**THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF NURSING SCIENCES**

# MOTIVATING FACTORS TO ANTIRETROVIRAL TREATMENT ADHERENCE BY PEOPLE LIVING WITH HIV IN NDOLA DISTRICT

**BY**

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**A dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Science in Nursing, Maternal and Child health**

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October 2017

## DECLARATION

I **Fanwell Hameenda Himaubi,** hereby declare that this Dissertation represents my own work and has not been presented either wholly or partially for a Degree at the University of Zambia or any other University. I further declare that all the sources I have cited have been indicated and acknowledged using complete references.

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I **Doctor Catherine M Ngoma,** having supervised and read this Dissertation is satisfied that this is the original work of the author under whose name it is being presented. I confirm that the work has been completed satisfactorily and approved it for final submission.

Signature…… Date…….
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## CERTIFICATE OF APPROVAL

The University of Zambia, School of Nursing Sciences approves this Dissertation by **Fanwell Hameenda Himaubi**, in partial fulfilment of the requirements for the award of Master of Science in Nursing Degree, Maternal and Child Health at the University of Zambia.

**Examiner I**

**Name : …….**

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**Examiner II**

**Name : ……,,,……**

**Signature…….. Date……..**

**Examiner III**

**Name : ……**

**Signature…….. Date……..**

## DEDICATION

To my wife and Children who missed my Tender care during my study period **especially Malawo** at his tender age, Dad Malawo Mosture Himaubi who passed on while I was still studying.

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Many thanks to you all

## ABSTRACT

### Introduction

Adherence to Antiretroviral Treatment (ART) is a major global public health challenge and a barrier in the management of HIV. Without adequate adherence, antiretroviral agents are not maintained at sufficient concentrations to suppress Human Immune Virus (HIV) replication in infected cells and to lower the plasma viral load. In addition to being associated with poor short-term virological response, poor adherence to antiviral medication accelerates development of drug-resistant HIV.

### Objectives

The main aim of the study was to determine motivating factors to ART adherence by people living with HIV in Ndola district.

### Methodology

This was a cross sectional study conducted in Ndola urban district. Convenient sampling method was used to select 150 respondents. Face to face interviews using a structured, interview schedule was used to collect data from the respondents.Data was analyzed using IBM SSPS version 24.0. Descriptive statistics and inferential statistics were applied and Chi-square test was used to test associations between the dependent variable and independent variables. Level of significant was set at 0.05 % with 95% confidence interval.

### Results

Seventy-six (76%) of the respondents were aged above 34 years, 63.3% were females, while 54% had attained secondary school education. Most respondents (83%) were self-employed and 68% earned an income above K1, 500. The adherence rate was suboptimal (63.3%) Most of the respondents (77.7%) had lived with the HIV infection for more than 19 years, 93.6% were able to disclose their status and 59.3% lived with their children. More than three quarters (84%) of the respondents did not know the benefits of taking Antiretrovirals (ARVs) and 84% did not know the importance of ART adherence. After initiation of ART, 74% of the respondents' health status improved and 81.5% received treatment daily while 18.5% took drugs twice in a day. Special instructions on dietary restrictions were given to 61.3% respondent, 67.8% were told to take extra fluid and 33% respondents' were given restrictions for both. Most respondents (56.7%) initiated ART when their CD4 count

was less than 350/mm$^3$, while 43.3% initiated ART when the CD4 count was > 350/mm$^3$.

Most respondent were on a one regime treatment (75.3%) and 55.4% had someone to remind them when to take their medications. Of the persons to remind the respondents 35.3% were their spouses, 74% of the respondents' reported that they sometimes forgot to take their ARVs. The reasons for forgetting to take drugs included being busy (9.3%), intoxicated with alcohol, (5.3%), feeling stigmatized (2.7%), in a hurry ( 0.7%) while 20% did not give any reason. Further analysis of data did not show any relationship between ART adherence and other variables except the level of education (P value 0.016).

**Conclusion**

The study findings revealed that adherence to ARVs was influenced by the knowledge of the benefits of taking ARVs, importance of taking ARVs and the level of education of the respondents. There is need therefore to strengthen and continuously provide information, education and communication by all the relevant stakeholders using both print and electronic media on ART adherence.

**Keywords**: Motivating factors, antiretroviral treatment, adherence, people living with HIV

## TABLE OF CONTENT

CHAPTER TWO



CHAPTER THREE

Methodology

APPENDICES

## LIST OF TABLES

**Table** **Page No**

## LIST OF FIGURES

**Figures** **Page No**

## LIST OF ABBREVIATIONS

| | |
|---|---|
| **AACTG** | Adult AIDS Clinical Trials Group |
| **AIDS** | Acquired Immunodeficiency Syndrome |
| **ART** | Antiretroviral Treatment |
| **ARV** | Antiretroviral |
| **CDC** | Centre for Disease Control |
| **CINAHL** | Cumulative Index of Nursing and Allied Health Literature |
| **CRSSS** | Creative Research System Survey Software |
| **CSO** | Central Statistical Office |
| **HAART** | Highly active antiretroviral treatment |
| **HAPCO** | HIV/AIDS Prevention and Control Office |
| **HBAC** | Home-Based Aids Care |
| **HC** | Health Centre |
| **HIV** | Human immune virus |
| **IEC** | Information education and communication |
| **IQR** | Interquartile Range |
| **MEMS** | Micro Electro Mechanical Systems |
| **MoH** | Ministry of Health |
| **MPR** | Monthly Prescribing Reference |
| **NANDA:** | North American Nursing Diagnosis Ass |
| **NGO** | Non-Governmental Organization |
| **NOC:** | National outcome classification |
| **NOCTE** | At night |
| **NNRTI** | Non-nucleoside reverse transcriptase inhibitor |
| **NRTI** | Nucleoside reverse transcriptase inhibitor |
| **OI** | Opportunistic Infections |
| **PCP** | Pneumocystis carinii pneumonia |

| | |
|---|---|
| **UNAIDS** | United Nations Programme on acquired immune deficiency syndrome |
| **UNZA** | University of Zambia |
| **USA** | United States of America |

# CHAPTER ONE

## 1.0 Introduction

According to Center for Disease Control (CDC) (2012) the importance of conceptualizing treatment adherence broadly should include early engagement in care and sustained retention in care. The concept of an HIV "treatment cascade" has been used to describe the process of HIV testing, linkage to care, initiation of effective ART, adherence to treatment, and retention in care. Evidence has shown that maintaining high levels of adherence to ART is a critical determinant of long-term outcome in HIV infected patients (Ross et al., 2011). Non adherence to ART may lead to loss of virologic control, drug resistance and loss of future treatment options (Cohen, 2011). Each and every step in the treatment cascade is very important in order to achieve optimal clinical outcomes and to realize the potential public health benefit of treatment and prevention. To avoid the emergence of the resistant strains of the virus, the World Health Organization (WHO) recommends at least 95% of adherence to ART (Stone et al., 2001). Based on these facts, the importance of adhering to ART has been widely publicized and accepted as a critical element in the success of slowing down the rate at which HIV makes copies of itself.

### 1.1 Background Information

Chapter one provides background information on motivating factors to anti-retroviral therapy (ART) adherence by people living with HIV, statement of problem, study justification and the theory that will guide the study. The research question, research objectives, hypothesis, conceptual and operational definitions and major study variables are indicated.

Adherence to ART is a major global public health challenge and a barrier in the management of HIV. Without adequate adherence, ARV are not maintained at sufficient concentrations to suppress HIV replication in infected cells and to lower the plasma viral load. In addition to being associated with poor short-term virological response, poor adherence to antiviral medication accelerates development of drug-resistant HIV (WHO, 2003). Most of the ARVs have dietary restrictions and some

have short or long term side effects. These could deter HIV positive clients from adhering to the treatment regimens.

ART is a combination of several medicines used to slow down the rate at which HIV makes copies of itself (multiplies) in the body (Grant et al.,2010). A combination of three or more ARV medicines has been found to be more effective than just one. This is referred to as "anti-HIV cocktail "and is the standard treatment for HIV infection. There are five classes of drugs which are used to treat HIV infection and these include; 1)Nucleoside/nucleotide reverse transcriptase inhibitors also called nucleoside/nucleotide analogs such as Abacavir, Emtricitabine, Tenoforvir, Lamivudine and Zidovudine, 2) Non-nucleoside reverse transcriptase inhibitors such as Efavirenz and Nevirapine, 3) Protease inhibitors such as Lopinavir, Indinavir and Ritonavir, 4) Entry inhibitors such as Enfuvirtide and Maraviroc, 5) Integrase inhibitors such as Dolutegravir and Raltegravir.

ART is a life-long treatment that helps people with HIV live longer, healthier lives. Before starting ART, people with HIV discuss the benefits and risks of ART with their health care providers. They also discuss the importance of medication adherence (taking HIV medicines every day and exactly as prescribed). According to the U.S. Department of Health and Human Services (2017), adherence to an HIV regimen prevents HIV from multiplying and destroying the immune system and taking HIV medicines every day also reduces the risk of HIV transmission.

It is critical therefore that patients are given and understand information about HIV disease including the goals of therapy (achieving and maintaining viral suppression, decreasing HIV-associated morbidity and mortality, and preventing sexual transmission of HIV), the prescribed regimen (including dosing schedule and potential side effects), the importance of strict adherence to ART, and the potential for the development of drug resistance as a consequence of suboptimal adherence (WHO, 2003). Additionally, patients must also be positively motivated to initiate and maintain therapy. Adherence to therapy is difficult to measure accurately. However, four basic techniques have been developed for quantifying adherence. Viral load suppression is one of the most reliable indicators of adherence. Patient self-report is a useful tool for assessing adherence over time and as well as pharmacy records and pill counts.

Evidence shows that adherence rates in Africa are below the WHO recommendation. For instance, a study conducted by Nachega et al (2004) on adherence to antiretroviral therapy in HIV-infected adults in Soweto, South Africa, found adherence levels of 88%. In Ethiopia, an adherence rate of 83% was reported in two hospitals of Oromiya Regional State by Awel (2008). Markos et al (2008) carried out a study on adherence to ART in People Living with Human Immune Virus and acquired immune deficiency Virus (PLWHA) in Yirgalem Hospital in Ethiopia. Another Ethiopian study by Mitiku et al (2013) aimed at determining the level of adherence and identifying the factors that are related to non-adherence to ART among the patients attending ART units in Harari National Regional State, eastern Ethiopia reported adherence levels of 87%.

Other authors have documented and divided into four main groups critical factors that influence adherence. The factors are: (1) patient factors, such as drug use, alcohol use, age, sex, or ethnicity; (2) medication regimen, such as dosing complexity, number of pills, or food requirements; (3) the patient-health-care provider relationship; and (4) the system of care (Olubusoye and Meshesha, 2008; Pinheiro et al., 2002; Sasaki et al., 2012). The objective of this study therefore was to determine the level of adherence and understand the factors that motivate adherence. This will inform policy so that appropriate interventions can be designed.

## 1.2 **Statement of the Problem**

Currently, little is known on patients' adherence to ART by people living with HIV in Ndola district despite having HIV prevalence of 47% with the total number of patients on ART being 13,593 (Ndola - Health Information Management System (HIMS) (2015). According to Ndola district HIMS a total numbers of lost to follow up clients is 6,433 from 2010 to 2015 as shown in the table 1. The results has shown a 4.5% increase in magnitude of patients that are lost to follow up from 2010 – 2015 in Ndola District.

The benefits of ART cannot be over emphasized. For instance, in countries where levels of adherence to ART are high fewer people are progressing to Acquired Immune Deficiency Syndrome (AIDS), hospital wards have practically emptied, and the age-adjusted death rate from HIV and AIDS has declined by more than 70%

(WHO 2003). Despite the lifesaving aspect of ART, many HIV positive clients are not adhering to ART regimens especially those on complex treatment schedules.

Table 1: Total numbers of lost to follow up clients from 2010 to 2015

| Year | No of Patients on ART | Lost to follow up | Percent |
|---|---|---|---|
| 2010 | 10,976 | 798 | 7.27 |
| 2011 | 11,531 | 800 | 6.94 |
| 2012 | 11,870 | 1,000 | 8.42 |
| 2013 | 12,461 | 1,075 | 8.63 |
| 2014 | 12,776 | 1,235 | 9.67 |
| 2015 | 12,962 | 1,525 | 11.77 |

Table prepared by Researcher from Ndola District HIMS records.

Therefore there is need to conduct this study to estimate the adherence levels and understand motivating factors to adherence to ensure decisions about adherence interventions are informed by empirical support.

## 1.3 Justification of the study

Most ART adherence studies have been undertaken in high-income countries (Sharada et al., 2012). Few studies have assessed adherence rates or predictors in low- or lower-middle income countries including Zambia (Ross et al., 2011). The study will reveal the motivators or cause of adherence among the PLWHA and identified gap in understanding ART adherence in Ndola district. The study will also identify any variables from the list that are associated to ART adherence. The findings will be utilized by Government through the Ministry of Health to formulate policy on adherence to ART and to develop interventions that could be used to enhance adherence to ART among the People Living with HIV and AIDS. The other beneficiaries to the findings will be nurses who will be able to identify clients needing counseling on adherence earlier than expected when they seek medical treatment as they are the first point of contact at all times.

## 1.4 Social Cognitive Theory

In 1941 Miller and Dollard proposed the theory of social learning. In 1963 Bandura and Walters broadened the social learning theory with the principles of observational learning and vicarious reinforcement. Bandura provided his concept of self-efficacy in 1977, while he refuted the traditional learning theory for understanding learning.

The Social Cognitive Theory was used because it is relevant to health communication, and provides a framework for designing, implementing and evaluating programs. The Theory deals with cognitive, emotional aspects and aspects of behavior for understanding behavioral change (Pajares 2002). It provides ways for new behavioral research in health education, the Theory explains how people acquire and maintain certain behavioral patterns while also providing the basis for intervention strategies (Bandura, 1977). Evaluating behavioral change depends on the following factors; environment, people and behavior (Pajares 2002). Environment refers to the factors that can affect a person's behavior. These are social and physical environments. Social environment include family members, friends and colleagues. Physical environment is the size of the room, the ambient temperature or the availability of certain foods. The environment and situation provide the framework for understanding behavior. The situation refers to the cognitive or mental representation of the environment that may affect a person's behavior. The situation is a person's perception of the place, time, physical features and activity.

The three factors, environment, people and behavior are constantly influencing each other. Behavior is not simply the result of the environment and the person, just as the environment is not simply the result of the person and behavior (Glanz et al, 2002). The environment provides models for behavior. Observational learning occurs when a person watches the actions of another person and the reinforcements that the person receives (Bandura, 1977). The concept of behavior can be viewed in many ways such as behavioral capability. This means that if a person is to perform a certain behavior he must know what that behavior is and have the skills to perform it.

### 1.4.1 **Concepts of the Social Cognitive Theory**

The concepts of the Social Cognitive Theory according to Pajares (2002) are:

1. **Environment**: Factors physically external to the person that provides opportunities and social support
2. **Situation**: Perceptions of the environment: Correct misperceptions and promote healthful ways
3. **Behavioral capability**: Knowledge and skill to perform a given behavior: Promote mastery learning through skills training
4. **Expectations**: Anticipatory outcomes of a behavior model positive outcomes of healthful behavior
5. **Expectancies:** The value that a person places on a given outcome, incentives, present outcomes of change that have functional meaning
6. **Self-control**: Personal regulation of goal-directed behavior or performance; Provides opportunities for self-monitoring, goal setting, problem solving and self-reward.

### 1.4.2 **Application of the Social Cognitive Theory to the current study**

The Theory adopted in this research was the Social Cognitive Theory because it was centered on the wellbeing of the individual as he/ she relates in society. The Social Cognitive Theory addressed the socio-structural determinants of health as well as the personal determinants. A comprehensive approach to health promotion required changing the practices of social systems that have widespread detrimental effects on health rather than solely changing the habits of individuals (Bandura, 1998). The application of this theory was considered from the perspectives of the following principles as outlined by Bandura in 1998: The most common (and pervasive) examples of social learning situations were television commercials. Commercials suggested that drinking a certain beverage or using a particular hair shampoo will make us popular and win the admiration of attractive people. In the study patients can take their medication freely if they have observed advertisements of people regaining their health having taken ARVs. Depending upon the component processes involved (such as attention or motivation), we may model the behavior shown in the commercials and buy the product being advertised. In this study patients can be given scenarios on how other persons have recovered after taking ARVs on documentaries or case studies.

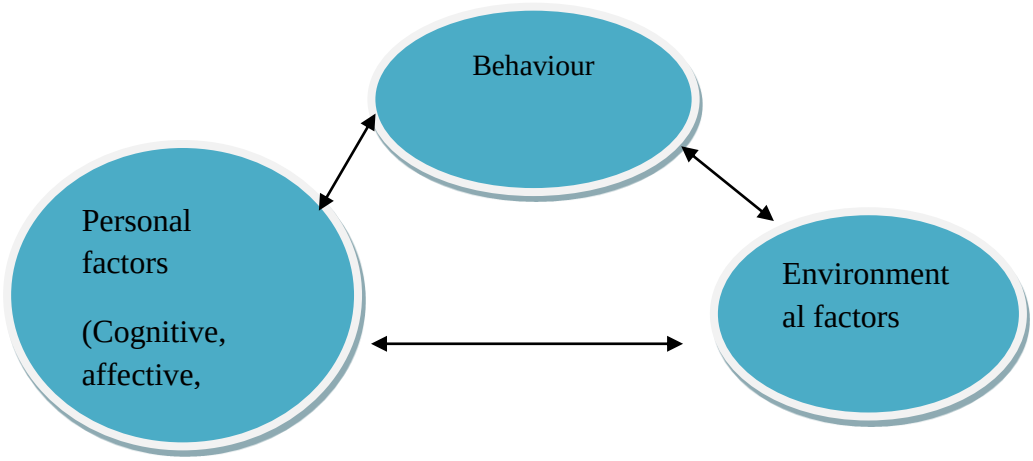
#### 1.4.2.1 **Principles**

1. The highest level of observational learning is achieved by first organizing and rehearsing the modeled behavior symbolically and then enacting it overtly.
2. Coding modeled behavior into words, labels or images results in better retention than simply observing.
3. Individuals are more likely to adopt a modeled behavior if it results in outcomes they value.
4. Individuals are more likely to adopt a modeled behavior if the model is similar to the observer and has admired status and the behavior has functional value.

The social cognitive theory is useful in that it directs how people behave when they have observed that which they feel will help change their life style. For example, if the HIV drugs have been observed to provide a prolonged life to some individuals who had taken the treatment, then even those other people that are put on treatment will be very much ready and willing to take the treatment themselves.

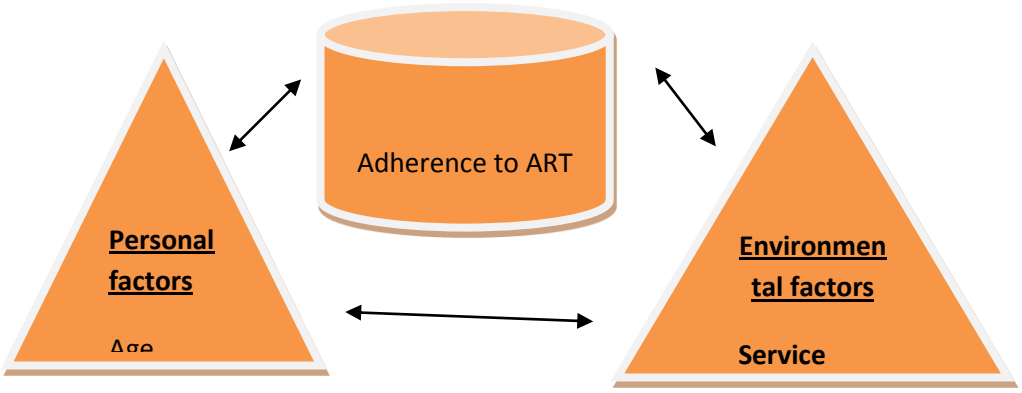
### 1.4.2.2 Figurative presentation of Social Cognitive Theory to study

**FIGURE 1: Social Cognitive Theory Theoretical framework**




Source: Pajares (2002)

**FIGURE 2: Modified Social Cognitive Theory as applied to this study**




Source: Himaubi's Modified Social cognitive theory adapted from Pajeres (2002)

## 1.5 Research Question

The research question which guided this study was: What are the factors that motivate clients who are HIV positive to adhere to ART in Ndola District?

## 1.6 Research Objectives

### 1.6.1 General objective

The general objective of this study was to determine motivating factors to ART adherence among clients in Ndola district who were enrolled onto the Highly Active Antiretroviral Therapy (HAART) dispensing point.

### 1.6.2. Specific objectives were:

1.6.2.1. To ascertain adherences levels to ART among HIV positive clients in Ndola district.

1.6.2.2. To establish factors motivating HIV positive clients to adhere to ART in Ndola district.

## 1.7 Hypotheses

### 1.7.1 Null Hypothesis ($H_0$)

The null hypothesis for the study was: There is no association between ART adherence among HIV positive patients and the following factors:

1. Knowledge
2. Age
3. Educational level

4. Employment status
5. Cultural beliefs
6. Social support

## 1.8. Conceptual Definition of Terms

The following were the conceptual definitions in the current study:

Adherence to ART: Refers to the extent to which a patient takes a medication in the way intended by a health care provider, Soanes and Stevenson, (2006).

Beliefs: an acceptance that something exists or is true especially one without proof, a firmly held opinion or conviction or worth (Soanes and Stevenson, (2006).

Antiretroviral Therapy: is a therapy composed of multiple anti-HIV drugs.

The therapy usually includes combinations of one or two nucleoside analogs, nucleoside reverse transcriptase inhibitor (NRTI), and a Protease Inhibitor (PI) or a non-nucleoside reverse transcriptase inhibitor (NNRTI). The goals of ART are to attain maximal and durable suppression of HIV viral load; restore and preserve immunologic function (improved CD4 lymphocyte count); improve quality of life, and reduce HIV-related Opportunistic Infections (OI), morbidity, and mortality (WHO, 2000).

Highly Active Antiretroviral Therapy: is used to describe a combination of three or more Anti HIV drugs (WHO, 2000).

Knowledge: having specific information on the subject (Soanes and Stevenson, (2006).

Stigma: being disgraceful (Soanes and Stevenson, (2006).

Non-adherence: is defined as a patient reporting of omitting at least one dose of drugs on 4 or more days in the last 3 months (90 days). Study participants missing 4 days of therapy over the prior 90 days were considered to have taken 95% of prescribed medications. Antiretroviral drugs are prescribed according to the Zambian National Guidelines for the treatment of Adults with AIDS/HIV infection (WHO, 2000).

**Operational definitions**

The operational definitions were:

Adherence to treatment was defined as: 1. the extent to which an HIV positive client takes prescribed medications by a health care provider. 2. Patients who reported an intake of ≥ 95% of the prescribed medication were considered adherent, those with a reported intake of < 95% were classified as non-adherent.

Knowledge: referred to the information the HIV positive clients had on adherence to ARVs.

## 1.9 Study Variables

The study variables included the following:

### 1.9.1 Dependent variable

The dependent variable for this study was ART adherence.

### 1.9.2 Independent variable

The independent variables were educational level, knowledge, age of the respondent, employment status, cultural beliefs and social support.

## 1.10 Table of Variables, Indicators and Cutoff Points

**Table 2: Variable, indicator, cut off points and questions**

| Variables | Indicators | Cut Off Points | Questions used |
|---|---|---|---|
| **Dependent**<br><br>ART adherence | Optimal | Taking more than 95% of prescribed pills in the past three days | Q15 |
| | Suboptimal | Taking less than 95% of prescribed pills in the past three days | |
| **Independent** | | | |
| Age | Adult | Respondent who is 18 years and above | Q2 |
| | Child | Respondent who is | Q2 |

| | | | |
|---|---|---|---|
| | | below 18 year s | |
| Educational level | High | Tertiary | Q4 |
| | Medium | Secondary | Q4 |
| | Low | Primary | Q4 |
| | None | Never been to school | Q4 |
| Knowledge | High | Scores of 8-10 on knowledge questions | Q 16 - 21 |
| | Medium | Scores of 5-7 on knowledge questions | Q16 - 21 |
| | Low | Scores of 1-4 on knowledge questions | Q 16-21 |
| Employment status | Employed | Not able to find time to take medication | Q6, 7 |
| | Unemployed | Able to have time to take medication | Q6, 7 |
| Cultural Beliefs | Good | Allows for taking | Q5 |
| | Bad | Discourages taking medication | Q5 |
| Social support | Family member available | Able to remind one to take medication at home | Q9-11, 22-25 |
| | Not available | Not able to remind one to take medication at home | Q 9-11, 22-25 |

# CHAPTER TWO

## 2.0 Literature Review

### 2.1 Introduction

The focus of this chapter is on all literature regarding/ related to motivating factors of adherence to HIV treatment in HIV positive individuals. Many studies have been conducted on the topic and evidence shows that non adherence to antiretroviral treatment (ART) is a worldwide problem that affects many countries (Matchtinger and Bangaberg 2006; Mills et al., 2005; Ross et al., 2011; and Sasaki et al. (2012)). The sources of literature consulted included Pub med, Google, Google Scholar, Peered reviewed Journal articles, Health facilities Registers, Ministry of Health policy documents and Dissertations. The literature review was organized according to the following variables; Adherence to ART, predictors of adherence and conclusion.

### 2.2 Adherence to ART

There are several studies on the rate of adherence to ART that have been conducted. In the United States of America (USA), California, Golin et al., (2002) assessed predictors of long-term (up to 1 year) adherence to newly initiated combination of ART using an accurate, objective adherence measure. This was a prospective cohort study of 140 HIV-infected patients at a county hospital HIV clinic during the year following initiation of a new highly active ART regimen. Adherence was measured every 4 weeks by computing a composite score from electronic medication bottle caps, pill count and self-reports. The study evaluated patient demographic, biomedical, and psychosocial characteristics, features of the regimen, and relationship with one's HIV provider as predictors of adherence over 48 weeks. On average, subjects took 71% of prescribed doses with over 95% of patients achieving suboptimal (<95%) adherence. In multivariate analyses, African-American ethnicity, lower income and education, alcohol use, higher dose frequency, and fewer adherence aids (e.g., pillboxes, timers) were independently associated with worse adherence. After adjusting the demographic and clinical factors, those actively using drugs took 59% of doses versus 72% for non-users, and those drinking alcohol took 66% of doses versus 74% for nondrinkers. Patients with more ART doses per day adhered less well, Golin et al., (2002). Participants using no adherence aids took 68% of doses

versus 76% for those in the upper quartile of number of adherence aids used. The study concluded nearly all patients' adherence levels were suboptimal, demonstrating the critical need for programs to assist patients with medication taking.

Matchtinger and Bangaberg (2006) reported that studies of different groups of HIV-positive individuals in the USA generally show similar, suboptimal rates of adherence. Adherence measurements can be grouped into measures based on a patient's self-report of pill-taking behavior and measures that are objective surrogates of pill-taking behavior, such as pill count or Micro electro mechanical systems (MEMS) caps. While it is difficult to compare studies using different measures of adherence, mean adherence was suboptimal in the following disparate groups of HIV-positive individuals: in a large multicenter clinical trial (85% adherence by self-report), among patients from a veterans and university hospital (75% by MEMS), among the marginally housed (89% by self-report, 73% by pill count, 67% by MEMS), among those with serious mental illness (66% by MEMS), among predominately minority women (64% by MEMS),and among 2 different groups of inner-city residents with a history of injection drug use (80% by pill count, 53.5% by MEMS in one group, and 78% by self-report, 53% by MEMS in the other group.

A study was conducted in Canada by Hoggs et al. (2002) to characterize the impact of intermittent use of triple drug ART on survival. The study population comprised of 1282 ART naive HIV-positive individuals aged 18 years and older in British Columbia who started triple-combination therapy between August 1996 and December 1999. Therapy use was estimated by dividing the number of months of medications dispensed by the number of months of follow-up. Intermittent therapy was defined as the participant having obtained less than 75% of their medication in the first 12 months. The findings showed that 106 study participants died. Cumulative mortality was 3.9% (+/- 0.5%) at 12 months. In a multivariate model, after controlling for other variables that were significant in the univariate analyses each 100 cell decrement in baseline CD4 cell count and the intermittent use of ART drugs were associated with increased mortality with risk ratios of 1.31. In order to control for downward drift, intermittent use of therapy was measured over the first year whereas other factors were measured at the end of year 1. After adjusting for all other factors, those participants who used ART drugs intermittently were 2.97 times more likely to

die. This study demonstrates that even after adjusting for other prognostic factors intermittent use of antiretroviral therapy was associated with increased mortality.

In Latin America, a cross-sectional study was conducted on HIV-infected adults being treated with ART drugs at a reference service in Southern Brazil. Participants answered a sociodemographic questionnaire and were tested by scales assessing socio-cognitive variables. Adherence to treatment was assessed by a self-report inventory developed for the study. Clinical information was obtained from the patients' records. Significance tests were conducted using univariate logistic regressions followed by multivariate logistic regression analysis. A total of 195 patients participated in the study and 56.9% of them reported > or = 95% adherence on the previous two days. In univariate analysis, the odds of adherence increased with self-efficacy (a person's conviction that he/she can successfully execute the behavior required to produce a certain desired outcome) in taking medications as prescribed and decreased with perception of negative affect and physical concerns. The odds were lower for taking ART medications >4 times a day and higher for patients with 8 years of schooling. In the multivariate analysis, self-efficacy and taking medication >4 times a day were independently associated with adherence. Self-efficacy was the most important predictor of adherence, followed by number of times ART medication was taken per day. Among socio-demographic and clinical variables, only the number of years of schooling was associated with adherence. The study concluded that motivational interventions based on self-efficacy may be useful for increasing treatment adherence.

Europe demonstrated similar rates of suboptimal adherence, For example, Murri et al (2002) in Italy carried out a study to compare self-reported nonadherence with ART with pre-dose plasma levels of Protease Inhibitors (PI). This was a cross-sectional study of consecutive patients from a university-based HIV clinic in Rome, Italy, was conducted. One hundred and forty HIV-infected patients were prescribed regimens containing ritonavir or indinavir. A patient questionnaire assessing knowledge of treatment regimen, adherence behavior, reasons for taking and missing therapy, factors influencing adherence, and health behaviors was administered. A pre-dose PI plasma level was measured concurrently. The study showed that 12% missed at least one dose "yesterday," and 24% missed doses in the last 3 days; 14% had a pre-dose

plasma concentration below the assay limit of quantitation (2 ritonavir and 18 indinavir samples). Confusion, poor psychological well-being, long office wait, running out of drugs between visits, having relatives to remind the patient to take medication, children, and alteration of sense of taste were related to unquantifiable pre-dose levels of PI. In multivariable analysis, reported nonadherence and confusion were related to unquantifiable pre-dose levels of PI. The study concluded that self-report of missing a dose of ARV medication "yesterday" was related to an unmeasurable plasma PI level.

A cross-sectional mixed-methods study surveying 330 ART-prescribed patients and 34 in-depth interviews with three different types of stakeholders: patients, care providers, and key people at policy level was conducted in Nepal by Wasti et al. (2012). Adherence was assessed through survey self-reporting and interviews. A multivariate logistic regression Model was used to identify factors associated with adherence, supplemented with a thematic analysis of the interview transcripts.

A total of 282 (85.5%) respondents reported complete adherence, i.e. no missed doses in the four-weeks prior to interview. Major factors influencing adherence were: non-disclosure of HIV status; alcohol use, being female, being illiterate, side-effects, ART started ≤24 months and travel time to hospital >1 hour. Similarly, lack of knowledge and negative perception towards ART medications also significantly affected non-adherence. Transport costs (for repeat prescription), followed by pills running out, not wanting others to notice, side-effects, and being busy were the most common reasons for non-adherence. The interviews also revealed religious or ritual obstacles, stigma and discrimination, ART-associated costs, transport problems, lack of support, and side-effects as contributing to non-adherence.

A program in rural Uganda led by the USA, C.D.C. and The AIDS Support Organization (TASO) has had initial success in the multidisciplinary treatment of hundreds of HIV-infected individuals, largely in their own homes (Cohen et al, 2011) This Home-Based AIDS Care Project (HBAC), includes a weekly home visit by a medical field officer and a basic package of medical services for affected individuals' families. At the weekly visits, the field officer delivers ARVs, performs a pill count, provides adherence support, administers a questionnaire to assess drug failure or toxicity, and collects necessary specimens and measurements. In addition, adherence

is supported by a volunteer "medicine companion" and support groups. The program also studies the degree of laboratory services necessary for the safe and effective treatment of HIV by randomizing each participant to 1 of 3 groups, each with a varying degree of laboratory services. To date, the program has initiated ART in 816 individuals and has described, anecdotally, a dramatic improvement in the health of the participants and a significant reduction in AIDS-related deaths in the rural community in which they live.

A prospective observational cohort study of 171 primarily ART-naive, HIV-positive individuals in Senegal also demonstrated successful treatment with ART, with high rates of adherence and viral suppression and low rates of resistance mutations (Cohen et al, 2011). Patients were followed for a median of 30 months. After two and three years of treatment, respectively, the median increases in the CD4 count were 193 cells/µL (interquartile range [IQR]: 99-289 cells/µL) and 225 cells/µL (IQR: 157-465 cells/µL), the median decreases in viral load were -2.6 $\log_{10}$ copies/mL (IQR: -1.6 to -3.6 $\log_{10}$ copies/mL) and -2.2 $\log_{10}$ copies/mL (IQR: -0.6 to -3.2 $\log_{10}$ copies/mL), and suppression of detectable viral load was achieved in 65.8% and 61.8% of patients. The emergence of drug resistance in those with detectable viremia was relatively infrequent (12.5%). At least 95% adherence was claimed in 1,323 (86.4%) of the 1,532 patient visits in which adherence was recorded. This level of adherence was reported by 79.8% and 88.1% of patients at years two and three, respectively.

World Health Organization (WHO, 2006) conducted a study on adherence among HIV positive adults which revealed high levels of adherence to ART, based on the average percentage of drugs taken at the right time. The estimates are highest for the two day recall method, suggesting a relatively high desirability bias. For Botswana, the visual analogue and pill count methods produced a remarkably similar average level of adherence. For Tanzania, adherence levels measured by visual analogue method show lower levels of adherence than by pill counts. In Uganda, two day recalls was used. No sub optimally adherent events were reported, suggesting either optimal adherence or a high level of desirability bias.

In Zambia, a study conducted in Chikankata by Katongo (2009) on adherence to ART by HIV positive clients revealed an adherence rate of 82%. The study results also

revealed that the reasons for missing doses by respondents included being busy with other activities (31%), running out of drugs due to missing review dates (14%), and stigma (12%). In addition the number of times one received information, education and communication on ART adherence had positive influence on adherence. The more information was given in form of education, the more adherent the client becomes. Socio-economic factors such as employment, income and level of education did not affect adherence.

Birbeck et al (2009) conducted a retrospective chart review of (ART) clinic patients treated during the first 12 months after clinics opened in rural Zambia (Chikankata, Monze, Nakambala), and assessed adherence based on clinic attendance, patient report, and staff assessment. They identified 255 eligible patients (mean age, 39.7 years; 44.3% male; 56.5% married; and 45.5% with only primary school education). Twenty percent had partners known to be HIV positive. Twenty percent were widowed. Thirty-seven percent had disclosed their HIV status to their spouse. Disclosure was less likely among women (27.5% versus 49.6%; 36.5% had "clinic buddies" to provide adherence support. Adherence rates were good for 59.2%. Disclosure of HIV status to ones' spouse, knowing spouses' HIV status, and having a clinic buddy were associated with good adherence. Social support is a key patient-level resource impacting ART adherence in rural Zambia. Limited spousal disclosure affects women more than men. Clinic buddies are associated with better adherence.

Sasaki et al. (2012) conducted a study whose aim was to identify the predictive factors associated with ART adherence during the early months of treatment in rural Zambia. This was a field based observational longitudinal study in Mumbwa district, which is located 150 km west of Lusaka, the capital of Zambia. Treatment naive patients aged over 15 years, who initiated treatment during September-November 2010, were enrolled. Patients were interviewed at the initiation and six weeks later. The treatment adherence was measured according to self-reporting by the patients. Multiple logistic regression analysis was performed to identify the predictive factors associated with the adherence.

Of 157 patients, 59.9% were fully adherent to the treatment six weeks after starting ART. According to the multivariable analysis, full adherence was associated with being female, having a spouse who were also on ART and experience of food

insufficiency in the previous 30 days. Some of the most common reasons for missed doses were long distance to health facilities (n = 21, 53.8%), food insufficiency (n = 20, 51.3%), and being busy with other activities such as work (n = 15, 38.5%).

Okawa et al. (2015) conducted a study in Chongwe .This study aimed to examine adherence to ARVs and identify the associated risk factors. A prospective cohort study was conducted in the Chongwe district from June 2011 to January 2014. Self-reported adherence to ARVs was examined during pregnancy and at one week, six weeks, and 24 weeks postpartum among 321 HIV-positive women. The probability of remaining adherent to ARVs was estimated using the Kaplan-Meier method, and the risk factors for non-adherence were identified using the Cox proportional hazard regressions—treating loss to follow-up as non-adherence. The statuses of HIV in HIV-exposed infants were assessed in January 2014.

During the study period, 326 infants were born to HIV-positive women, 262 (80.4 %) underwent HIV testing, and 11 (3.4 %) had their HIV infection detected at the time that they had the latest HIV testing as of January 2014. The ARV adherence rate was 82.5 % during pregnancy, 84.2 % at one week postpartum, 81.5 % at six weeks postpartum, and 70.5 % at 24 weeks postpartum. The probability of remaining adherent to ARVs was 0.61 at day 50, 0.35 at day 100, 0.18 at day 200, and 0.06 at day 300. Attending a referral health centre (HC) was a risk factor for non-adherence compared with attending rural HCs that provided HIV care/treatment and those that did not provide HIV care/treatment. A new diagnosis of HIV infection compared to a known HIV-positive status before pregnancy was another risk factor for non-adherence. Maintaining adherence to ARVs through pregnancy to the postpartum period remains a crucial challenge in Zambia. To maximize the treatment benefits, adherence to ARVs and retention in care should be improved at all health facilities. From the mentioned reviewed studies, it can be concluded that most patients on ART, regardless of their background or life situation, encounter difficulties with adherence.

## 2.3 **Predictors of Adherence**

### 2.3.1 **Stigma and discrimination**

Stigma, on top of the general knowledge of the population about HIV/AIDS and ART treatment, is an important determinant of adherence in the settings of sub-Saharan countries according to studies conducted recently (Biadgilign, 2011; Nash et al., 2011). Social or family stigmatization and fear of the consequences of revealing HIV infection status to sexual partners are closely related to poor adherence [Biadgilign, 2011]. Family plays a crucial role in any kind of treatment in children or adults (Skovdal, et al. 2011). Major issues related to family or caregiver that influence adherence include presence of anxiety; depression active substance abuse (Nash et al., 2011); the presence of HIV infection in another family member; fear of disclosure of HIV positivity to the family; family disruptions; belonging to racial minorities or other vulnerable groups of the population.

Family and community members can both play a positive and negative role in ART treatment initiation and adherence (Steele and Grauer, 2003). For instance, the stigma associated with HIV infection or AIDS may be more severe than that of other illnesses, creating barriers to treatment initiation and support for adherence that might otherwise be available (Kip et al., 2009). On the positive side, family members and friends can play the role of treatment partners and provide much needed support (Sasaki, 2012).

Patients need to be encouraged by health care workers to disclose their status. However, studies of interventions to facilitate disclosure are lacking. Social institutions like the church, non-governmental organizations (NGOs), and food aid services play a crucial role in issues ranging from creating awareness about the illness, mobilizing support, facilitating treatment, and promoting adherence (Cantrell et al., 2008). For instance, in an evaluation program about the impact of family nutritional support during the first year of ARV treatment in the west African region, family nutritional support for persons living with HIV initiating ARV treatment showed a positive impact after six months (Serrano et al., 2010).

In a qualitative study conducted in Nigeria, Lagos on perception of societal stigma and distribution towards PLWHA it was revealed that three quarter of the participants had become miserable following episodes of stigma and discrimination against their personality in public, family, health care settings and the work-place Additionally, some had feelings of guilt and depression towards these actions. About three quarter of the participants had coped with the situation by living a low-keyed lifestyle, dissociating themselves from the public and avoiding seeking care in HIV care centers. Many participants were not willing to come out publicly to discuss their positive HIV status for fear of discrimination (Sociomed. 2014). The study concluded that perception of PLWHAs on how the public feels about them could influence their willingness to seek medical care, interaction with the society and their coping strategies hence adherence was a problem.

### 2.3.2 **Knowledge**

Knowledge on adherence to ART could motivate an individual not to default on treatment. Some studies conducted in India, Swaziland, Thailand and Zambia indicate that poor knowledge about the length of treatment predicts default behavior (Atre et al., 2004). Most defaulting patients interrupt treatment soon after they feel better and/or around two months after initiating chemotherapy. For example, findings from India suggest that patients' misconception of well-being with cure leads to default. Also, patients who did not know about potential side effects of medicines were more likely to default (Atre et al., 2004). The Indian study showed that key differences among compliers and non-compliers included motivation, perceived severity of disease, and self-efficacy. Those who are more motivated have a higher perception of risk, and feel more confident about their ability to complete treatment are less likely to default. Similar findings were found in a study in Thailand where compliance was more likely among patients with good knowledge, who perceive their illness to be more serious, and believe that treatment will alleviate the condition (Maneesriwongul et al., 2006).

### 2.3.3 **Age**

A study done in Kenya, Namibia and Tanzania, by Matlin and Spence, (2001) assessed on adherence to medication among respondents aged 18-50 years. The

results show that the middle-age did not adhere either as a result of workload and other activities requiring them to fulfill personal and family needs. This age group is the most active and likely to forget their medication as they tend to be busy.

### 2.3.4 **Substance- abuse-related challenges**

Drug abuse and alcohol consumption are factors that further threaten proper adherences to ART. Studies have consistently shown that active alcohol use and substance abuse makes it more difficult for patients to adhere to treatment (Weiser, Leiter, Heisler, et al., 2006; Chander, Lau, Moore, 2006). For instance, in Botswana nearly 40% of the patients surveyed admitted missing a dose because of alcohol consumption (Steele and Grauer, 2003). Similar studies also indicate that alcohol is highly related to reducing adherence (Gill et al., 2005) A systematic review in 2009 found that HIV and AIDS patients that used alcohol are 50–60% more likely to adhere less to their prescribed medications (Hendershot et al., 2009).

### 2.3.5**. Socioeconomic Challenges**

The patterns of infection have been shown to vary globally depending on the social and economic conditions of the country affected, with poverty having a significant role as a social determinant of HIV and AIDS and the spread of the virus as well as access and adherence to ART treatment (Skovdal, 2011). Common reasons reported for missed doses include financial trouble (Chesney, 2000) that prevent caregivers of children or adult patients from collecting medication on time (Skovdal et al, 2011), distance barrier or lack of transportation facilities to the ART clinic (Nash, 2011), vomiting of medication without re-dosing, incorrect dosing by a caregiver, missed clinic appointments and pharmacy collections, confusion between multiple caregivers, and self-discontinuation or refusal by children (Kalichman et al., 2009). Furthermore, patients' beliefs that medications need to be taken with food leads them to avoid taking medications whenever food is unavailable, interfering with adherence (Skovdal et al, 2011; Nachega et al., 2006). Sometimes patients are forced to choose between paying for transportation to the ART facility and using the money for food (Skovdal et al, 2011). Studies in Uganda and Tanzania reported that transportation costs are considered serious obstacles to taking ART (Mshana et al., 2006; Tuller et al., 2010). This has implications not only for day-to-day adherence but also losses to follow up

(Orrell et al., 2005). Determinants of ART adherence for HIV-infected persons in sub-Saharan Africa were examined with ethnographic research methods at HIV treatment sites in Jos, Nigeria, Dar es Salaam, Tanzania, and Mbarara in Uganda. The findings indicated that individuals taking ART routinely overcome economic obstacles to ART adherence such as borrowing and "begging" transport funds, making "impossible choices" to allocate resources in favour of treatment, and "doing without". (Ware et al., 2009).

### 2.3.6 **Cultural Beliefs**

Culture puts women in submissive role and consequently reduces their negotiating power. However, a qualitative study conducted in South Africa by Aspelling (2006) on factors associated with adherence to ART for the treatment of HIV infected women attending an urban private health care facility showed that traditional beliefs did not interfere with adherence, but in the presence of inadequate knowledge regarding HIV patients may revert thereto.

### 2.3.7 **Service related factors**

Structural factors not directly related to patient or medications can also influence adherence. Some researchers have even contended that these could be the most important barriers to ART adherence in resource limited settings (Nachega, 2010). Limited availability and accessibility of ARV medications and healthcare facilities for diagnosis and treatment of HIV/AIDs, out-of-pocket payments, high cost of ART and other health services, presence of healthcare providers experienced in ART provision, patient-nurse and other provider relationships, health care providers' beliefs, waiting time and opening hours (Biadgilign,2010; Skovdal, 2011) availability of counselling services, and social, economic, or psychological support for people living in both developing as well as developed countries can influence adherence positively or negatively (Nachega, 2010). Ensuring the privacy of ART clinics and waiting areas need to be given special emphasis as authors of this paper and others documented (Biadgilign et al., 2010; Skovdal, 2011). For instance, Skovdal and colleagues reported about patients who refused to leave consultation rooms citing to nurses "Mr. so and so is outside" (Skovdal et al., 2011).

Adherence support and clinic policies are also important predictors of adherence (Nash et al., 2011) as well as lack of adherence monitoring mechanisms (Landovitz et al., 2011). A recent study from South Africa indicates that improving adherence is cost effective and helps to reduce health care costs especially those of hospital care (Ross et al., 2010).

### 2.3.8 **Patient related factors**

Other studies on facilitators or motivators of adherence to ART mentioned that social support (Kumarasamy et al., 2005; Starks et al., 2008; Akhila et al., 2010; Ruanjahn et al., 2010), predominantly from partners, children and friends, played a significant role in increasing adherence. Three studies reported that self-efficacy (Kumarasamy *et al.* 2005; Starks et al., 2008; Akhila et al., 2010) and willingness to live longer (Kumarasamy et al., 2005; Starks et al., 2008; Ruanjahn et al., 2010) positively influenced adherence. Two studies noted that improved overall health (Kumarasamy et al., 2005; Starks et al., 2008), financial assistance (Kumarasamy et al., 2005; Ruanjahn et al., 2010) and being in higher income groups (Li et al., 2010; Ruanjahn et al., 2010) resulted in better adherence. Electronic reminders (Starks et al., 2008), obligation to live for family (Starks et al., 2008), good relationship with care providers (Starks et al., 2008), status disclosure (Spire et al., 2008) and worries regarding a fear of drug resistance (Starks et al., 2008) were other motivating factors.

Wasti et al (2012) conducted a systematic review of the literature of factors affecting adherence to ART in Asian developing countries. The study concluded that adherence to ART varies between individuals and over time. There is need to redress impeding factors while promoting factors that reinforce adherence through financial support, better accessible points for medicine refills, consulting doctors for help with side effects, social support and trusting relationships with care providers (Wasti et al 2012)

Lake et al (2003) found that connectedness with health care providers, particularly female providers, nurses, and nurse practitioners, experienced in HIV/AIDS care was important for women and led to reports of better care. Although children can be motivators to remain healthy, they can also be a source of anxiety about the future in case of death.

Sankar, Luborsky, Schuman, and Roberts (2002), conducted a study on adherence discourse among African-American women taking ART. They used in-depth interviews to identify sources of influence used by 15 African-American women to describe their adherence behavior. The women, who attended an inner-city infectious disease clinic, were asked to provide information on self-reported adherence and sources of authority or reference groups in adherence practice. The results showed that sources of influence that encouraged adherence included physician, quasi-scientific rationale, belief that the drugs work, religiosity and faith (support from God), family members (mom), secular popular cultural prescription (they say) television talk shows, the body instinct (my body tells me when I need it), friends, and self (I know when I need it), the belief in the power of positive thinking and individual responsibility. The results also showed adherence rate of 69%.

Loggerenberg et al (2015), conducted a qualitative sub-study comprising 30 individual interviews and four focus group discussions (FDG) with patients in the first 9 months of ART initiation. Data were inductively analysed, using thematic analysis, to identify themes central to ART adherence in this context. Four themes emerged that characterize the participants' experiences and high motivation to adhere to ART. Participants in this study were highly motivated to adhere, as they acknowledged that ART was 'life-giving', in the face of a large amount of morbidity and mortality. They were further supported by techniques of routine remembering, and highlighted the importance of good social support and access to supportive healthcare workers, to their continued success in negotiating their treatment. Participants informed research that their motivation to adherence is enhanced by free accessible care, approachable and supportive healthcare workers, broad social acceptance of ART, and past first-hand experiences with AIDS-related co-morbidity and mortality. Programs that include specific attention to these aspects of care are likely be successful in the long term.

Ross et al. (2011) carried out a study exploring patients' and their caregivers' perceptions of factors which may positively influence adherence to ART. This study was a descriptive, qualitative study that used both free attitude interviews and FGDs. Nineteen patients attending a busy ART-clinic at a district hospital in KwaZulu-Natal and eight caregivers were purposefully selected. Selection criteria included good

adherence to ARTs as evidenced by excellent clinic attendance for more than one year with evidence of clinical, immunological and viral improvement. Interviews were tape recorded, transcribed and thematically analysed.

Ten female participants, nine male participants and eight caregivers took part in the study. Participants highlighted three main categories that positively affect their adherence to ART namely: patient, disease and health care provider-related factors. Sub-themes included issues related to acceptance, disclosure to significant others, symptomatic improvement on ARTs and the importance of supportive relationships. Participants greatly valued the health care provider relationship and felt that the main role of the health care provider was to educate and support. This study has shown that the factors which most influenced adherence were patient-related (acceptance, disclosure, determination, and family support), disease-related and treatment-related (symptomatic illness and improvement on ARTs), and healthcare Worker-related (relationships, and adherence classes).

Disclosure of HIV status is an essential part of behaviour modification and access and adherence to treatment in people infected with HIV. Findings from a quantitative study conducted by Birberk et al. (2012) among people attending ART clinics in rural Zambia revealed that disclosure of one's status associated with better adherence among those who access ART care. The study also showed that patients were more likely to disclose their HIV status to family and friends than to their partner. This was especially true for women an all patients who reported spousal disclosures had also informed family or friends. Other factors associated with adherence were knowing spouses' HIV status, and having a clinic buddy.

Norman et al. (2007) conducted interviews in two South African communities of similar ethnic mix but with very different rates of disclosure of HIV status and found that disclosure was the catalyst for access to a variety of important and often essential resources. In a community with high rates of disclosure of HIV infection, disclosure led to greater access to formal institutional support and opportunities to take positive leadership roles in the community. The findings highlight the prominence of wider socio-political contexts for disclosure decision making and the need for HIV interventions to increase levels of disclosure of HIV infection. A number of factors have been associated with nonadherence to ART. Understanding these factors can

increase a clinician's attention to adherence when working with particularly susceptible patients and can inform the development of interventions to improve adherence.

## 2.4 **Conclusion**

The review of literature has shown that several studies have been conducted on adherence to ART. The studies have shown no relationships among these factors such as: stigma and discrimination, knowledge, socioeconomic challenges, substance abuse, cultural beliefs, age, service related and patient factors. A few studies have been done on the subject of adherence to treatment in Zambia, but not conclusive; however, no study has been conducted on the rate of adherence and motivating factors to ART adherence in Ndola. In chapter three the research methodology is discussed in details.

# CHAPTER THREE

## 3.0 Methodology

### 3.1 Introduction

In this chapter, the research design, research setting, study population, sampling method, sample size, data collecting tool, validity and reliability of the data collection tool and the data collection technique are discussed. The pilot study, ethical consideration and limitations of the study are discussed.

### 3.2 Research Design

A cross sectional study design was used to examine the motivating factors to ART adherence in Ndola district. This design was chosen because it explains the relationship between variables at a particular point in time. It is less expensive and uses both qualitative and quantitative techniques in data analysis which was helpful in this study. The study was the first of its kind in Zambia as shown by the literature review showing no records identified regarding the motivating factors to ART adherence to the patients with HIV and AIDS in Zambia and Ndola in particular.

### 3.3 Research Setting

The study was conducted at Ndola central hospital and all health centers in Ndola that provide HAART services. Ndola central hospital is a tertiary hospital with specialized clinics including the ART clinic. The clinics are dotted around the district but within reach, these include: Lubuto, New Masala, Chipokota Mayamba, Railway clinic and Ndola ART clinic. The current total number of client being 13 593.

### 3.4 Study Population

The study population comprised patients on ART aged between 18 and 45 years, who had received HIV treatment from the study sites for a period of six months or more. These are individuals who were sexually active and within the child bearing age. They are able to make their own choice and be able to give consent on their own.

### 3.4.1 **Inclusion criteria**

The inclusion criteria were:

1. A patient diagnosed with HIV infection and those who gave consent to participate in the study
2. All those who had been on ART for at least 6 months
3. Above 18 years of age
4. Patients who have had at least one measure of CD4 count.
5. Patients who have had viral load collected within 2 months of completing the PMAQ

### 3.4.2 **Exclusion criteria**

The exclusion criteria were:

1. Patients on ART not residing in the study area

## 3.5 **Sampling Method**

Convenient sampling was used to select the participant. This was done by random sampling of patients who reported to collect their drugs at the time of the interview.

## 3.6 **Sample Size**

OpenEpi was used to calculate the sample size. The formula that was used is:

$N = \frac{Z^2 \times P(1-P)}{d^2}$, the N is sample required; Z, Z statistic (usually 1.96);

P, expected prevalence and d, acceptable accuracy range (+/- 0.05). The sample size of 150 was arrived at by using a confidence interval of 8 and confidence level of 95% and using the power of 80% and confidence level of 95%, the confidence interval of 6.4 was calculated by using the Creative Research System Survey Software (CRSSS).

## 3.7 Data Collection Tool

A pre-tested semi - structured interview schedule was used to collect data from the study respondents. It included both open and closed ended questions to give the interviewer an opportunity to interact with the respondents as well as accommodating those who may not be able to read and write. The schedule also contained information on demographic variables such as age, marital status, educational level, occupation and knowledge on ART as well as the motivating factors to adherence to ART. Face to face interview using a semi - structured, interview schedule developed by the researcher and some questions were adapted from other researchers such as the Adult AIDS Clinical Trials Group (AACTG) was used.

### 3.7.1 Validity of the tool

To ensure validity the data collection tool was pre-tested through a pilot study to ensure that questions were logical, and easily understood by respondents. Research assistants were trained before they were asked to collect data from the respondents.

### 3.7.2 Reliability of the tool

The instrument were validated to ensure consistency and accuracy using a variety of open ended questions in the interview schedule to allow spontaneous responses which give more valid answers. The pretesting of the data collection tool also provided for consistency in responses by the respondents.

## 3.8 Data Collection Technique

Prior to administration of the questionnaire it was translated from English to Bemba by an independent translator. The participants were met at the ART dispensing points within the district. They were asked if they would be willing to be interviewed before-hand. To ensure confidentiality, all respondents were interviewed in a private room at the ART clinic by the researcher. Each interview took about 30-45 minutes and before the interview, each respondent was put at easy by using an ice breaker and self-introductions. The respondent were thanked for participation at the end of the interview.

## 3.9 Data Processing and Analysis

Coding of questionnaires was done and data analyzed and reported collectively. The information obtained from the patients were analyzed using SPSS version 24.0. Descriptive statistics and inferential statistical tests were applied. Inferential statistics were based on other information rather than on direct observations. This provided for generalization from the data collected regarding the behavior of clients on HAART. It considers the measures of averages, variation measure and relationships that was obtained during the study.

## 3. 10 Pilot Study

A pilot study was done at Kavu clinic in Ndola (center not earmarked for the study) on an average number of 25 persons as respondents. This was to determine the suitability of the instruments to be used during the research study. The results of the pilot helped make changes where the original work would have identified mistake. Hence this helped in avoiding errors or mistakes in the final work.

## 3. 11 Ethical and Legal Consideration

Permission was sought from all levels of authority and confidentiality and anonymity was ensured by the use of numbers as opposed to personal identification. Permission was sought from the University of Zambia Bio-medical Research Ethics Committee, the District Medical Officer and the Senior Medical Superintendent at Ndola central hospital. A consent form was signed before the interview and measures put in place to replace those who would withdraw along the way by providing extra questionnaires. Counselling was done to prevent aspects of getting emotional during the interview process. The data collected was kept in a sealable box for safety.

# CHAPTER FOUR

## 4.0 Data Analysis and Presentation of Findings

### 4.1 Introduction

In this chapter the investigator discusses the analysis and presentation of findings of the study. Data was collected from 150 respondents. Data was collected for a period of 3 weeks from 17/10/2016 to 05/11/ 2016. The study findings were presented using frequency tables, cross tabulation tables and graphs. The frequency tables summarized he results of the study in a way that enables readers to understand the findings of the research study. Cross tabulation of the variables helped to show the relationship between variables and hence the researcher was able to draw meaningful inferences.

### 4.2 Analysis of Data

The raw data was sorted out and then grouped in categories. The data collecting instruments were checked for completeness, consistence illegibility and accuracy daily after data collection after which data was coded. Codes were assigned to each category, entered and analyzed using IBM SSPS for windows statistical software version 24.0.

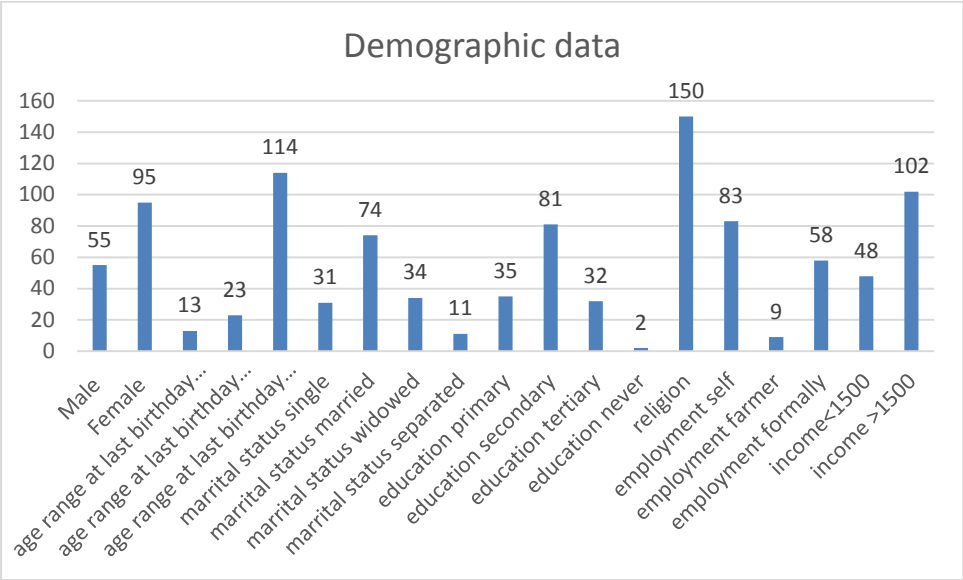
Descriptive statistics and inferential statistics were applied and Chi-square test was used to test associations between the dependent and independent variables. Data was displayed in 2 x 2 tables with 1 degree of freedom. Significant levels were set at 0.05 % with 95% confidence interval. The predicators of adherence were assessed using bivariate logistic regression model.

## 4.3 Presentation of Findings

### 4.3.1 Section A: Demographic data of the respondents

Section A presents the respondents demographic data. The variables presented are gender, age, marital status, level of education, religion, employment and income level. The data is presented in figure 3.

**Figure 3: Demographic data (n=150)**




As indicated in figure 3, 63.3% of the respondents were females and 36.7% were males. Seventy six percent (76%) of the respondents were aged more than 34 years, 15.3 % were aged between 26 to 34 years and 8.7% were aged between 18-25 years. The respondents who were married consisted of 49.3% of the sample, 22.7% were widows, 20.7% were single and 7.3% were separated. Among the respondents who took part in the survey, 54% had attained secondary school education, 23.3% had attained primary education, 21.3% had attained tertiary education and 1.3 % had never been to school. All the respondents who participated in the study were Christians. There were more self-employed respondents (83%) followed by those who were formerly employed (35%) and farmers (9%). The figure also shows the income status of the respondents that 68% earned an income above K1, 500 and those who had an income below K1, 500 were 32%.

### 4.3.2 Section B: Adherence level to art by the respondents

Section B (Table 3) Majority of the respondents (63.3%) adhered to ART, while 36.7 did not.

**Table 3: Respondents adherence level to ART (n=150)**

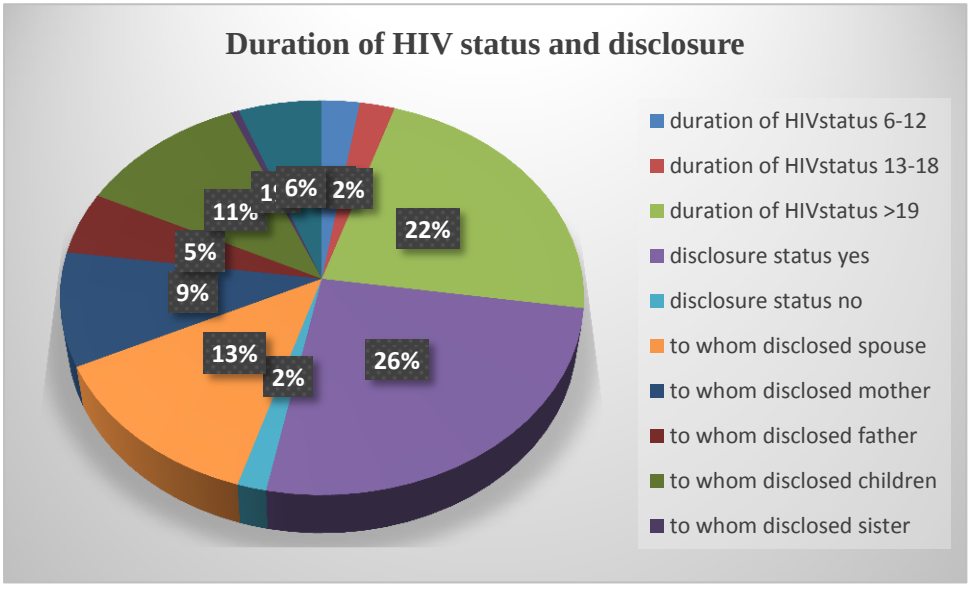
| ART Adherence | Frequency | Percent |
|---|---|---|
| Yes | **95** | **63.3** |
| No | **55** | **36.7** |
| Total | **150** | **100%** |

### 4.3.3 Section C: Predictors to art adherence among the respondents

This section includes variables such as the duration of HIV status, disclosure of HIV status, benefit of taking ARV, importance of adherence, health status, how often were the drugs taken and special instruction, cd4 at initiation and other parameters, who reminds client to take medicines, forgot to take medication, reasons for forgoing to take medication, experiencing side effect and missed appointment, staff welcoming and availability of drugs.

#### 4.3.3.1 Respondents duration of HIV status and disclosure

**Figure 4: Respondents duration of HIV status and disclosure (n=150)**



Most of the respondents 77.7% had lived with the HIV infection for more than 19 years. A large percentage of the respondents (93.6%) were able to tell someone about their status with no problems while 6.4% had problems on who to tell. 48% of the respondents were comfortable to disclose their HIV status to their spouses, 42% told their children and 34% disclosed to their mothers, 28% disclosed their status to their fathers, 2% told their sisters. Most of the respondents' lived with their children (59.3%), 43.3% lived with their spouses or partners, 13.3% lived with their parents and few (4%) live alone.

4.3.3.2 **Respondents responses on the benefits of taking arv and importance of art adherence**

**Table 4: Respondents responses on the benefit of taking (n=150)**

| **Benefit of taking ARV** | Frequency | Percent |
|---|---|---|
| Yes | 24 | 16 |
| No | 126 | 84 |
| Total | 150 | 100.0 |

Table 4. Most respondents (84%) did not know the benefits of taking ARVs.

**Table 5: Respondents responses on the importance of art adherence (n=150)**

| **Importance of ART adherence** | Frequency | Percent |
|---|---|---|
| Yes | 42 | 16 |
| No | 108 | 84 |
| Total | 150 | 100.0 |

Table 5. 84% of the respondents did not know the importance of adherence to ART.

4.3.3.3 **Respondents health status, frequency of taking drugs and special instruction given during treatment**

**Figure 5: Respondents health status, frequency of taking drugs *and special instructions given during treatment (n=150)***

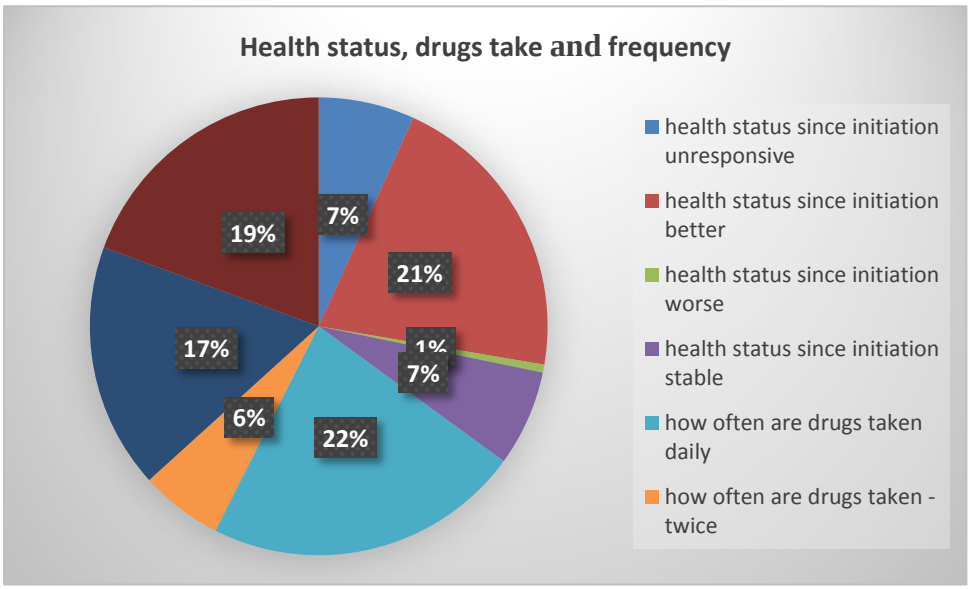



Figure 5. 74% of the respondents stated that they felt better than before the initiation of ART, 24 % of the respondents stated that they were stable and 2% of the respondents said that they were worse off than they were before they started ART. In the present study 81.5% of the respondents received drug treatment daily while 18.5% of the respondents took treatment drugs twice in a day. 61.3% of the respondents were on dietary restrictions, 68. 7% of the respondents were on extra fluid requirements and 33% of the respondents were on both dietary and extra fluids.

4.3.3.4 **Respondents CD4 at the initiation and other parameters**

**Figure 6: Respondents cd4 at the initiation and other parameters (n=150)**

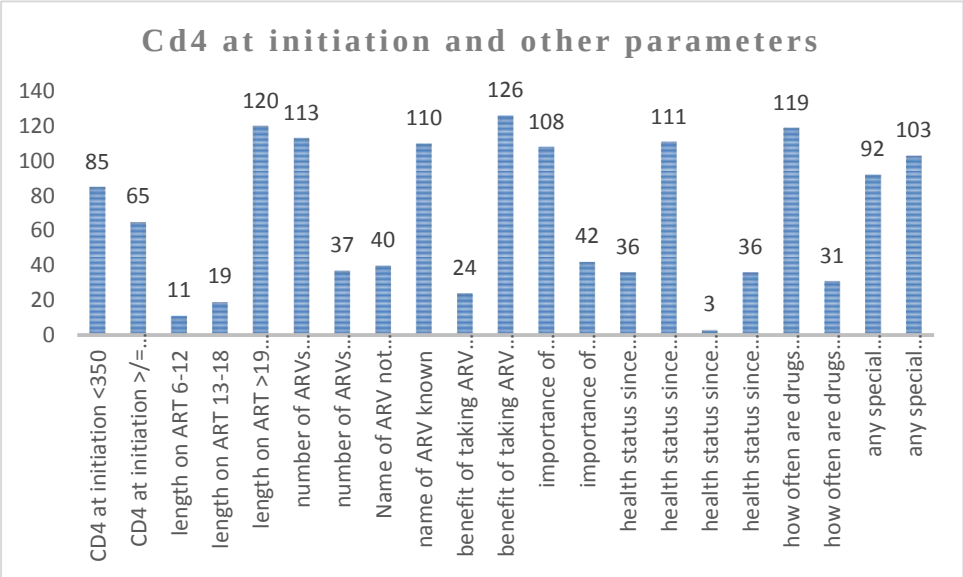



Figure 6. Among the respondents majority (56.7%) initiated treatment when their CD4 count was less than 350/mm3 while 43.3% respondents initiated treatment when their CD4 was > 350/mm3. In this study, most (80%) of the respondents were enrolled in the ART program for more than 19 months), 7.3% were enrolled within 6-12 months period and those enrolled for 13-18 months were at 12.7%. Most (75.3%) respondent were on a one regime treatment and 24.7% of the respondents were taking two drugs. Majority (73.3%) of the respondents new the drugs they were taking while few (26.7%) did not.

4.3.3.5 **Respondents responses on who reminded them to take medicines**

**Figure 7: Respondents responses on who reminded respondents to take medicines**

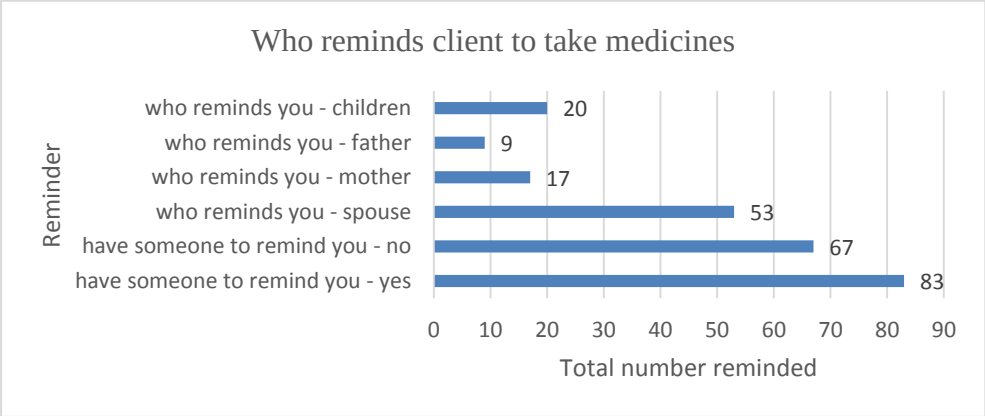



Figure 7. Slightly more than half (55,4%) of the respondents had someone to remind them when to take their medications and 44.6% respondents had none. Of the persons to remind the respondents, 53.3% were reminded by their spouses, 20% were reminded by their children, 17% were reminded by their mothers and 9% were reminded by their fathers.

4.3.3.6 **Respondents who forgot to take medication**

**TABLE 6a: Respondents who forgot to take medication (n=150)**

| **Forgot to take medication** | **Frequency** | **Percent** |
|---|---|---|
| Never | 95 | 63.3 |
| Ever | 55 | 36.7 |
| Total | 150 | 100.0 |

Table 6a. 36.7% of the respondents had forgot to take medications while 63.3% respondents have never forgotten

4.3.3.7 **Reasons for forgetting to take medication by the respondents**

**TABLE 6b: Reasons for forgetting to take medication by the respondents (n=150)**

| **Reason** | **Frequency** | **Percent** |
|---|---|---|
| Drunk | **8** | **5.3** |
| Busy | **14** | **9.3** |

| | | |
|---|---|---|
| Forgot | **30** | **20.0** |
| Hurry | **1** | **.7** |
| Stigma | **4** | **2.6** |
| Did not forget | **93** | **62** |
| Total | **150** | **100** |

Table 6b. 20% of the respondents forgot with no other reason, while 9.3% respondents said were busy and 5.3% respondents were drunk with alcohol. 2.7% of the respondents felt stigmatized, 0.7% respondents were in a hurry and 95% of the respondents did not forget at all.

4.3.3.8 **Respondents on Whether They Experienced Side Effects and Missed Appointment**

**Figure 8: Respondents on whether they experienced side effects and missed appointment (n=150)**

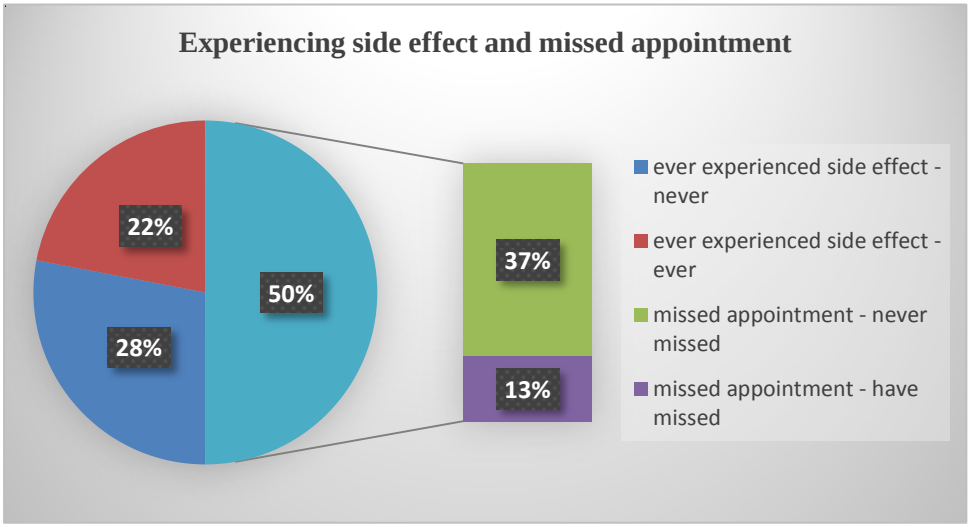



Figure 8. 56% of the respondents had never experienced side effects of ARVs while 44% respondents did. 25.3% of the respondents have ever missed their appointments and 74.7% of the respondents never missed their appointments.

4.3.3.9 **Respondents Responses on Whether Staff Were Welcoming at the ART Centers**

**Table 7: Respondents responses on whether staff were welcoming at the art centers (n=150)**

| **Staff welcoming at the ART centers** | **Frequency** | **Percent** |
|---|---|---|
| Ever | 142 | 94.7 |
| Never | 8 | 5.3 |
| Total | 150 | 100.0 |

Table 7. Most respondents 94.7% felt that the staff at the ART centers were welcoming while few (5.3%) respondents did not feel so.

4.3.3.10 **Respondents Responses on Availability of ARVs at the ART Centers**

**Table 8: Respondents responses on availability of ARVs at the art centers (n=150)**

| **Drug availability at the ART centers** | Frequency | Percent |
|---|---|---|
| Yes | 149 | 99.3 |
| No | 1 | 0.7 |
| Total | 150 | 100.0 |

Table 8. 99.3% of the respondents said drugs were readily available while 0.7% respondents felt not.

## 4.4 Section D: Associations between the Dependent and Independent Variables

Section D present associations between the dependent (ART adherence) and independent variables such as knowledge, Age, Education level, Employment status, cultural beliefs and social support on ART adherence. Adherence measurement in this study was based on patient recall of their compliance of the prescribed doses in the three days prior to the interview. Patients who report an intake of ≥ 95% of the

prescribed medication are considered adherent, those with a reported intake of < 95% are classified as non-adherent.

**Table 9: Association between ART Adherence by the respondents and their Knowledge levels about ART (n=150)**

| | | Knowledge levels on ART | | Total | P Value |
|---|---|---|---|---|---|
| | | Yes | No | | |
| ART Adherence | Yes | 83 (55%) | 25 (16.7%) | 108 (72%) | .118 |
| | No | 27 (18%) | 15 (10%) | 42 (28%) | |
| Total | | 110 (73%) | 40 (26.7%) | 150 (100%) | |

Table 9. Most of the respondents 83 (55%) were knowledgeable about ART were adhering to ART. Chi square test was used to test associations and was not statistically significant with a value of 0.118.

4.4.1 **Association between ART adherence and their age at the last birthday**

**Table 10: Association between ART adherence by the respondents and their age at last the birthday (n =150)**

| Variable | | Age at last birthday | | | Total | P value |
|---|---|---|---|---|---|---|
| | | 18-25 | 26-33 | 34 and above | | |
| ART adherence | Yes | 11 (7%) | 12 (8%) | 87 (58%) | 110 (73%) | .096 |
| | No | 3 (2%) | 10 (6.6%) | 27 (18%) | 40 (26.6%) | |
| Total | | 14 (9%) | 22 (14.6%) | 114 (76%) | 150(100%) | |

Table 10.58% of the respondents were aged 34 and above, 8% of respondents were aged 18-25, 7% respondents were aged 18-25, at a P value of 0.096 using Pearson Chi-Square.

### 4.4.2 **Association between ART adherence by the respondents and their level of education**

**Table 11: Association between ART adherence by the respondents and their level of education (n=150)**

| Variable | | Level of education | | | | | Total | P value |
|---|---|---|---|---|---|---|---|---|
| | | | Primary | Secondary | tertiary | None | | |
| ART adherence | Yes | 0 | 29 (19%) | 51 (34%) | 28 (18.7%) | 2 (1%) | 110 (73%) | 0.016 |
| | Not | 1 (.7%) | 6 (4%) | 29 (19%) | 4 (2.7%) | 0 | | |
| Total | | 1 (.7%) | 35 (23%) | 80 (53%) | 32 (21%) | 2 (1%) | | |

Table 11. 73% of the respondents' adherence to ART was significantly associated with the level of education (P value of 0.016).

### 4.4.3 **Association between ART adherence by the respondents and their employment status**

**Table 12 Association between ART adherence by the respondents and their employment status (n=150)**

| Variable | | Employment status | | | | Total | P value |
|---|---|---|---|---|---|---|---|
| | | Unknown | Self | Farmer | Formally | | |
| ART adherence | Yes | 1 (.6%) | 59 (39%) | 6 (4%) | 44 (29%) | 110 (73%) | .749 |
| | No | 0 | 24 (16%) | 3 (2%) | 13(8.7%) | 40 (27%) | |
| Total | | 1(.6%) | 83 (55%) | 9 (6%) | 57 (38%) | 150 (100%) | |

Table 12. 73% of the respondents adhered to ART, 39% of those who adhered were self-employed while 29% respondents were formally employed and 4% were farmers. Chi square test was used to test the association between ART adherence and employment status and the p value was 0.749. This means that employment status did not have an impact of adherence as this result was not statistically significant.

4.4.4 **Association between ART adherence by the respondents and whom they were living with in the house**

**Table 13: Association between ART adherence and whom living with in the house (n=150)**

| Variable | | Whom living with in the house | | | | | Total | P Value |
|---|---|---|---|---|---|---|---|---|
| | | Parent | Spouse | Child | Relative | None | | |
| ART Adherence | Yes | 14(9%) | 45 (30%) | 38 (25%) | 8 (5%) | 5 (3%) | 110(72.7 %) | .069 |
| | No | 6 (4%) | 18 (12%) | 6 (4%) | 4 (2.7%) | 6 (4%) | 40 (26.7%) | |
| Total | | 20(1%) | 63(42%) | 44 (29%) | 12(7.7%) | 11(7%) | 150(100% ) | |

Table 13. 25% of the respondents were supported by children and 9% by their parents. However, this result was not statistically significant (P values.069). Therefore the null hypothesis was rejected

## 4.5 Summary of Findings

The study findings showed that 76% of the respondents were aged more than 34 years, 63.3% were females, 54% had attained secondary school education and all were Christians. There were more self-employed respondents (83%) followed by those who were formally employed (35%) and farmers consisted of 9% of the study sample. Data shows that 68% of the respondents' earned an income above K1, 500 and 32% had an income below K1, 500.

The findings showed that most of the respondents have lived with the HIV infection for more than 19 years (77.7%). A large percentage of the respondents (93.6%) were able to disclose their status with no problems while 6.4% had problems on who to tell. Most of the respondents' lived with their children (59.3%), 43.3% lived with their spouses or partners, 13.3% lived with their parents and 4% lived alone. After initiation of ART, 74% of the respondents' health status improved while 24 % was stable and 2% was reported to be worse. In this study, 81.5% of the respondents' received treatment daily while 18.5% took drugs twice in a day. Special instructions

were given to some respondent on dietary restrictions (61.3%), 67.8% were told to take extra fluid and some respondents' were given restrictions for both (%).

Majority (56.7%) of the respondents' initiated ART when their CD4 count was less than 350/mm3 while 43.3% initiated ART when the CD4 count was > 350/mm3. The respondent who were enrolled more than 19 months ago 80.0% were more than any of the two groups. Most respondent were on a one regime treatment (75.3%). The remaining percentage were those taking two drugs (24.7%). Among the respondents almost all had someone (55.4%) to remind them when to take their medications and 44.6% had none. Of the persons to remind the respondents 35.3% were their spouses and 14. % others.

With regards to adherence to ARVs, 74% of the respondents' reported that they forgot to take ARVs while 26% have never forgotten. Among the respondents that had ever forgotten to ARVs there were a number of reasons advanced for forgetting to take ARVs. Among the respondents that have ever forgotten there were a number of reasons for forgetting such as forgot with no other reason (20%) followed by being busy (9.3%) and drunk alcohol (5.3%) with others having felt stigmatized (2.7%) and in a hurry ( 0.7%) and others did not forget at all (95%).

The study sought to establish associations between the dependent (ART adherence) and independent variables such as knowledge, Age, Education level, Employment status and social support on ART adherence. The findings show no significant associations between adherence and all the independent variables except the level of education (p value 0.016). This is as observed from the tables and discussion of findings.

# CHAPTER FIVE

## 5.0 Discussion of Findings

### 5.1 Introduction

In chapter the investigator discusses the finding of the study. The findings are based on the data which was collected and presented in chapter four (4). The discussion tries to respond to the null hypothesis that: 'there is no association between ART adherence among HIV positive patients and the following factors: - knowledge, age, educational level, employment status cultural beliefs and social support.

### 5.2 Demographic Characteristics of the Respondents

The demographic characteristics of the respondents which were relevant to this study included gender, age, marital status, level of education, religion, employment and income level (Figure 3).

63.3% females were recruited in the study and 36.7% of respondents recruited were males. An indication worth noting on prevalence of HIV among women. However other study reports showed that the prevalence of HIV infection is higher in females (1.9%) than males (1%) as shown by Ministry of Health (MoH)/ HIV and AIDS Prevention and Control Office) HAPCO (2012) in Ethiopia. This finding is supported by WHO (2012) and Chesney et al (2000) but were contrary to Nachenga et al (2004)'s study in Soweto South Africa that showed that more HIV positive males rather access the HIV services more than HIV positive females.

Seventy six percent (76%) of the respondents in the current study were aged more than 34 years, 15.3 % were aged between 26 to 34 years and 8.7% were aged between 18-25 years (Figure 3). This finding is supported by Tegera (2011) and other studies conducted in Kenya that reported similar findings.

The respondents who were married consisted of 49.3% of the sample, 22.7% were widows, 20.7% were single and 7.3% were separated. This was not a surprising finding because in Zambia according to the Zambia Demographic Health Survey (ZDHS) more people are married (CSO, 2009). Marriage is still a respected institution

in Zambia. This findings is consistent with studies by Beyene et al and Amberbir et al (2008) which reported similar findings in 4 studies in adults and 14 studies in children, respectively.

Among the respondents who took part in the survey, 54% had attained secondary school education, 23.3% had attained primary education, 21.3% had attained tertiary education and 1.3 % had never been to school. The educational attainment of the respondents in this study was good due to the fact that the Government of the republic of Zambia is providing free education up to grade nine level (Ministry of Education, 2014). All (100%) the respondents who participated in the study were Christians. This could be attributed to the fact that Zambia was declared a Christian nation and people a free to congregate with any religious denomination of their choice.

There were more self-employed respondents (83%) followed by those who were formerly employed (35%) and farmers (9%). This could be attributed to high unemployment rates in Zambia especially among the young people. Currently the rate of unemployment is 13.3% (CSO, 2017). Therefore most young people are encouraged to engage themselves in small business ventures.

Figure 3 shows the income status of most of the respondents (68%) was above K1, 500 per month and those who had an income below K1, 500 were 32%. Most of the respondents earned an income that poses difficulties in sustaining livelihood. This notion is supported by studies undertaken by Asiimwe-Kateera et al (2013) and Kartaedt et al (2010).

## 5.3 **Discussion of Findings according to Variables**

### 5.3.1 **Adherence level to art by the respondents**

The first specific objective of the study was to ascertain the level of ART adherence among the respondents. Standard ART consists of the combination of ARVs to maximally suppress the HIV virus and stop the progression of HIV disease (WHO, 2017). World Health Organization also states that ART prevents onward transmission of HIV and huge reductions have been seen in rates of death and infections when use is made of a potent ARV regimen, particularly in early stages of the disease. Hence

WHO recommends ART for all people with HIV as soon as possible after diagnosis without any restrictions of CD4 counts (WHO, 2017).

Adherence to ART among the respondents in this study was 95 (63.3%) against 55 (36.7%) non adherence (See Table 1). This could be attribute to the educational level that showed a P value of 0.016. In the USA, the rate of adherence to HIV therapy is generally low. A meta-analysis of adherence studies whose durations ranged from a few days to one year, observed a rate of adherence of 55% among a pooled group of 17,573 patients.

The adherence rate in an Ethiopian study was 87%. This was comparable with the one found in Yirgalem Hospital (88.3%) (Markos et al., 2008) and Soweto, South Africa, (88%) (Nachega et al., 2015). Other developing countries ranges from 40% to 70% (Bangsberg, et al., 2000; Peltzer, 2010).

### 5.3.2 **Predictors to ART adherence among the respondents**

A number of factors have been associated with non-adherence to ART. Understanding these factors can increase a clinician's attention to adherence when working with particularly susceptible patients and can inform the development of interventions to improve adherence. The factors that were considered to influence adherence to ART among the respondents in this study included duration of HIV status and disclosure, health status (Figure 4), how often were the drugs taken (Figure 5) and special instruction, CD4 at initiation and other parameters (Figure 6), who reminds client to take medicines (Figure 7), forgetting to take medication (Table 6a), experiencing side effect and missed appointment (Figure 8), staff welcoming (Table 7) and availability of ARVS (Table 8). These factors are discussed below.

#### 5.3.2.1 **The respondents' duration of HIV status disclosure**

The findings in Figure 4 revealed that most of the respondents (77.7%) had lived with the HIV infection for more than 19 years. These findings suggest that HIV positive people on ART are living longer. ART has the potential to reduce both mortality and morbidity rates among HIV-infected people, and to improve their quality of life

(WHO, 2017). This current study and World Health Organization findings are in agreement with Feldman et al (2014) in a study conducted in Southwest Ethiopia.

A large percentage of the respondents in this study (93.6%) were able to tell someone about their status with no problems while, 6.4% had problems on who to tell. This could be due to the fact that HIV stigma is diminishing due to continued and increased community sensitization and establishment of peer counselors or treatment support groups in the past years in Zambia.

Data from this study shows that 48% of the respondents were comfortable to disclose their HIV status to their spouses, 42% told their children and 34% disclosed to their mothers, 28% disclosed their status to their fathers or the sisters 2% told their sisters. This could also be attributed to continued community sensitization on HIV and AIDS. This findings is supported by a study conducted in Rural Zambia by Birbeck et al stating that people who received counseling were able to disclose easily.

AIDS is a disease that affects not only physical health but also mental and social conditions of patients because of the negative attitude of society, discrimination, and stigmatization (Hall, 1999; Bunock, 1993) especially in the developing countries (Peltzer and Ramlagan, 2011). People living with HIV/AIDS (PLWHA) may experience social drift, changing pattern of sexual behaviors and self-image (Kadushin, 1996). They may lose employment, financial resources, and even family and friends as major sources of support [Hall, 1999). In the present study, most of the respondents' lived with their children (59.3%), 43.3% lived with their spouses or partners 13.3% live with their parents and few live alone (4%). This shows that psychosocial support is still valued in Zambia (Figure 7). A previous study suggested that social support can be an important factor for influences on well-being and quality of life (Theorell, 1995).

In this study one of the striking finding is that, 84% of the respondents did not know the importance of adherence to ART (Table 5). This revealed an information gap among the respondents hence the need for continued sensitization on HIV and AIDS. It also means that there are high chances of non-adherence to treatment. Strict adherence to ART is key to sustained HIV suppression, reduced risk of drug resistance, improved overall health, quality of life, and survival as well as decreased

risk of HIV transmission (Chesney, 2006; WHO, 2003; Cohen, 2011 ). Conversely, poor adherence is the major cause of therapeutic failure. Achieving adherence to ART is a critical determinant of long-term outcome in HIV infected patients (AIDS info, 2014).

#### 5.3.2.2 **Respondents health status, frequency of taking drugs and special instruction given regarding drug treatment**

Figure 5 indicates the health status of the respondents after initiation of ART. 74% stated that they felt better than before the initiation of ART, 24 % stated that they were stable and 2% said that they were worse off than they were before they started ART. Many respondents in this study felt better after ART initiation because they felt they lived long than they thought. In the present study 81.5% of the respondents were taking treatment drugs daily while 18.5% took treatment drugs twice in a day. This shows that many respondents were following daily regimens which is much easier to take and better tolerated than older regimens. Studies have shown that patients taking once-daily regimens have higher rates of adherence than those taking twice-daily dosing regimens (Nachega et al, 2015).

The respondents were asked to state special instructions they were given by health workers alongside treatment, 61.3% were on dietary restrictions, 68.7% were on extra fluid requirements and some respondents were on both dietary and extra fluids 49 (33%)**.** Literature suggest that simple, once-daily regimens, including those with low pill burden, without a food or fluid requirement are associated with high level of adherence (Raboud et al., 2011).

#### 5.3.2.3 **Respondents CD4 at initiation of treatment and other parameters**

Among the respondents majority (56.7%) initiated treatment when their CD4 count was >350/$mm^3$ while 43.3% initiated treatment when their CD4 was < 350/$mm^3$. In this study, most of the respondents' were enrolled in the ART program for more than 19 months (80.0%), 7.3% were enrolled within 6-12 months period and those enrolled for 13-18 months were at 12.7%. This could be attributed to the wellness exhibited after initial treatment observed on those whose CD4 <350/mm3 on initiation supported by Hansana et al (2013). Coherent with studies elsewhere indicating that

patients who have been on ART for shorter periods were likely to be non-adherent, Jiamsakul (2014) and Wastis et al (2012).

Most respondent were on a one regime treatment (75.3%) and 24.7% were taking two drugs. This findings may be due to the improved scientific strides in trying to reduce the quantities of drugs taken by patients causing non-adherence as supported by previous studies as shown by Asiimwe-Kateera et al (2013).

The influence of pill burden on adherence and outcomes was observed in a study published in 2012 by Sax et al, in which 7073 commercially insured HIV-infected patients (selected from the LifeLink database) were evaluated for adherence and risk of hospitalization, with medication possession ratio (MPR) being used to measure adherence. A treatment adherence rate of 95% or higher was observed in approximately 47% of patients taking 1 pill a day versus 41% in patients taking 2 pills a day versus 34% taking 3 pills or more a day ($P$ = .019 for 1 pill vs 2 pills; $P$ <.001 for 1 pill vs ≥3 pills). After logistic regression analysis, hospitalization risk was found to be significantly lower for patients taking 1 pill a day versus those taking 2 or 3 plus pills a day ($P$ = .003), although there was no difference in risk between the 2 pills and 3 plus pills groups.

Persistence, along with proper execution of a prescribed regimen, is one of the two components of adherence was the main driver of adherence in the study, with 81% of those dosing once nightly persisting with treatment for the full 48 weeks compared with 62% of those dosing twice daily. At the end of the trial period, patients in the once-nightly dosing group were significantly more likely to have been adherent compared with patients in the twice-daily dosing group ($P$ = .03).

Figure 6 revealed that majority of the respondents (73.3%) new the drugs they were taking while few did not (26.7%). This could be attributed to health education given by health care workers at initiation and continued support in the course of treatment as observed by the researcher. This is comparable with previous reports on pill burden decreasing ART adherence (UNAIDS, 2005).

#### 5.3.2.4 **Respondents responses on who reminded them to take medicines**

In order to assess the role of family members and others in assisting with treatment adherence, respondents were asked to indicate if different types of persons helped remind them to take their medicine. Slightly more than half of the respondents' (55.4%) had someone to remind them when to take their medications and 44.6% had none (Fig. 7). Of the persons to remind the respondents, 53.3% were reminded by their spouses, 20% were reminded by their children, 17% were reminded by their mothers and 9% were reminded by their fathers (Figure 7). Most of the respondents were reminded to take medications by their spouses because they felt safe and supported. This finding is in line with Tiyou et al (2010), Amberbir et al (2008) and Alagaw (2013) that social support may be a positive predictor of adherence.

#### 5.3.2.5 **Respondents forgetting to take medication**

The findings of the study showed that 63.3% of the respondents had never forgotten to take medication (Table 6b). This could be attributed to family members, including parents, who assisted ART patients to remember to take their medications (Figure 7). However, studies from Canada and developed countries in Latin America and Europe demonstrate rates of suboptimal adherence (Hoggs et al, 2002; Pinheiro, 2002). In general, 10% of patients report missing at least one antiretroviral dose on any given day and 33% report missing at least one dose within the past month (Ickovic, 2002).

These results underscore the need to incorporate close family members. That is to include parents more explicitly into programs intended to augment adherence and to facilitate their effectiveness as long-term adherence partners by providing them with adequate information, training and resources.

##### 5.3.2.5.1 **Reasons for forgetting to take medication by the respondents**

Among the respondents (36.7%) that agreed to have ever forgotten taking medication, there were a number of reasons for forgetting such as forgot with no other reason (20%) followed by being busy (9.3%) and drunk alcohol (5.3%) with others having felt stigmatized (2.7%) and in a hurry (0.7%) and others did not forget at all (95%). This may be due to being ill, busy, running out of medication, drunk or away from

home (Table 6b). Similar reasons were reported in studies conducted in Adama and Jimma hospitals and Yirgalem Hospital, Ethiopia, and in Kenya. Other researchers who reported similar findings include Biressaw et al (2013), Hogg et al (1999), Kebede (2012) and Alagaw (2013).

#### 5.3.2.6 **Respondents who experienced side effect and missed appointment**

Respondents that experience side effects from their medications are known to be risk patients for nonadherence to ART (Bangsberg et al., 2000). This was not found to have a significant influence on adherence in this study. As indicated in Figure 8, 56% of the respondents' had never experienced side effects from ARVs while 44% did. This could be attribute to the reduced number and improved methods of drug administration resulting in less toxic effects of drugs Coffey (2003). It could also be due to the mildness of the side effects reported.

The study revealed that 74.7% of the respondents had never missed their appointments. Only 25.3% of the respondents had ever done so (Figure 8). This is due to consistent sensitization observed by the researcher.

#### 5.3.2.7 **Respondents response on whether Staff were welcoming at the ART centers**

The relationship between patient and provider may influence whether a patient will be adherent to treatment. However, most respondents in the present study (94.7%) felt that the staff at the ART centers were welcoming while few (5.3%) did not feel so (Table 7). This finding could be attributed to fact that participants only came to the center once after three (3) months and would not want to antagonize the staff. It could also be that these respondents were not free to express themselves as the study was conducted at ART centers. This finding is supported by a study conducted in Uganda by Arnsten et al (2001), UNAIDS (2005) and Kitabira (2002).

Schneider et al undertook a study to quantify the impact of different aspects of the physician-patient relationship on adherence. The authors surveyed 554 patients with HIV being treated at 22 outpatient practices in Boston, Massachusetts, evaluating adherence through targeted and confirmatory questions, and patient perceptions of

their relationship with their physicians primarily through established multi-item patient satisfaction scales. After adjusting for age, gender, education, race, physical health, and mental health, 6 out of 7 physician-patient relationship factors were significantly associated with adherence: 1) general communication, 2) adherence dialogue (i.e, perceptions regarding a doctor's skills at providing treatment-related information), 3) physician trust, 4) satisfaction with physician, 5) willingness to recommend physician, and 6) (provision of) HIV-specific information. The only factor that did not achieve statistical significance was "participatory decision making." A study from Johns Hopkins evaluated the importance of the physician-patient relationship in a somewhat different way by determining whether patients felt "known as a person" by their provider. The study included 1743 patients with HIV who were interviewed an average of 2.7 times to determine not only whether the patient felt their HIV provider knew them, but whether they had received a prescription for HAART, if they were adherent to their regimen, and the status of their viral suppression. Subjects who had a positive response to the "known" question were found to be significantly more likely to have been prescribed HAART (60% vs 47%; $P$ <.001), to be adherent to their prescribed treatment (76% vs 67%; $P$ = .007), and to have undetectable serum HIV RNA (49% vs 39%; $P$ <0.005)

#### 5.3.2.8 **Respondents responses on availability of ARVs at the ART centers**

Universal access to affordable ART for HIV infected persons is a high priority endorsed by the UN and major donor agencies. Substantial progress is being made towards this goal in low-and middle-income countries. The findings of this study shows that there were no problems with availability of drugs at the health facilities as 99.3% of the respondents (Table 8) were able to get drugs. The programs the Ministry of Health has in support of the PLWHA in providing for their treatment as pronouncements in the 2016-2021 National Health Strategic Plans has helped in the availability of drugs.

### 5.4 **Associations among the Dependent and Independent Variables**

In this study, association between ART adherence and the respondents' knowledge level of ART was measured (Table 9). Chi square test was used to test associations and was not statistically significant with a value of 0.118. Therefore there was no

association between ART adherence and knowledge levels of ART. The current study tested the association between ART adherence and age of the respondents (Table 9). The findings showed no significant association (P value of 0.096).

As indicated in Table 11 the findings show that the level of education was significantly associated with the level of education (P value of 0.016). This could be attributed to the fact that better educated people generally have access to information and are more likely to make better informed decisions. Similarly, Cauldbeck et al. (2009) and Amberbir et al. [2008) reported similar findings in their studies.

The study showed no association between ART adherence and employment status (p value was 0.749). This means that employment status did not have an impact of adherence as this result was not statistically significant (Table 12). There was also no association between ART treatment adherence and who reminded the respondent to take their medication in table 12 (P values.069).

### 5.5. **Relationship between Research Theory and the Study Results**

The research Theory that guided this study was the Social Cognitive Theory. It was relevant to health communication as the theory deals with cognitive, emotional aspect and for understanding behavioral changes. It provides ways for new behavioral research. The theory explains how people acquire and maintain certain behavioral patterns while also providing the basis for intervention strategies. (Bandura, 1977).

The application of the theory was adopted in this research because it is centered on the wellbeing of the individual as he/she relates in society. It also addresses the social cultural determinants of health as well as the personal determinants. The researcher considered a modification to the theory by a triangular approach of 1. ART adherence, 2. Environmental factors which are service related and 3. Personal factors such as age, marital status socioeconomic status and knowledge, vice vesa.

## 5.6. **Implications for Nursing**

### 5.6.1 **Nursing practice**

The findings show that 84 % did not know the importance of adherence to ART. The nursing implication is that there should be continued sensitization in the area of treatment knowledge specifically to drugs and importance of adherence by all health care providers including public health nurses if adherence is to be maintained and sustained.

### 5.6.2 **Nursing Administration**

Nurse administrators should ensure that nurses and midwives give Information, Education and Communication to clients at the ART centers either individually or collectively. This also calls for regular supervision of the staff at the ART centers.

### 5.6.3 **Nursing education**

This study has revealed information gap on ART among the respondents. Therefore, there is need to train nurses and midwives on HIV, AIDS and ART in particular through conferences, seminar workshops. There is also need to educate upcoming nurses on the subject through strengthening of HIV and AIDS components in their curricular.

### 5.6.4 **Nursing research**

There is need to continue researching on ART adherence and improving on methods that can be used to build on existing body of knowledge.

## 5.7 **Conclusion and recommendation**

### 5.7.1 **Conclusion**

The main objective of the study was to determine motivation factors to ART adherence among clients enrolled on HAART in Ndola district dispensing points. The

findings showed that the rate of adherence to ART was 63.3%. Thus some people were adhering to ART treatment. The major factor influencing ART adherence in this study was lack of awareness of the importance of adherence. The respondents' education level was found to have an influence on ART adherence. Therefore there is need for continued community sensitization on HIV, AIDS and ART adherence. This is because most results' P values were far from providing the significance that would conclude the research positively except for relationship to educational level (P 0.016). Thus the variables under study did not provide reasons for positive adherence.

### 5.7.2 **Recommendations**

Based on the findings of this study, the following recommendations were made:

- Continuous Information education and communication (IEC) should be given to the public on importance of early initiation of treatment and ART adherence by the health care providers and via print and electronic media by the Ministry of Health (MoH).
- Further research should be conducted on the same topic using a larger sample to enable generalization of findings.

## 5.8 **Dissemination and Utilization of Findings**

The findings were disseminated at the UNZA postgraduate seminar week in the month of August 2017. The bound approved copies of the study document were sent to the following:

1. School of Nursing Sciences

2. The University Medical Library and UNZA library special collection

The research results will be published in peer reviewed journals such as the Medical Journal of Zambia. The abstract of this study will be distributed to MOH, Ndola Provincial Health Office, and District Health Office. The researcher also intends to disseminate the findings in meetings and presentations at nursing and medical workshops and seminars that will be taking place in Ndola district especially concerning HIV and AIDS.

## 5.9 Limitations and Strength of the Study

### 5.9.1 Limitations

Citing prior research studies forms the basis of your literature review and helps lay a foundation for understanding the research problem you are investigating. There was little, if any, **prior research studies on the topic** especially in Zambia. The study was conducted in Ndola, therefore generalization of findings to the rest of the country should be done with caution. Use of self-report may have influenced the validity and accuracy of data from the respondents. Respondents may have given socially desired responses particularly if the questions require them to provide undesirable traits.

### 5.9.2 Strength of the study

Due to limited information on the study topic, the results of the study provide a basis for further research. Adoption of free access to ART in Zambia provides the reason why such a study becomes important in checking if recipient are appreciative to such recommendations by government.

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## APPENDICES

## APPENDIX I

## INFORMATION SHEET

**Title of Study: MOTIVATING FACTORS TO ANTI-RETROVIRAL TREATMENT ADHERENCE BY PEOPLE LIVING WITH HIV IN NDOLA DISTRICT** My name is Himaubi; a student of Masters of Science in Nursing at the University of Zambia who is kindly requesting for your participation in the research study mentioned, because it is important to identify the factors that influence **MOTIVATING FACTORS TO ANTI-RETROVIRAL TREATMENT ADHERENCE BY PEOPLE LIVING WITH HIV**

Participation in this study is voluntary. If you are not interested in participating in this study you are free to do so. Even after you have joined the study you are free to withdraw as you wish, and this will not affect your working relationship at this center.

If you are willing to participate, you will be asked to sign a consent and agreement to participate, will not result in any immediate benefits. Please ask where you do not understand.

### PURPOSE OF THE STUDY

The study will identify the factors **MOTIVATING FACTORS TO ANTI-RETROVIRAL TREATMENT ADHERENCE BY PEOPLE LIVING WITH HIV**. The information obtained will help the policy makers and implementers of the programme in the MOH to re-direct programme implementation in order to improve the management of gender based victims in Zambia.

### PROCEDURE

The study involves a set of questions using a structured questionnaire. After signing the consent form, you will be given a self-administered questionnaire to fill in at your convenient time within a period of 2 weeks.

**RISKS AND DISCOMFORTS**

There is no risk involved in this research though part of your time will be utilized to answer some questions. Some questions may seem to be sensitive and personal. If you will need further discussion, it will be offered to help you understand the topic more.

**BENEFITS**

There is no direct benefit to you by participating in this study, but the information which will be obtained will help the policy makers to take measures that will ensure that Adherence to ART is given priority as one of the major public health problems in Zambia. Health care providers shall receive the necessary training on gender based violence through ongoing capacity building, provision of manuals and management protocols, improved and strengthened networking system. No monetary favors will be given in exchange for information obtained.

**CONFIDENTIALITY**

Your research records and any information you will give will be confidential to the extent permitted by law. You will be identified by a number, and personal information will not be released without your written permission except when required by law. The Ministry of Health, the University of Zambia Research Ethics Committee or the School of Medicine may review your records again but this will be done with confidentiality

## APPENDIX II: INFORMED CONSENT FORM

The purpose of this study has been explained to me and I understand the purpose, the benefits, risks and discomforts and confidentiality of the study. I further understand that:

If I agree to take part in this study, I can withdraw at any time without having to give an explanation and that taking part in this study is purely voluntary.

I_____

(Names)

Agree to take part in this study.

Signed: _____ Date: _____

(Participant)

Participant's signature or **thumb print**

Signed: _____ Date: _____

(Witness)

Signed: _____ Date: _____

Researcher)

### PERSONS TO CONTACT FOR PROBLEMS OR QUESTIONS

1. Himaubi, University of Zambia, Department of Nursing Sciences, P.O. Box 50110, Lusaka. Cell: 0978438307. Email: himaubi@yahoo.com
2. The Head of Department, Department of Midwifery, Women and Child health, School of Nursing Sciences, University of Zambia P.O. Box 50110, Lusaka. Telephone Number 252453.
3. The Chairperson, Bioethics and Research Committee, University of Zambia. P.O. Box 50110, Lusaka.

**APPENDIX III: STUDY BUDGET**

| BUDGET CATEGORY | UNIT COST (ZMK) | QUANTITY | TOTAL |
|---|---|---|---|
| **1. STATIONERY** | | | |
| a) Flash Disc | 140,000.00 | x1 | 140,000.00 |
| b) Bond paper | 30,000.00 | x10 | 300,000.00 |
| c) Pens | 1,000.00 | x10 | 10,000.00 |
| d) Pencils | 500.00 | x10 | 5,000.00 |
| e) Rubbers | 1,000.00 | x5 | 5,000.00 |
| f) Note book | 8,000.00 | x1 | 8,000.00 |
| g) Tippex | 10,000.00 | x1 | 10,000.00 |
| h) Bag for questionnaires | 150,000.00 | x1 | 150,000.00 |
| i) Stapler | 50,000.00 | x1 x1 | 50,000.00 |
| j) Staples | 10,000.00 | Box x1 | 10,000.00 |
| k) Lap- top | 3,500,000.00 | | 3,500,000.00 |
| **SUBTOTAL** | | | **4, 188, 000.00** |
| **3. SERVICES** | | | |
| a) Ethics committee | 250,000.00 | x1 | 250,000.00 |
| b) Data entry | 500,000.00 | x1 | 500,000.00 |
| c) Data analysis | 1000,000.00 | x1 | 1,000,000.00 |
| d) Photocopying proposal | 250.00 | x81 pages x 5 copies | 101,250.00 |
| e) Photocopying questionnaire | 250.00 | x10 pages x 169 copies | 422, 500.00 |
| f) Photocopying report | 250.00 | 90 pages x 5 | 112, 500.00 |
| g) Binding | 60,000.00 | 87copies x 5 | 26, 100, 000.00 |
| **SUBTOTAL** | | | **28, 486, 250.00** |

| | | | |
|---|---|---|---|
| **TOTAL** | | | **32, 674, 250.00** |
| **CONTIGENCY FUND 10%** | | | **3, 267, 425.00** |
| **GRAND TOTAL** | | | **35, 941, 675.00** |

## JUSTIFICATION FOR THE BUDGET

### STATIONERY

The 10 reams of bond paper were used for the research proposal development and the final report. Paper was also be required to make extra copies of the proposal for submission to the Research Ethics committee and the board of graduate studies.

The bag for questionnaires was for the researcher to ensure that the interview schedules were kept safe.

The flash disc was for copying, storage and safe keeping of research data.

The lap-top was to facilitate typing and easy information storage for the investigator.

Other accessories such as pens, pencils rubbers, stapler and staple and note books were required for the routine collection of research data.

### PERSONNEL

Data collection was conducted throughout the day as such the researcher needed lunch allowance. The research was allocated 30 days to allow adequate time for administration, checking for completeness of questionnaires and coding.

### SECRETARIAL SERVICES

Funds for photocopying services and binding of the proposal and report was needed. The charge for photocopying implies that one copy was printed and the rest photocopied to cut down on the cost. The researcher needed five copies of the proposal to submit to Post Graduate Research Committee for dissertation and dissemination.

## CONTIGENCY

Contingency fund which was 10% of the budget was required for any extra costs due to inflation and for any eventualities.

**APPENDIX IV: GANNT CHART**

| | | | 2016 | | | | | | | | | | | | 2017 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NO** | **TASK TO BE PERFORMED** | **RESPONSIBLE PERSON** | **JAN** | **FEB** | **MAR** | **APL** | **MAY** | **JUN** | **JUL** | **AUG** | **SEP** | **OCT** | **NOV** | **DEC** | **JAN** | **FEB** |
| 1 | Literature Review | Researcher | | | | | | | | | | | | | | |
| 2 | Proposal Development | Researcher | | | | | | | | | | | | | | |
| 3 | Presentation to Graduate studies | Researcher | | | | | | | | | | | | | | |
| 4 | Approval by BRC | Researcher | | | | | | | | | | | | | | |
| 5 | Data collection | Researcher | | | | | | | | | | | | | | |
| 6 | Data analysis | Researcher | | | | | | | | | | | | | | |
| 7 | Report writing | Researcher | | | | | | | | | | | | | | |
| 8 | Submission of draft report | Researcher | | | | | | | | | | | | | | |
| 9 | Submission of | Researcher | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | final report | | | | | | | | | | | | | | | |
| 10 | Dissemination of results | Researcher | | | | | | | | | | | | | | |

**APPENDIX V**

**THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF MEDICINE**

**DEPARTMENT OF NURSING SCIENCES**

**INTERVIEW ADMINISTERED QUESTIONNAIRE FOR PEOPLE LIVING WITH HIV**

**MOTIVATING FACTORS TO ANTI-RETROVIRAL TREATMENT ADHERENCE BY PEOPLE LIVING WITH HIV IN NDOLA DISTRICT**

**Questionnaire serial number** _____

**Date of interview** _____

**Place/Location** _____

**INSTRUCTIONS FOR THE INTERVIEWER**

1. Introduce yourself to the respondent.
2. Explain the purpose of the interview and reasons for undertaking the research
3. Ask for permission to interview the respondent as well as taking notes
4. Respondent should not be forced to be interviewed
5. Assure confidentiality and all information should be kept confidential
6. Do not write the respondents names on the interview schedule
7. For questions provided with alternatives, **tick** in the box provided against the most appropriate response(s).
8. For questions without alternatives, **write down** your responses in the spaces provided.

**SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTIC OF RESPONDENTS**

1. What is your Gender?

   a) Male
   b) female

2. How old were you on last birthday?

   a) 18- 25 years
   b) 26-33 years
   c) > 34 years

3. What is your current marital status?

   a) Single
   b) Married
   c) Widowed
   d) separated

4. What is your highest level of education?

   a) Primary
   b) Secondary
   c) Tertiary education
   d) Never been to school

5. What is your religion?
6. What is your employment status?

   a) Self employed
   b) Farmer
   c) Formally employment

7. What is your monthly income?

**8.** Duration since HIV diagnosed (months)

a) 6 -12 months
b) 13- 18 months
c) >19 months

9. Have you ever disclosed HIV status to anyone?

a) Yes
b) No

10. If yes to whom

a) Spouse
b) Mother
c) Father
d) Children
e) Friend

11. Persons living in the same house

a) Live alone
b) Parent
c) Spouse/partner
d) Children
e) Relative
f) Friend

12. WHO clinical stage

a) Stage I
b) Stage II
c) Stage III
d) Stage IV

13. CD4 at initiation of ART

a) $< 350/mm^3$

b) $\geq 350/mm^3$

**SECTION B: ADHERENCE LEVEL TO ART/PREDICTORS TO ART**

14. For how long have you been on ART (Duration of ART months)

a) 6 -12 months

b) 13- 18 months

c) >19 months

15. How many ARV medicines you take per day

a) 1

b) >2

16. What are the names of the ARVs you are taking?

17. What is the benefit of taking ART?

18. Why is it important to adhere to ART?

19. What is your health status since initiation of ART?

a) Better

b) Worse

c) Stable

20. How often they take the pills,

a) Daily

b) Twice a day

c) Three times

d) Others specify

21. Do you have any special instructions for any of the pills such as

a) Dietary restrictions

b) Extra fluid requirements

22. Do you have someone to remind you to take ARVs at home?

a) Yes
b) No

23. If yes who reminds you

a) Spouse
b) Mother
c) Father
d) Friend
e) Others specify

24. Have you ever forgotten to take ARV medicine in the in the past three days

a) Never
b) Ever

25. What were the reasons for missing doses?

a) Forgot
b) Busy
c) Too many Pills
d) Bad taste of Pills
e) Run out of Medicine
f) Long distance to the ART Clinic
g) Side effects
h) Stigma
i) Away from home
j) Drunk alcohol
k) Others specify

26. Have you ever experienced any side effects of ARV Medicine

a) Never
**b)** Ever

**27.** Have you ever missed an appointment?

a) Never

b) Ever

28. Is the staff at the ART clinic welcoming?

29. Are ARVs always available at your nearest ART Clinic

30. How long do you wait at the ART clinic before you are attended to by health care staff?

31. What should be done to increase adherence to medications.

Thank you for your cooperation and participation