictors of adherence to antiretroviral therapy among people living with HIV and AIDS in Lesotho. Irrational use of ARVs have led to the emergence of HIV resistant strains, treatment failure and increased the cost of treatment.⁽⁵⁾

Research on adherence to ART has included methodological investigations; many questions still need to be answered as regard ART adherence because of lack of the standardised measuring tool. Several studies have been conducted to measure adherence in low-income countries. In such settings, measurement of adherence has either been subjective such as questionnaires reporting or the objective method of pill counting. In some studies, a combination of the methods has been used.⁽¹¹⁾

Different studies have been done on adherence spanning across all regions. Some of the studies were conducted in Sub-Saharan Africa. For example, a study done on adherence using self-report and provider assessment in Botswana recorded a 54% and 56% adherence level respectively. The study further enumerated on how the patients surmounted various obstacles to adhere to treatment. Some of the obstacles encountered are a lack of adequate funds, travelling long distances to the clinics. Botswana government has taken urgent strides to make antiretroviral medication (ARVs) available and accessible to the populace so as to improve adherence, enhancing monitoring through the clinics and the laboratories and strengthening the health care delivery system.⁽¹²⁾

Lesotho government has embarked on various initiatives to ensure that patients on ARVs adhere to treatment. Despite this, lack of proper documentation on ARV treatment adherence has been the bane in progress made. This is one of the problems facing Quthing District as the predictors of adherence are not known because of lack of documented studies. Some studies done elsewhere highlight a range of factors affecting adherence to ART.⁽¹³⁾ It is, therefore, imperative that the research be undertaken so as to identify any possible obstacle to patients taking their medication to prevent the development of resistant strains of HIV and attendant treatment failure. The study will attempt to determine the level of adherence to ART and to establish factors associated with adherence to ART among **PLWHA**.

1.4 Purpose of the study

The study was designed to understand better and determine the level of adherence to ART and to document those factors associated with antiretroviral therapy adherence in Quthing District, Lesotho.

1.5 Research question

To understand the predictors of adherence to antiretroviral therapy in the context of HIV, the research questions created for this study were;

- What are factors associated with adherence among PLWHA in Quthing District Hospital and Villa Maria Health Centre?
- What is the level of adherence among PLWHA receiving ART from the hospital and the health centre?

1.6 Research Objectives

The objectives of this study were:

- To establish the proportions of patients that adhere to antiretroviral therapy received from Quthing District Hospital and Villa Maria Health Centre in Lesotho.
- To determine factors influencing adherence to antiretroviral therapy received from Quthing District Hospital and Villa Maria Health Centre in Lesotho
- To determine the knowledge of HIV and practice of ARVs among PLWHA in Quthing District Hospital and Villa Maria Health Centre in Lesotho.

1.7 Significance of the study

The importance of the study is to improve AIDS treatment, allowing for more outpatient than inpatient care, and the increased life spans for persons with AIDS since **HAART**. Also, the historical emphasis on the negative stigmatising and discrimination rather than support pointed to the need to focus on the predictors of adherence to antiretroviral therapy. Due to improved treatments, there is decreased need for hospital care for persons with AIDS.⁽¹⁴⁾ According to Wheeler,⁽¹⁵⁾ the challenges to taking the combination medications consisted of the following: a)

compliance with rigorous dosing, scheduling, and food requirements; b) common diarrhoea and gastrointestinal upset; and c) patients' developing resistance to the drugs. Although HIV/AIDS is no longer viewed as a death sentence and medications allow for care at home, there were considerable challenges posed by newer medications. However, Pujol,⁽¹⁶⁾ reported how reformulations of older medicines allow fewer pills to be taken, less frequent doses and decreased toxicity and side effects. The reformulated pills are also more efficient.

The projected impact of the epidemic is a cause for concern given the present especially in very high HIV-prevalence countries such as Lesotho. Knowledge gained from this study about predictors of adherence to ART may contribute to knowledge in health care, particularly the knowledge of facilitators and barriers to adherence as conceptualised by people living with HIV and AIDS. HIV and AIDS affect the working population especially the young adults usually between 15 and 49 years. Some of those affected are heads of household who are breadwinners, families, and societal leaders. This scenario perpetuates poverty.⁽⁶⁾ Therefore, there is a need for the government of Lesotho to redirect its resources and implement policy recommendation to achieve compliance of treatment to antiretroviral therapy and review health education programmes for people living with HIV to improve clinical management outcomes.

1.8 Definition of terms

In this study, the following terms were conceptually and operationally defined as follows:

Adherence: Adherence to ART is taking all ARV medication in the correctly prescribed doses at the right time and in the right way while observing any dietary restriction. ⁽³⁾ In this study adherence to ART refers to patients of Quthing District Hospital and Villa Maria Health Centre, who are observing the correct dosage as prescribed by the health care practitioner while following the instructions given.

1.8.1 Working definition of adherence

- Consumption of antiretroviral medication without the clients missing any dose in the past three months is regarded as perfect adherence (100% use).
- Skipping minimum of one dose in a week for the previous three months is a near perfect adherence (95% use of ARVs).

- Skipping a minimum of 2 doses a week in the past three months is regarded as a modest adherence. (90% - 94.9% consumption of ARVs).
- Low adherence is regarded in clients who in the past three months skipped more than two doses a week (<90% consumption of ARVs).

1.8.2 Antiretroviral therapy

- It is a highly active antiretroviral medication that acts at different stages of the HIV life cycle to stop the multiplication of the virus.

-In the present study, antiretroviral therapy refers to the treatment of HIV infection with the first-line regimen, which is Zidovudine, Lamivudine and Nevirapine or Tenofovir fumarate and second line regimen which are Tenofovir, Lamivudine and Kaletra or Abacavir, Lamivudine boosted with Ritonavir.

1.9 Conceptual framework for the study

Health Belief Model is a theoretical framework commonly used in health education and health promotion. Developed in the early 1950s, the model is widely credited in explaining and predicting health behaviours.⁽¹⁷⁾ The health belief model attempts to explain the rationale for individuals accepting or rejecting preventive measures or adopting healthy lifestyles. It was first used in explaining the failure of the United States Public Health Service screening programmes. The model is used to engage individuals to take a preventive health action while understanding the motivation and decision for such health behaviours. Thus the target interventions offered by the health behaviour theory provides means for establishing health behaviours that are beneficial to the individual.

As a result, research in medication adherence has found ways in which health behaviour can be changed to achieve the desired health outcome. It is in the light of this, the theoretical framework guiding this research is to explain how people living with HIV and AIDS receiving ART rationalise threats to their health, proffering solution to the health threat through the use of medication or

seeking treatment and the reason why the use of drugs may take place or not. Although, several theories relating to health behaviour could be used in explaining interventions relating to individual cognitive factors and adherence to medication in PLWHA. The cognitive perspective of the Health Belief Model-guided this study. It can be used in explaining health seeking behaviour among ART patients.

1.9.1 Meta-theoretical assumption

The premise that individuals possessing a high level of self-efficacy as regards adherence to ART and positive attitude towards medication, in general, would most likely result in such individuals being motivated to adhere to ART, thereby resulting in good clinical outcome informed the meta-theoretical assumption of this research. The assumption is premised on logic without evidence.⁽¹⁸⁾ Widely held beliefs grounded in theory, research previously undertaken were sources of assumption. The hypothesis, study design and interpretation of research findings are assumption ingrained in research studies.⁽¹⁹⁾

1.9.2 Health Belief Model (HBM)

Health Belief Model attempts to explain health behaviour dealing in life expectancy relating to health and well-being. A group of psychologists in the 50s introduced the model and ever since, the model has been adapted to modify health behaviours. It has also been used by various researchers because the model view human as rational being capable of using cognitive and interpersonal approach to minimise their perceived threat such as disease symptoms while promoting what is viewed as beneficial to their health such as adherence to treatment.⁽²⁰⁾ Perception of a threat as a result of health problem, informed individuals to seek health behaviour that will minimise such threat and the benefits of the cue to action.⁽²¹⁾

Individuals past experiences, perceived severity of the debilitating condition coupled with beliefs about medication and self-efficacy have been known to influence adherence. It is on this note that the researcher attempts to find a link between the cognitive perspective of health behaviour about how PLWHA interpret and evaluate their situation. It will also help to understand whether having self-efficacy will motivate them to adhere to treatment. Adherence to medication is often complex, and health knowledge and beliefs might not be sufficient to trigger behaviour change in certain individuals especially in a chronic condition such as HIV and AIDS.

1.10 RESEARCH DESIGN AND METHODOLOGY

An analytical cross-sectional design was used in the study. The success of any investigation is grounded in its design which dictates how the researcher want to carry out the research.⁽²²⁾ A cross-sectional study is not expensive, and it can be carried out to examine the relationship between the variables without any intervention been introduced. According to Brink ⁽²³⁾, a quantitative component of research entails numerical data analysed mathematically using statistics. The aim of the researcher is to describe the Predictors of adherence to antiretroviral therapy among people living with HIV and AIDS at the Quthing District Hospital and Villa Maria Health Centre, Lesotho.

1.10.1 Study design

The study was conducted at Quthing District Hospital and Villa Maria Health Centre, located in Quthing District, Lesotho. These two sites are among a range of locations where ART is being provided. The District has a population of 70,792 between the ages of 15 – 49 years. Quthing District has one District Hospital and eight health centres. The district hospital and the Villa Maria Health Centre were chosen because they caters for more than 25% of ART clients in the District. Also, they are one of the pioneer sites for ART implementation in 2004.⁽²⁴⁾

1.10.2 Study population

The study population was all adults, people living with HIV and AIDS, who were on ART identified from the Quthing District Hospital and Villa Maria Health Centre in the district.

1.10.4 Sampling method

The selection of participants was made using a simple random sampling method. The study respondents consisted of both males and females, 18 years or older, that have been on ART for a period not less than three months and were followed up. All the clients on ART that met the eligibility criteria were invited to participate using simple random sampling. The file number of all the 5000 ART patients was listed. A consecutive number of 1 to 5000 was then assigned to each of the file listed. A random number generator was used to select the participants based on the

sample size calculated. If a participant selected was ineligible or refused to participate, the next person on the list was selected.

1.10.5 Sample size

For the study of this nature to acquire the desired power, a single population proportion formula was used to calculate the sample size. A 50% proportion of event occurrence and 0.05 margin of error was used. The minimum sample size estimated based on the above assumption was 382.

1.10.6 Data collection

The questionnaire-assisted interviews in both English and Sesotho was used in collecting data. Participants on ART in the study settings that met the inclusion criteria were invited to participate while explaining the risks and benefits to the potential participants. The principal investigator administered the questionnaires assisted by two research assistants trained in the recruitment of the respondents and the administration of the questionnaires. The questionnaires assisted interview were conducted in private rooms, and data were collected using twenty-one questions as quantitative instruments during three months period (Annexure E). The independent variables measured in this study include; Gender, Age, Educational Status, Place of residence, Alcohol consumption, HIV status disclosure, HIV status knowledge, and ART perception by the respondents while adherence was the dependent variable.

1.10.7 Data Analysis

Capturing of data was done using Microsoft Excel spread sheet and analysis was done using the Statistical Package for Social Sciences (SPSS) version 23 programme. Each questionnaire was checked for its completeness, cleaned before being entered into the Excel spread sheet. After that, the data was then exported into the SPSS programme for processing and analysis. Univariate descriptive statistics was used to check for accuracy of data by checking out of range values, means, standard deviations and outliers.

1.10.8 Ethical considerations

Written informed consent was obtained from all respondents who agreed to participate, after obtaining ethical clearance from the Biomedical Research Ethics Committee (BREC). A letter of permission was obtained from the Ministry of Health, Maseru, Lesotho to commence the research. Ethical principles about privacy and confidentiality of the respondents, informed consent, and strict anonymity were observed.

1.11 STRUCTURE OF THE DISSERTATION

This dissertation follows the traditional thesis format comprising five chapters: the Introduction, Literature Review, Methodology, Discussions and Conclusions.

CHAPTER ONE: This chapter offers background information to the study as well as a statement of the problem. It also includes the purpose of the study, the conceptual framework as well as the rationale and significance of the research.

CHAPTER TWO: This chapter includes a literature review on the research topic. Also, the chapter provides information on prior studies to highlight the importance of the research topic. Information on the theory associated with adherence will be discussed as well as methodological strengths and limitations of some of the research conducted.

CHAPTER THREE: This chapter deals with the methodology including aims and objectives. The study adopted the quantitative research approach. Procedures for data collection, ethical issues and a discussion on quality and rigour in the study will be presented. The study design, data collection techniques, sampling and study population together with measuring tools and data analysis are also presented in this chapter.

CHAPTER FOUR: The findings from the research will be presented in this chapter. Descriptive and analytic statistics conducted will be submitted.

CHAPTER FIVE: This chapter focuses on the summary of the discussion, conclusions and recommendations of the study. Comments are made regarding limitations, study implications and recommendations for future research.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

A literature review is a process that attempts to identify lacuna in information on the subject matter been researched. This may serve as a foundation in which new research is undertaken to generate new knowledge. A study cannot be conducted in isolation ⁽²⁵⁾. Prior knowledge is needed to carry out research. This chapter elucidates what is in the literature and put the research into perspective while providing background information relevant to adherence to antiretroviral therapy among people living with HIV and AIDS. The researcher explored previous studies that have been published using databases such as PubMed, Google Scholar and Cochrane Library. Literature relevant to the study was selected and reviewed. Keywords such as Adherence, ART were used to gain a broader understanding of the research. Also, an extensive review of relevant journals, books and policy documents was carried out. The results of the searches were helpful in gaining a better understanding of the study while substantiating it scientifically.

2.2 SUB-SAHARAN AFRICAN HIV/AIDS EPIDEMIC

It was estimated that 72% of AIDS deaths that occurred worldwide in 2009 occurred in Sub – Saharan Africa. The Sub–Saharan African epidemic has thrown up three epidemic patterns with proportions of persons living with HIV ranging from 24.9% to 27% in Southern Africa. The proportion of people living with HIV in East Africa and West Africa ranges from 3 – 7% and 2 – 5.3% respectively. In Southern Africa, the prevalence is particularly high in the regions with Lesotho recording 23.6%.⁽²⁾ The effect of the epidemic continues to manifest in Sub-Saharan Africa as it continues to record 2.1 million new infections daily.⁽²⁶⁾ It is estimated that out of 35 million people diagnosed with HIV worldwide, 25 million live in Sub-Saharan Africa.⁽²⁶⁾

Lesotho, a resource-limited setting and one of the countries hardest hit by the epidemic, has made unprecedented efforts and remarkable progress since 2004 when it set its ‘3 by 5’ target of putting on treatment 50% (28, 000) of the population who need ART by the end of 2005. However, this urgency and intensity of effort have met with less success in extending the provision of ART to the entire population in need. By the end of 2006, 17,966 of 57,000 people who needed ART were started on the treatment of which 1,436 were children. A meta-analysis conducted in the Sub-

Saharan African region indicated that 77% of clients successfully achieved an optimal level of adherence while 23% achieved a sub-optimal level.⁽²⁷⁾

There are not many documented studies of adherence in Lesotho. The few studies that are available only talked about the facilitators and barriers to adherence and are mostly qualitative in nature. The assessment of adherence to HAART could, therefore, be an opportunity to identify potential obstacles to being ART compliant. This may help prevent treatment failure and any resistance to medication that will occur as a result of poor adherence.

2.3 GLOBAL ART COVERAGE

In 2013, worldwide, there were 1.5 million deaths, 35 million living with HIV and AIDS while there are 2.1 million new infections. There has been a remarkable increase in access to ART since its introduction. Access to ART has been expanded considerably reaching up to 9.7 million people in resource-limited settings in 2012. This represents an increase from 54% to 65% of the 15 million target. The UNAIDS report highlighted that ART has the desired effect by reducing new cases of HIV infections and also AIDS-related mortality and morbidity. However, the progress made masked some disproportionate access to ART. According to ⁽²⁸⁾, eligible men are less likely to be receiving ART, which might reverse the gains already made.

At the end of 2013, an estimated 12.9 million people were on ART globally.⁽²⁶⁾ The scale-up of antiretroviral therapy has seen an increase in the percentage of individuals living with HIV not receiving ART from 90% in 2006 to 63% in 2013.⁽²⁶⁾ Of the 12.9 million people currently on ART, 5.6 million people were put on ART in 2010. It is estimated that the rapid scale-up of ART occurred in Sub-Saharan Africa which continues to endure the ravaging effect of the epidemic.

2.4 OVERVIEW OF THE IMPORTANCE OF ART ADHERENCE

The progression of HIV to AIDS will eventually result in morbidity unless appropriate ART intervention is instituted. The importance of adherence to ART in the successful management of HIV cannot be overemphasised. Viral suppression and clinical progression of the disease is achieved through adherence to ART. Achieving maximum benefits of ART requires 95% compliance in taking the medication as anything short of this, may result in the evolution of resistant viral strains and subsequent virologic failure.⁽²⁹⁾ The attendant consequence of the

inability to adhere to antiretroviral treatment has been shown to have a severe impact on individuals, families and public health putting pressure on the available resources.

The ends of AIDS is an aspiration vision. As of today, the key to ending AIDS is epidemic control as a result of deliberate intervention measures (CAPRISA, 2016). One of the measures is ART, which helps to prolong the life of the people living with HIV. The essence of ART is to achieve viral suppression thus minimising weakening of the immune system and enabling it to recover from the damage caused by the HIV. The interconnection between adherence and therapeutic success cannot be overemphasised, and it has been seen across a broad range of highly active antiretroviral therapy ⁽³⁰⁾. According to UNAIDS ⁽²⁸⁾ the following are the main types of ARVs:

- Protease inhibitors (PIs) targeting HIV protein called protease thus it prevents the processing of the viral protein into functional components
- Nucleoside/Nucleotide reverse transcriptase inhibitors (NRTIs) targeting HIV protein called reverse transcriptase thus preventing the conversion of viral RNA into DNA
- Non-nucleoside reverse transcriptase inhibitors (NNRTIs) acting on the HIV protein reverse transcriptase but does not require activation.
- Fusion inhibitors blocking the entry of the virus into the cell.

Successful treatment of people living with HIV and AIDS remains one of the greatest challenges in Sub-Saharan Africa. This affects a high volume of people living with HIV in Lesotho. In this country, approximately 92,747 PLWHA were receiving ART while a further 170,000 were yet to be linked to care. It is imperative that, for the country to be able to achieve the 90-90-90 target, factors that determine the success of ART need to be explored. Adherence to ART will play a significant role in ensuring that HIV no longer represents a public health threat through a reduction in the level of infection and no longer represent one of the country's highest disease burdens. This study focuses on predictors of adherence to ART.

The advent of HAART marked a breakthrough in the fight against the human immunodeficiency virus (HIV). However, this breakthrough was not without its challenges. HIV infection has become a chronic infection due to adherence, unlike the previous years, whereby HIV infection was associated with fatal and debilitating outcome. PLWHA placed on ART can enjoy relatively normal lives. Increasing access to ART in Africa which accounts for 68% of the global population of PLWHA ⁽²⁸⁾ has led to prolonging and healthy lives among HIV-positive people. The public health burden of HIV is still very much palpable in Sub-Saharan Africa. There is still high mortality due to HIV. In 2010, of the 1.8 million deaths attributable to the epidemic, 1.2 million of them were reported in from the Sub-Saharan Africa.

Much as the end of AIDS is an aspirational vision, the golden rule of thumb for the treatment of infected individuals is ART. ART plays a role in prolonging and improving the quality of lives of the PLWHA. PLWHA are linked to care through HIV continuum. ART is prescribed and consists of daily dosing. The essence of ART is to suppress the viral load and to increase the CD4 counts. It thus minimises the weakening of the immune system. The benefits of ART in the management of HIV are well established in some settings. ⁽³¹⁾

2.5 ADHERENCE TO ANTIRETROVIRAL THERAPY

Adherence to antiretroviral therapy ⁽⁹⁾ is pivotal to the management of HIV. It seeks to maximise good health outcomes while minimising the attendant risk of developing viral resistance leading to increasing morbidity and mortality. Adherence to ART has resulted in therapeutic success across a broad range of highly active antiretroviral therapy regimens (HAART) such as protease inhibitors, nucleoside reverse transcriptase inhibitors, and non-nucleoside reverse transcriptase inhibitors. HAART has been shown to be highly effective in the suppression of plasma HIV -1 RNA, improving CD4 cell counts that ultimately lead to decreased morbidity and mortality of HIV-infected patients. Studies conducted in different settings have established the benefit of HAART in the management of HIV. ⁽³¹⁻³³⁾

However, successful treatment outcomes were dependent on the patients' ability to adhere to ART, which may be influenced by factors both within and outside the clinical environment. For HAART to be effective, a high level of adherence is required (<95%) ⁽³⁴⁾. This will prevent the patient from

developing viral resistance due to rapid replication mutation of HIV. Some studies conducted, however, reported success in viral load with less than 95% adherence.^(34, 35)

Immunological and virological failures can arise as a result of poor adherence to medication leading to resistant strains of the HIV. Drug-resistant HIV is a public health concern as it not only add to the cost of health care to the individuals and the community, it contributes to higher hospitalisation rates and decimation of the workforce. The loss of productivity of the workforce is of concern to any country because they are the driving force of the economy. In resource-limited settings such as Lesotho, which do not have the wherewithal to monitor drug resistance and often, not enough capacity to provide second line regimen, this is of concern.⁽³⁶⁾

Different studies conducted on adherence in Sub-Saharan Africa have been promising. A meta-analysis review estimated adherence to be in the region of 77% in African settings. This was in comparison to just 55% adherence in North American settings (adherence is usually measured by taking 95% of the pill prescribed)^(27, 37). In addition to the above, studies conducted in some African countries such as Botswana, Tanzania, and Uganda have reported a high level of adherence to the prescribed medication and showing positive outcomes of ART.^(27, 38)

2.5.1 Measuring adherence

Measuring adherence to ART has raised so many questions. This is because of lack of definitive accepted ways of adherence measurement. Across all illness, commitment to taking medication involves the individual, sets of complex and dynamic behaviour that present difficulty in measurement. It is imperative that measurement of adherence to ART be accurate in evaluating interventions aimed at improving adherence. Measuring patients' adherence to antiretroviral therapy is further complicated by the different diversity of measures available, depending on the clinical and research settings the study is carried out.^(39, 40)

Various methods have been used to detect the extent of patients compliance to taking medication. Such measures of adherence vary from electronic drug monitoring to pharmacy refill records. Other methods used is self-report, pill counts and plasma concentration of the drug and its metabolites in the system.^(30, 41, 42)

2.5.1.1 Self-report

Most commonly used form of adherence measurement in the clinical setting where clients are asked to recall doses missed in the past few days. It is not expensive, flexible and requires little time to complete. Discussion about missed doses and possible solutions could be done in clinical settings with this type of method.

In a systematic review utilising different self-reported means of antiretroviral therapy⁽⁹⁾ adherence measurement, it was found that there was a correlation between the HIV viral load and self-reported adherence in 84% of recall periods. In 65% of studies conducted using meta-analysis, the odds that the viral load will be detected was twice in non-adherent patients compared to the patients that adhere.^(43, 44) Similar studies done in India reported adherence to be at 74%.⁽³⁷⁾

Several limitations of the self-reporting methods have been documented. These ranged from non-standardized questions, over-reliance on the recall of events most likely forgotten and its vulnerability to social desirability in patients' reporting. Patients often over-estimate their adherence and only tend to remember short-term events. Research conducted in Uganda on adherence using self-report had the same high preponderance as with the objective measure of monitoring medication through electronic means. Self-report might be beneficial in resource-limited settings.^(30, 39, 40, 42)

2.5.1.2 Pill counts

Pill counts have been widely used in clinical settings, and it involves counting the leftover medications in the client's bottle or vials. Patients are expected to bring their pill containers to the clinic for the pill count to be conducted. Excess pills found in the container give an indication of adherence or non-adherence. However, there are many shortcomings associated with this type of method. Patients may deliberately throw away their pills before their visits to the clinic giving the impression of adherence. Thus, adherence may be over-estimated. Other shortcomings noticed with pill counting was that it did not provide information on the time the dose is taken and doses taken during the holidays. It is essential that these be taken into consideration as they are important in determining the success of treatment. Another downside to pill counting is the issue of trust as patients may feel the health care providers do not trust them.^(41, 42)

Dumping of the pill may be minimised in unannounced pill counts in research settings and have been documented to be slightly more effective in predicting the viral load than the electronic drug monitoring.⁽³⁵⁾

2.5.1.3 Electronic drug monitoring

Electronic drug monitoring (EDM) has been utilised in measuring adherence in chronic diseases. HIV researchers have frequently used electronic drug monitoring. The method makes use of surveillance device embedded with a microprocessor. This electronic device record the time and date each bottle is opened. Information is stored in the cap until it is downloaded^(45, 46).

In a study conducted in China using electronic drug monitor feedback, the mean adherence among Chinese ART patients improved significantly.⁽⁴⁷⁾ However, the study could not determine any effect on the degree of viral suppression and also, there is a lack of script for the EDM feedback counselling.⁽⁴⁷⁾ Given this, further research might be necessary to understand how EDM feedback altered the style and content of counselling sessions.

Electronic drug monitoring is not without limitations. Underestimation of adherence may occur as a result of inconsistent use of the cap and the “pocket dosing effect”, a situation where the patient removes more than one dose with a view of taking the extra dose at a later time. Other potential limitation could be as a result of patients opening the bottle without removing any pill otherwise known as “curiosity opening”. Thus, electronic drug monitoring (EDM) has the potential of overestimating adherence^(45, 48).

2.5.1.4 Pharmacy Refills records

In a closed pharmacy system, pharmacy refill records can be used to assess adherence in areas where medication are dispensed over a period, and financing is done in a particular place. These are measured at several points in time. This method can provide the research scientist or the clinician with information on the number of occasions prescription are handed out, and that can be used to determine the extent of patients adherence to the prescribed medication or not.⁽⁴¹⁾

This method is premised on whether patients receive timely refills from the pharmacy, as measured by the lengthy period between refills or missing doses. Comparison of refill records with expected

actual refill dates is used to determine the adherence rate of the patient.⁽⁴⁹⁾ The disadvantage of this method is its over-reliance on the assumption that patients who get their supply regularly do comply with medication adherence. The assumption that patients that get timely refills comply with adherence has been subjected to validity test by comparing the association between adherence to pharmacy refills and clinical outcome. Several studies have indeed shown a correlation between viral loads and medication refills ⁽⁴²⁾. A study conducted in Australia, comparing the long-term adherence to ART using self-reports and pharmacy refill records found out the correlation between pharmacy refills files and self-reports. It recorded <95% level of adherence as non-adherence for pharmacy refills records and <97% as non-adherent for self-reports.

2.5.1.5 Therapeutic drug monitoring

A Therapeutic Drug intervention can be monitored in vivo as a direct consequence of measuring adherence to medication and is widely known in a scientific environment. The insufficient concentration of drugs in the body are some of the reasons for treatment failures in PLWHA. This may not be unconnected to poor adherence.⁽⁴¹⁾ The low concentration of drug in the body has been responsible for non-adherence and viral failure. A cross-sectional study of 83 individuals to explore the association between drug concentration in the body system and adherence to medication, found out 88% low drug specificity for detecting adherence.

The expensive nature of therapeutic drug monitoring makes it difficult to use across various settings. One of the major drawbacks is the timing of the medications which may affect its plasma concentration. Thus patients may become compliant in anticipation of the test as it reflects adherence over 24 hours ⁽⁴²⁾.

2.6 Factors affecting adherence

It is imperative to identify predictors of adherence before measures to improve them are put in place.⁽¹³⁾ Many factors have been attributed to contributing to non-adherence. Factors including behavioural, provider related (or health systems) and socio-demographic have all been implicated in contributing to non-adherence to ART. Predictors of adherence that have been identified in the literature could either impact positively or negatively on the patient's' adherence. Such factors include the cost of treatment, the severity of disease symptom, the risk of recurrence of the illness,

treatment benefit, knowledge about illness and the medication, the complexity of therapy, education attainment and disease progression.

Factors affecting adherence are commonly arranged into disease characteristics, individual factors, treatment regimen, interpersonal relationships such as doctor-patient relationship, and the medication factors that have to do with the complexity of the treatment regimen. However, it is important to note that, interrelationships exist among those factors.⁽⁵⁰⁾ Ammassari⁽⁵¹⁾ Wang⁽⁴⁾ established that the reasons adduced for missing doses are the complexity of the regimen (7%-52%) and side effects (13-42%). Other factors include patients forgetting to take their medications (30-66%), disclosure worries (14-33%), and the inability of the patient's to integrate treatment regimen into their daily schedule.⁽⁵¹⁾ A study done in Zambia on adherence to ART came up with three main factors affecting adherence:

- Socio-economic and cultural factors
- The patient's beliefs and behaviour such as busy work schedule, excessive alcohol consumption, experiencing better health.
- Service provider-related (health system) factors such as lack of appropriate counselling, privacy and confidentiality, distance to the health facilities, time constraints during the consultation and lack of effective communication between the clients and the service providers.

Adherence to ART has been associated with improved clinical outcomes by increasing the CD4 count in due course and lowering the viral load at initiation. Mannheimer⁽⁵²⁾ found out that improvement in the quality of life is seen over time in clients that successfully maintained 80% adherence whereas ⁽⁵³⁾ found no association between quality of life and adherence. The adverse effect of ART has been found to contribute to non-adherence in 50% of cases.⁽⁵³⁾ Factors such as depression, poor social support, provider relations and attitudes, such as mistrust about treatment and medication have been consistently associated with poor adherence.⁽⁵³⁾

Other predictors of adherence to ART identified are the level of education and age. Factors such as forgetfulness and complexity of the regimen have also been implicated as some of the factors preventing adherence to ART. Low literacy levels have also been implicated.⁽⁵⁴⁾ A systematic review discovered higher adherence is associated with higher literacy level.⁽²⁷⁾ However, difficulty

with dosing during work time, depression, coupled with negative thoughts, was found to be implicated factors in such group of people.⁽⁵⁵⁾ Negative characteristics of particular medication regimens are common barriers to adherence. Adverse reactions to ART will most likely result in discontinuation of the said medication. Diarrhoea, hallucinations and vomiting have been reported as one of the transient adverse effects of HAART while fat redistribution otherwise known as ‘Buffalo hunk’ and peripheral neuropathy are some of the longer lasting side effects.

2.7 THEORETICAL FRAMEWORK

Behavioural interventions are theories that attempt to change the behaviour of the individual or to develop good health ⁽⁵⁶⁾. Researchers have sought to modify behaviour to achieve the desired outcome. Behavioural intervention has become increasingly popular among researcher to understand adherence to medication. The essence of the theoretical framework guiding this research is geared towards understanding how PLWHA, on ART rationalise threats to their well-being, rationalising solutions to the threat while in fact, the solutions may or may not be carried out. Several theories have been proposed in understanding and modifying health behaviour. The focus of this study is the cognitive aspect of health behaviour and the framework adapted from the Health Belief Model.⁽⁵⁶⁾

The Health Belief Model (HBM) has explained variation in adherence to chronic medication. An important component of the HBM is beliefs about medicines, and it has been postulated by various researchers that it is an important influencing factor in the behavioural use of medication.⁽⁵⁶⁾ The model discussed four major critical elements which influence patients’ adherence to drugs: (Figure 2.1)

- Belief about the seriousness of the disease (perceived severity)
- The risk of illness (perceived susceptibility)
- Outcome expectations (perceived Benefits)
- Barriers to engaging in treatment due to individual’s expected obstacles to treatment

- **Perceived Seriousness:** This deals with the individual's conviction as regard a medical condition. This is usually informed by the knowledge or information acquired about the disease. Perceived severity may also arise from the belief that the disease may cause some difficulties that will be difficult to overcome. Individual perception of the seriousness of a disease differs. A self-employed man might perceive flu as severe because of loss in wages while a government employee may not. The threat of contracting HIV and consequence of its manifestation such as rashes, hospitalisation, wasting away and death are some of the perceived threat to the individual.⁽⁵⁷⁾
- **Perceived susceptibility:** Individual perception of risk of contracting a disease will elicit a preventive action. This will motivate people to adopt a healthier behaviour. It is assumed that the greater the risk, the more likely it will elicit a reaction to decrease the risk. Thus, it is only normal that individuals at risk of contracting an infection or disease do something to stop it from happening. Therefore if people living with HIV and AIDS believe they are at the risk of progressing to full-blown AIDS when they do not comply with their treatment, this will motivate their adherence to their medication likewise if there is no perception of susceptibility.⁽⁵⁷⁾ Their susceptibility is influenced by factors such as education, inability to negotiate condom use, distance to the clinic and economic factors.
- **Perceived Benefits:** This construct relies on the individual's opinion of the importance of new behaviour in ameliorating a particular disease from developing. It is believed that people adopt a healthy behaviour when they feel it is beneficial to their overall health. The question is would PLWHA adhere to their medication if they perceived it to be beneficial? Thus it is imperative that adoption of secondary preventive behaviour is believed to be advantageous to the individual such as adherence. Studies have consistently shown that individual beliefs influence adherence to medication, thus any doubts as regard the need for that medication is associated with low adherence.⁽⁵⁸⁾ It can be assumed that belief in medication influences its use, whether positive or negative. Medication outcome conceptualises its use by patients to achieve a specific health need. In this study, the assumed benefits of taking ART medication can be seen as a necessity to suppress HIV
- **Perceived Barriers:** Behavioural change does not come easily unless the positives outweigh the negatives. The individual need to analyse the obstacles preventing him from changing. It is important in determining the change in behaviour. The advantage of

adopting a new behaviour serves as a motivation for embracing a healthy behaviour. People living with HIV and AIDS might perceive the side effects of the medication as a barrier to continuing with its use. The moment they can convince themselves of its benefits as outweighing its negatives, it will be easier for them to maintain adherence.

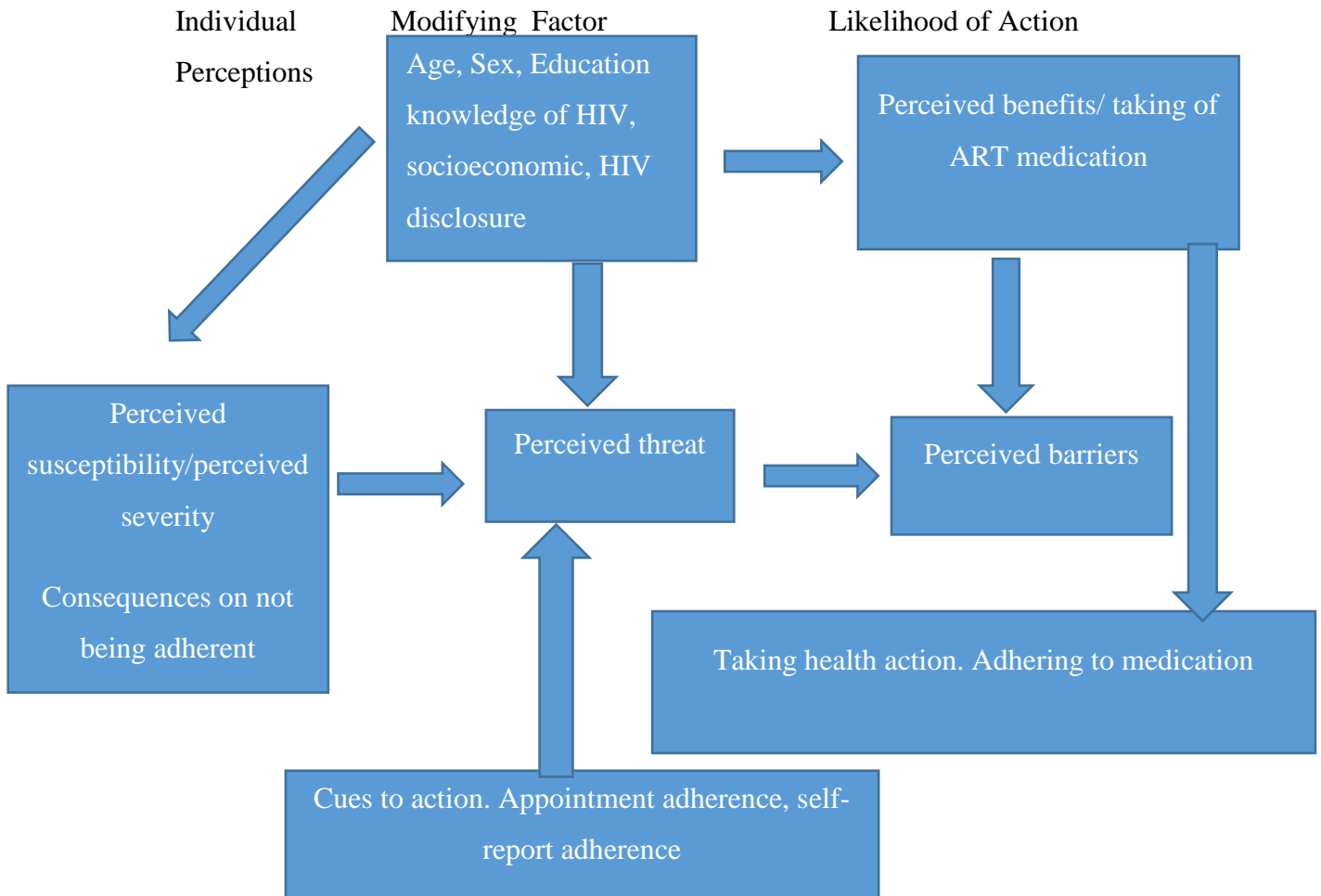


Figure 2. 1 Theoretical framework adapted from the Health Belief Model⁽⁹⁾

The model takes cognisance of other factors that could shape the health behaviour of an individual. Predisposing factors such as beliefs, values, attitudes and enabling factors such as availability of drugs and access to the health care facility are some of these factors. Another consideration in the model is the reinforcing factors like feedback, assurances from the healthcare provider and peer support groups. Knowledge, attitude and individual

practices are thought to drive perceived susceptibility to a disease.⁽²⁰⁾ The use of medication and the experience from such use will influence the behaviour towards such medication ⁽⁹⁾. The patients experience of adverse drug reactions is due to the adverse events occurring which the patient might have attributed to the ARVs. This ultimately shapes the behaviour of the patient towards the ARVs. Subsequent use of such drugs by the patient may be influenced by the possibility of adverse effects of the drugs ⁽⁹⁾.

Predicting adherence to medication is a very complex issue as it involves interrelationship of so many factors. Knowledge about health and personal beliefs might not be sufficient to initiate change in behaviour especially in a situation where long-term adherence is required as in the case of HIV and AIDS. It is essential to understand how PLWHA evaluate and interpret their situations as well as having the belief and motivation to adhere to treatment. Thus health care practitioners have a role to play in assisting patients accepting and implementing healthy behaviour, reduce barriers and threats.

2.8 CONCLUSION

One of the biggest challenges facing the scale up antiretroviral therapy is adherence. ART is a life-saving medication only if patients adhere to the course of treatment. Different health theories have attempted to improve our understanding of adherence to chronic medication and how they can be used to achieve adherence. This research explores the predictors of adherence to ART and makes a recommendation for intervention where possible. The literature review delves into factors affecting adherence and the different methods of measuring adherence. Also, the HBM model was explored to gain an understanding of interventions that address obstacles to adherence.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter discussed the literature relevant to adherence to ART, measures of adherence, factors influencing adherence to ART and the theoretical framework applied in carrying out the research. This chapter presents the research methodology employed by the researcher used in determining the predictors of adherence to ART in Quthing Hospital and Villa Maria Health Centre. The research methodology employed was influenced by the research objectives. This chapter includes the aims and objectives, the research design and the study population. Also, the sampling procedures, the research instruments, data collection tools, validity and reliability of the research instruments were discussed. The least but not the last, data analysis and ethical considerations related to the study are presented.

3.2 AIMS AND OBJECTIVES

The aim of this study is to determine the level of adherence to ART and to document the factors associated with antiretroviral therapy adherence in Quthing District, Lesotho.

The study attempted to answer the following objectives:

- To establish the proportions of patients that adhere to antiretroviral therapy received from Quthing District Hospital and Villa Maria Health Centre in Lesotho.
- To determine factors influencing adherence to antiretroviral therapy received from Quthing District Hospital and Villa Maria Health Centre in Lesotho among PLWHA.
- To determine the knowledge of HIV and practice of ARVs among PLWHA in Quthing District Hospital and Villa Maria Health Centre in Lesotho

3.3 RESEARCH DESIGN

Research design attempts at explaining the strategies and methods that were used in conducting and obtaining data as regard the phenomenon of interest. Also, it gives a clear indication of the format to follow in the research regarding data collection and analysis.⁽⁵⁹⁾ According to, Durrheim

and Painter⁽⁶⁰⁾, the choice of method to be adopted in research is primarily influenced by the ability to control factors that could alter the reliability and validity of such research. Research design serves as the backbone of the study in which answers are obtained to the phenomena being studied.

3.3.1 Study design

Quantitative research approach has often been regarded as the traditional scientific method to research. This approach derived its root from the philosophical paradigm for human enquiry otherwise called positivism. Essentially, it uses mathematically based methods to explain phenomena after subjecting the data collected to statistical calculations to obtain quantifiable information.⁽⁶¹⁾ A positivist approach to research emphasises objectivity with rational thoughts, Prediction and control.⁽⁶²⁾ Researchers are of the opinion that quantitative research is less susceptible to bias. This view is rooted in the belief that orderly and disciplined procedure characterised the objective form of measurement in the social world.⁽⁶³⁾

In this study, cross-sectional analytic design was used. A research design allows the researcher to plan the nature of the research to be undertaken.⁽²²⁾ This method is sometimes used to investigate the association between risk factors and outcome of interest.⁽²²⁾ The limitation of the design stem from the fact that it does not measure sequence of events regarding whether exposure occurred before or after as it is usually carried out at a point in time. Thus it is hard to infer causality. The design was chosen because it allows the research to be conducted at a point in time, over a short period. Cross-sectional design is usually used to estimate the prevalence of outcome in the population of interest, usually to plan public health programmes or intervention.

Data on individual information as well as exposure to the risk factors and outcomes are collected and measured. This enable the risk factor to be investigated while offering a snapshot of the outcome interest coupled with the characteristics associated with it at a particular point in time. This design will offer insight regarding the relationship and strength of the associations among the variables under investigation which is predictors of adherence to ART. Issues relating to adherence to ART among PLWHA had been highlighted by the researcher. The Predictors of adherence to ART among the PLWHA attending Quthing Government Hospital and Villa Maria Health Centre

is the problem been studied. The above design was chosen because fewer resources and time are needed for the investigation to be carried out.

Some researchers have stated that some public health issues are better studied using quantitative approach while others are better suited using qualitative.⁽¹⁸⁾ Whatever methodologies employed, health research methodology needed to be diverse and picked to suit the problem under investigation. The variables under survey in this study include education level, Alcohol consumption, ART perception that is quantifiable. Thus objective and epistemological stance as regard the study variables was adapted. Descriptive and inferential statistics are employed. A cross-sectional study is a form of quantitative design in which data are collected at a specific point in time or extended over a period. A non-experimental cross-sectional design was used in this study.

3.3.2 Study population and study area

The study population was drawn from Quthing District comprising of males and females, aged 18 years or older, and were on ART for more than three months. Quthing District Hospital and Villa Maria Health Centre were selected because they were one of the pioneering sites of ART and the population groups can be found in the district representing a heterogeneous population. According to the records, there were 5,000 adult patients 18 years or older on ART in the two facilities chosen.⁽²⁴⁾

3.3.3 Power of the Study

The ability of a research study to demonstrate an association between two variables of study is the power of the survey. In a quantitative study, it is desirable always to enumerate the study power and to determine the size of the sample required to realise this power during the planning stage of the survey otherwise one will end up with a study without statistical power. Researchers traditionally viewed a study with a statistical power of 80% to be the minimum.⁽⁶⁴⁾ and in this light, a statistical power of 95% was used in this study.

3.3.4 Sampling and Sample Size

The choice of a sampling method for this study was simple random sampling to ensure that all the study population were given equal chance of being selected using the inclusion criteria which are (a) *Adults (18 years and above)*, (b) *been on ARV treatment for three months or more*. The exclusion criteria were (a) Patients below the age of 18 years. (b) On ART for less than 3 months. (c) Patients initiated from a different clinic or hospital from the study centre. (d) Pregnant women because they are on different ART regimen and attend clinic away from the ART clinic. The file number of all the 5,000 patients was listed. Participants were selected from the random number generator until the desired sample size of 382 was attained. If a participant selected was ineligible or refused to participate, the lot fell on the next person on the list. The calculation of the sample size was done using a single population proportion formula with a 0.05 margin of error and 50% proportion of the event occurring.

The sample size was determined using the following formula:

$$n = N \times X / (X + N - 1)$$

Where $X = Z_{\alpha/2}^2 \times p \times (1 - p) / MOE^2$ and $Z_{\alpha/2}$ is the critical value of the normal distribution $\alpha/2$. For this study the confidence level was 95%, α was 0.05 and the, critical value was 1.96. MOE was the margin of error while p is the sample proportion, and N was the population size. The above assumption generated a sample size of 382 for the study.

3.3.5 Data collection

The researcher used questionnaire-assisted interview to collect data over a period of three months from April 2016 to June 2016 among ART clients attending clinic in the study setting. Participants were recruited consecutively over the study period until the desired sample was obtained. Questionnaires are a group of structured questions or questions arranged in sequence to extract information from a respondent or participant that can be completed by the participant or the interviewer through questions been asked. ⁽²²⁾ The questionnaires were administered by two research assistants who were recruited and trained. They were registered professional nurse having more than seven years working at ART clinic. Their work includes HIV counselling and testing, initiating eligible patients and linking them to care. They also screened patients for tuberculosis

and other opportunistic infections related to HIV and AIDS, strengthening engagement in care and retention in care by developing plans to ensure adherence. Both research nurses speak English and Sesotho fluently and as at the time of the study, they were not engaged in the ART clinic where the study was carried out.

Training was offered to the research assistants to enhance their skills in protecting human participants in research. Role play was used in training the assistants to ensure consistency, in obtaining informed consent, completing questionnaires, how to handle questions and approach in the administration of questionnaires. Simulation of the process was done by each of the assistant using a volunteer to explain the study process to would - be participants. The simulation was also done on how informed consent will be obtained and handling queries that may arise in the course of the research from the participants. The research assistants were told to liaise with the principal investigator in resolving critical issues. The questionnaires were both in English and Sesotho.

Patients who are on ART accessing services from the study settings were duly informed about the research. Since they were all potential participants, explanation on the risk, time, benefits and eligibility were explained to them. Respondents selected were further educated on their commitment and informed consent obtained from them. After that, questionnaires were then completed by the participants through assisted interview by the researcher and the assistant. The questionnaires were completed at the convenience of the participants while ensuring privacy at all times. The completion rate of each questionnaire by the participants on the average was 40 -55 minutes. Incentives were not offered to the participants in order not to compromise the standard of the research and exert undue influence. The recruitment of participants was solely voluntary.

3.3.6 Research instruments and variables measured

Questionnaires have the advantage of been less costly, provide anonymity of the interviewees, eliminate interview bias, and are easy to use. Also, the data generated from the questionnaire can be easily analysed.⁽²²⁾

The questionnaire was developed using the literature review as terms of reference and in line with the research objectives. It consisted of five sections. The questionnaire consisted of socio-demographic characteristics, barriers to adherence and clinical features of the participants. The

following were captured in the demographic information; gender, age, marital status, educational level, religion, place of residence amongst others. Other data included in the questionnaire were the information on ART regimen, number of years on ART adherence, knowledge of HIV and AIDS. Data on HIV disclosure to the sexual partner and sexual behaviour were collected among the sexually active participants. Sexually active participants were presumed to have at least one sexual encounter with a partner in the course of three months preceding the study.⁽⁶⁵⁾

The level of adherence in the study was quantified using three measurements tools, and these are (a) self-reporting of any dose missed. The participants were interviewed for missed doses for the past four days and if no doses were missed during the previous four days. (b) The number times the participants renewed his or her prescription expressed as the number of times the participants come for their appointment in the last three months preceding the study. Participants that do not miss any appointment were presumed to be adherent. (C) By counting the number of pills remaining. The research assistant records the number of pills remaining. Adherence is calculated using the number of remaining tablets and missed tablets or medication absorbed. ART patients are expected to renew their medication every month by appointment, usually at their respective ART clinics. Participants were considered adherent with a percentage intake of pills equal to or greater than 95%.

The result of all the different measurements of adherence was summed up to obtain the global index of adherence by assigning a coefficient to each item with 1 for adherence and 0 for non-adherence. In essence, the participants were categorised into two using the global index of adherence to ART. Thus poor adherence index from 0- 1 while good adherence index ranges from 2 to 3.

3.3.7 Pre-test/Pilot study

This is a study undertaken before a planned project specifically to test research instruments developed for the research is called pilot study. This is to enable the researcher to identify any flaws and make the necessary adjustment before the final preparation of the design.⁽⁶¹⁾ The tools were tested in the health facility and the hospital on a total of 25 patients with similar characteristics to the sample that was selected. This is to enable the researcher to address any misunderstood questions. Respondents selected for the pilot study were asked to comment on the

clarity, consistency of the research tool. They were also requested to comment on whether the questions were fully comprehended and the time taken to complete the questionnaires. No respondent experience difficulty in completing the questions and on the average, participants were able to finish the survey between 30 -60 minutes.

Respondents were able to make some comments which were considered by the researcher. On one of the socio-demographic questions concerning age, participants felt that above 35 years old was too ambiguous. They advised it should be broken down further. This prompted the question to be broken down to 35 – 45 and the researcher included more than 45 years. Furthermore, the participants in the pilots study observed that there were no filters that might influence adherence to ART. This set of questions was then added. The questionnaires were then revised based on the feedback from the pilot study participants which assisted in the training of research assistants on how to administer the questionnaires.

3.4 DATA CAPTURING AND ANALYSIS

Data entry was done using Microsoft Excel spread sheet and analysis were done using the Statistical Package for Social Sciences (SPSS Inc.) version 23.0 manufactured by IBM (Chicago, IL, USA) after it has been entered and captured into MS Excel spread sheet. The researcher checked each questionnaire for completion to ensure that they were answered correctly before being entered into the MS Excel spread sheet. Each questionnaire was checked for errors, cleaned and then exported into the SPSS programme for processing and analysis. Data was double checked, and each of the variables was separately examined using the SPSS for entry accuracy and missing values. They were also checked for fit between their distribution and multivariate analysis assumption. Strange data was checked for values out of range, means and standard deviation using univariate descriptive analysis to confirm the accuracy of data. Twenty-one questions were included in the questionnaire which included five sections namely: socio-demographic characteristics, clinical features, knowledge of HIV and AIDS, barrier to adherence and adherence to antiretroviral therapy.

Adherence to ART is the dependent variable assumed by the researcher to be influenced by the independent variables such as the socio-demographic data, ART perception, knowledge of HIV zero status of the partner, alcohol consumption and educational status were investigated. Other

variables include religion, place of residence, duration of therapy, clinical WHO stage, any reported side effect, HIV status disclosure, duration of treatment and barriers to adherence. Descriptive statistics was used to summarise the demographic data. This includes means, frequency distribution and percentages were used while proportions were used in calculating the categorical variables. The primary interest in the research is to compare People living with HIV, who were adherent compared to those who were not adherent. The bivariate associations between the variables were assessed using Pearson correlation and Fischer's test employed where appropriate. Multivariate logistic regression analysis was used in determining predictors of adherence. Logistic regression was utilised for all variables that are significant at a p-value less than 0.05 during bivariate analysis. The confidence interval used throughout was 95%. The variance observed was used.

3.5 INTERNAL AND EXTERNAL VALIDITY OF THE STUDY

Internal validity could be defined as the degree to which inference can be made from causal conclusion from a study between the independent variable and dependent variable and the ability to generalise or extrapolate the study findings beyond the area of study to other settings.⁽⁶⁶⁾ The independent variables were age, sex, educational level, marital status, duration of ART therapy, type of ART prescribed, and the therapeutic line while the dependent variable was adherence. Cross-sectional designs limit the degree to causal inferences, and generalisation that can be made in a study. The use of fairly large sample for the study and the sampling method used to enhance the external validity of the research.

3.6 CONTENT VALIDITY OF THE RESEARCH INSTRUMENTS

The degree to which intended domain of content is reflected in measurement is known as content validity.⁽⁶⁷⁾ The researcher undertook the following measures to ensure that all the facets of the constructs under investigation were logically presented;

- The consistent refinement of the construct under investigation
- Target population were consulted to increase the content validity of the item
- Experts was consulted for their inputs into validity of the content instruments

- Extensive consultation of the literature relevant to the constructs under investigation so ⁽⁶⁸⁾that the characteristics of the domains can be defined such as the variables being investigated.

3.7 RELIABILITY OF RESEARCH INSTRUMENTS

Summated scales often probe the underlying constructs of interest in research. Responses to a dichotomous questionnaire or are indexed and analysed to arrive at a score for the individual participants. In essence, the consistency and accuracy at which an instrument measures the target attribute are defined as reliability.⁽¹⁸⁾ It is essential that the reliability of the summated scales be known since they are designed to measure underlying constructs. The power of the study is strengthened by the reliability of the instruments to identify the relationship of any significance in a population of study. The correlation coefficient is used to express reliability, and they are usually in degrees. A correlation coefficient of 1.00 indicates perfect reliability while 0.00 means no reliability. The lowest acceptable value for any psychosocial measurement instrument is a coefficient of 0.80 while 0.70 coefficient is acceptable for the newly developed instrument.

3.8 ETHICAL CONSIDERATIONS

Ethics in research studies are an aggregation of values, behavioural expectations and standard principles that shaped the process as regard what is acceptable towards study participants and other vested interest in the research world.⁽²²⁾ It is imperative that ethical standards be adhered to at all times in the course of conducting research including justice and respect for human rights. In conducting this research, ethical considerations included:

3.8.1 Ethical permission

Approval was obtained from the Biomedical Research Ethics Committee (BREC) of the University of KwaZulu-Natal, Durban, South Africa (Annexure A). Also, approval and permission were sought and obtained from the Ministry of Health, Maseru, Lesotho, to conduct the study in Quthing government Hospital and Villa Maria Health Centre (Annexure D).

3.8.2 Informed consent

It is essential that informed consent be obtained from human participants before the commencement of any research. It involves outlining the idea, values and what the research entails to the prospective participants by the researcher. It is important that participants were made aware of the nature and the research topic. The purpose of the study, the potential risks and benefits and the information that would be collected are made known to the participants (Annexure E). This process offers the participants opportunity to have their questions and concerns addressed. The consent form was signed by all the participants which allowed them to participate in the study. Voluntary consent was obtained from all the participants, and they were informed of their rights to withdraw from the study without any repercussions and that, it will also not affect their treatment in the clinics.

3.8.3 Confidentiality

The participants were assured that information collected in the process of collecting data would be treated with utmost respect and privacy. The research assistants used for the study were also trained to maintain the confidentiality of all information regarding the respondents. The research assistants signed a confidentiality agreement regarding the research. Also, all data were stored in a secure location, and access to them was restricted while electronic data were password protected.

3.8.4 Anonymity

The questionnaire did not have any personal identifiers and addresses of the participants. No identification numbers were used for any of the questionnaires that link the participants to the questionnaires neither were they identified in any results published.

3.8.5 The principle of justice

3.8.5.1 Right to fair treatment and privacy

The research team was fair to all the participants, and equal treatment was meted out to them. The principal investigator and the research assistants were courteous towards the participants and exhibited a high degree of tolerance in their behaviour towards the participants. Interviews were

arranged at a time that was convenient to each of the participants and it was conducted in private to ensure that their right to privacy was not violated.

3.8.6 Principle of Beneficence

3.8.6.1 Freedom from harm

The research team ensured that the participants were protected from any potential risk even though no risk was anticipated. The research was conducted in a safe environment, and the research assistants were trained to handle any distressing issues. The research assistants were to report any adverse issues promptly to the principal investigator and to discontinue the interview process. All the participants were given the assurances that they will not be exploited for any financial or personal gain.

3.8.6.2 Benefit from the research

The principal investigator informed all the participants that no monetary gain will be received from participating in this study. However, their participation will go a long way in contributing to the pool of knowledge already known in the field of HIV and AIDS.

3.8.7 Principle of respect for human dignity

3.8.7.1 The right to self-determination

Written informed consent was obtained from all the participants before their participation in the study without coercion or intimidation. They were informed of their rights of refusal to participate in the study and not to answer any questions they were not comfortable with in answering.

3.8.7.2 The right to full disclosure

The management of the hospital and the participants were duly informed about the research. The District Medical Officer served as the gatekeeper in ensuring that the research meets ethical standards. The names and phone numbers of the researcher and his supervisor were provided in case of any clarification regarding the study.

3.8.7.3 The right of vulnerable subjects

The group of participants that participated in the study were considered to be vulnerable due mostly to societal attitude towards them. The principal investigator and the research assistants ensured that participants were treated with dignity and respect and were not subjected to any form of discrimination, stigma and psychological trauma. The interaction between the research team and the participants were cordial and non-judgemental. Counselling services and follow-up were offered to any of the participants who developed psychological trauma as a result of their participation in the study.

3.9 CONCLUSION

The research methodology and the design was described in this chapter. The researcher justified why the method was chosen and statistical method applied in analysing the data collected. The quantitative research instruments, the pilot study and ethical considerations were discussed. This chapter also discussed measures taken to ensure that ethical standards are observed at all times. The next chapter presents the result of the research and their interpretations.

CHAPTER 4: RESULTS

4.1 Introduction

The researcher has discussed a detailed description of the research design, research methods, measures to ensure trustworthiness and ethical considerations in Chapter 3. This chapter presents the results of the participants' responses to the predictors of adherence to ART among people living with HIV and AIDS. It contains both the descriptive and analytical elements of the research.

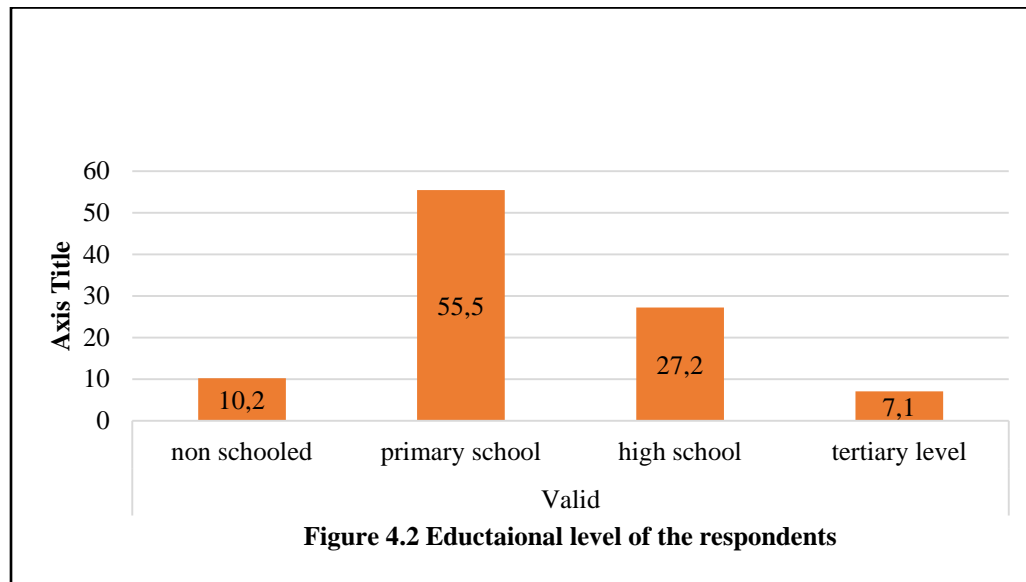
4.2 SOCIO-DEMORGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

The socio-demographic characteristics of the study population are presented in Table 4.1. Three hundred and eighty-two participants took part in the study, of which 139 (36.4%) were male, and 243 (63.6%) were females. The majority of the respondents 199 (52.1%) were above 45 years of age while 109 of them (28.5%) were in the 35 to 45 years age group. The majority of the participants were clustered between 35 to over 45 years of age, 308 (80.6%). A large proportion has been married 326 (85.3%). Of these, 156 (40.8%) indicated that they are still married while 127 (33.2%) and 43 (11.3%) are widowed and divorced respectively (Table 4.1). Among the 382 PLWHA, 156 (40.8%) were cohabitating, and 343 (89.8%) had one form of education or the other. The majority of the participants lived in urban areas 296 (77.5%). Though in this study, there was a statistically linear relationship between ART adherence and education, there was significant level of association ($p < 0.000$). The majority of the participants 212 (55.5%) had primary school education while 39 participants (10.2%) indicated no form of formal education. About 104 (27.2%) and 27 (7.1%) had undergone a high school education and tertiary education respectively (Figure 4.1 and Table 4.1).

Patients characteristics	Proportions N=382	percentage
GENDER		
Male	139	36.4
Memale	243	63.6
AGE		
Less than 25 years	10	2.6
25-35 years	64	16.8
35-45 years	109	28.5
More than 45 years	199	52.1
MARITAL_STATUS		
Single	56	14.7
Widowed	127	33.2
Divorced	43	11.5
Married	156	40.8
EDUCATIONAL_STATUS		
Non schooled	39	10.2
Primary school	212	55.5
High school	104	27.2
Tertiary level	27	7.1
RESIDENCE		
Urban	296	77.5
Rural	86	22.2

Table 4. 1 Socio-demographic characteristics of the study population

Figure 4. 1 Educational level of the respondents



4.3 HIV AND ART RELATED FACTORS

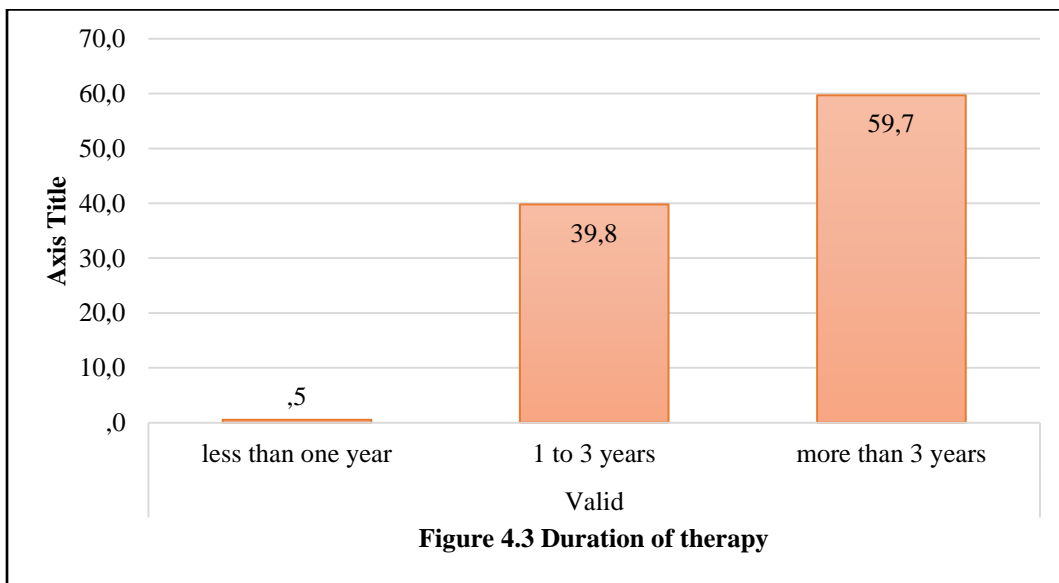
The variables measured included the duration of therapy, HIV status disclosure of the respondents, type of ART prescribed, barriers to adherence and adherence to ART. On the clinical and therapeutic level, the majority of the participants were at WHO clinical stage I (88.5%) while 37 (9.7%) were at WHO clinical stage II. The remaining seven respondents (1.8%) were at stage III and IV. The duration of therapy varied among the participants. Of all the respondents, 228 (59.7%) had been on ART for the past three years (Table 4.2). About 152 (39.8%) had been on ART for less than three years while only 2 (0.5%) had recently commenced ART as at the time of the study (Figure 4.2). About 258 (81.6%) of the participants were open about their HIV status to those they are having sexual relationship and 58 (18.4%) were yet to do so. Among those participants that were sexually active, about 241 (77.5%) were aware of the zero statuses of their sexual partner while 22.5% of them did not know the HIV zero status of their spouse/partner (Table 4.2).

The majority of respondents 173 (45.3) were taking a TDF/3TC/EFV-containing regimen followed by an AZT/3TC/NVP combination 78 (20.4%), and AZT/3TC/EFV 58 (15.2%) while the remaining first line regimen constituted about 42 respondents (11%). Of all the respondents, only

few were on second line regimen 28 (7.1%). The majority of the participants were reporting no side effects 283 (74.1%) (Table 4.2).

Participants identified different barriers to adhering to ART. Three-quarters of them 285 (74.6%) said travel or migration was not a barrier to adhering to ART while only 97 (25.4%) indicated that frequent travelling or migration could be a barrier (Table 4.3). In the same vein, the majority of the participants did not regard any of the barriers to adherence asked in the questionnaire as constituting a hindrance to adhering to ART. Also, 340 (89.0%) of the participants had good perception of ART while only 42 (11%) of them had low perception of ART (Table 4.3). When looking at alcohol consumption, It was observed that over half of the participants 205 (53.7%) said that they did not consume alcohol while the remaining 177 (46.3%) said they consumed alcohol.

Figure 4. 2 Duration of therapy



Variables	Frequency	Percentage
Clinical WHO stage		
Stage 1	338(88.5)	88.5
Stage 2	37(9.7)	9.7
Stage 3&4	7(1.8)	1.8
Duration of therapy		
Less than 1 year	2	0.5
1 to 3 years	152	39.8
More than 3years	228	59.7
CD4 count		
CD4>350	203	53.1
CD4<350	179	46.9
Therapeutic Line		
1 st line	352	92.1
2 nd line	28	7.3
3 rd line	2	0.5
Side effects		
No	283	74.1
Yes	99	25.9
Knowledge of HIV status		
No	71	18.6
Yes	245	64.1
Disclosure of HIV status		
No	58	15.2
Yes	258	67.5
ART perception		
No	42	11.0
YES	340	89.0

Table 4. 2 HIV and ART related information of the study population

Variables	Frequency	Percentage
Alcohol consumption		
no	205	53.7
yes	177	46.3
Frequent travel or migration?		
no	285	74.6
yes	97	25.4
Is hunger a barrier to treatment?		
no	220	57.6
yes	162	42.4
Overall economic situation a barrier?		
no	242	63.4
yes	140	36.6
Too busy?		
no	270	70.7
yes	112	29.3
Distance from clinic?		
no	289	75.7
yes	93	24.3

Table 4. 3 Barriers to adhering to ART among the study population

4.4. FACTORS AFFECTING ADHERENCE TO ART

4.4.1 Self-reported adherence to ART

A total of 382 participants responded to the question about adherence to ART. The number of participants who in the last four days had not missed any dosage days before the study was 354 (92.7%) as a measure of self- report (Figure 4.3). This tool of measurement indicated that the proportion of those who adhere is lower in males (88.5%) than in females (95.1%). In this study, the percentage of those living in an urban area using this tool of measure is higher (94.9%) than those living in a rural area. Adherence to ART was also significantly greater in those with one form of education or another. This tool indicated a higher percentage of adherence among those with tertiary education (96.3%) (Table 4.4a). This study also found out there was an association

between adherence levels and the age of the participants ($p < 0.000$). Adherence was proportionately higher in those that did not consume alcohol compared to those that consumed alcohol (95.1% and 89.8% respectively). The perception of the respondents about ART was found to be associated with ART adherence. Those with a positive perception about ART had a higher self-reported adherence (96.8%) compared to those with negative perception about ART (59.5%). The same goes for those that were open about their relationships and those whose partner confided in them (Table 4.4b).

4.4.2 Appointment Renewal

The majority of the participants honoured their appointment renewal to ART 331 (86.6%) (Figure 4.3). There was no decrease in the proportion of people who honoured their appointment overtime as the duration of therapy increases as seen in Table 4.4b (86.8%). The percentage of participants who honoured their appointment renewal was higher among the participants with a high school education (91.3%) and in those who did not drink alcohol (92.7%; $p < 0.001$). The proportion was also high among participants who had a positive view of ART (93.5%). Also, the HIV status disclosure and knowledge of HIV serostatus of the sexual partner were associated with appointment renewal to ART. The duration of treatment is not a barrier to adherence appointment renewal as shown in Table 4.4b. The therapeutic line was also significantly associated with appointment renewal to adherence as indicated in Table 4.4b (88.1%; $p < 0.001$).

4.4.3 Pills count Adherence

The pill count adherence measure of the participants stood at 83.2% (Figure 4.3). This showed that 318 of the participant have complied with 95% of their ART or more (Table 4.4a). This tool of measurement indicated that adherence increased significantly in the respondent's place of residence. Participants living in urban areas were more likely to be adherent according to this tool of measurement (77.5%; $p < 0.005$). This proportion of adherence was high among the participants with a high school education (86.5%). Also, the proportion of adherent participants that had a positive perception about ART was 305 (89.7%) ($p < 0.001$). There was a statistically significant linear relationship between participants ART perception and pill count as a measure of adherence though the strength of the association was moderate. Pill count adherence was also associated with intake of alcohol ($p < 0.001$). HIV status disclosure to sexual partner ($p < 0.001$) and knowledge of

the HIV zero status of the sexual partner ($p < 0.001$) had a positive relationship with the pill count measure of adherence (Table 4.4b).

4.4.4 Global Adherence to ART

Of the 382 participants who responded to questions about adherence, 325 (85.1%) were found to comply with global adherence to ART (Figure 4.3). The global adherence was calculated using the three tools of measurement for adherence, namely self-report adherence, pill count adherence and lastly the number of appointment honoured three months prior to the study (Figure 4.3). There was an association between the perception about ART and global adherence in the analysis ($p < 0.000$). Also, there was an association between alcohol intake and adherence ($p < 0.000$). The disclosure of the participants' status ($p < 0.002$) and status of the sexual partners' knowledge ($p < 0.000$) were also associated with global adherence. The global adherence was also statistically associated with the level of education ($p < 0.000$), age ($p < 0.011$) and marital status ($p < 0.028$). Furthermore, statistical association was found between global adherence and place of residence ($p < 0.000$), clinical WHO stage ($p < 0.000$), the therapeutic line ($p < 0.000$), side effects ($p < 0.000$), duration of treatment ($p < 0.000$), frequent travel or migration ($p < 0.000$), being too busy ($p < 0.000$), and distance from the clinic ($p < 0.000$) (Tables 4.4a – 4.4c).

Figure 4. 3 Proportion of Adherence to ART among the study population

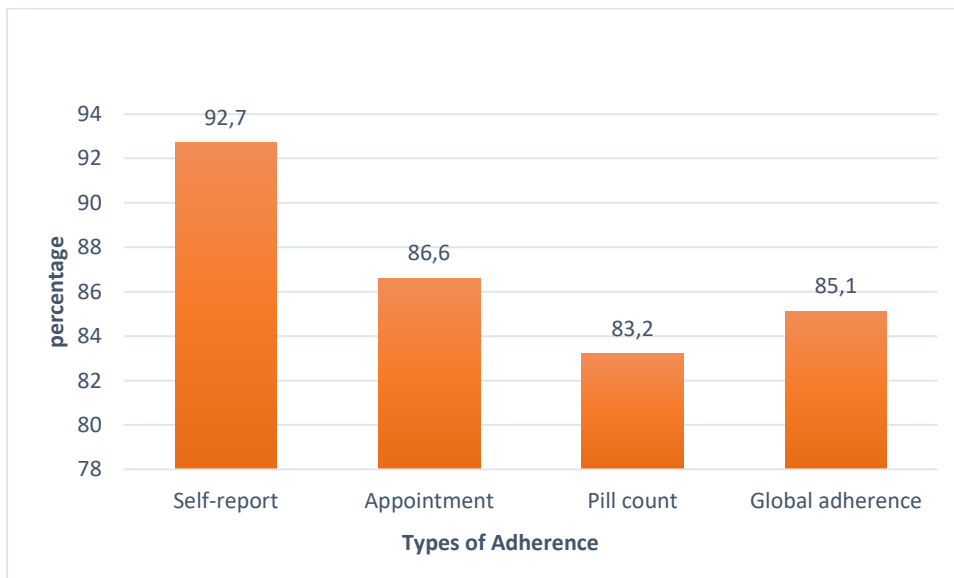


Table 4.4 a Factors associated to adherence to ART among the study population

Variables	Appointments adherence to ART n (%)	Pills count adherence to ART n (%)	Self-report adherence to ART n (%)	Global adherence to ART	
				n (%)	p-value
Overall					
Yes	331(86.0)	318(82.2)	354(92.7)	325(85.1)	
No	51(13.4)	64(16.8)	28(7.3)	57(14.9)	
Gender	*	^	*	**	0.001
Male	114(82%)	109(78.4%)	123(88.5%)	107(77%)	
Female	217(89.3%)	209(86%)	231(95.1%)	218(89.7%)	
Age	^	^	**	*	0.011
Less than 25 years	7(70%)	7(70%)	7(70%)	7(70%)	
25-35 years	58(90.6%)	58(90.6%)	62(96.9%)	59(92.2%)	
35-45 years	90(82.6%)	84(77.1%)	74(86.2%)	84(77.1%)	
More than 45 years	176(88.4%)	169(84.9%)	191(96%)	175(87.9%)	
Marital status	*	^	*	*	0.028
Single	48(85.7%)	45(80.4%)	50(89.3%)	48(85.7%)	
Widowed	108(85%)	107(84.3%)	122(96.1%)	110(86.6%)	
Divorced	32(74.4%)	32(74.4%)	35(81.4%)	30(69.8%)	
married	143(91.7%)	134(85.9%)	147(94.2%)	137(87.8%)	
Educational status	*	^	^	**	0.000
Non schooled	28(71.8%)	31(79.5%)	34(87.2%)	32(82.1%)	
Primary school	185(87.3%)	175(82.5%)	201(94.8%)	190(89.6%)	
High school	95(91.3%)	90(86.5%)	93(89.4%)	87(83.7%)	
Tertiary level	23(85.2%)	22(81.5%)	26(96.3%)	16(59.3%)	
Residence	*	^	*	**	0.000
urban	265(89.5%)	252(85.1%)	281(94.9%)	264(89.2%)	
rural	66(76.7%)	66(76.7%)	73(84.9%)	61(70.9%)	

Table 4.4 b Factors associated to adherence to ART among the study population

Variables	Appointments adherence to ART n (%)	Pills count adherence to ART n (%)	Self-report adherence to ART n (%)	Global adherence to ART	
				n (%)	p-value
Clinical WHO stage	**	**	**	**	0.000
Stage 1	299(88.5%)	289(85.5%)	323(95.6%)	304(89.9%)	
Stage 2	25(67.6%)	22(59.5%)	24(64.9%)	14(37.8%)	
Stage 3&4	7(100%)	7(100%)	7(100%)	7(100%)	
Duration of therapy	^	^	^	^	0.816
Less than 1 year	1(50%)	1(50%)	1(50%)	2(100%)	
1 to 3 years	132(86.8%)	128(84.2%)	142(93.4%)	130(85.5%)	
More than 3years	198(86.8%)	189(82.9%)	211(92.5%)	193(84.6%)	
CD4 count	**	^	^	^	0.217
“CD4<350”	142(79.3%)	142(79.3%)	164(91.6%)	148(82.7%)	
“CD4>350”	189(93.1%)	176(86.7%)	190(93.6)	177(87.2%)	
Therapeutic line	*	**	**	**	0.000
1 ST line	310(88.1%)	300(85.2%)	338(96%)	315((89.5%)	
2 ND line	19(67.9%)	16(57.1%)	14(50%)	8(28.6%)	
3 RD line	2(100%)	2(100%)	2(100%)	2(100%)	
Side effects	*	**	**	**	0.000
no	254(89.8%)	246(86.9%)	271(95.8%)	254(89.8%)	
yes	77(77.8%)	72(72.7%)	83(83.8%)	71(71.7%)	
Alcohol consumption	**	**	*	**	0.000
no	190(92.7%)	183(89.3%)	195(95.1%)	188(91.7%)	
yes	141(79.7%)	135(76.3%)	159(89.8%)	137(77.4%)	
Knowledge of HIV status	**	**	*	**	0.000
no	53(74.6%)	50(70.4%)	65(91.5%)	55(77.5%)	
yes	227(92.7%)	221(90.2%)	238(97.1%)	226(92.2%)	
Disclosure of HIV status	*	**	*	*	0.002
no	45(77.6%)	42(72.4%)	52(89.7%)	45(77.6%)	
yes	235(91.1%)	229(88.8%)	251(97.3%)	236(91.5%)	
ART perception	**	**	**	**	0.000
no	13(31%)	13(31%)	25(59.5%)	9(21.4%)	
yes	318(93.5%)	305(89.7%)	329(96.8%)	316(92.9%)	

Table 4.4 c Factors associated to adherence to ART among the study population

Variables	Appointments adherence to ART n (%)	Pills count adherence to ART n (%)	Self-report adherence to ART n (%)	Global adherence to ART	
				n (%)	p-value
Side effects with ARV medication?	**	**	**	**	0.000
no	253(91.3%)	242(87.4%)	269(97.1%)	254(91.7%)	
yes	78(74.3%)	76(72.4%)	85(81%)	71(67.6%)	
Duration of treatment too long	**	**	*	**	0.000
no	254(92.7%)	241(88%)	264(96.4%)	257(93.8%)	
yes	77(71.3%)	77(71.3%)	238(97.1%)	68(63%)	
Frequent travel or migration?	**	**	*	**	0.000
no	260(91.2%)	248(87%)	269(94.4%)	255(89.5%)	
yes	71(73.2%)	70(72.2%)	85(87.6%)	70(72.2%)	
Is hunger a barrier to treatment?	*	^	^	^	0.733
no	198(90%)	182(82.7%)	200(90.9%)	186(84.5%)	
yes	133(82.1%)	136(84%)	154(95.1%)	139(85.8%)	
Overall economic situation a barrier?	*	^	^	^	0.529
no	219(90.5%)	205(84.7%)	221(91.3%)	208(86%)	
yes	112(80%)	113(80.7%)	133(95%)	117(83.6%)	
Too busy?	**	*	^	**	0.001
no	247(91.5%)	235(87%)	254(94.1%)	240(88.9%)	
yes	84(75%)	83(74.1%)	100(89.3%)	85(75.9%)	
Distance from clinic?	*	^	*	*	0.040
no	257(88.9%)	246(85.1%)	273(94.5%)	252(87.2%)	
yes	74(79.6%)	72(77.4%)	81(87.1%)	73(78.5%)	

4.5 CORRELATIONS ANALYSIS

All the variables were tested for significant relationships using Pearson correlation analysis. This correlation analysis was run to assess the relationship between global adherence and the independent variables. There is a positive correlation between educational status and global adherence as demonstrated by Pearson product Moments correlation $r = 18.047$, $p < 0.000$ 3df as

shown in **Annexure H**. Likewise, there is moderate positive correlation between global adherence to ART and ART perception as shown by $r = 1.506$, $p < 0.000$, 1df in Annexure H. Therefore this moderate positive relationships between educational levels, ART perception may be taken to influence adherence outcomes among the participants. Also, there was also a positive correlation between HIV status disclosures, Knowledge of HIV serostatus of sexual partner as shown in Annexure H. The interpretation of these findings is that there was a synergistic relationships among some of the independent variables and global adherence. Participants having a favourable perception of ART are likely to adhere to ART.

4.6 REGRESSION ANALYSIS

Multiple regression analysis has been widely used in statistics. They are important in studying and analysing the effects of various independent variables on the dependent variables.⁽⁵⁹⁾ The relationships between the dependent variable which is adherence and the best linear combinations of the predictors is known as multiple correlation coefficients. In this study, multiple regression analyses were run for all the significant independent variables in the bivariate analysis to appreciate the adjusted effect to derive the adjusted odds ratio (aOR). The multiple regression was done to predict the independent variables that influence global adherence to ART among the participants. The multiple regression model statistically predicted educational status, knowledge of HIV status and ART perception as influencing adherence to ART. The p-value, adjusted odds ratio (aOR) and the confidence interval of the educational status and ART perception are found in the Annexure G. Thus, participants with a primary school education were likely to be about 12.6 times to be adherent to ART ($p < 0.018$) whereas, participants with educational level equivalent to high school were likely to be 36 times adherent to ART ($p < 0.000$). In contrast, participants with tertiary education were 88 times likely to be adherent to ART ($p < 0.000$). Participants who have HIV status knowledge of their partner were 0.090 more times likely to be adherent to ART ($p < 0.020$). Also, participants who had a positive view of ART were 0.005 times more likely to comply with adherence to ART in contrast to those with poor perception ($p < 0.000$).

4.7 CONCLUSION

The research results presented in this chapter reveal that the majority of the participants were female aged between 18 and 45 years, married with a primary level of education and lived in urban

area. Furthermore, the results showed that the majority of the participants have been living with HIV for more than three years, on clinical WHO stage one of the disease and the first line regimen. While the results of the study revealed a positive perception of ART among the participants, adherence measures from the individual and global tools was still sub-optimal. Several factors were found to be statistically significantly associated with adherence in the bivariate analysis. Among these factors are age, place of residence, therapeutic line, Clinical WHO stage, educational level, side effects, HIV status knowledge of the partner and HIV status disclosure of the participants. However, the multivariate analysis of these significant factors indicated that only three factors influenced adherence in this study. The next chapter discusses the results of the study and compares with the available literature.

CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

While the previous chapter dealt with analysis and interpretation of the research findings, this chapter discusses the results of the investigation, its implications regarding adherence to ART and the research limitations. Furthermore, this chapter offers recommendations for improving adherence to ART.

5.2 DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

The majority of the participants were in their productive years with the age distribution ranging from 18 to above 45 years. Thus, it is in tandem with the pattern of age distribution released by the Lesotho demographic health survey which stated that the majority of the HIV infections occurred in the age groups 15-49 years.⁽⁷⁰⁾ In this study, the majority of the participants were females (63.6%). This confirms the fact that women are disproportionately affected by the epidemic in Lesotho and Sub-Saharan Africa.^(26, 70, 71) Some reasons have been attributed to this. Gender-based violence has been found to be one of the drivers of the outbreak.⁽⁷¹⁾ The patriarchal nature of the society has entrenched gender inequality and continues to fuel gender-based violence. A study done in Lesotho concluded that 62.5% of men believed in resulting to violence if the spouses refused to have sexual intercourse with them while 37.1% of women believed this to be justified.⁽⁷⁰⁾ It is therefore not surprising that the majority of the participants are female and are on ART compared to their male counterparts. Earlier studies done corroborated this assertion.⁽⁷²⁾ The number of participants on ART in this study above 45 years was 199 (52.1%) which may indicate some people on ART are living longer and enjoying the desired quality of life.

The majority of the participants had primary school education 212 (55.5%) while a total of 156 participants were married (40.8%) and 33.2% of the respondents were widowed. Most of the participants lived in urban areas 296 (77.5%) while 86 (22.5%) of the participants lived in the countryside. Access to health care has been described as one of the factors militating against delivery of health care services. It was established that access to health care services is influenced by gender, socio-economic status and geography with about 72% of women unable to access health care services at the community level.⁽⁷⁰⁾ Lack of funds and stock out are some of the factors

hindering health care service provision.⁽⁷⁰⁾ Over half of the respondents on ART said they did not drink alcohol 205 (53.7%) while the remaining 177 (46.3%) said they drink alcohol.

5.3 ADHERENCE TO ART

Three different tools of measure of adherence were used in this study to examine the global adherence of the participants. Pill count adherence was the first method used in calculating the global adherence to ART, and 83.2% of the participants were found to be adherent. It has been demonstrated that adherence to medication is secondary to CD4 count in determining the progression to AIDS and eventual death⁽³⁵⁾. Studies have shown that adherence of over 90% significantly reduces the progression of HIV to AIDS using this method of adherence compared to adherence of 51-90% that recorded 8% mortality.^(35, 73) However, the barrier to adherence does not in any way influence the pill count as a measure of adherence. The participants all have a positive outlook towards their therapy. This may be connected to the availability of medication and free treatments being offered by the Lesotho Ministry of Health. The other tool of measuring was appointment adherence to ART which indicated that 86.6% of PLWHA were able to honour their appointment, three months before the study.

The third method of choice in measuring the global adherence in this study was the self-report. The self-reporting tool indicated that 92.7% of the participants had good adherence. Similar studies conducted in Nigeria reported a lower rate (62.8%).⁽¹¹⁾ In the same vein, a study carried out in California recorded 95-99% adherence using self-report as a measuring tool.⁽⁷⁴⁾ The self-reporting method of measurement, without doubt, is subjective, but it was applied in this study to eliminate recall bias and is a commonly used method in measuring adherence to ART among PLWHA.^(30, 37, 39, 75) Aside from the fact that these methods are not financially demanding, they are easy to implement, and the combination of one or two of them yield a more reliable result.⁽⁷⁶⁾

The global adherence of the participants in this study was 85.1% as calculated from the self-report adherence, pill count and appointment adherence methods which was sub-optimal because it was less than 95% though it was higher than those reported by Mills et al.⁽²⁷⁾ at 55% and less than that reported in the study conducted by Nachega⁽⁷⁷⁾ which recorded 95% adherence among participants. It is widely acknowledged that there is a correlation between adherence and clinical outcomes. In fact, documented evidence suggest that a minimum of 95% adherence level must be obtained by

PLWHA to prevent virologic failure occasioned by the development of drug-resistant virus.^(39, 78) The global adherence rate in this study was less than 95% despite the fact that for maximum viral suppression to be achieved, near perfect adherence is needed.⁽³⁵⁾ In this study, 14.9% of the participants were found to be non-adherent. The implication of this is that the eventual virological failure impacts the possibility of clinical success in the long-term. The attendant development of drug-resistant strains of HIV in the face of ART poses a danger to the uninfected people as these strains can be transmitted leaving them with very narrow treatment options.⁽⁷⁹⁾

The ART adherence reported in this study was comparable to the studies carried out in Kenya which reported adherence rate of (82%).⁽⁸⁰⁾ It was also comparable to the ones done in Nepal (85.5%) and West Africa (91.8%) by Wasti et al.⁽⁸¹⁾ and Jaquet et al.⁽⁸²⁾ respectively. The result of this study was higher than the meta-analysis study which found out that 77% of patients were adherent in Africa⁽²⁷⁾ and to the one conducted in the Southern part of Ethiopia.⁽⁸³⁾ The finding was also higher than the study carried out by Achappa⁽³⁷⁾ that reported an adherence rate in India to be 74%. It should be noted that the difference in the adherence rates across different studies may be influenced by the context and the various methods of adherence measurement used by other studies.

5.4 FACTORS ASSOCIATED WITH ADHERENCE

It is essential that highest level of adherence must be obtained to achieve the best possible outcomes in the management of PLWHA (over 95% adherence). Various factors have been implicated having influence adherence in ART patients. These factors varies from region to region. In this study, the global adherence of the participants was recorded to be 85.1% indicating that adherence was suboptimal (<95%). It is imperative to state that three factors were found to influence global adherence to ART among the participants. These are the educational status of the participants, HIV status knowledge and ART perception.

This study demonstrated that participants with good ART perception are most likely to follow their drug regimen. It has been shown that self-efficacy in the effectiveness and belief is a predictor of adherence to medication as demonstrated by various studies.^(20, 84, 85) Self-efficacy has been shown to influence adherence to chronic medication widely, and it has been implicated in the adherence to ART.⁽⁷²⁾ Patients that have undergone health related events such as HIV infection having been

able to incorporate health-promoting behaviour such as self-beliefs were able to control their thoughts processes and have favourable perception of ART.^(81, 86) This is primarily because their health conditions have improved and are healthy.⁽⁸⁶⁾ A mixed method study conducted in Nepal found out that poor adherence was associated with negative perception.⁽⁸¹⁾

In the same vein, patients' use of medication is influenced by the perception they have towards the drugs.⁽⁹⁾ The perception to ART will be affected by the positive or negative attitude towards the medication. In this study, the majority of the participants had favourable perception towards ART. The study underscores the cost-benefit analysis that the participants must have done to have a good perception and the importance of promoting health education both in the ART clinic and the communities so as to overcome the barriers such as side effects of the ARVs militating against adherence.

Secondly, educational level was found in the study as one of the predictor of adherence to medication. Education has been shown to play a meaningful role between ART patients and adherence to medication.⁽⁸⁷⁾ In this study, educated participants are likely to adhere to treatments compared to their counterparts who are uneducated. Education serves as a medium through which information is disseminated to the clients. People with a higher education may exhibit better adherence to ART because of their ability to comprehend instructions given by their service providers.

Various studies have been done to buttress the importance of education in adherence. Studies conducted in Keffi, Nigeria by Pennap⁽¹¹⁾ highlighted the importance of formal education in adherence. The study found out that the adherence rate was higher among clients with formal education. Likewise, a study conducted in Nepal by Wasti⁽⁸¹⁾ supported the fact that the adherence rate was higher among patients' who are educated whereas Kalichman et al.⁽⁸⁸⁾ in a study conducted in the United States of America found out association between low educational status and non-adherence. It was reported that an inability to assess HIV-related care and adherence was due to lack of education among those patients.

However, the above report is at variance with some studies conducted in the developing countries. Non-adherence was found among the educated groups in a study undertaken in Ilorin, Nigeria by Bello.⁽⁸⁹⁾ Higher educational status was determined to be a factor in non-adherence among these

group of participants. This group of people attributed their non-adherence to their busy schedule.^(89, 90) Another study conducted by Okoronkwo et al.⁽⁹¹⁾ at the retroviral clinic of the Nnamdi Azikwe University Teaching Hospital, South East, Nigeria did not find any association between education and adherence.

Similarly, participants status knowledge played a role in adherence. The findings of this study demonstrated that the majority of the participants were aware of their HIV status and were knowledgeable enough about ART. Documented evidence suggests that with appropriate treatment and continued adherence to medication; HIV can be turned into a chronic disease.⁽⁹⁾ Knowledge of HIV zero status could create a two-fold nature of social support systems. It could lead to a lack of support and on the other hand it could serve to enhance adherence.⁽⁹²⁾ The issue of stigma is still prevalent in Lesotho. While some people remain accepting and supportive, others might not. HIV status knowledge will create an avenue for family members to remind participants of the need to take their medication and offers support while creating a channel for constant communication and knowledge.^(27, 81) A study conducted by Remien⁽⁸⁴⁾ elucidated that the social support played a positive role thus the family serves as fulcrum in promoting adherence. In a meta-analysis study done, patients with cohesive families were found to be 1.74 times more adherent.⁽⁹³⁾ On the other hand, its absence had been implicated in non-adherence.⁽⁹⁴⁾ It is imperative that health care providers continue to engage and encourage PLWHA to foster support and facilitate adherence.

An analysis of other factors found no association between these factors and adherence to ART. This is in contrast to evidence from elsewhere. For example Glass et al⁽⁹⁵⁾ indicated that substance abuse and alcohol are linked to poor adherence to medication which most often than not lead to poor outcomes in the treatment of HIV.⁽⁹⁵⁾ The use of recreational drugs and alcohol have been associated with non-adherence. The substances have been implicated in preventing adherence in HIV-infected individuals on lifelong medication.⁽⁹⁵⁾ Excessive alcohol intake is associated with men living with HIV as they are constantly reminded through daily dose of ARVs.⁽⁹⁶⁾

Furthermore, several studies done in Sub-Saharan Africa have implicated socio-economic factors in hindering adherence to ART. These studies were carried out in multiple setting in the sub-continent. These factors range from distance, busy schedule, hunger and cost.⁽⁹⁷⁾ Also, there are

some indirect costs linked to adherence to ART. Some of these are; the time taken from work, the number of days spent in the hospitals and general inability to provide for the family as a result of the debilitating effect of HIV.⁽⁹⁷⁾

Though the present study assessed the relationship between adherence to ART and the duration of being on ART therapy and the type of ART regimen, these two factors were also not associated with adherence to ART. The majority of the participants 228 (59.7%) have been on ART therapy for more than three years which was an indication that they have been living with HIV and AIDS disease for more than three years. Of those who were sexually active, the majority of them had disclosed their HIV status to their sexual partner 258 (81.7%). Disclosure of their HIV status by sexually active participants is an indication of acceptability of their condition which is critical in adherence to ART. Various studies corroborated the view that people living with HIV and AIDS who disclosed their status, having been engaged in care will most likely adhere to treatment.^(95, 98) According to Nachege⁽⁷⁷⁾, it is essential that social support and disclosure be inherent issues to be considered when assessing clients for adherence. One of the biggest challenges facing PLWHA is stigma and discrimination.⁽⁹⁹⁾ In Lesotho, stigma and discrimination remains a major issue in preventing people accessing treatment and support services. These range from verbal to physical abuse as well as exclusion from social gatherings. According to Lenepwha⁽¹⁰⁰⁾ as high as 41.1% of the people interviewed had the experience of people gossiping about their status while 26.8% reported verbal abuse. It is therefore not surprising that some ART clients prefer taking their medication in secret, thus compromising their adherence.⁽⁹⁷⁾ Also, the length of ART therapy and duration of been diagnosed with HIV is pivotal in influencing adherence to ART.⁽¹⁰³⁾ This in contrast to a cohort study done which implicated the duration of the disease. The longer the time of living with the disease, the less one is likely to adhere to treatment.⁽⁹⁵⁾

Adherence to ART has been linked to healthy and positive clinical outcomes, thus stopping the virus from being replicated, improving the response of the immune system and lowering the viral load.⁽¹⁰¹⁾ Research has shown that good adherence levels have been linked to good clinical outcomes. Thus, patients suffering from opportunistic infection before ART initiation will be influenced by the severity of their infection to achieve good clinical outcome.⁽¹⁰²⁾

Research conducted on ART among people living with HIV showed an association between adverse drug reaction and adherence. Untoward side effects of the ARVs have been linked with poor adherence.^(98, 104) However, the majority of the participants in this study indicated no adverse reaction to their medication as a barrier to adherence 283 (74.1%). This may have influenced the high level of adherence reported (85.1%) in the study. It is possible because of the limited resources in this area and to prevent the attendant comorbidity and opportunistic infections; PLWHA are more than willing to accept the side effects of these medications. Also, research carried out in Botswana found no association between adherence to ART and the adverse effects of ART.⁽¹⁰⁵⁾ The increasing HIV morbidity and mortality have been associated with poor adherence due to the significant side effects of the ART therapy by various studies conducted.^(95, 102) As a result, it has been advised that the health care providers should consider individual patient's circumstances before engagement, linkage to care and ART initiation.⁽¹⁰⁶⁾ The advent of single dosage regimen have significantly reduced pill burden and promoted simplified antiretroviral therapy regimen, which in the long run promoted adherence to ART.^(102, 106, 107)

5.5 SUMMARY OF FINDINGS

The study was designed to provide a better understanding, determine the level of adherence to ART and to document those factors associated with antiretroviral therapy adherence in Quthing District, Lesotho, and the information obtained can be used to proffer recommendations to enhance adherence to ART. This section summarises the research findings and conclusion. This section looks at the extent to which the objectives of the study have been met.

5.5.1 Objective 1: To establish the proportions of patients that adhere to antiretroviral therapy received from Quthing District Hospital and Villa Maria Health Centre in Lesotho.

The objective was achieved through conducting a research using bivariate analysis. Data were collected from the participants living with HIV and on ART. Descriptive data was analysed using quantitative instruments. The research findings indicated that the proportions of the participants who are adherent to ART are more than 80% in each of the three methods used to measure adherence with an overall adherence of more than 85%. These findings revealed that the adherence of the participants was sub-optimal.

5.5.2 Objective 2: To determine factors influencing adherence to antiretroviral therapy received from Quthing District Hospital and Villa Maria Health Centre in Lesotho

The second objective was met through the use of correlation and regression analysis of the descriptive data. The predictors of adherence to ART were demonstrated by analysing the relationships between the independent variables and dependent variable. The statistically significant variables were further subjected to multivariate regression analysis to determine the factors influencing global adherence in the study. Three factors were found to be predictors of adherence to ART, that is, educational level, knowledge of HIV and ART perception.

5.5.3 Objective 3: To determine the knowledge of HIV and practice of ARVs among PLWHA in Quthing District Hospital and Villa Maria Health Centre in Lesotho.

Referencing this section to the HBM, the descriptive data of the participants demonstrated that the majority of them had a favourable perception towards ART. Their knowledge of HIV and practice of ARVs was demonstrated in them having been able to determine the stage in which they are, the duration of their treatment and the different type of ART. It was also recognisable in the fact that the majority of the participants recognised the importance of adherence to ART as this will increase their life expectancy once they are placed on it.

5.6 LIMITATIONS OF THE STUDY

The result of this study are not without limitations. Firstly, the study made use of a cross-sectional design which tends to measure adherence at a single point in time, thus limiting the causal inference. It does not provide for the variation of adherence of the participants that may occur over time. Therefore, it is important that measures such as longitudinal studies should be employed in these settings. Longitudinal studies are capable of reaching wider participants and make use of different assessment tools which are essential in understanding adherence over time. Factors that influence adherence to ART can be investigated in the long term thus precluding over-estimation.

Secondly, the fact that the study was conducted in a public health facility that offers free ART services may have led to over-estimation of adherence. Socio-economic barriers to adherence that are usually identified as barriers to adherence may not have affected the participants in this study.

This may have played a role in the responses of the respondents to the questions on barriers to adherence.

Thirdly, other possible predictors of adherence to ART were not explored and investigated. Such predictors as transportation cost, roles of service providers and social support. Fourthly, Self-report questionnaire could have been affected by recall bias, the desirability in responding positively and patient's motivation. This could lead to over-estimation of adherence by the participants while the actual picture of non-adherence is not reported. It is possible that other measures of adherence such as laboratory blood monitoring, medication events monitoring systems (MEMS) may have given different results.

Finally, the study was conducted in Quthing District only, and therefore may not be representative of adherence to ART of PLWHA in Lesotho.

5.7 RECOMMENDATIONS

The researcher is of the view that the following recommendation should be followed to enhance adherence to ART among PLWHA.

- a) It is imperative that baseline screening should be obtained on all patients being initiated on ART to obtain baseline data on adherence. This may help the service providers to recognise clients that will need further intervention before ART initiation.
- b) Health education campaigns still need to be intensified to address stigma and discrimination of PLWHA.
- c) High level of adherence may not be a guaranteed adherence for a long time. It is, therefore, imperative that family and community support should be encouraged to strengthen support for PLWHA.

- d) The study has shown that more females are affected than males which reflected the number of participants attending clinic. Efforts should be geared towards developing programmes that specifically target men. These programmes should be implemented with a view of diagnosing, linking them to care, initiation and retaining them in care. The programmes should also assist in educating them on gender issues relating to HIV and AIDS.
- e) It is important that future studies utilise multiple measurements of adherence to validate the accuracy of other measures such as self-report.
- f) Different health care providers such as faith-based organisations may be incorporated into the future research. This will encourage sharing of ideas in the strategies used to initiate and sustain adherence among their ART clients. This collaboration may help gain a better understanding of potential obstacles to adherence among clients not yet initiated.
- g) The present study did not deal with patient-provider relationship regarding the influence the provider exert on the patients that will affect their adherence to ART. In future, a further study may be carried out to explore this relationship and how it influences adherence.
- h) It is essential that the service provider should regularly be empowered as the knowledge gained will be used to disseminate information that is not only appropriate but improve the patients' understanding of adherence, what is expected of them and what should be done. Communication channels should be kept wide open at all times between the service providers and the patients as self-efficacy develops over time. Therefore, positive reinforcement is necessary to promote adherence to ART among PLWHA.
- i) Different approaches to enhance adherence should be employed. Approach such as modelling behaviour can be utilised. HIV positive patients who are adherent can be used to reinforce self-care behaviours. This can be utilised by the health care providers in enhancing adherence as this will improve the individual's self-care behaviour.

5.8 CONCLUSIONS

It is important to note that HIV is a chronic disease that can be managed with medications to ensure successful clinical outcome. The successful clinical outcomes rest on appropriate clinical management as well as the patient's positive belief reinforced by self-efficacy in ensuring adherence to ART. In this study, the adherence level in the Quthing District Hospital and Villa Maria Health Centre was Sub-optimal. Educational attainment, Knowledge of HIV status and the perception to ART were the main predictors of adherence to ART. It is, therefore, important that relevant policy makers, non - governmental organisations and service providers prioritise interventions aimed at promoting regular follow-up, updating and constant education of PLWHA on adherence, risk of non-adherence and issues relating to HIV and AIDS.

Also, an attempt should be made to provide enabling environment to the health care service providers that is supportive of PLWHA so that people living with HIV could have the structural and emotional support for partners to both be open about their individual zero-status. As knowledge regarding health and individual beliefs is not enough to achieve behaviour change modifications, efforts should be geared towards understanding other behavioural modification and lifestyle changes that could influence adherence in resource-limited settings such as Lesotho.

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ANNEXURE A: ETHICAL CLEARANCE CERTIFICATE FROM UKZN



UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

06 April 2016

Dr OA Abiodun (214580311)
Discipline of Public Health Medicine
School of Nursing and Public Health Medicine
drabiodun@yahoo.com

Protocol: Predictors of adherence to antiretroviral therapy among people living with HIV and AIDS at the Quthing District Hospital and Villa Maria Health Centre, Lesotho.

Degree: Mph

BREC reference number: BE034/16

EXPEDITED APPLICATION

The Biomedical Research Ethics Committee has considered and noted your application received on 08 December 2015.

The study was provisionally approved pending appropriate responses to queries raised. Your responses dated 29 February 2016 to queries raised on 18 February 2016 have been noted and approved by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given **full ethics approval**.

This approval is valid for one year from **06 April 2016**. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be **RATIFIED** by a full Committee at its meeting taking place on **10 May 2016**.

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely


Professor V Rambiritch
Deputy Chair: Biomedical Research Ethics Committee

cc supervisor: tsokagwegweni@ukzn.ac.za
cc postgrad: arumugamd@ukzn.ac.za

Biomedical Research Ethics Committee

Professor J Tsoka-Gwegweni (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

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Website: <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>

ANNEXURE B: ETHICAL CLEARANCE LETTER FROM THE MOH, LESOTHO



Ministry of Health
PO Box 514
Maseru 100.

REF: Proposal ID57-2015

Date: 30 September 2015

To: **Oluwasola Abiodun (Dr.)**
MPH Candidate, University of KwaZulu-natal, SA

Dear Dr. Abiodun,

Category of Review:

- Initial Review
- Continuing Annual Review
- Amendment/Modification
- Reactivation
- Serious Adverse Event
- Other _____

RE: Predictors of adherence to ART among people living with HIV and AIDS at the Quthing District Hospital and Villa Maria Health Centre. Lesotho
[Protocol date: 04/09/2015]

This is to inform you that on 29/09/2015 the Ministry of Health Research and Ethics Committee reviewed and **APPROVED** the above named protocol and hereby authorizes you to conduct the study according to the activities and population specified in the protocol. Departure from the approved protocol will constitute a breach of this permission.

This approval includes review of the following attachments:

- Protocol version dated 04/09/2015
- English consent forms dated 04/09/2015
- Sesotho consent forms dated 04/09/2015
- Data collection questionnaire date 04/09/2015
- Participant materials [insert types, versions, dates]
- Other materials [insert types, versions, dates]

This approval is **VALID** until 29 September 2016.

Please note that an annual report and request for renewal, if applicable, must be submitted at least 6 weeks before the expiry date.

All serious adverse events associated with this study must be reported promptly to the MOH Research and Ethics Committee. Any modifications to the approved protocol or consent forms must be submitted to the committee prior to implementation of any changes.

We look forward to receiving your progress reports and a final report at the end of the study. If you have any questions, please contact the Research and Ethics Committee at the Research Coordination Unit at room number 326, level 3 MOH (email: rcumoh@gmail.com).

Sincerely,

Dr. Nyane Lesie
Director General Health Services (a.i)

Dr. Jill Sanders
Co-Chairperson NH-REC

ANNEXURE C: CONSENT FORM ENGLISH

INFORMED CONSENT FORM

Greetings,

My name is Oluwasola Afolabi Abiodun, and I am a master's student at the University of KwaZulu-Natal (UKZN), Howard College Campus. I am conducting a research study on better understanding of the level of adherence and factors associated with it. This research process forms part of my Master's thesis entitled:

“Predictors of adherence to antiretroviral therapy among people living with HIV and AIDS at the Quthing District Hospital and Villa Maria Health Centre, Lesotho”.

The study aimed to understand better and explain why people living with HIV adhere or do not adhere to their medication. The result might help to inform future interventions in the district. Please be advised that you may choose not to participate in this research study, and should you wish to withdraw at a later stage, you have the full right to do so, and your actions will not disadvantage you in anyway. You are invited to participate in the research by answering a few questions that I will ask you. If you volunteer to participate in this study, we would ask you to respond to a questionnaire with 20 questions.

The study asks about adherence to antiretroviral therapy that may be unpleasant to recall. These questions could stir up feelings that may cause some discomfort. Additional risks associated with your participation in this study are: having confidential information collected, being asked personal questions, and being inconvenienced by the time spent in the interview (a total of about thirty minutes to one hour). In the event that any participant experiences discomfort, the researcher will stop the questions and allow for such information to be omitted. Depending on the circumstances, the researcher will avail the participants opportunity to speak to a counsellor if they so wish. The following registered counsellors will be on hand to offer counselling and psychosocial support.

Mary Matobo mary_matobo@yahoo.com +26658032671

Mejoane Mohapi mejoanefm@gmail.com +26658107877

There is no material or financial benefits attached to participating in this research study, and your participation is entirely voluntary. The information obtained from you will be treated in a confidential manner, and will be safely stored at the University of KwaZulu-Natal. Your input will add significant value to the research project and increase knowledge in the area of adherence to antiretroviral therapy.

Should you need further clarity or have any questions regarding this research study, please contact me or my research supervisor.

Researcher:

O. A. ABIODUN

Tel +26657515171

Email: drabiiodun@yahoo.com

Research Supervisor

Prof Joyce Tsoka-Gwegweni

Tel +27312604386

tsokagwegweni@ukzn.ac.za

Your participation is much appreciated, thank you.

DECLARATION

I..... hereby declare that I am fully aware of the contents of this Informed Consent Form and the nature of this research project. I fully agree to participate in this research project as a volunteer, and, therefore, I have the right to refuse to answer any questions.

I also have the right to withdraw from this research study at any point, should I wish to do so, and my actions will not disadvantage me in any way. I will not receive any payment for participating in the research.

Signature of Participant

Signature of witness

Date

ANNEXURE D: CONSENT FORM SESOTHO

LITLATSETSO

Tlatsetso ea 1: Foromo ea tumello

FOROMO EA TUMELLO

Ea Nkang Karolo

Lebitso laka ke Oluwasola Afolabi Abiodun 'me ke moithuti oa lengolo la *Masters* Sekolong se Sehoho sa Kwa-Zulu Natal (UKZN) Howard College. Ke etsa boithuto holim'a kutloisiso e ntle mabapi le bokhomareli ba se itseng hammoho le tsohle tse amanang le taba ena. Boithuto bona ke karolo ea sengoloa sa ka sa lengolo lena la *Masters* seo sehlooho sa teng e leng:

“Predictors of adherence to antiretroviral therapy among people living with HIV and AIDS at the Quthing District Hospital and Villa Maria Health Centre, Lesotho”.

(Matšoao a tšepahallo ea litlhare ho batho ba phelang le HIV le AIDS Sepetleleng sa Quthing le Setsing sa Bophela sa Villa Maria, Lesotho).

Sepheo sa boithuto bona ke ho utloisisa hantle le ho hlalosa hore na ke hobaneng batho ba phelang le kokoana-hloko ea HIV le AIDS ba phehella kapa hona ho se phehelle ho sebelisa litlhare tsa bona. Sephetho se ka thusa ho etsa khoeletso ea lithuso tsa ka moso seterekeng. Hlokomela hore u ka khetha ho se nke karolo boithutong bona 'me ha u ka lakatsa ho ikhula hamorao, u na le tokelo eohle ea ho etsa joalo, 'me seo u se etsang ha se na ho sebetsa khahlanong le uena ka tsela efe kapa efe. U kopuo a ho nka karolo puisanong e tataisoang ke lipotso.

Boithuto bona bo botsa ka ho phehella ho sebelisa lithlare tsa kokoana hloko ea HIV le AIDS tseo ho ka etsahalang hore ebe ha ho monate ho li hopola. Lipotso li ka tlisa mepolo eo u ka utloang e u beha tlasa moea oa khatello. Tse ling tsa ntho tse ka u behang tlokotsing mabapi le boithuto bona ke : ho batloa litaba tse amanang le lekunutu la hao u le mokuli, le ho botsoa lipotso tse batlang litaba tsa bokulo ba hao, le ho nka nako tetelele o botsoa lipotso(nako e ka bang metsosto e mashome a mararo ho isa ho hora). Ha u utloa eka moithuti u tla u hata litorong u lumelletsoe ho mo emisa ho botsa lipotso tse ka latelang. `Me ba nkang karolo ebile ba angoe ke lipotso ba

lumelletsoe ho bua le mohlabolli haeba ba ikutloa joalo. Bahlabolli ba teng semmuso ba latelang ba tla ba teng ho fana ka thuso:

Mary Matobo mary_matobo@yahoo.com +26658032671

Mejoane Mohapi mejoanefm@gmail.com +26658107877

Ha ho litsiane tsa mofuta ofe kapa ofe tse tsamaeang le ho nka karolo ha hau boithutong bona, ka hona ho nka karolo ha hau empa e le boithapo feela. Litaba tse tla fumanoa ho tsoa puisanong eo li tla sebelisoa e le lekunutu 'me li tla bolokoa Sekolong se Seholo sa Kwa-Zulu Natal. Ke leboha ho nka karolo ha hau boithutong bona 'me tlatsetso ea hau e bohlokoa haholo boithutong bona.

Haeba u ka hloka tlhalosetso e fetang mona kapa oa ba le lipotso mabapi le boithuto bona, bua le 'na kapa mosupisi oa ka.

Moithuti:

O. A. ABIODUN

Mohala: 266 57515171

Email: drabiodun@yahoo.com

Mosupisi:

Prof. Joyce Tsoka-Gwegweni

Mohala: +27312604386

tsokagwegweni@ukzn.ac.za

Kea leboha ka nako ea hao, ho nka karolo boithutong bona.

BOITLAMO

‘Na..... ke itlama mona hore ke utloisisa tsohle tse ka hare ho foromo ena hammoho le boleng ba boithuto bona. Ke lumela ka ho tiea ho nka karolo boithutong bona ke le moithaopi ‘me kena le tokelo ea ho hana ho araba potso ea mofuta ofe kapa ofe.

Ke boetse ke na le tokelo ea ho ikhula boithutong bona nako eohle e-bang nka lakatsa ho etsa joalo ‘me sohle seo ke tla se etsa ha se na ho sebetsa khahlanong le ‘na ka tsela efe kapa efe. Ha ho litsiane tsa mofuta ofe kapa ofe tse tsamaeang le ho nka karolo boithutong bona.

Tekeno ea motho ea nkang karolo

.....

Letsatsi:

.....

ANNEXURE E: RESEARCH INSTRUMENT, ENGLISH

QUESTIONNAIRE ON PREDICTORS OF ADHERENCE TO ART

	n (%)
1. Sex	
Male	<input type="text"/>
Female	<input type="text"/>
Age	
Less than 25	<input type="text"/>
25-35 years	<input type="text"/>
35-45 years	<input type="text"/>
More than 45	<input type="text"/>
3. Marital status	
Single	<input type="text"/>
Widower	<input type="text"/>
Divorced	<input type="text"/>
Married	<input type="text"/>
4. Educational level	
Non Schooled	<input type="text"/>
Primary School	<input type="text"/>
High School	<input type="text"/>
Tertiary Level	<input type="text"/>
5. Religion	
Christian	<input type="text"/>
Islam	<input type="text"/>
None or Traditional	<input type="text"/>

6. Place of residence

Urban

Rural

7. Alcohol consumption

Yes

No

8. Clinical WHO stage

Stage I

Stage II

Stage III and IV

9. Duration of ART therapy

Less than one year

1 to 3 years

More than 3 years

10. CD4's count(Last check-up)

CD4<350

CD4>350

11. Therapeutics` line

1st Line

2nd Line

3rd line

12. Type of ART prescribed

TDF/3TC/NVP

TDF/3TC/LPV/r or ATV/r

AZT/3TC/LPV/r or ATV/r

ABC/3TC/NVP

ABC/3TC/EFV

AZT/3TC/EFV

ABC/3TC/LPV/r

AZT/3TC/NVP

TDF/3TC/EFV

13. Reported side effects

No

Yes

14. ART perception by patient

Low

Good

15. HIV-Status disclosure to sexual partner

No

Yes

16. Knowledge of the HIV zero-status of the sexual partner

No

Yes

17. Self-reported 4 - day recall dose adherence to ART

No

Yes

18. Appointment`s adherence to ART

No

Yes

19. Pills count`s adherence to ART

No

Yes

20. Barriers to treatment

20.1 Duration of treatment too long

No

Yes

20.2 Side effects with ARV medication?

No

Yes

20.3 Frequent travel or migration?

No

Yes

20.4 Is hunger a barrier to treatment

No

Yes

20.5 Overall economic situation a barrier

No

Yes

20.6 Too busy

No

Yes

20.7 Distance from clinic

No

Yes

21 Global adherence to ART

No

Yes

ANNEXURE F: RESEARH INSTRUMENT, SESOTHO

QUESTIONNAIRE

LIPALO-PALO TSE HLALOSANG BATHO BA PHELANG LE KOKOANA-HLOKO EA HIV

**LE AIDS BA TLASA TS`EBELSO EA LITHLARE SEPETLELENG SA MMUSO QUTHING
Boleng ba bakuli**

	n (%)
1. botona kap bots`ehali	
Botona	<input type="text"/>
Bots`ehali	<input type="text"/>
2. Lilemo	
Tse ka tlase ho 25	<input type="text"/>
Lilemong tse 25-35	<input type="text"/>
lilemong tse 35-45	<input type="text"/>
ka holimo ho 45	<input type="text"/>
3. Boemo ba lenyalo	
Ka thoko ho lenyalo	<input type="text"/>
Ea lahlahetsoeng ke molekane ka lefu(mohlolohali/Mohlolo)	<input type="text"/>
Thlalo	<input type="text"/>
Ka hare ho lenyalo	<input type="text"/>
4. Boemo ba thuto	
ea sa kenang sekolo	<input type="text"/>
Sekolo sa mathomo	<input type="text"/>
Sekolo se phahameng	<input type="text"/>
Setsi sa thuto e holimo	<input type="text"/>
5. Tumelo	
Mo-kriste	<input type="text"/>
Mo-moslam	<input type="text"/>
Molumeli oa setso	<input type="text"/>

6. Sebaka sa bolulo

Toropong

Mahaeng

7. Ts`ebeliso ea tai

Che

E

8. Mokhahlelo

Mokhahlelo I

Mokhahlelo II

Mokhahlelo III

9. Nako ea ts`ebeliso ea lithlare

Ka tlase ho selemo

Selemo ho is a tse tharo

Ho feta lilemo tse tharo

10. Palo tsa CD4 (Tlathhobo ea ho qetela)

ka tlase ho 350

ka holimo ho

350

11. Mola oa therapeutics

Mola oa pele

Molaoa bobeli

mola oa boraro

12. Mofuta oa lithlare tse khothalelitsoeng

TDF/3TC/NVP

TDF/3TC/LPV/r or ATV/r

AZT/3TC/LPV/r or ATV/r

ABC/3TC/NVP

ABC/3TC/EFV

AZT/3TC/EFV

ABC/3TC/LPV/r

AZT/3TC/NVP

TDF/3TC/EFV

13. Litlamorao tse tlalehiloeng

Che

E

14. Tsela eo mokuli a amohelang lithlare ka eona

E tlase

E nepahetse

15. Na molekane o tsebisitsoe ka boemo ba HIV?

Che

E

16. Tsebo ea hore molekane ha a na HIV?

Che

E

17. Ts`epahallo ea lithhare ea motho ka bo eena

Che

E

18. Ts`epahallo ea lithlare ho latea letsatsi le beiloeng ho ea setsing sa bophelo

Che

E

19. Ts`epahallo ea lithhare ho latela palo ea lipilisi

Che

E

20. Lintho tse thibelang ts`epahallo

20.1 Nako ea kalofo e telele haholo?

Che

E

20.2 Litlamorao tsa lithhare

Che

E

20.3 Ho nka maeto hangata kapa ho tsoa le ho kena ka hara naha

Che

E

20.4 Tlala ke thibelo ho kalafo

Che

E

20.5 Maemo a akaretsang a morou ke thibelo

Che

E

20.6 U phathahane haholo

Che

E

20.7 Nako ea ho ea setsing sa kokelo

Che

E

21. Ts`epahallo e akeretsang ho ART

Che

E

ANNEXURE G: Predictor of adherence of PLWHA to ART at QUTHING in LESOTHO

	B	S.E.	Wald	df	Sig.	Exp(B)	95,0% C.I.for EXP(B)	
							Lower	Upper
Step 1 ^a GENDER(1)	-.413	.637	.421	1	.517	.662	.190	2.306
AGE			1.897	3	.594			
AGE(1)	2.730	2.354	1.345	1	.246	15.332	.152	1.545E3
AGE ⁽⁶⁹⁾	.922	1.080	.729	1	.393	2.514	.303	20.861
AGE(3)	-.342	.781	.192	1	.661	.710	.154	3.284
MARITAL_STATUS			3.524	3	.318			
MARITAL_STATUS(1)	.559	1.311	.182	1	.670	1.748	.134	22.856
MARITAL_STATUS ⁽⁶⁹⁾	.078	.776	.010	1	.920	1.081	.236	4.949
MARITAL_STATUS(3)	3.038	1.630	3.472	1	.062	20.855	.854	509.090
EDUCATIONAL_STATUS			18.773	3	.000			
EDUCATIONAL_STATUS(1)	2.532	1.072	5.575	1	.018	12.575	1.537	102.856
EDUCATIONAL_STATUS ⁽⁶⁹⁾	3.582	.906	15.643	1	.000	35.948	6.092	212.127
EDUCATIONAL_STATUS(3)	4.476	1.269	12.434	1	.000	87.920	7.303	1.058E3
RESIDENCE(1)	1.251	.882	2.010	1	.156	3.494	.620	19.701
ALCOHOL_CONSUMPTION(1)	.181	.601	.090	1	.764	1.198	.369	3.892
CLINICAL_WHO_STAGE			5.141	2	.076			
CLINICAL_WHO_STAGE(1)	-16.850	1.826E4	.000	1	.999	.000	.000	.
CLINICAL_WHO_STAGE ⁽⁶⁹⁾	-19.824	1.826E4	.000	1	.999	.000	.000	.
THERAPEUTICS			.691	2	.708			
THERAPEUTICS(1)	-16.519	4.019E4	.000	1	1.000	.000	.000	.
THERAPEUTICS ⁽⁶⁹⁾	-17.691	4.019E4	.000	1	1.000	.000	.000	.
SIDE_EFFECTS(1)	-1.217	1.093	1.240	1	.265	.296	.035	2.522
HIV_STATUS_KNOWLEDGE(1)	-2.408	1.034	5.423	1	.020	.090	.012	.683
HIV_STATUS_DISCLOSURE(1)	.463	1.067	.188	1	.664	1.588	.196	12.846
ART_PERCEPTION(1)	-5.397	1.318	16.758	1	.000	.005	.000	.060
BARRIERS_TO_TREATMENT_2(1)	-.573	1.104	.270	1	.604	.564	.065	4.904
BARRIERS_TO_TREATMENT_1(1)	1.085	.807	1.808	1	.179	2.961	.608	14.409
BARRIERS_TO_TREATMENT_3(1)	1.055	.912	1.340	1	.247	2.872	.481	17.148
BARRIERS_TO_TREATMENT_6(1)	-.124	.875	.020	1	.887	.883	.159	4.913
BARRIERS_TO_TREATMENT_7(1)	-1.120	.986	1.289	1	.256	.326	.047	2.255

Constant	33.932	4.415E4	.000	1	.999	5.454E14		
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Predictor of adherence of PLWHA to ART at QUTHING in LESOTHO

		p-value.	aOR Exp(B)	95,0% C.I.for EXP(B)	
				Lower	Upper
Step 1 a	GENDER(1)	.517	.662	.190	2.306
	AGE	.594			
	AGE(1)	.246	15.332	.152	1.545E3
	AGE ⁽⁶⁹⁾	.393	2.514	.303	20.861
	AGE(3)	.661	.710	.154	3.284
	MARITAL_STATUS	.318			
	MARITAL_STATUS(1)	.670	1.748	.134	22.856
	MARITAL_STATUS ⁽⁶⁹⁾	.920	1.081	.236	4.949
	MARITAL_STATUS(3)	.062	20.855	.854	509.090
	EDUCATIONAL_STATUS	.000			
	EDUCATIONAL_STATUS(1)	.018	12.575	1.537	102.856
	EDUCATIONAL_STATUS ⁽⁶⁹⁾	.000	35.948	6.092	212.127
	EDUCATIONAL_STATUS(3)	.000	87.920	7.303	1.058E3
	RESIDENCE(1)	.156	3.494	.620	19.701
	ALCOHOL_CONSUMPTION(1)	.764	1.198	.369	3.892
	CLINICAL_WHO_STAGE	.076			
	CLINICAL_WHO_STAGE(1)	.999	.000	.000	.
	CLINICAL_WHO_STAGE ⁽⁶⁹⁾	.999	.000	.000	.
	THERAPEUTICS	.708			
	THERAPEUTICS(1)	1.000	.000	.000	.
	THERAPEUTICS ⁽⁶⁹⁾	1.000	.000	.000	.
	SIDE_EFFECTS(1)	.265	.296	.035	2.522
	HIV_STATUS_KNOWLEDGE(1)	.020	.090	.012	.683
	HIV_STATUS_DISCLOSURE(1)	.664	1.588	.196	12.846
	ART_PERCEPTION(1)	.000	.005	.000	.060
	BARRIERS_TO_TREATMENT_2(1)	.604	.564	.065	4.904
	BARRIERS_TO_TREATMENT_1(1)	.179	2.961	.608	14.409
	BARRIERS_TO_TREATMENT_3(1)	.247	2.872	.481	17.148
BARRIERS_TO_TREATMENT_6(1)	.887	.883	.159	4.913	
BARRIERS_TO_TREATMENT_7(1)	.256	.326	.047	2.255	

EDUCATIONAL STATUS, HIV STATUS KNOWLEDGE AND ART PERCEPTION ARE SIGNIFICANT IN THE MULTIVARIATE ANALYSIS.

ANNEXURE H. Correlation Matrix

Global adherence to ART * HIV status disclosure to sexual partner

Crosstab

			HIV status disclosure to sexual partner		Total
			no	yes	
Global adherence to ART	no	Count	13	22	35
		% within HIV status disclosure to sexual partner	22.4%	8.5%	11.1%
	yes	Count	45	236	281
		% within HIV status disclosure to sexual partner	77.6%	91.5%	88.9%
Total		Count	58	258	316
		% within HIV status disclosure to sexual partner	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.272 ^a	1	.002		
Continuity Correction ^b	7.915	1	.005		
Likelihood Ratio	7.884	1	.005		
Fisher's Exact Test				.005	.004
Linear-by-Linear Association	9.242	1	.002		
N of Valid Cases ^b	316				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6,42.

b. Computed only for a 2x2 table

Global adherence to ART * Knowledge of the HIV zero-status of the sexual partner

Crosstab

			Knowledge of the HIV zero-status of the sexual partner		Total
			no	yes	
Global adherence to ART	no	Count	16	19	35
		% within Knowledge of the HIV zero-status of the sexual partner	22.5%	7.8%	11.1%
	yes	Count	55	226	281
		% within Knowledge of the HIV zero-status of the sexual partner	77.5%	92.2%	88.9%
Total		Count	71	245	316
		% within Knowledge of the HIV zero-status of the sexual partner	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	12.209 ^a	1	.000		
Continuity Correction ^b	10.755	1	.001		
Likelihood Ratio	10.582	1	.001		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	12.171	1	.000		
N of Valid Cases ^b	316				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7,86.

b. Computed only for a 2x2 table

Table 4. 4 Correlation matrix between Global adherence and educational status of the study population

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.074 ^a	3	.000
Likelihood Ratio	14.747	3	.002
Linear-by-Linear Association	7.451	1	.006
N of Valid Cases	382		

Correlation matrix between Global adherence and ART perception

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.506E2 ^a	1	.000		
Continuity Correction ^b	145.010	1	.000		
Likelihood Ratio	104.755	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	150.197	1	.000		
N of Valid Cases ^b	382				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6,27.

b. Computed only for a 2x2 table