

**FACTORS INFLUENCING ADHERENCE TO ANTIRETROVIRAL  
THERAPY IN EMBU TEACHING AND REFERRAL HOSPITAL, EMBU  
COUNTY, KENYA**

EVANGELINE KANANU NJUE MUGOH (HIGHER DIPLOMA KRCHN)

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DEPARTMENT OF COMMUNITY HEALTH

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## DECLARATION

“This thesis is my original work and has not been presented for a degree or other award in any other University”

Signature\_\_\_\_\_ Date\_\_\_\_\_

Evangeline Kananu Njue Mugoh

## SUPERVISORS' APPROVAL

We confirm that the work presented in this thesis was carried out by the candidate under our supervision.

Signature\_\_\_\_\_ Date\_\_\_\_\_

Prof. Ephantus Kabiru  
Department of Community Health  
Kenyatta University

Signature\_\_\_\_\_ Date\_\_\_\_\_

Dr. Joyce Mwaniki  
Department of Plant Sciences  
Kenyatta University

**DEDICATION**

I dedicate this thesis to my dear husband Rev. Patrick Niue Mugoh and our dear children Grace Patience Nyaribo, Kezziah Njue and Joseph Njue who were a great encouragement to me. My son in law Boniface N. Maseru and my dear mother Joyce Ikiugu who prayed for me and always assured me that I can make it. To my dear late dad Samuel and my late mother in law Rahab who longed to see me graduate but God took them home to be with him. To all who stood with me, encouraged and prayed for me, may the almighty Father God bless you.

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## TABLE OF CONTENTS

	Page
<b>DECLARATION.....</b>	<b>ii</b>
<b>DEDICATION.....</b>	<b>iii</b>
<b>ACKNOWLEDGEMENTS .....</b>	<b>iv</b>
<b>TABLE OF CONTENTS .....</b>	<b>v</b>
<b>LIST OF TABLES .....</b>	<b>vii</b>
<b>LIST OF FIGURES .....</b>	<b>viii</b>
<b>LIST OF APPENDICES .....</b>	<b>ix</b>
<b>ACRONYMS AND ABBREVIATIONS.....</b>	<b>x</b>
<b>DEFINITION OF OPERATIONAL TERMS.....</b>	<b>xi</b>
<b>ABSTRACT.....</b>	<b>xiii</b>
<b>CHAPTER ONE: INTRODUCTION .....</b>	<b>1</b>
1.1 Background Information.....	1
1.2 Statement of the Problem.....	3
1.3 Justification of the Study .....	4
1.4 Research Questions.....	4
1.5 Research Objectives.....	5
1.6 Significance of the Study.....	5
1.7 Limitations and Delimitations of the Study.....	6
1.8 Conceptual Framework.....	7
<b>CHAPTER TWO: LITERATURE REVIEW.....</b>	<b>9</b>
2.1 The Global Picture of HIV/AIDS .....	9
2.2 HIV and AIDS Treatment in Africa .....	10
2.3 HIV and AIDS Management in Kenya.....	11
2.4 Adherence of ART Treatment among HIV/AIDS Patients .....	12
2.5 Main Factors Hindering Adherence to ART .....	14
2.6 Summary of the Literature .....	22
<b>CHAPTER THREE: MATERIALS AND METHODS .....</b>	<b>23</b>
3.1 Study Design.....	23
3.2 Study Variables.....	23
3.3 Study Area .....	24
3.4 Target Population and Study Population .....	24
3.5 Inclusion Criteria and Exclusion Criteria .....	25
3.6 Sampling Procedure.....	25
3.7 Data Collection .....	27
3.8 Pre-Testing of Study Instruments .....	28
3.9 Reliability and Validity of Study Instruments .....	28
3.10 Data Analysis.....	29

3.11 Ethical Considerations .....	29
<b>CHAPTER FOUR: RESULTS .....</b>	<b>30</b>
4.1 Socio-demographic characteristics of the respondents .....	30
4.2 Adherence to ART Treatment by the respondents.....	35
4.3 Influence of socio-demographic factors on adherence to ART .....	36
4.4 Influence of social factors on adherence to ART .....	37
4.5 Influence of socio-economic factors on adherence to ART .....	38
4.6 Influence of ART treatment services and ART drugs on adherence to ART	39
4.7 Influence of health care facilities and providers on adherence to ART.....	42
<b>CHAPTER FIVE: SUMMARY, DISCUSSION, CONCLUSIONS AND</b>	
<b>RECOMMENDATIONS .....</b>	<b>45</b>
5.1 Summary of the Findings.....	45
5.2 Discussion.....	46
5.3 Conclusions.....	52
5.4 Recommendations.....	53
5.5 Recommendations for Further Research .....	54
<b>REFERENCES.....</b>	<b>55</b>
<b>APPENDICES .....</b>	<b>61</b>

**LIST OF TABLES**

	Page
Table 4.1: Marital status .....	32
Table 4.2: Main occupation .....	32
Table 4.3: Average monthly income.....	33
Table 4.4: Comparison between Self-report and Pill Count.....	36
Table 4.5: Social demographic characteristics and adherence to ART .....	37
Table 4.6: Social factors and adherence to ART .....	38
Table 4.7: Social-economic factors and adherence to ART .....	39
Table 4.8: ART Services offered in the facility.....	40
Table 4.9: Treatment of co-infections charges .....	41
Table 4. 10: ART side effects experience.....	41
Table 4.11: Health care facilities rating.....	43
Table 4.12: Respondents' Perception of Healthcare workers.....	44

**LIST OF FIGURES**

	Page
Figure 1. 1: Factors affecting adherence to ART.....	8
Figure 4. 1: Age of respondents.....	30
Figure 4.2: Gender of respondents.....	31
Figure 4.3: Education level.....	31
Figure 4.4: Number of meals taken.....	33
Figure 4.5: Disclosure of HIV status .....	34
Figure 4.6: Person who supported the HIV patients in adherence to ART treatment	35
Figure 4.9: Causes non-adherence to the treatment.....	36
Figure 4.10: Adherence by ART treatment.....	42

**LIST OF APPENDICES**

	Page
Appendix 1: Map of Embu .....	61
Appendix 2: Consent Form.....	62
Appendix 3: Interview Schedule.....	66
Appendix 4: Approval of Research Proposal.....	75
Appendix 5: Introduction letter to NACOSTI .....	76
Appendix 6: NACOSTI Certification .....	77
Appendix 7: Research Authorization from NACOSTI.....	78
Appendix 8: Research Authorization from Embu West DC.....	79
Appendix 9: Research Authorization Ministry of Education .....	80
Appendix 10: Publications.....	81

**LIST OF ACRONYMS AND ABBREVIATIONS**

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-retroviral Therapy
CCC	Comprehensive Care Clinic
DAART	Directly Administered Antiretroviral Therapy
FGD	Focus Group Discussion
HAART	Highly Active Anti-retroviral Therapy
HIV	Human Immuno Deficiency Virus
KAIS	Kenya AIDS Indicator Survey
KDHS	Kenya Demographic Health Survey
MCTC	Mother to Child Transmission
NACC	National AIDS Control Council
NASCOP	National AIDS & STI Control Programme
NGO	Non-Governmental Organization
PGH	Provincial General Hospital
PLWHA	People Living With HIV and AIDS
PMTCT	Prevention of Mother to Child Transmission
SDGS	Sustainable Development Goals
TB	Tuberculosis
UNAIDS	United Nations Agency for International Development
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

## DEFINITION OF OPERATIONAL TERMS

<b>Adherence</b>	Adherence to ARV is defined as individuals taking all ARV pills in the correctly prescribed doses at the right time and in the right way, observing any dietary restriction.
<b>HIV/AIDS</b>	This refers to a progressive immune deficiency caused by infection of CD4+ T cells with the human immunodeficiency virus (HIV).
<b>Co-treatment</b>	This is treatment of two or more infections simultaneously.
<b>Incidence</b>	This is the measure of the probability of occurrence of a given medical condition in a population within a specified period of time.
<b>Optimal adherence</b>	Proportion of those who take their medication $\geq 95\%$ of the time. It also looks at taking dietary measures as well keeping appointments of clinic attendance as it is expected.
<b>Sub-optimal adherence</b>	Proportion of those who take their medication $<95\%$ of the time
<b>Prevalence;</b>	This refers to the number of affected persons present in the population at a specific time divided by the number of persons in the population at that time.
<b>Treatment supporter</b>	Individuals close to the patient who walks with him/her, reminding and supporting him/her through the treatment. Usually termed as treatment buddy.

**Undetectable viral load** When the virus is not detected in the blood after a laboratory test.

**Viral load** Magnitude of HIV virus found in the blood per 10 milliliters.

## ABSTRACT

Adherence to antiretroviral therapy is a major predictor of the survival of individuals living with HIV/AIDS. Appropriate use of antiretrovirals (ARV's) has improved the health of many human immunodeficiency virus (HIV) positive individuals. The effectiveness of HIV treatment depends on sustenance of high levels of adherence to ARV; however, ARV regimens are often complicated and can be affected by varying dosing schedules, failing to have proper dietary requirements and patients developing adverse effects. The main objective of this study was to determine factors influencing adherence to Anti-retroviral drugs among HIV and AIDS patients 18 years and above in Embu Teaching and Referral Hospital comprehensive care clinic. A cross sectional study was carried out at Embu Teaching and Referral Hospital in Embu County, Kenya. Stratified random sampling was used to obtain relative proportion of male and female adult respondents in the sample population. Three hundred and thirty one HIV positive patients were chosen from a total of 1694 patients who were active in ART for more than one year. A semi-structured interview schedules was used to obtain demographic information and patients view on various dimension or ART services at the facility. The study revealed that almost half (48.2%) of the respondents had optimal adherence to ART treatment while 51.8% had sub-optimal adherence to ART treatment. Over a third (34.9%) of the patients indicated that travelling was the main cause of hindrance to optimal adherence to treatment. Other reasons included forgetfulness 23.5%, tiredness of taking drugs all the time 20.8% and side effects 20.8%. Patients aged below 25 years were more likely to have optimal ART adherence as compared to respondents aged 56 years and above ( $\chi^2=10.745$ ,  $df=4$ ,  $p$ -value = .030). Monogamously married and polygamously married patients more likely to have optimal adherence as compared to widowed or widower respondents ( $\chi^2=17.944$ ,  $df=4$ ,  $p$ -value = .001). Majority (88.0%) of the respondents had disclosed their HIV status to other people of whom 46.9% had disclosed to their spouse/sexual partner and 49.7% of them had been accorded moral support. There was significant association between adherence to ART and the type of drug respondent was using with AZT, ddI, NVP having the highest proportion of sub-optimal adherence to treatment while respondents on D4T, 3TC, NVP had the lowest proportion of sub-optimal adherence to treatment. Patients who had sub-optimal ART adherence significantly had longer waiting time and deemed costs of co-infection treatment to be higher as compared to respondents who had optimal ART adherence. Convenience of the facilities for people with chronic ailments and waiting time at the facilities were reported to be lower. The study concludes that majority patients had sub-optimal adherence to ART treatment. Adherence was significantly influenced by age; marital status; engagement in income generating activity; type of drug taken and cost of co-infection treatment; health facility accessibility and perceived waiting time. The study recommends that HIV patients should be sensitized on importance of carrying ART drugs when travelling and the use of treatment assistants to ensure optimal adherence thus enabling them fully realize its life extending benefits as it has been shown that there is significant non-adherence among HIV positive patients on ART in the County.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background Information

Globally, the number of people living with HIV/AIDS continues to grow, for instance, there were 36.9 million people living with HIV in 2014, up from 29.8 million in 2001. This is as a result of continued new infections, people living longer with HIV and general population growth (Kaiser Family Foundation, 2015). In Africa as of 2016, an estimated 26 million people were living with HIV, 1.5 million new HIV infections and 1.1 million AIDS-related deaths (WHO, 2016). More than 1.5 million people were infected with HIV in Kenya by the year 2005 but in the year 2016, 1.6 million people were living with HIV with a prevalence rate of 6.1% (National AIDS Control Council [NACC], 2016).

The number of patients on Antiretroviral Therapy (ART) worldwide increased from 7.5 million in 2010 to over 15 million in 2015 representing 72% of eligible patients according to WHO 2013 guidelines (UNAIDS, 2015). In Kenya, the number of People Living With HIV and AIDS (PLWHA) was estimated to have increased from about 1.4 million in 2009 to 1.6 million in 2013 of whom 656,359 were on ART against estimated 902,302 (141,608 children and 760,694 adults) (NACC, 2014) while according to the Kenya AIDS Indicator Survey 2014, 78.4% of adults and 42.5% of children eligible for ART coverage were receiving treatment as of 2013 (NASCO, 2014).

Adherence to ART is crucial for treatment success among HIV patients. A high level of adherence is a prerequisite for maintained viral suppression and a lower risk of

drug resistance, and prevents premature morbidity and mortality (Collins, Grant and Shafer, 2015). Low adherence is the second strongest determinant for disease deterioration and death after CD4 count. Non-adherence to ART is a substantial challenge in resource-poor settings like urban slums, where increasing drug resistance is hard to combat using the limited treatment alternatives available (Mills, Lester and Ford, 2012).

The shift to combination therapies for treating human immunodeficiency virus (HIV)-infected individuals has increased adherence challenges for both patients and health-care providers. Monjok *et al.* (2010) estimated average rates of non-adherence to antiretroviral therapy to be ranging between 50% and 70%. In the same study it was revealed that adherence rates of less than 80% were associated with detectable viremia in a majority of patients. However, major factors that contribute to non-adherence to treatment were reported as follows; inconvenient dosing frequency, dietary restrictions, pill burden, side effects, patient-health-care provider relationships and the system of care (Monjok *et al.*, 2010).

Kenya has exempted people living with HIV from the usual cost-sharing requirements for antiretroviral therapy and treatment for tuberculosis. However, patients may remain liable for certain costs associated with nutritional support, laboratory investigations and treatment of opportunistic infections (Mohammed *et al.*, 2013). A study done in Eldoret, Kenya by Scanlon and Vreeman (2013) suggested that the rollout of ART significantly reduced HIV-related morbidity and mortality, but good clinical outcomes depend on access and adherence to treatment. According to

UNAIDS, (2015) treatment access globally has resulted in AIDS-related deaths declining by more than 42% between 2004 and 2014 (UNAIDS, 2015).

## **1.2 Statement of the Problem**

Significant progress in the health of HIV/AIDS patients has been made since lifesaving drugs for HIV/AIDS came into existence. Low compliance to prescribed medical interventions is an ever present and complex problem, especially for patients with a chronic illness (Monjok *et al.*,2010). With an increasing number of medications shown to do more good than harm when taken as prescribed, low compliance is a growing concern and seriously undermines the benefits of the current medical care (Karcher *et al.*, 2007).

Embu County, as of 2015, had an HIV prevalence of 3.3% with 66% of adult PLWHA eligible for ART having access to treatment and only half of them had suppressed viral load (NACC, 2016; NASCOP, 2016). Given that only half of PLWHA in the County had suppressed viral load, it points out a problem in achievement of the realization of 90% viral suppression as enshrined in the Sustainable Development Goals (SDGs) (UNAIDS, 2015). Furthermore, the County has witnessed a marginal decline (16%) in HIV-related adult deaths since 2013 compared to 25% aimed decline nationally (NACC, 2016; NASCOP, 2016). However since Embu County Teaching and Referral Hospital started administering ART in 2004 there was no documented study on the adherence levels among HIV patients living with HIV/AIDS or on the factors influencing their adherence. Therefore this study sought to explore various factors that influence adherence to ART among some AIDS patients in Embu.

### **1.3 Justification of the Study**

Embu County Teaching and Referral Hospital started administering ART in 2004 and there has been no documented study done to evaluate adherence on ART treatment given to the patients. Therefore it is important to undertake a study on the adherence of antiretroviral in the facility to assess on how well the patients have been taking their ARV treatment. This is because poor adherence can lead to the resumption of rapid viral replication, poorer survival rates, and the mutation to treatment-resistant strains of HIV. Therefore, understanding and enhancement of ART treatment adherence remains a critical goal for the individuals receiving treatment, for those providing treatment, for public and private health officials who are responsible for making treatment available, and for the public health at large.

### **1.4 Research Questions**

- i) What proportion of HIV/AIDS patients adhere to ARV Treatment?
- ii) Which socio-demographic and economic factors influence adherence to ARV's among the AIDS patients?
- iii) How do treatment regimen and treatment of co-infections affect adherence to ARV among the AIDS patients?
- iv) How do health care facilities and health care providers influence adherence to ARV among AIDS patients?

## **1.5 Research Objectives**

### **1.5.1 Broad Objective**

To determine factors that influence adherence to ART treatment among HIV/AIDS patients in Embu Teaching and Referral Hospital CC Clinic.

### **1.5.2 Specific Objectives**

- i) To determine the proportion of HIV/AIDS patients that adhered to ART treatment.
- ii) To establish socio-demographic and economic factors that influence adherence to ART drugs among AIDS patients.
- iii) To establish the effect of ART regimen and treatment of co-infections on adherence to ART treatment among AIDS patients.
- iv) To determine how health care facilities and health care providers influence adherence to ART among AIDS patients.

## **1.6 Significance of the Study**

The study was designed to achieve the outlined study objectives. In looking at the factors that influence client's adherence to antiretroviral therapy through their own experiences, a good understanding of client's need, expectations and perceptions were established. The study identified special issues needing attention from the service providers at the same time providing scientific foundation for practical patient friendly recommendations. The study provided a good platform for informed and useful policy and operational decisions to improve and strengthen the existing ART delivery systems. In order for this study to give a good feedback, the quality ART

services were identified; these include availability, affordability, accessibility and acceptability of ART drugs. Questions addressing these specific issues which were understood to highlight the four issues were formulated. They were measured and correlated to other studies and variables for further analysis to establish their relative importance. The results of the study were disseminated to the hospital management, comprehensive care clinic staff and all the staff in the hospital for the purpose of getting information on status of ART treatment. The study also provides information useful for future studies.

## **1.7 Limitations and Delimitations of the Study**

### **1.7.1 Limitations of the Study**

This study adopted a cross-sectional approach; this implied that the results only described a snapshot of a specific time only. However, adherence is a dynamic process that may change over time; thus, it may be that multiple contacts with respondents could have provided more useful information than a single interview. The respondents consisted only of patients who were visiting, the CCC. Therefore those who defaulted from the ART service were not included in the study.

### **1.7.2 Delimitations of the Study**

Estimating adherence to ART is both complex and dynamic to measure; the researcher relied on triangulation between the self-report adherence for the last three days, the visual analogue for the last one month and the less subjective pill count. The study focused on patients' characteristics, treatment related and health system factors influencing ART adherence. In addition the study took place in the largest hospital in

Embu County, which implied a higher accessibility of large pool of patients. Furthermore the hospital acts as a referral hospital for all sub-county hospitals and health centers, thus patients attended to represent the face of Embu County as a whole.

## **1.8 Conceptual Framework**

Fig 1.1 below shows there are four interactive elements that may cause non-adherence to ART treatment; (i) the health care team and system –related factors (ii)condition –related factors (iii)patient –related factors (iv) the characteristics of the antiretroviral therapy. All these have a bearing towards the patients adherence of ART (UNAIDS, 2008).

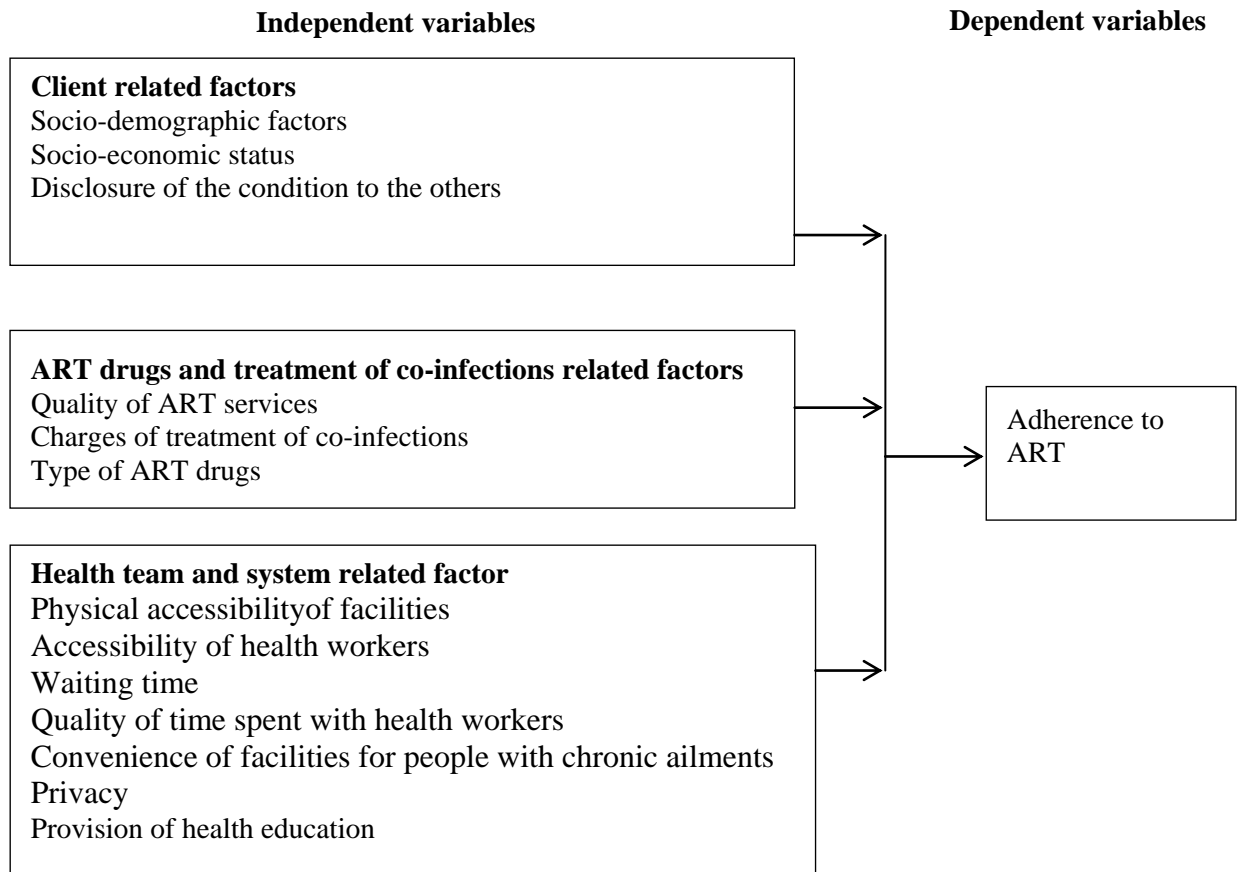


Figure 1.1: Factors affecting adherence to ART

Adapted and modified from Sumbi (2010)

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 The Global Picture of HIV/AIDS

The number of People Living HIV/AIDS (PLWHA) global has increased from 31.7 million in 2003 to 35.3 million in 2013 and 36.9 million in 2015 (UNAIDS, 2015) with 70 percent of all PLWHA living in sub-Saharan Africa (Aids2014Community, 2014). It was estimated that by the end of 2012, 9.7 million PLWHA would have had access to ART in low- and middle-income countries. This implies that over 15 million people living with HIV in low and middle-income countries urgently needed ARV medication (UNAIDS, 2013). Of these only 36% are accessing the ARV drugs (UNAIDS/WHO, 2010). Though shockingly small, this figure represents a great advance since 2003, when only 400,000 were receiving treatment (WHO, 2016).

A study done by Mills *et al.*, (2006) on level of adherence to ART on sub-Saharan Africa and North America revealed that sub-Saharan Africa had favorable levels of adherence than North America despite the poor setting. This has raised great concern on adherence in North America. The impact of providing ART is not often quantifiable due to limited monitoring systems. One measure, life-years gained, provides a standardized measure that shows the survival impact of ART on the population while controlling for variations in underlying survival. Measuring life-years gained allows a comparison of the impact of ART between regions. Suboptimal adherence is associated with antiretroviral failure, the development of resistance to antiretroviral therapy, and subsequent reduction of treatment options (Williams *et al.*, 2006). The benefits of antiretroviral therapy include a reduction in quantitative viral

load and subsequent decreased risk of HIV transmission due to undetectable viral loads in heterosexual discordant couples (Attica *et al.*, 2009).

Uncontrolled HIV replication imposes an increased risk of morbidity and mortality at all CD4-Tlymphocyte strata and the devastating consequences of HIV disease are preventable with antiretroviral treatment and adherence (Kuller *et al.*, 2008).

However, long term treatment with antiretroviral medications involves daily therapy to often complex regimens, thus representing an ongoing challenge to HIV-infected patients, families, and serving clinicians. At best, the rates of adherence to medication for adults and children with any chronic illness have been described to be approximately 50% with decrements occurring over time (Jimmy and Jose, 2011).

## **2.2 HIV and AIDS Treatment in Africa**

Sub-Saharan Africa has the most serious HIV and AIDS epidemic in the world. In 2013, an estimated 24.7 million people were living with HIV, 1.5 million new HIV infections and 1.1 million AIDS-related deaths (UNAIDS, 2015). As of 2012, at least 10 African countries (Botswana, Cape Verde, Eritrea, Kenya, Namibia, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe) reported reaching 80% or more of adults eligible for antiretroviral therapy, under the WHO guidelines of (2010). According to WHO (2016) of the 26 million people in Africa eligible for ART in 2016, only 7.6 million people were receiving HIV treatment.

Under the 2013 WHO guidelines, 79% of people living with HIV in West and Central Africa and 59% of people living with HIV in East and Southern Africa eligible for treatment were not accessing ART (UNAIDS, 2015). Moreover, 75% of adults with

HIV in sub-Saharan Africa who are accessing ART have not achieved viral suppression. Eastern and Southern Africa (41%) is scaling up ART uptake faster compared to Western and Central Africa (21%), in North Africa (11%) and 34% globally. In South Africa, for example, of the 5.8million PLWHA only 2.5m were started on ARV medication translating to 84% of those eligible people as per the 2010 WHO guidelines (Pillay *et al.*, 2012). The case for access of ART's in South Africa has been the most high profile of all African countries. However a gloomy picture is painted in South Africa, home to the world's largest ART program, since 25% of patients who begin ART are lost to follow-up one year after starting treatment, and in 25% of treated patients, viral suppression is not achieved (Ellman, 2015).

### **2.3 HIV and AIDS Management in Kenya**

More than 1.5 million people were infected with HIV in Kenya by the year 2005 but in the year 2012, 1.6 million people were living with HIV with a prevalence rate of 6.1% (UNICEF, 2013). Kenyan new HIV infections are estimated to have stabilized at an average of 89,000 among adults and about 11,000 among children annually. However progress has been made with HIV prevalence dropping from 10.5% in 1996 to 6.1% in 2012. However in Kenya HIV, continues to contribute the highest mortality rates, burdening households and straining national health systems (Avert, 2015). In the Kenya Aids Strategic Framework 2014/2015 – 2018/2019, Kenya aims at reducing new HIV infections by 75% and reduce AIDS related mortality by 25% in the next five years (NACC, 2014). In addition, Kenya's Vision 2030 aims at achieving comprehensive HIV prevention, treatment and care.

Of the 1.6 million PLWHA, 656,359 were on ART against estimated 902,302 in 2014 (141,608 children and 760,694 adults) PLWHA needing ART according to WHO 2009 guidelines (NACC, 2014). A report by Kenya AIDs Indicator Survey 2014, indicated that 78.4% of adults and 42.5% of children eligible for ART coverage were receiving treatment as of year 2013 (NAS COP, 2014). The low uptake in children was because of poor awareness on the part of parents and caregivers than non-availability of drugs. The country's leadership has shown high-level of political commitment to scaling up treatment and care alongside prevention efforts. The scaling up of antiretroviral treatment means that spending on HIV treatment and care accounted for the majority of HIV expenditure (52%) between 2009 and 2013. However, HIV response in Kenya is expected to increase by 114% between 2010 and 2020 representing a funding gap of \$1.75 billion (Avert, 2015).

#### **2.4 Adherence of ART Treatment among HIV/AIDS Patients**

Consistency and nearly perfect ART adherence is an essential requirement for HIV positive patients on ART to fully realize sustained suppression of HIV viral replication to below the level of detection (Scanlon *et al.*, 2013; Shumba *et al.*, 2013). Any levels of adherence below 95% have been associated with poor suppression of HIV viral load and a lowering of CD4 count leading to disease progression and development of drug resistance (Kgatlwane *et al.*, 2006). The SDGs aims at attaining 90% viral suppression among HIV patients on ART by 2030, however, only half of patients on ART in Embu County have achieved viral suppression (UNAIDS, 2015; NACC, 2016; NAS COP, 2016).

Botswana has the second-highest (HIV) infection rate in the world (Kandala *et al.*, 2012) with a prevalence rate of 23.0% (340,000 PLWHA) as of 2012 (UNICEF, 2013). However, as of 2014, 62% of those in need of ARVs in Botswana were receiving the ART treatment (World Bank, 2015). A study by Kgatlwane *et al.* (2005, 2006) showed ART adherence rate of 77% in this country which is comparable to that of developed countries.

In Uganda, by the year 2012, 1.5 million people were living with HIV, according to UNAIDS data. The country's adult HIV prevalence fell from around 15% in the early 1990s to around 7.2% by 2012 (UNICEF, 2013). Uganda ran one of the first pilot ART programmes in Africa which begun in 1998 with 399 patients and they were paying for their own treatment. At the end of the two-year pilot, patients reported good adherence to treatment and virological and immunological response to ART which were similar to those found in western countries and Uganda exceeded the government target of 60,000 (41%) (Byakika *et al.*, 2005; UNAIDS/WHO 2005, 2006). In a survey among 763 PLWHA patients in Uganda, it was revealed that 97% of the patients had not missed their doses in the last week and 93% of patients had not missed appointments in the past three months (Shumba *et al.*, 2013). In Malawi as of 2012 had an adult HIV prevalence rate of 10.8% (1.1 million PLWHA) and it was also revealed that 40% of those in need of ARVs access ART treatment (UNAIDS, 2014).

A study by Kidder *et al.*, (2013) showed that 84.6% of patients on 30-days a longitudinal group-randomized trial in Kenya had optimal adherence. A study done in Pumwani Hospital by Karanja (2013) reported higher levels of adherence, where

91% of the respondents showed perfect adherence levels between 95 and 100% according to hospital records as opposed to this study in Embu comprehensive care clinic. In a study among HIV patients attending Moi Teaching and Referral Hospital it was reported that the overall adherence levels based on timing of taking ARVs was low for all respondents 43.2%, (45.5% for males and 42.1% females) clearly indicated that there were serious barriers to adherence (Talam *et al.*, 2008).

## **2.5 Main Factors Hindering Adherence to ART**

Generally, the factors that influence adherence to anti-retroviral drugs fall into three categories namely; patient-related (psychosocial and educational) factors, patient-provider factors (interaction with physicians, nurses and other health workers and access to medications) and clinical factors (pill burden, dosing frequency and adverse effects of medications).

### **2.5.1 Patient Factors**

Patient factors include fear of disclosure and wanting to avoid taking medication in public places, feeling depressed, hopeless, or overwhelmed, having a concurrent addiction and forgetting to take medication at the specified time (Strace *et al.*, 2007; Kip, 2009, Mills *et al.*, 2006). Other barriers include being suspicious of treatment establishment, wanting to be free of medication or preferring a natural approach (due to treatment fatigue); feeling that treatment is a reminder of HIV status, wanting to be in control, not understanding treatment instructions, still having doubt or not being able to accept HIV status and lack of self-worth (Castro, 2005; Nakiyemba *et al.*, 2005; Mills *et al.*, 2006). Low level of education may impact negatively on some

patient's ability to adhere, while high level of education has a positive impact (Catz *et al.*, 2009; Rodriguez *et al.*, 2010). There are beliefs/perceptions concerning medications which include:-side effects (either real or anticipated), complicated regimens, and the taste, size, dosing frequency, and /or pill count and doubting the efficacy of HAART. In other studies when individuals prescribed to HAART felt healthy, adherence was often negatively affected (Castro 2005; Mills *et al.*, 2006).

A study in Southwest Ethiopia showed that the main hindrance to ART adherence was forgetfulness with 43.7% of HIV patients on ART forgetting to take their drugs (Amberbir *et al.*, 2008). Similar findings were made in Pumwani CCCs where it was found out that most patients cited forgetfulness and side effects as a challenge in taking medications (Karanja, 2013). Similar findings were also made at Moi Teaching and Referral Hospital where it was found out that patients failed to adhere to timing of drugs because of being away from home (58.7%), forgetting (59.0%), change in routine (59.6%), and running out of medicines (60.9%) and due to unpleasant taste of ARVs (65.2%) (Talam *et al.*, 2008). A study in Botswana revealed that 58% of ARV users reported having experiencing side-effects while only 8% cited side-effects as a reason for failure to achieve optimal adherence (Kgatlwane *et al.*, 2006).

In a cohort study in Kenya by Karcher *et al.* (2007) findings showed older patients were found to have lower treatment denial and therefore a higher risk of mortality as compared to younger patients. Similar findings were also made in Moi Teaching and Referral Hospital in which it was found out that most of the patients who failed to adhere to ART treatment were in the age bracket of 36-45 years and were either divorced, widowed or separated (Talam *et al.*, 2008).

### 2.5.2 Financial Constrains

Most studies conducted in poor settings overlook how direct and indirect economic burdens borne by patients affect their ability to access a steady supply of antiretroviral and take them on time. Such burdens may include absenteeism from work, the cost of elder or childcare during medical visits, the cost of transportation to a health center, being homeless, the cost of user fees, or the cost of tests and supplies (Castro, 2005). Although these costs may seem minimal to health professionals and decision makers, bearing these costs often translates into difficult household decisions about who eats, who works, or who goes to school. In resource poor countries many people live below poverty line and there is often no medical insurance or disability pension for people living with HIV (Knafi, 2007).

A study in Uganda observed that 66% of HIV patients reported to have had 3 to 5 meals per day with median number of meals being 4 per 24 hours (Nanziri, 2010). Also in Cameron, it was observed that a monthly middle income was significantly associated with greater pharmacy adherence (Rougemont *et al.*, 2009). In a study at Pumwani Comprehensive Care Clinics, patients earning an income of 20,000 Kenyan shillings and above were four times more likely to adhere to ART which was attributed to the ability to meet expenses such as transport to the clinic, food and shelter leading to a better way of dealing with economic problems that can negatively affect adherence (Karanja, 2013).

### **2.5.3 Daily Schedules of ART**

ART is a complex treatment that is characterized by pill burden, dietary and fluid restrictions and timing of medication intake. The daily schedule of the treatment is looking at what drugs a patient take daily and how they are able to tolerate them. The complexity of drug regimens is one of the causes of non-adherence among patients; in addition, daily dosing regimens of taking drugs three times or more are associated with non-adherence (Ingersoll and Cohen, 2008). According to a study by Curioso *et al.* (2010), it was found that having a fixed routine and the use of reminder tools enhanced adherence to ART among patients. The pill burden is a major challenge since combination of ART is used and it often contains 2–20 pills that have to be taken in a day together with the other factors to be considered like timing of dosages and food requirements (Protopopescu *et al.*, 2009). Castro, (2005) and Mills *et al.* (2006) reported nine common barriers related to daily schedules to ART. Some of these barriers include, disruptions in routine or having a chaotic schedule, finding HAART too inconvenient or difficult to incorporate. Patient finds difficulties in coordinating ART adherence with work, family or care giving responsibilities at home.

### **2.5.4 Interpersonal Relationships with Health Providers and Care Givers**

Interpersonal relationships can affect adherence behaviors. Effective treatment relationships are characterized by an atmosphere in which alternative therapeutic means are explored, the regimen is negotiated, adherence is discussed, and follow-up is planned (Ophelia, 2015). Cohesive partnerships and effective interpersonal communication make it possible for patients and physicians to work together to help

patients follow mutually agreed-upon recommendations in addition to promoting greater patient satisfaction with medical care, which in turn fosters higher levels of adherence (Martin *et al.*, 2005).

Positive and open relationships with their medical providers as an important adherence facilitator while also feeling comfortable to ask questions, talk about challenges, and feeling a part of decision making with one's medical provider play a key role in facilitating adherence. Curioso *et al.*, (2010) found that having family and friends reminding the patients to adhere to their ART regimen and living for someone was associated with improved ART adherence. Lack of trust or dislike of a patient health care-provider, social isolation, negative publicity regarding HAART or the medical establishment, discouraging social network are impediment to ARV adherence (Oloo, 2013).

Non-disclosure to family members and friends is seen as a constraint to successful adherence. In cases of non-disclosure among partners, the partner on ART may resort to hiding pills, occasionally skipping medications and failure to keep clinic appointments for refills or review. Disclosure on the other hand allow for support which plays a vital role in encouraging good adherence (Ophelia, 2015). In Southern Malawi, although healthcare providers advocate for disclosure of HIV status to family members, more than half of the providers interviewed stated that some of the women fear disclosing their HIV status to their spouses because their husbands may leave them (McKinney *et al.*, 2014). A study at Pumwani CCCs by Karanja, (2013) reported that among patients interviewed 89% had disclosed their HIV status to someone close to them while most reported to be receiving support from the people

they disclosed to. In South-west Ethiopia, better adherence was recorded among patients who got some form of support in their homes, or among their friends, as compared with non-supported patients (Amberbir *et al.*, 2008).

### **2.5.5 Treatment Related Factors**

In a study in Ethiopia, 99.4% of HIV patients reported to obtain ARVs from government health facilities the only source while 0.7% got ART drugs from friends, relatives and from private health facility (Alagaw *et al.*, 2013). It was also reported that over 65.8% of the patients were undergoing treatment of both HIV and opportunistic infections (Alagaw *et al.*, 2013). A much lower proportion of side effects were experienced by 52.3% of the patients at baseline while after 3-month follow up period only 20.4% reported having side effects among HIV patients in Southwest Ethiopia (Amberbir *et al.*, 2008).

In Southern Malawi it was found out that although patients were currently being transferred from the old regimen (Tenofovir) to the new regimen (Efavirenz), side effects were still a common reason their patients reported missing medication doses (McKinney *et al.*, 2014). A study in Ethiopia found that 18.2% of patients who missed ART was among the groups on Stavudine (D4T) +Lamivudine (3TC) +Efavirenz (EFV) while 14.5% missed Tenofovir (TDF) + Lamivudine(3TC) + Efavirenz (EFV) and 12.5% were on Zidovudine (AZT) + Lamivudine (3TC) + Nevirapine (NVP) (Alagaw *et al.*, 2013)

### **2.5.6 Clinical Setting and Service Provision**

The effect that the clinic setting has on ART adherence should not be underestimated. Clinic characteristics that impact on adherence include: proximity to the patients home or place of work; the cost of transport to the health facility, lengthy delays between appointments, clinic opening and closing times, long waiting times, lack of services such as child care, privacy, confidentiality, and unsympathetic or inconsiderate staff (Nakiyemba *et al.*, 2005). A randomized control trial study in three clinics in Kenya involving a clinical nurse sending a text message in the local language showed that adherence to ART was reported in 168 of 273 patients receiving the SMS intervention compared with 132 of 265 in the control group as well as improved viral suppression outcomes when compared with care (Lester *et al.*, 2010).

### **2.5.7 Influence of Health Providers Support on ART Adherence**

Health care providers have an important role to play in ART care in resource-limited settings by promoting appropriate use and ensuring availability of quality and efficacious medicines. Healthcare providers play a role in monitoring ART adherence, patient follow-up on refill, management of ART side-effects and providing counseling and information to ART patients (Warkowski and Barmans, 2010; Sumbi, 2010; NACC, 2014)

A study conducted by Binagwaho and Ratnayake (2009) on the role of social capital in the success of ART in Africa showed that some health care providers threatened to discontinue giving treatment to non-adherent clients, a situation which made them to remain adherent. In a study at Pumwani Comprehensive Care Clinic, it was reported

that although it was not mandatory for patients attending Pumwani clinic to obtain a treatment assistant before ART initiation, 36% of the patients had treatment assistants which aided them in adhering to treatment (Karanja, 2013).

In studies done in Zimbabwe by Skovdal *et al.* (2011) and Biadgilign *et al.* (2011) in Ethiopia reported that healthcare providers experienced in ART provision, patient-nurse and other provider relationships, health care providers beliefs, waiting time and opening hours were found to be a hinderance to adherence to ARV treatment. It was also found that availability of counseling services, and socio-economic, or psychological support for people living AIDS in both developing as well as developed countries can influence adherence positively or negatively (Reda and Biadgilign, 2012).

A study in Nairobi found that where early intensive adherence counseling services were given when a patient was being started on HAART, it resulted in a significant reduction in poor adherence and virologic failure (Chung *et al.*, 2011). Similar findings were made by Karanja, (2013) where it was observed that most of the Pumwani CCCs participants, 63% take less than an hour queuing before being attended by a health care provider during clinic appointments, 73% rated the services delivered at the clinic as good, and 99% indicated that they trust the health care providers.

## 2.6 Summary of the Literature

Of the 1.6 million PLWHA in Kenya, 78.4% of adults and 42.5% of children eligible for ART coverage were receiving treatment as of year 2013 and high-level of political commitment to scaling up treatment has been demonstrated. In Embu County out of the 5,540 adult HIV positive patients in need of ART, 5,130 were receiving ART in 2014, of these, 1694 patients have been started at the Embu Teaching and Referral Hospital (Embu hospital records,2014). Any levels of adherence below 95% have been associated with poor suppression of HIV viral load and a lowering of CD4 count leading to disease progression and development of drug resistance. Locally, studies have been carried out at Moi Teaching and Referral Hospital, Pumwani CCCs, Nyeri Teaching and Referral Hospital and Mombasa County among others. Despite these wide coverage of ART in the Embu County, there has no documented study carried out to evaluate ART adherence levels among patients attending the hospital CCC. Therefore this study will be very timely to assess adherence to ART treatment.

## **CHAPTER THREE: MATERIALS AND METHODS**

### **3.1 Study Design**

An explorative, descriptive cross-sectional study design was used. The study design provided information about the presence and strength of associations between variables, permitting the testing of hypothesis about such associations.

### **3.2 Study Variables**

#### **3.2.1 Dependent Variable**

Dependent variable assessed in the study was adherence to ARV treatment which was assessed based on the triangulation of self-report adherence for the last three days, a 10cm analogue scale and the less subjective pill count

#### **3.2.2 Independent Variables**

Independent variables which were investigated in this study were:

- i. Socio-demographic and socio-economic factors which included gender, age, marital status, highest level of education, occupation, average household monthly income and number of meals taken in household as well as socio-cultural factors such as attitude and perceptions, stigma.
- ii. Treatment related factors and treatment of co-infections which included charges for treatment of co-infections and quality of ART services and type of ART drugs given.

- iii. Health system related factors which included ratings of health care facilities and perception of health workers.

### **3.3 Study Area**

The study was carried out in Embu Teaching and Referral Hospital Comprehensive Care Clinic (See the Map on Appendix 1). The hospital is in Embu County and is a referral hospital for Tharaka-Nithi, Mbeere, Kirinyaga, Kitui and Mwingi Counties. This makes it to be one of the busiest hospitals in the region. The County has a population of 278,186 people as per national census of 2009. Overall HIV prevalence for the County is 3.3% with male prevalence at 2.0% while women prevalence is 4.5% (NACC, 2016). Within the county it is estimated that out of the 9,224 adult HIV positive patients in need of ART, only 6,275 receive ART (NASCOP, 2016). Since the inception of the clinic in 2004, over 3913 patients have been seen in the facility and over 1694 patients have been started on ART as of 2014 according to Embu Teaching and Referral Hospital Comprehensive Care Clinic records (Embu Hospital Records, 2014).

### **3.4 Target and Study Population**

The target population composed of adult HIV patients on ART in Embu County. Overall only half of ART patients in the County have achieved viral suppression, however decline in HIV-related deaths in the County is marginal among adults (16%) as compared to children (53%). The marginal decline in viral suppression among adults could be an indicator of sub-optimal adherence to ART; therefore this study targeted adult patients. The study population comprised of all adult patients (men and

women) 18 years and above with HIV positive and on ART for more than one year attending the HIV clinic in Embu teaching and referral Hospital.

### **3.5 Inclusion and Exclusion Criteria**

#### **3.5.1 Inclusion Criteria**

- i) HIV/AIDS patients who had been started on ART for more than one year.
- ii) Patients who were HIV positive 18 years and above and on ART treatment attending the comprehensive care clinic in Embu Teaching and Referral Hospital.
- iii) Patients who consented to be involved in the study.

#### **3.5.2 Exclusion Criteria**

- i. HIV/AIDS patients who had not been started on ART because they are only on care
- ii. HIV/AIDS patients on ART who did not consent to participate in the study.
- iii. HIV/AIDS patients below 18 years because they cannot give consent by themselves.

### **3.6 Sampling Procedure**

The sampling frame (patients' register) which contains names of the HIV patients on ARV's attending the medical facility in Embu teaching and Referral Hospital. They were randomly selected to give equal chance of participation of each number in the register. Patients attending CCC were systematically selected where every other 3<sup>rd</sup> client was interviewed after selecting the first client. In a case where the selected

patient decline to be interviewed, the next number was interviewed. This provided a representative sample of the HIV patients in Embu Teaching and Referral Hospital because all patients had equal chances of being selected for study.

### 3.6.1 Sample Size Determination

The sample was determined as per the formula used by Fisher *et al.* (1998)

$$n_0 = \frac{Z^2 p(1-p)}{d^2}$$

Where:

$n_0$ =Initial sample size

Z= the standard normal deviates (1.96) and it corresponds to 95% confidence level.

P=the proportion of the population estimated to have a particular characteristic (HIV positive clients over 18 years and on ARV (0.74)). According to PEPFAR (2014), 74% of HIV patients were on ART by 2012.

d =Level of statistical significance = 0.05

$$n = \frac{1.96^2 \times 0.74 \times (1 - 0.74)}{0.05^2} = 295.6 \approx 296 \text{ clients}$$

For population of less than 10,000 the following formula was used. In this case the population was 1694.

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}} = \frac{296}{1 + \frac{296 - 1}{1694}} = 252.1 \approx 253 \text{ Clients}$$

The minimum sample size required was 253 clients; however 331 clients were used targeted inclusive of 12% attrition rate.

### 3.7 Data Collection

This study relied on researcher administered questionnaire. The questionnaire was structured and semi-structured and contained both closed ended questions and open ended questions. In closed ended questions, the respondents chose the relatively best answers from a set of given options. In open ended questions, they were free to express their views unrestricted.

To assess ART adherence, this study used three measurement tools:

i) Three - day recall.

Patients were asked how they took their medicines in the last three days. The three-day recall had the advantage of a short time-span, which means that memory of medicine intake was likely to be good.

ii) One-month self-report recall using (10 cm long visual analogue scale)

ARV users were asked to indicate their adherence rate over the past month using a 10-centimeter long 'visual analogue' line. The beginning of the line indicated not taking the medications at all in the past month, while the end meant taking all of them as prescribed. The patient's mark was measured using a 10 cm ruler and translated into percentages.

iii) Pharmacy pill count.

The pill-counts can be defined as the most 'objective' of the three approaches, measuring the actual number of pills left over since the previous refill. However, patients who fear the possible repercussions of revealing to the dispensing pharmacist that they have not achieved optimal adherence, may present fewer pills to the pharmacist than were actually left over. All three methods are likely to overestimate

adherence. The three methods are preferred so that one method could compensate the weaknesses of the other.

### **3.8 Pre-Testing of Study Instruments**

The instruments of the study were tested on patients who were HIV positive and on ART in Runyenjes Sub-County Hospital.

### **3.9 Reliability and Validity of Study Instruments**

#### **3.9.1 Reliability**

The pretesting of the tool was done to make sure it collected the data it was intended to collect. Care was taken not to collect data from one respondent twice. All data collectors were well trained and orientated to the tool. After pre-testing, the researcher assessed the reliability of the study instrument based on Cronbach Alpha score. The score was calculated using split-half techniques where the pre-test data was split into two equal sets and correlation evaluated. The results found a Cronbach Alpha score of 0.81 which was deemed satisfactory.

#### **3.9.2 Validity**

Validity is described as the degree to which a research instrument measures what it was intended to measure. Validity of the tool was assessed by extensive literature review of previous studies and adopting validated tools in these reviewed studies.

### **3.10 Data Analysis**

Data was sorted, coded, and processed using SPSS software version 20. Descriptive statistics such as mean, frequencies and percentages were used to describe and summarize the data. Both means, for optimal adherence and non-adherence rates at Embu Teaching and Referral Hospital was calculated using data from the three days recall, one month self-recall (10 cm long visual analogue scale) and pill count by the pharmacist. Analysis of contingency tables was done and Chi-square statistic used to test for association between variables.

### **3.11 Ethical Considerations**

These were:

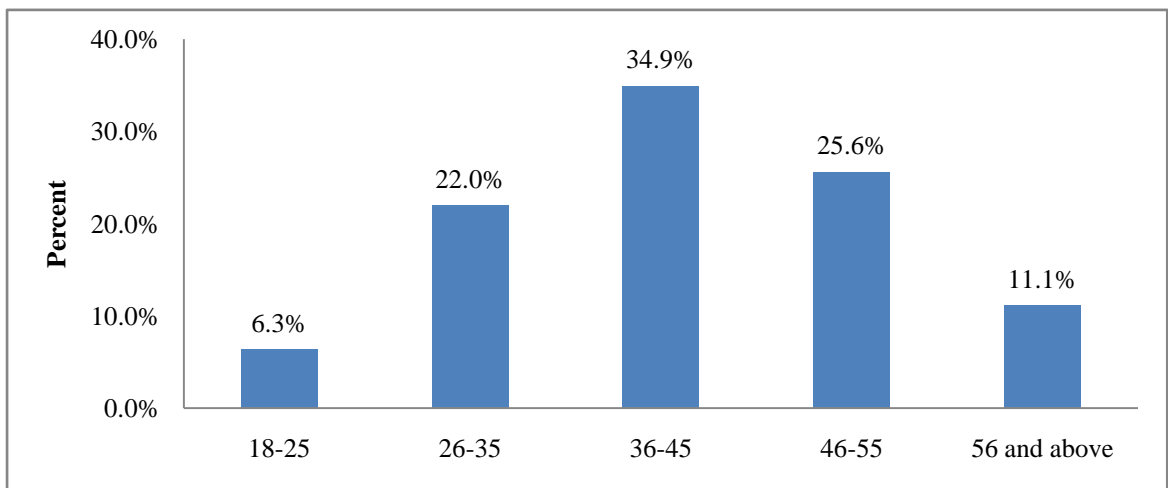
- i) Research approval to carry out the research study was obtained from Kenyatta University School of Public Health, ethical approval was obtained from Kenyatta University Ethical Review Committee and research authorization was sought from NACOSTI.
- ii) Clearance to collect data was obtained from the Embu Teaching and Referral Hospital management and from Embu County commissioner and Ministry of education.
- iii) Informed consent was obtained from all the study participants.
- iv) Confidentiality, anonymity and privacy was observed during the study.

## CHAPTER FOUR: RESULTS

### 4.1 Socio-demographic characteristics of the respondents

#### 4.1.1 Age of the Respondents

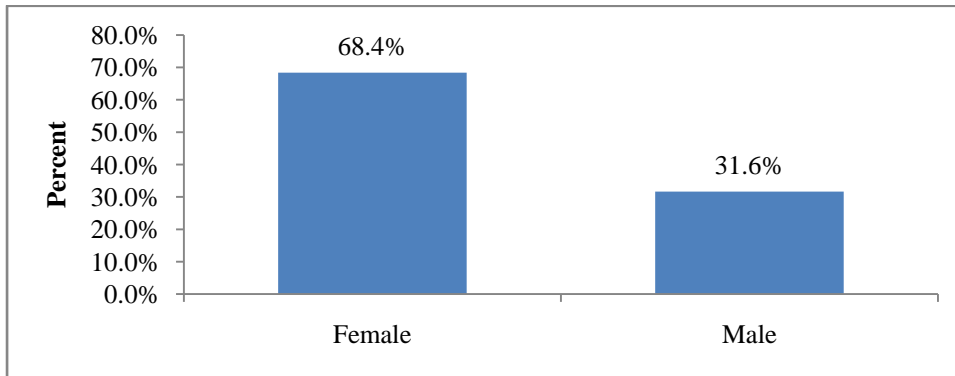
The highest number of respondents interviewed 116(34.9%) were aged between 36 and 45 years while lowest 21(6.3%) were aged between 18 and 25 years as shown in Figure 4.1.



**Figure 4.1: Age of respondents**

#### 4.1.2 Gender of the Respondents.

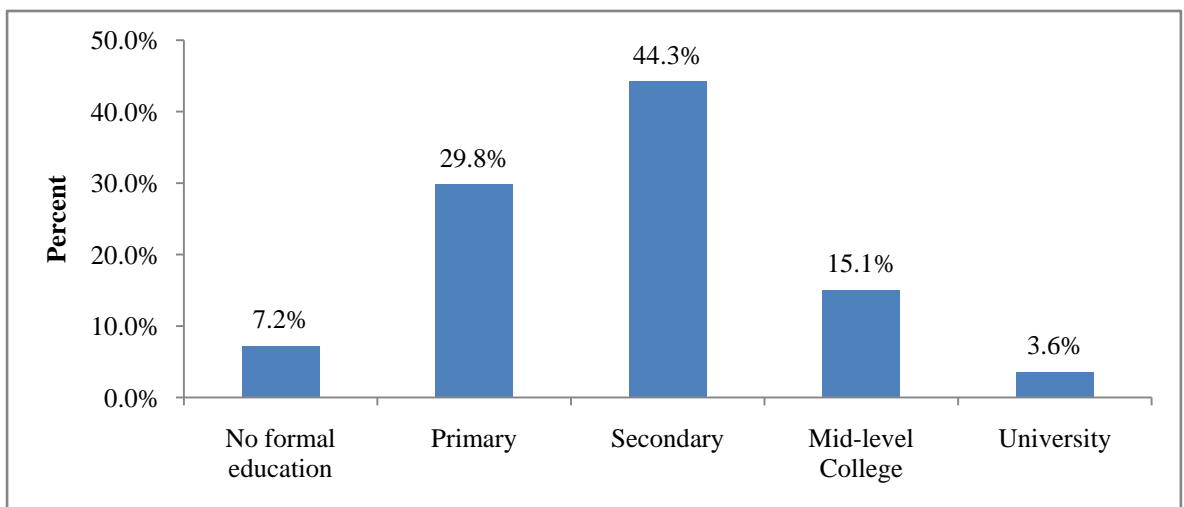
Majority 227(68.4%) of the respondents interviewed were female and 105(31.6%) were male as indicated in Figure 4.2.



**Figure 4.2: Gender of respondents**

#### 4.1.3 Level of education of the Respondents.

Nearly half 147(44.3%) of the respondents had attained secondary level of education while 12(3.6%) had attained University education as shown in Figure 4.3.



**Figure 4.3: Education level**

#### 4.1.4 Marital status of the Respondents

Over a third 126(38.0%) of the respondents were in monogamous marriage, and 91(27.4%) were single while a small percentage of 17(5.4%) were separated or divorced as indicated in Table 4.1.

**Table 4.1: Marital status of the Respondents**

<b>Marital status</b>	<b>Frequency</b>	<b>Percent</b>
Married Monogamous	126	38.0
Single	91	27.4
Widowed/er	55	16.6
Married polygamous	42	12.7
Separated/Divorced	17	5.4

#### **4.1.5 Occupation of the Respondents**

Nearly a third 105(31.6%) of the respondents were employed permanently or on part-time job while 16(4.8%) were students as shown in Table 4.2.

**Table 4.2: Main occupation of the Respondents**

<b>Main occupation</b>	<b>Frequency</b>	<b>Percent</b>
Employed	105	31.6
Business	69	20.8
Farmer	63	19.0
Casual worker	55	16.6
Unemployed	24	7.2
Student	15	4.8

#### **4.1.6 Level of income of the Respondents**

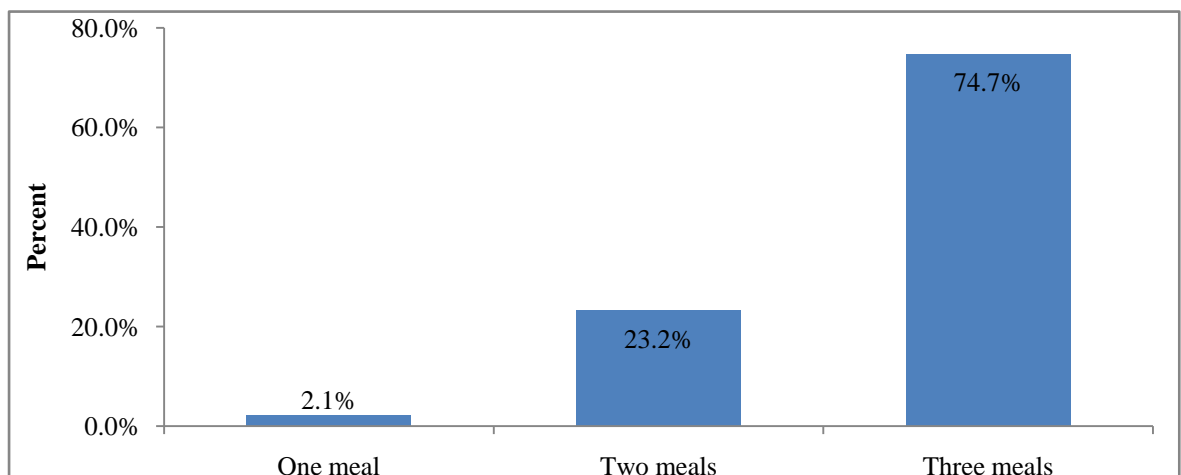
Nearly half 157(47.3%) of the respondents were earning less than Kshs. 5000 while only a few 7(2.1%) were earning more than Kshs. 20,000 monthly as indicated in Table 4.3.

**Table 4.3: Average monthly income of the Respondents**

Average monthly income	Frequency	Percent
<Kshs. 5,000	157	47.3
Kshs. 5,001 - 10,000	116	34.9
Kshs. 10,001 - 15,000	32	9.9
Kshs. 15,001 -20,000	19	5.8
>Kshs. 20,000	7	2.1

#### 4.1.7 Meals eaten per day by the Respondents

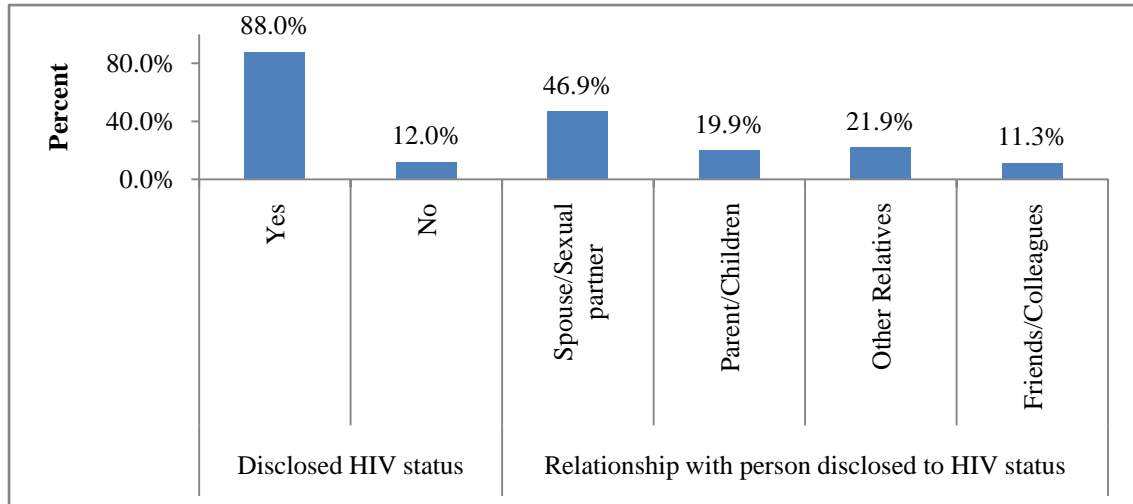
Majority 248(74.7%) of the respondents could afford three meals in a day while few 7 (2.1%) could afford one meal only in a day as indicated in Figure 4.4.

**Figure 4.4: Number of meals taken**

#### 4.1.8 HIV status disclosure

Majority 292(88.0%) of the respondents had disclosed their HIV status to other people while 40(12.0%) had not disclosed to anyone. Nearly half 137(46.9%) had disclosed their HIV status to their spouse or sexual partner while 33(11.3%) had

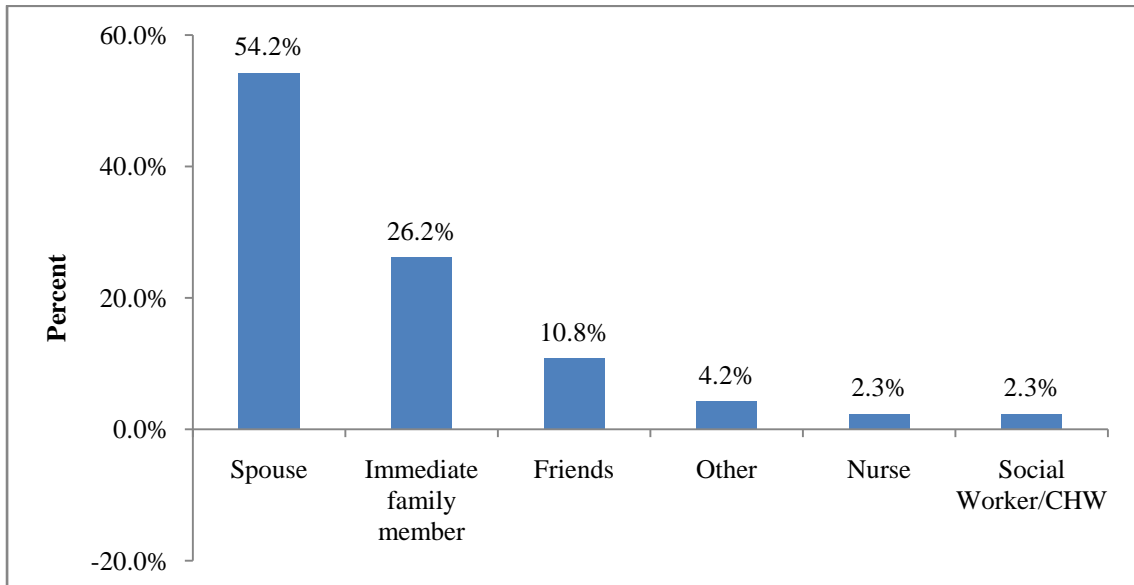
disclosed their HIV status to their friends or colleagues as seen in Figure 4.5. Other had disclosed their status to relatives and parents or children.



**Figure 4.5: Disclosure of HIV status**

#### 4.1.9 Psychosocial Support on taking ARVs

Majority 260(78.3%) of the respondents in the last one month had been supported (reminded or encouraged) to take their ARV medications. From the above 141(54.2%) were supported by their spouses while 6(2.3%) were supported by a social worker/CHW and a nurse respectively as shown in Figure 4.6. below.



**Figure 4.6: Person who supported the HIV patients in adherence to ART treatment**

## 4.2 Adherence to ART Treatment by the respondents

### 4.2.1 Self-report and Pill Count

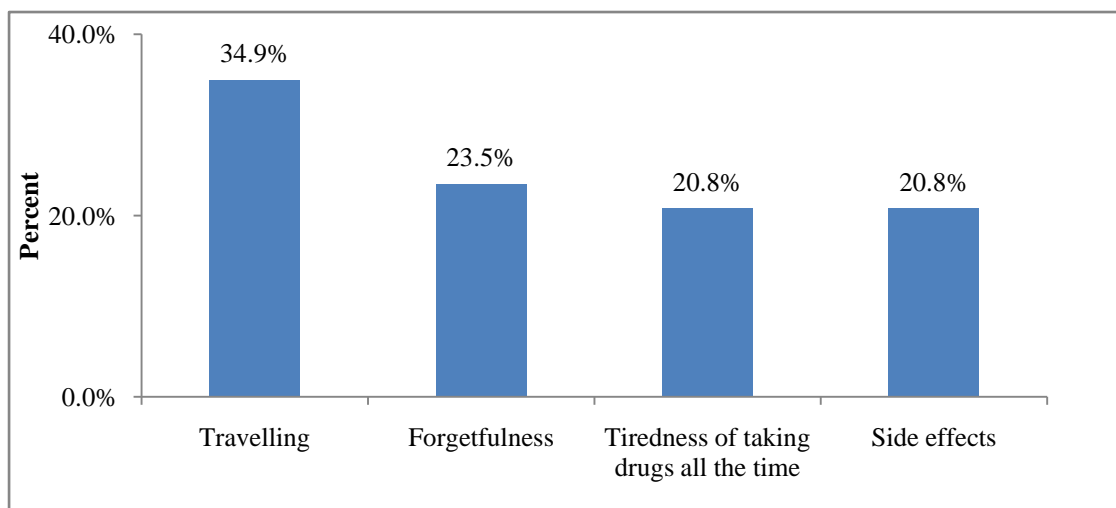
Self report indicated that 171 patients had 100% adherence. The pill count ascertained that only 160 among the 171 patients had 100% adherence according to ART. Since the pill-counts is considered the most 'objective' approach to assessing ART adherence, the 160(48.2%) patients were considered to have had optimal ART adherence and the rest having sub-optimal adherence to ART as seen in Table 4.4. below.

**Table 4.4: Comparison between Self-report and Pill Count**

Self-report adherence in the last one month	Adherence to ART treatment (pill count)	
	Sub-optimal	Optimal
10 cm	11	160
9 cm	118	0
8 cm	31	0
<=7 cm	11	0

#### 4.2.2 Respondent's reasons for non-adherence

Over a third 116(34.9%) of the respondents indicated travelling as the main cause of sub-optimal adherence to treatment. Other reasons included forgetfulness (23.5%), fatigue of taking drugs all the time (20.8%) and side effects 20.8% as seen in Figure 4.7.

**Figure 4.7: Causes non-adherence to the treatment**

#### 4.3 Influence of socio-demographic factors on adherence to ART

Adherence to ART treatment was significantly associated with age of the respondents ( $\chi^2=10.745$ ,  $df=4$ ,  $p$ -value = .030) and marital status ( $\chi^2=17.944$ ,  $df=4$ ,  $p$ -value = .001)

of the respondents. However, gender ( $\chi^2=1.079$ ,  $df=1$ ,  $p\text{-value} = .299$ ) and educational level ( $\chi^2=1.920$ ,  $df=4$ ,  $p\text{-value} = .750$ ) of the respondents were not significantly associated with ART adherence as seen in Table 4.5.

**Table 4.5: Social demographic characteristics and adherence to ART**

Social demographic	Categories	Adherence to ART treatment		Chi-square ( $\chi^2$ , df, p-value)
		Sub-optimal	Optimal	
Age of respondent	36-45	60(34.9)	56(35.0)	10.745, 4, 0.030
	46-55	52(30.2)	33(20.6)	
	26-35	34(19.8)	39(24.4)	
	56 and above	21(12.2)	16(10.0)	
	18-25	5(2.9)	16(10.0)	
Gender of respondent	Female	122(70.9)	105(65.6)	1.079, 1, 0.299
	Male	50(29.1)	55(34.4)	
Education level of respondents	Secondary	72(41.9)	75(46.9)	1.920, 4, 0.750
	Primary	50(29.1)	49(30.6)	
	Mid-level College	29(16.9)	21(13.1)	
	None	14(8.1)	10(6.3)	
	University	7(4.1)	5(3.1)	
Marital status of respondents	Single	48(27.9)	43(26.9)	17.944, 4, 0.001
	Married Monogamous	56(32.6)	70(43.8)	
	Married polygamous	16(9.3)	26(16.3)	
	Separated/Divorced	11(6.4)	7(4.4)	
	Widowed	41(23.8)	14(8.8)	

#### 4.4 Influence of social factors on adherence to ART

ART therapy opinion ( $\chi^2=0.540$ ,  $df=1$ ,  $p\text{-value} = 0.462$ ), friends or relative avoidance due to medication ( $\chi^2=0.360$ ,  $df=1$ ,  $p\text{-value}=0.549$ ) and family or community member support existence in the last one month on taking ARV medications ( $\chi^2=0.006$ ,  $df=1$ ,  $p\text{-value} = 0.936$ ) were not significantly associated with adherence to ART treatment as indicated in Table 4.6.

**Table 4.6: Social factors and adherence to ART**

Social factors	Categories	Adherence to ART treatment			Chi-square ( $\chi^2$ , df, p-value)
		Sub-optimal	Optimal	Total	
ART therapy opinion	Approve	168(97.7)	158(98.8)	326(98.2)	0.54, 1, 0.462
	Disapprove	4(2.3)	2(1.3)	6(1.8)	
Friends or relatives avoidance	Yes	48(27.9)	40(25.0)	88(26.5)	0.36, 1, 0.549
	No	124(72.1)	120(75.0)	244(73.5)	
Family or community member support	Yes	135(78.5)	125(78.1)	260(78.3)	0.006, 1, .936
	No	37(21.5)	35(21.9)	72(21.7)	

#### 4.5 Influence of socio-economic factors on adherence to ART

As shown in the table 4.7, the status of engagement in income generating activities (occupation) was significantly associated with adherence to ART treatment ( $\chi^2=12.565$ ,  $df=5$ ,  $p\text{-value} = 0.028$ ) while Monthly income ( $\chi^2=8.924$ ,  $df=4$ ,  $p\text{-value} = 0.063$ ), source of family food ( $\chi^2=1.55$ ,  $df=3$ ,  $p\text{-value} = 0.670$ ) and daily meals uptake ( $\chi^2=0.396$ ,  $df=3$ ,  $p\text{-value} = 0.959$ ) were not significantly associated with adherence to ART treatment.

**Table 4.7: Social-economic factors and adherence to ART**

Social-economic factors	Category	Adherence to ART treatment		Chi-square ( $\chi^2$ , df, p-value)
		Sub-optimal	Optimal	
Occupation	Employed	55(32.0)	50(31.3)	12.565, 5, 0.028
	Business	37(21.5)	32(20.0)	
	Farmer	33(19.2)	30(18.8)	
	Casual worker	34(19.8)	21(13.1)	
	Unemployed	11(6.4)	13(8.1)	
	Student	2(1.2)	14(8.8)	
Monthly income (Kshs.)	< 5,000	76(47.8)	62(46.6)	8.924, 4, 0.063
	5,001 - 10,000	47(29.6)	55(41.4)	
	10,001 - 15,000	18(11.3)	11(8.3)	
	15,001 -20,000	13 (8.2)	4(3.0)	
	> 20,000	5(3.1)	1(.8)	
Family food source	Market	107(62.2)	108(67.5)	1.55, 3, 0.670
	From own farm	62(36.0)	48(30.0)	
	Others	2(1.2)	3(1.9)	
	Welfare	1(.6)	1(.6)	
Daily meals uptake	Three meals	128(74.4)	120(75.0)	0.396, 3, 0.959
	Two meals	40(23.3)	37(23.1)	
	One meal	4(2.3)	3(1.9)	

#### **4.6 Influence of ART treatment services and ART drugs on adherence to ART**

##### **4.6.1 Quality of ART services**

To establish how quality of ART services influenced ART adherence, respondents were asked to rate the charges on a 4 point likert scale spanning from excellent (4) to poor (1). The rates were then compared among respondents with optimal adherence vis-à-vis respondents with sub-optimal adherence using Mann-Whitney U test. The respondents reported excellent availability of ART services at the CCC and adherence

counseling, however only as shown in Table 4.8, respondents who had optimal ART adherence rated significantly (Mann Whitney U test p-value = 0.004) higher the availability of ART services at the CCC as compared to respondents who had sub-optimal ART adherence. This showed that overall availability of ART services at the CCC influenced ART adherence.

**Table 4.8: ART Services offered in the facility**

Mean ratings of ART Services	Adherence to ART		Total	Mann Whitney U test p-value
	Sub-optimal	Optimal		
Availability of ART services at the CCC	3	4	4	0.004
TB counselling	3	3	3	0.347
ART drugs counselling	4	3	3	0.268
Nutritional counselling	3	3	3	0.188
Adherence counselling	4	3	4	0.372

#### 4.6.2 Treatment of co-infections

To establish how charges for treating various co-infections influenced ART adherence, respondents were asked to rate the charges on a likert scale spanning from very high (4) to free of charge (1). The rates were then compared among respondents with optimal adherence vis-à-vis respondents with sub-optimal adherence using Mann-Whitney U test. Majority of the respondents did not know about the charges for dermatological, ENT, psychiatric treatment services. However among respondents who know the charges of these treatment services, respondents who had sub-optimal adherence indicated that the charges were very high (4) while respondents who had optimal adherence indicated that charges were reasonable (3) as shown in Table 4.9.

**Table 4.9: Treatment of co-infections charges**

Mean ratings of costs for co-infections	Adherence to ART		Total	Mann Whitney U test p-value
	Sub-optimal	Optimal		
Psychiatric treatment	4	3	3	.000
Ophthalmological treatment	4	3	3	.035
Laboratory tests	4	3	3	.000
ENT treatment	4	3	3	.001
Dermatological treatment	4	3	3	.009
Specialized treatment	3	3	3	.000

#### 4.6.3 ART side effects experience

About a third of the respondents had experienced side effects which they attributed to ART as shown in Table 4.10. ART adherence was significantly associated ( $\chi^2=13.103$ ,  $df=1$ ,  $p\text{-value} = 0.000$ ) with experience of ART related side effects with respondents who had experienced ART related side effects having lower adherence as compared to respondents who did not experience ART related side effects.

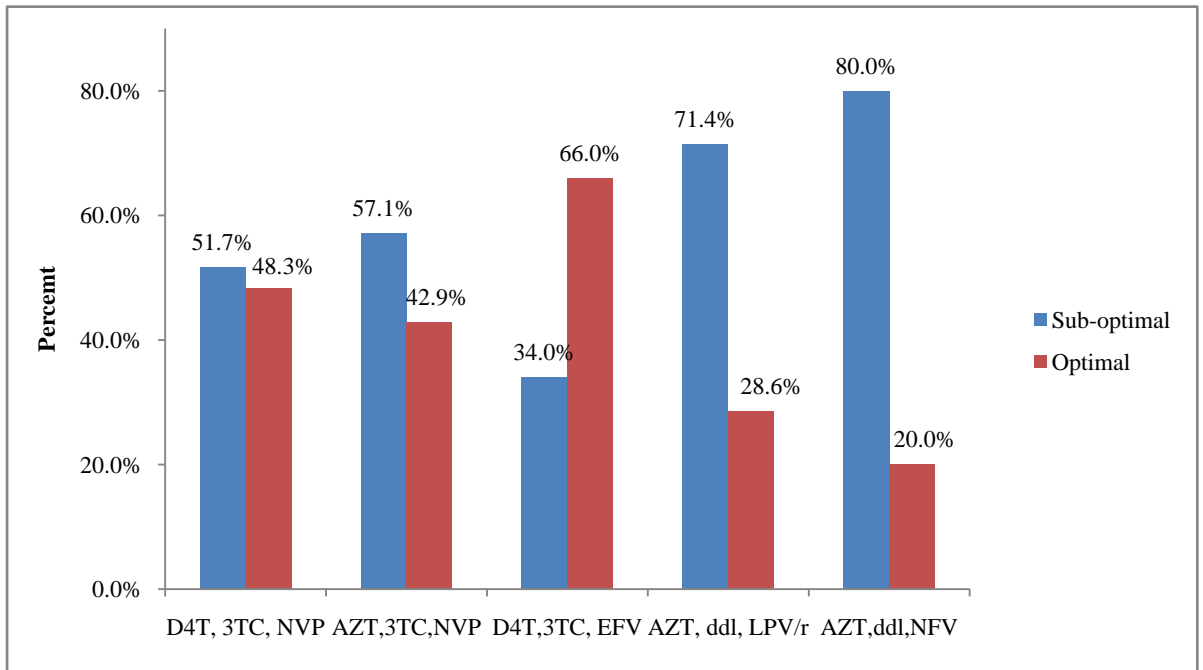
**Table 4.10: ART side effects experience**

Experienced ART side effects	Adherence to ART		Total	Chi-square ( $\chi^2$ , df, p-value)
	Sub-optimal	Optimal		
Yes	73(66.4%)	37(33.6%)	110(33.1%)	13.103,1,.000
No	99(46.6%)	123(55.4%)	222(66.9%)	

#### 4.6.4 Type of ART drugs and adherence

Respondents on Zidovudine (AZT), Didanosure (ddl), and Nelfinavir (NFV) had the highest proportion of sub-optimal adherence to treatment (80%) and the lowest proportion of optimal adherence (20%) while respondents on Stavudine (D4T), Lamivudine (3TC), efavirenz (EFV) had the highest proportion of optimal adherence

to treatment (66%) as shown in Figure 4.10. There was significant association (Chi-square p-value = .034) between adherence to ART treatment and the type of drug a respondent was in.



**Figure 4.7: Adherence by ART treatment**

#### **4.7 Influence of health care facilities and providers on adherence to ART**

##### **4.7.1 Influence of health care facilities on adherence to ART**

To establish how various health facilities related factors influenced ART adherence, respondents were asked to rate the factors on a likert scale spanning from excellent (4) to poor (1). The rates were then compared among respondents with optimal adherence vis-à-vis respondents with sub-optimal adherence using Mann-Whitney U test. As indicated in Table 4.11 below, respondents who had sub-optimal ART adherence significantly rated higher physical inaccessibility and longer waiting time as compared to respondents who had optimal ART adherence. However the privacy/confidentiality during examination at the comprehensive care clinic was

reported to be poor by both categories of patients. Therefore respondents who had sub-optimal adherence had poorer physical accessibility and longer waiting time as compared to respondents who had optimal ART adherence.

**Table 4.11: Health care facilities rating**

Health care facilities rating	Adherence to ART		Total	Mann Whitney U test p-value
	Sub-optimal	Optimal		
Physical inaccessibility	2	3	3	.000
Convenience for people with chronic ailments	3	3	3	.152
Privacy during examination	2	2	2	.303
General cleanliness	3	3	3	.082

#### 4.7.2 Respondents' Perception of Healthcare workers

To establish how health worker related factors influenced ART adherence, respondents were asked to rate the factors on a likert scale spanning from excellent (4) to poor (1). The rates were then compared among respondents with optimal adherence vis-à-vis respondents with sub-optimal adherence using Mann-Whitney U test. As indicated in Table 4.12 below, respondents who had sub-optimal ART adherence significantly rated longer waiting time as compared to respondents who had optimal ART adherence. However the respondents rated the health personnel behaviour and quality of time spent with health personnel as excellent.

**Table 4.12: Respondents' Perception of Healthcare workers**

<b>Healthcare workers rating</b>	<b>Adherence to ART</b>		<b>Total</b>	<b>Mann Whitney U test p-value</b>
	<b>Sub-optimal</b>	<b>Optimal</b>		
Health personnel's behaviour	4	4	4	.093
Accessibility of health personnel	3	3	3	.853
Waiting time	2	3	3	.000
Quality of time spent with health personnel	4	4	4	.090
Provision of health education	3	3	3	.310

## **CHAPTER FIVE: SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Summary of the Findings**

The study revealed that (48.2%) of the patients had optimal adherence to ART treatment while 51.8% had sub-optimal adherence. It was also found that 34.9% of the respondents reported that travelling was the main cause of hindrance to optimal adherence to treatment. Majority (88.0%) of the patients had disclosed their HIV status to other people of whom 46.9% had disclosed to their spouse or sexual partner and they were accorded excellent moral support. Adherence to ART treatment was significantly associated with age (p-value = .030), marital status (p-value = .002) and status of engagement in income generating activities (occupation) (p-value= 0.028) of the patients.

Patients on AZT, ddl, NFV had the highest proportion of sub-optimal adherence to treatment (80%) while patients on D4T, 3TC, EFV had the lowest proportion of sub-optimal adherence to treatment (34%). Majority (65.7%) of patients had not observed any side effects emanating from the ART treatment.

Accessibility to the health facility was reported to be good by (50.3%) of the respondents. Convenience of the facilities for people with chronic ailments was rated to be good with (46.4%) of the respondents and waiting time at the facilities was reported to be average (38.6%). The general state of the infrastructure at the health facility was reported to good with (44.6%) of the respondent however the privacy during examination was reported to be poor by (31.3%).

## 5.2 Discussion

### 5.2.1 Proportions of HIV patient who Adhere to ART treatment for the last one month

It was established that about half (48.2%) of the patients had optimal adherence to ART treatment. This was different from a study by Kidder *et al.*, (2013) where a much higher figure 84.6% of 30-days optimal adherence was reported in a longitudinal group-randomized trial in Kenya. The difference with this study could be attributed to type of the study since this study adopted cross-sectional approach as opposed to longitudinal design. A study done in Pumwani Hospital by Karanja (2013) reported higher levels of adherence, where 91% of the respondents showed excellent adherence levels between 95 and 100% according to hospital records as opposed to this study in Embu comprehensive care clinic. Similar findings were made among HIV patients attending Moi Teaching and Referral Hospital where it was reported that the overall adherence levels based on timing of taking ARVs was low (43.2%) (Talam *et al.*, 2008).

On patient's opinion, travelling was found to be the main hindrance to optimal adherence to treatment. Other reasons included forgetfulness, tiredness of taking drugs all the time and side effects. This finding agrees with results made in studies in Pumwani CCC (Karanja, 2013), Moi Teaching and Referral Hospital (Talam *et al.*, 2008), Southwest Ethiopia (Amberbir *et al.*, 2008) and Botswana (Kgatlwane *et al.*, 2006) which documented being away from home, forgetfulness and side effects as patients reasons behind sub-optimal ART adherence.

The study revealed that on the pill count 48.2% of the patients had optimal adherence to ART while majority had sub-optimal adherence. This study agrees with a study done by Talam *et al.* (2008) in Eldoret where it was found that only 43.2% were having optimal adherence to ART. It was contrary to a study done in Pumwani by Karanja (2013) where most of the patients had good adherence to ART treatment.

### **5.2.2 Influence of socio-demographic and economic factors on adherence to ART**

Adherence to ART treatment was significantly associated with age and marital status of the patients with patients aged 18-25 years having better adherence as compared with patients aged 36-55 years. Also, greater proportions of the married had optimal adherence as compared to the single, widowed and separated. The higher prevalence of adherence among married patients could be attributed to presence of partner who offers psychosocial support and acting as a treatment assistant. In addition the higher adherence among those below 25 years compared to those above 35 years could be attributed to being busy by the latter as a result of employment activities hence prone to being busy as a result of work-related activities hence lower adherence. The finding agrees with observations made in Moi Teaching and Referral Hospital who found non-adherence to be higher among patients aged above 36 years, and divorced, widowed or separated patients (Talam *et al.*, 2008). Contrary findings were made in a cohort study in Kenya by Karcher *et al.*, (2007) where older patients were found to have lower treatment denial and therefore a higher likelihood of adhering to ART as compared to younger patients.

Majority (88%) of the patients had disclosed their HIV to other people, mostly to spouse or sexual partner and was accorded excellent moral support. However disclosure of HIV status did not significantly influence adherence to ART. A similar proportion was recorded at Pumwani CCCs by Karanja (2013) in which it was reported that among patients interviewed 89% had disclosed their HIV status to someone close to them while most reported to be receiving support from the people they disclosed to. The findings also agree with observations made in Southern Malawi where it was reported that some women fear disclosing their HIV status to their spouses because their husbands may leave them (McKinney *et al.*, 2014).

Patient's ART therapy opinion was not associated with adherence to ART treatment. Additionally, friends or relative avoidance due to medication and family support existence in the last one month on taking ARV medications were not significantly associated with adherence to ART treatment. Contrary findings were made in Southern Malawi where it was reported that disclosure of HIV status and stigma were contributing to non-adherence. In the interview of healthcare providers, it was found that seven out of eight healthcare providers interviewed indicated that patients go to ART clinics far from home to avoid friends and family because they fear discovery of their HIV status. It was also revealed that there was better adherence among patients who get some form of support in their homes, hospital, or among their friends, as compared with non-supported patients (McKinney *et al.*, 2014). Contrary findings were also made in South-west Ethiopia where it was found that existence of social support was a significant predictor of adherence to treatment (Amberbir *et al.*, 2008)

Although level of income was not significantly associated with adherence to treatment, the engagement in income generating activities (occupation) was significantly associated with adherence to ART treatment of whom greater proportions of employed, business persons, farmers and casual workers had sub-optimal adherence as compared to unemployed and students who majority had optimal adherence. This could be attributed to the fact that the later might have had sufficient time in their hands hence always remembering to take their medications as compared to the former. The findings disagrees with findings which were made in Pumwani CCCs (Karanja, 2013) and Cameron (Rougemont *et al.*, 2009) where it was observed that patients with higher monthly income had greater ART adherence which was attributed to the ability to meet expenses such as transport to the clinic, food and shelter leading to a better way of dealing with economic problems that can negatively affect adherence. The difference observed in this study where students and unemployed had better optimal adherence as compared to employed respondents could be attributed to the busy schedule of the later due to engagement in income generating activities while the former has much time at their disposal.

### **5.2.1 Effect of ART Drugs and Treatment of Co-Infections on Adherence to ART Treatment**

Most patients sourced ARVs from public hospitals; however other treatments like multivitamins, analgesics and some antibiotics were sometimes not available in public hospitals. Also most patients (65.7%) had not observed any side effects emanating from the ART treatment. However patients who experienced ART side effects were more likely to have sub-optimal adherence compared to patients who had not

experienced ART side effects. A much higher proportion of side effects were experienced by 52.3% of the patients at baseline while after 3-month follow up period only 20.4% reported having side effects among HIV patients in Southwest Ethiopia (Amberbir *et al.*, 2008). The study agrees with findings made in Southern Malawi where it was found that although patients were transferred from the Tenofovir to Efavirenz, side effects were still a common reason their patients reported missing medication doses (McKinney *et al.*, 2014).

Patients on AZT, ddI, NFV had the highest proportion of sub-optimal adherence to treatment while patients on D4T, 3TC, EFV had the lowest proportion of sub-optimal adherence to treatment. Contrary findings were reported in Ethiopia where relatively higher proportion of patients who missed ART was among the groups on D4T+3TC+EFV (18.2%) while 14.5% missed TDF-3TC-EFV and 12.5% missed AZT-3TC- NVP (Alagaw *et al.*, 2013)

### **5.2.2 Influence of health care facilities and health care providers on adherence to ART**

Patients with optimal ART adherence reported excellent overall availability ART services at the CCC as compared to patients with sub-optimal ART adherence. Also patients with sub-optimal ART adherence reported high cost for opportunistic infection treatment and laboratory services relative to optimally adhering patients. Physical accessibility to the health facility and longer waiting times hindered ART adherence. In addition, the privacy during examination at the CCC was reported to be poor. This agreed with other studies done in Zimbabwe by Skovdal *et al.* (2011) and Biadgilign *et al.* (2011) in Ethiopia where waiting time and opening hours were found

to be a hinderance to adherence to ARV treatment. It was also found that availability of counseling services, and socio-economic, or psychological support for people living with HIV/AIDS in both developing as well as developed countries can influence adherence positively or negatively (Reda and Biadgilign, 2012). Comparable findings were also made in Nairobi where it was reported that where counseling services were available at early stages when a patient is being started on HAART resulted in a significant reduction in poor adherence and virologic failure (Chung *et al.*, 2011)

Accessibility of health personnel in the facility were reported to be excellent however patients who had sub-optimal ART adherence significantly rated longer waiting time as compared to patients who had optimal ART adherence. In addition health workers spent quality time with both patients with optimal and sub-optimal ART adherence. Concurring findings were made by Karanja, (2013) where it was observed that most of the Pumwani CCCs participants, 63% took less than an hour queuing before being attended to by a health care provider during clinic appointments, 73% rated the services delivered at the clinic as good, and 99% indicated that they trust the health care providers. This finding was different from a study in India which indicated that up to a quarter of patients visited health centre and did not meet the counselors but just collected the drugs from pharmacy and left (Joshi *et al.*, 2014). Comparable findings were made in Zambia where HIV patients reported to have spent quality and right amount of time with healthcare workers (Torpey *et al.*, 2008).

### 5.3 Conclusions

Based on the study findings the researcher concludes as follows:

1. A proportion of 48.2% patients had optimal adherence to ART treatment while the majority (51.8%) had sub-optimal adherence to ART treatment.
2. Age, marital status and patient engagement in income generating activities influenced adherence to treatment. Young age (<25) years, increased chances of adherence to ART. Married patients received satisfactory moral support from spouses which increased chances of adherence to ART. Slightly bigger proportions of patients engaged in income generating activities were more unlikely to achieve optimal adherence.
3. The type of drug a patient used and costs of treating co-infections influenced adherence to ART treatment. Use of AZT, ddI, NFV reduced the chances of optimal adherence compared to use of D4T, 3TC, EFV. Higher cost of treating co-infections reduced chances of adherence to ART treatment.
4. Physical inaccessibility of health facilities and longer waiting times at the health facility was a significant barrier to optimal ART adherence. Furthermore privacy/confidentiality during examination at the facility/CCC was poor hence a hindrance to service utilization and ultimately hindering optimal ART adherence.

## 5.4 Recommendations

The following recommendations are formulated from the study:-

1. HIV patients should be given more information on the importance of consistency and nearly perfect adherence to ART so as to fully realize its life extending benefits as it has been shown that there is significant non-adherence among HIV positive patients on ART in the County. This will also improve the percentage of the individuals who adhere to the HIV treatment.
2. There is need to create an environment for the employed individual to find out why their adherence levels are wanting and to help them to develop better adherence strategies. Also patient who do not have drug assistant can be encouraged to have one so that they can encourage/ remind them to take their drugs as expected. The health worker should create more time with the older patients to know what problems make them not to take ARV as expected, work together with them to develop ways of enabling them to remember to take their treatment.
3. All patients who are showing tendencies of sub-optimal adherence to ART should be identified by the clinician and appropriate action be taken to help them achieve optimal adherence levels to the treatment. All drugs for treatment of opportunistic ailments should be availed in the hospital so that the patients will not be forced to go and buy outside taking into considerations that their financial levels are wanting.

4. The effort should be made to make the clinic user friendly by improving the privacy of the clinic by renovating the rooms so that patient can be able to discuss their issue with clinician without being interfered with and without fear of the other patients who are being seen at the same time. There is also need to improve the staffing so that patient will not take a long time waiting to be seen

### **5.5 Recommendations for Further Research**

This study has investigated the factors influencing adherence to antiretroviral therapy (ART). Therefore a further study should be carried out to assess how challenges elicited in this study can be addressed to enhance adherence to antiretroviral therapy (ART) within the Embu County. A further study should be carried out to investigate why older patients in this county have poor adherence to ART compared to the younger patients 18-25 years. Moreover, a further study should be carried out on other hospitals to find out if the similar results will be obtained.

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# APPENDICES

## Appendix 1: Map of Embu MAP OF EMBU (Inset The Map of Kenya)

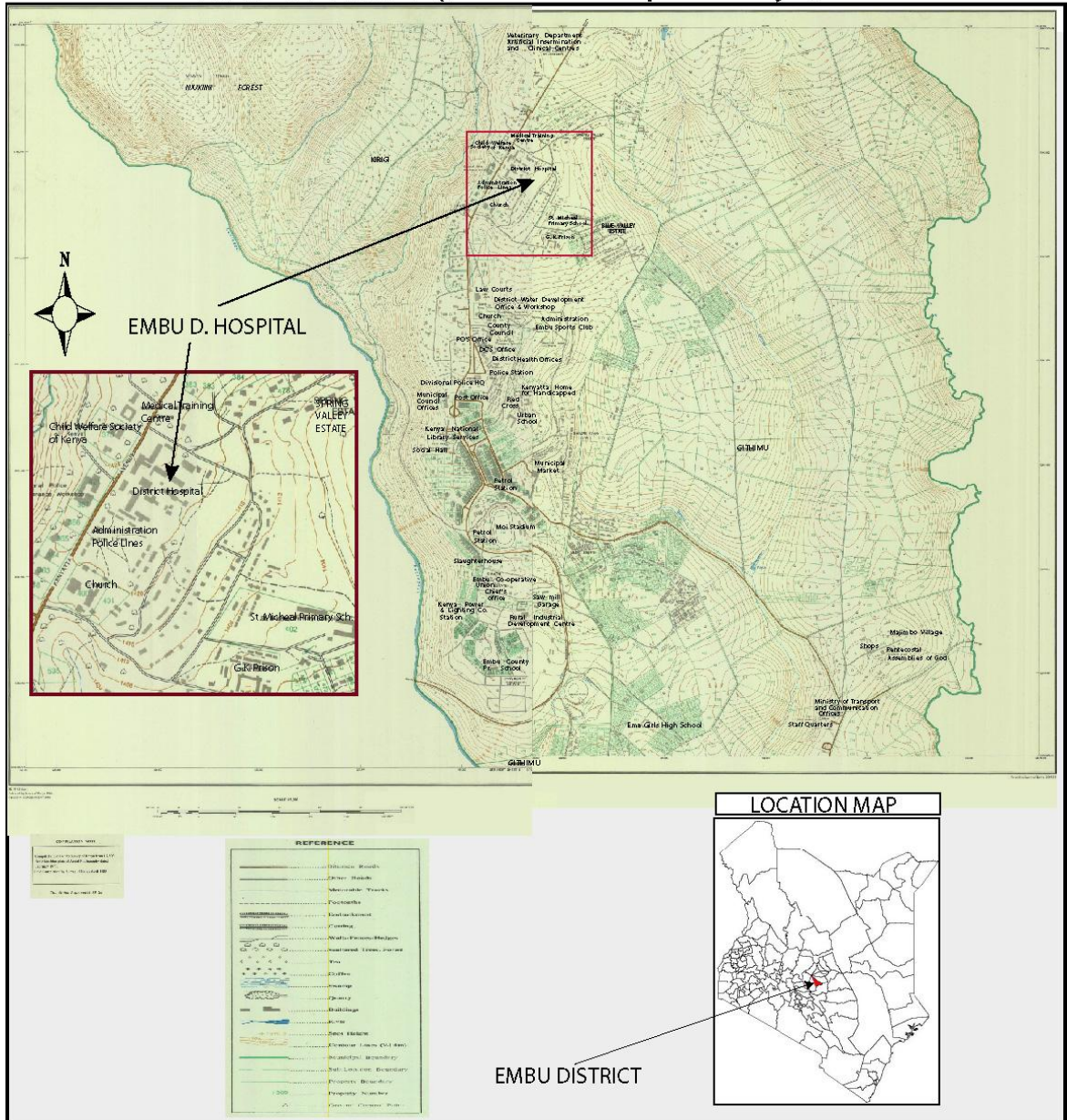


Figure 2

Source: Google Maps and Google Earth

**Appendix 2: Consent Form**

Kenyatta University

School of Public Health

P.O Box: 43844-00100

Nairobi

Tel: +25420 8710901 Ext: 57236

E-mail: kuerc.chairman@ku.ac.ke/kuerc.secretary@ku.ac.ke

**RECORD OF INFORMED CONSENT TO CONDUCT AN INTERVIEW**

Date: \_\_\_\_\_

Interviewer: \_\_\_\_\_

Reg no: I57/6044/2003

Tel: +254723903137

Interview Code Number: \_\_\_\_\_

Place at which the interview was conducted: .....

Thank you for agreeing to allow me to interview you. What follows is an explanation of the purpose and process of this interview.

**Information about the interviewer**

Hello. \_\_\_\_\_

My name is Evangeline K N Muggon and I am a student at Kenyatta University, School of Public Health. As part of my Masters in Public Health, I am required to conduct a study to apply the knowledge and skills that I have acquired during the Masters program. I am here today to conduct the survey whose focus is on HIV/AIDS . I am interested to know the factors that affect adherence on antiretroviral drugs, specifically what you understand about HIV/AIDS, how ARV drugs are taken and how you can adhere to HIV treatment. I will also want to get information on how you relate to the health worker during your visits

**Purpose and contents of interview**

The purpose of this interview is to find out the factors that affect adherence to antiretroviral treatment in Embu P G Hospital comprehensive care clinic. The interview will gather information on what you know about HIV treatment and side effect of treatment, how you acquire drugs, what are the socio demographic, cultural and economic factors which affect adherence to treatment. Your relationship with the health workers and how HIV as affected your relationship with your family and community at large.

**The interview process**

The interview will take about 30 minutes. I will be asking questions and noting down your answers on this form. You are free to ask any question during the interview in case you need clarification.

**Anonymity of contributors**

The purpose of this interview is solely for academic purposes and will not be used against you in any way. At all times, I will keep the source of the information confidential and refer to you or your words by a number. I shall keep any other records of your participation locked away at all times, and destroy them after the data has been collected.

**Things that may affect your willingness to participate**

The interview may touch on issues concerning your personal and family living situation. If there is anything that you would prefer not to discuss, please feel free to say so. I will not be offended and there will be no negative consequences if you would prefer not to answer a question. I would appreciate your guidance should I ask anything which you see as intrusive.

Please note that there will be no financial gain to the study participants.

**How will you benefit from the study?**

Even though the study will not benefit you personally, the results will provide insight into the situation of adherence to ARV treatment. The recommendations from the study

will be used to inform the relevant authorities on how they can work with HIV patients to improve adherence to treatment.

### **Risks**

This study involves only collection of information from you and as such there are no risks associated with the research. Therefore you will not be exposed to any risks.

### **Withdrawal from the study**

Participation in this interview is on voluntary basis and as an interviewee you are at liberty to withdraw from the study any time you feel that you do not want to continue with the interview. In case you decide to withdraw from the study, you shall not be penalized in any way for your decision.

### **Questions**

Do you have any questions or clarification you need regarding the information that I have given you?

### **Agreement**

#### **Interviewee's agreement**

The interviewee will be asked to give his/her consent below.

Interviewer's agreement

The contents of this interview shall be treated with confidentiality in the sense that the only the number noted above will be used in all documents which refer to the interview. The contents will be used for the purposes referred to above, but may be used for published or unpublished research at a later stage without further consent. Any change from this agreement will be renegotiated with you.

Signed by interviewer: \_\_\_\_\_

Signed by participant: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Place: \_\_\_\_\_

**Contact Persons**

1. Prof Ephantus Wanjohi Kabiru  
Dean School of Public Health  
Kenyatta University
2. Joyce W Mwaniki  
Senior Lecturer School of Plant Science  
Kenyatta University

### Appendix 3: Interview Schedule

#### Client's Adherence to Antiretroviral treatment at the Embu Provincial General Hospital

Date of interview: \_\_\_\_\_

Name of the interviewer: \_\_\_\_\_ FORM NO \_\_\_\_\_

#### INSTRUCTIONS

All information given to the interviewer will be treated with ultimate confidentiality.

No client names will be inscribed in the interview form

The clients will not be forced to be interviewed.

There will be no monetary gain to the interviewee for answering the question

The feedback of the study will be shared with the institutions.

Are you willing to participate in project?

1. Yes      2. No

#### SOCIO - DEMOGRAPHIC DATA *(Please tick appropriately)*

1. Gender	a. Male b. Female
2. Age	a. 18-25 yrs b. 26-35 yrs c. 36-45 yrs d. 46-55 yrs e. 56 and above f. No response
3. Level of education	a. Primary b. Secondary c. Mid-level college d. University e. None
4. Marital Status	a. Single b. Steady Partner not living together c. Steady partner and living together d. Married in monogamous relationship e. Married in a polygamous relationship f. Separated / Divorced g. Widowed / Widower
5. How many Children	
6. Age of last child	
7. Have you disclosed HIV status to anyone?	a. Yes b. No c. No response d. Don't remember

8. If Yes, what was the relationship with person/s you disclosed to	a. Spouse/Sexual partner
	b. Parent/children
	c. Relatives
	d. Friends/colleagues
	e. Spiritual leaders
	f. Others (specify).....
9. What type of support did you receive	a. Psychological/Emotional b. Financial c. Moral d. Spiritual e. N/A
10. How would you rate support received from spouse/sexual partners, relatives, parents, children, friends, colleagues	a. Excellent b. Good c. Poor d. Don't know e. N/A
11. How would you rate your satisfaction with the support above	a. Excellent b. Good c. Poor d. Don't know e. N/A

### SOCIO-ECONOMIC DATA

12. What is/was your main occupation for the last three months	a. Employed full time b. Part time employment c. Casual work d. Farmer e. Business f. Student g. Retired h. Unemployed i. Self employed j. Others (specify).....
13. What is your average monthly income	a. < KSHs 5,000 b. 5,001-10,000 c. 10,001-15,000 d. 15,001-20, e. Over 20,000
14. For how long have you been working	a. 1-5 b. 6-10 c. 10-15 d. Over 16 yrs
15. What is the main source of food for family	

16. How much money from your income is used in buying food per day in your household?	
17. How many meals do you afford to take in a day?	a. One meal b. Two meals c. Three meals d. Others (specify).....

**SOCIAL-CULTURAL FACTORS**

Attitude/ perceptions towards ART

19. What is your opinion regarding ART therapy  
 1. Approve                      2. Disagree                      3. Undecided
20. If disapprove what are the reasons? Kindly list at least 2  
 .....  
 .....
21. Do you avoid friends or relatives because of your illness?  
 1.Yes      2.No
22. In the last one month did you have any family or community member who supported (reminded or encouraged) you to take your ARV medications?  
 1.Yes      2.No
23. If yes, who was the person who supported you?  
 (Check one response only)  
 1.Spouse   2.Immediate member of family (specify)      3.Nurse      4.Doctor  
 5.Social Worker/Community Health Worker      6.Friend      7.Other  
 specify.....
24. Do you think that ARV will have a positive effect on your health?  
 1.Yes      2.No
25. What benefits have you gained from using ARV drugs  
 1.Gained more weight/energy      2.No more frequent sickness      3.Child grows normally now
26. Do you think ARV drugs can prevent the child you are expecting from HIV infection (Only for pregnant women)  
 1.Yes      2.No

**KNOWLEDGE OF THE DISEASE AND THE DRUG**

27. Do you know your latest CD4 cell count?  
1. Yes 2. No 3. No response 4. Don't know
28. Do you know the normal range of CD4 cell count?  
1. Yes 2. No 3. No response 4. Don't know
29. Do you know any substances that when taken can lead to non adherence to ARV?  
1. Yes 2. No 3. No response 4. Don't know
30. If yes in 29 above, kindly list them in order of their contribution to non-adherence.  
-----  
-----
31. In your own opinion what do you think ARV is used for?  
1. Reducing pain 2. Reducing the progression of HIV 3. I don't know.  
4. Curing HIV

**KNOWLEDGE OF TREATMENT BY DRUG ASSISTANT .**

32. Do you have anybody who assists you in taking drug?  
1. Yes 2. No
33. If yes, how would do you rate their attitude towards you?  
1. Excellent 2. Good 3. Average 4. Poor 5. Don't know
34. How would you rate his/her Knowledge on the HIV/ AIDS treatment?  
1. Excellent 2. Good 3. Average 4. Poor 5. Don't know
35. Does he/her accompany you to the facility to know more about your progress and treatment?  
1. Yes 2. No
36. If yes, how would you rate the support given by the person?  
1. Excellent 2. Good 3. Average 4. Poor 5. Don't know

**TREATMENT REGIMEN AND CO- MANAGEMENT LEVEL OF ADHERENCE.**

Instructions on study participant. I would like to ask you a few questions concerning your taking of ART drugs for the last one month. Please be assured that missing doses is very common at one time or the other to all patients/people. The information you give will not affect your treatment for ARV medication in the facility or your participation in this study

37. How would you rate the overall availability of ARV services at the hospital/CCC?

On-going Counseling

1. Excellent      2. Good      3. Average      4. Poor      5. Don't know

38. TB Counseling

1. Excellent      2. Good      3. Average      4. Poor      5. Don't know

39. ART drugs Counseling

1. Excellent      2. Good      3. Average      4. Poor      5. Don't know

40. Nutritional Counseling

1. Excellent      2. Good      3. Average      4. Poor      5. Don't know

41. Adherence Counseling

1. Excellent      2. Good      3. Average      4. Poor      5. Don't know

42. Any other comment concerning availability of ART

-----

43. Which drugs are you taking currently

- a. Stavudine(D4T), Lamivudine (3TC), Nevirapine (NVP)
- b. Stavudine (D4T), Lamivudine (3TC), Efavirenz (EFV)
- c. Zidovudine (AZT), Didanosure (ddl), Lopinavir/Rit (LPV/r)
- d. Zidovudine ( AZT), Didanosure(ddl), Nelfinavir (NFV)
- e. Others (specify)-----

44. How would you rate the charges and costs for any specialized treatment you receive resulting from ART medication at the CCC?      For example

a) Psychiatric treatment

1. High      2. Reasonable      3. Low      4. Don't know      5. Free of charge

b) Ophthalmological treatment:

1. High    2. Reasonable    3.Low    4. Don't know    5. Free of charge

c) Laboratory Tests:

1. High    2. Reasonable    3.Low    4. Don't know    5. Free of charge

d) ENT treatment:

1. High    2. Reasonable    3.Low    4. Don't know    5. Free of charge

e) Dermatological Treatment:

1. High    2. Reasonable    3.Low    4. Don't know    5. Free of charge

f) Other Treatment: Specify-----

45. Does the hospital waive the fee for those people who are not able to afford?

1. Yes    2. No    3. Don't Know

46. Would you recommend other clients for the services in the facility?

1. Highly Recommend    2. Recommend    3. Averagely recommend    4. Cannot Recommend    5. Not sure

### **FACTORS ASSOCIATED WITH HEALTH SERVICE PROVISION AND HEALTH FACILITIES**

47. How would you rate the appropriateness of physical location (distance) / accessibility of this hospital/CCC? Is it easy to access it?

1. Excellent    2. Good    3. Average    4. Poor    5. Don't know

48. How long did it take you to reach the CCC/ hospital from home?

1. Less than one hour    2. 1-2hours    3. over 3hours

49. How would you rate waiting time at the facility/CCC?

1. Excellent    2. Good    3. Average    4. Poor    5. Don't know

50. List areas where you experienced long waiting times ( in order of duration):

-----

51. How would you rate the convenience of facilities for people with chronic ailments at this hospital/CCC?

1. Excellent    2. Good    3. Average    4. Poor    5. Don't know

52. How would you rate the accessibility to any doctor in this facility? (clinical officers, ART Specialist etc)

- 1.Excellent      2. Good                      3. Average      4.Poor  
5.Don't Know

53. How long would you be willing to wait for a doctor in this CCC/Facility?  
Specify

---

#### **HEALTH CARE PROVIDER FACTORS INFLUENCING ADHERENCE**

54. In your opinion, how would you rate the professional competence of the doctors/nurses and workers handling your ART needs?

- 1.Excellent      2. Good                      3. Average      4.Poor  
5.Don't Know

55. In your opinion, how would you rate the doctor's behavior ( friendly, caring, listening etc)

- 1.Excellent      2. Good                      3. Average      4.Poor  
5.Don't Know

56. In your opinion, how would rate the quality of time spent by the doctor addressing your needs. For example (explaining about health and treatments, patient and not in a hurry etc)

- 1.Very adequate   2.Adequate    3.Inadequate   4.Very inadequate    5.don't  
Know

57. In your opinion, how would you rate privacy/ confidentiality during examination at the facility/CCC?

- 1.Excellent      2. Good                      3. Average      4.Poor      5.Don't  
Know

58. In your opinion, how would you rate the behavior of the nurses (smiling faces, polite, caring attitude, supportive, time to talk, time to explain issues etc)?

- 1.Excellent      2. Good                      3. Average      4.Poor  
5.Don't Know

59. How would you rate the provision of health education at this facility/CCC?

- 1.Excellent      2. Good                      3. Average      4.Poor  
5.Don't Know

60. How would you rate the general state of the infrastructures in the CCC/facility?  
 1.Excellent      2. Good                      3. Average      4.Poor  
 5.Don't Know

61. How would you rate the general cleanliness of the CCC/ hospital?  
 1.Excellent      2. Good                      3. Average      4.Poor  
 5.Don't Know

### **PROPORTION OF HIV/AIDS PATIENTS WHO ADHERE TO INSTRUCTIONS**

62. In your opinion how would you rate your taking of antiretroviral drugs?  
 1. Very well      2. Fairly well      3. Well      4. Poor      5.don't know

63. How long have been on ART treatment?

1. 1year- 2years              2.3-4yrs              3.5-6yrs              4.over 7yrs.

64. In a measure of 10cm, how would you rate your drug uptake looking at timings, missing of drugs all together for the last three days?

1. 10cm (100%)              2. 9cm (90%)      3. 8cm (80%)      4. 7cm and below ( 70% and below)

65. Did you come with your remaining tables/drugs during this visit?

a) Yes                      b) No

66. If yes, how many have you brought back? .....

- a. More than 5 days
- b. Less than 5 days
- c. Exactly 5 days

**Note:      acceptable adherence is >95% adherence.**

67. For the last one month how many times have you failed to take your ART drugs as expected?

1. Over 3 times              2. 2-3 times      3. Once only      4.Never.

68. In your opinion what were the main causes that hinder you from adhering to the treatment? List 3 problems in order of priority.

---

69. What things can make it hard for you to remember your treatment?
1. Develop toxicity/side effect
  2. Forgot to take ART
  3. Felt too ill
  4. Fear of disclosure/Stigma
  5. Stock was finished
  6. Drinking of alcohol
  7. Too many pills/pill burden
  8. Others (Specify).....
70. Where do you get your ARV and other treatment from?
1. Chemist/pharmacy
  2. From relatives and friends
  3. Hospital/clinic and GOK health centres
  4. Private Hospital /mission Hospital/clinic
  5. Don't know
  6. Others (specify).....
71. What other drugs other than ART are you currently taking.
1. Pain relievers
  2. Sleeping pills
  3. Multivitamin
  4. Antibiotics
  5. Anti Fungal
  6. TB treatment
  7. Others
72. Have you had any side effects because of ART treatment?
1. Yes
  2. No
  3. No Response
  4. Do not remember any
73. If Yes in 70 above how does the side effect experienced affect your perception on ART treatment? Explain -----  
-----
74. If Yes in 70 above, in your opinion, how would you rate the severity of the side effect?
1. Very severe
  2. Severe
  3. Mild
  4. Very mild
  5. Not applicable
75. What other factors other than the one mentioned in the questionnaire affect your adherence to ART treatment? Please list them in order of priority.  
.....
76. What is your overall satisfaction with antiretroviral treatment?

**Thank you for taking time to participate in this interview**

## Appendix 4: Approval of Research Proposal



KENYATTA UNIVERSITY  
GRADUATE SCHOOL

E-mail: [kubps@yahoo.com](mailto:kubps@yahoo.com)  
[dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)  
Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 8710901 Ext. 57530

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### Internal Memo

---

**FROM:** Dean, Graduate School **DATE:** 10<sup>th</sup> March, 2012  
**TO:** Ms. Evangeline K. N. Mugoh **REF:** IS7/6044/03  
C/o Community Health  
Department  
**SUBJECT:** APPROVAL OF RESEARCH PROPOSAL

=====

This is to inform you that the Graduate School Board at its meeting of **1<sup>st</sup> March, 2012** approved your research proposal for M.P.H. degree subject to including the county of the study area.

Thank you.



**JOHN M. ODONGI**  
**FOR: DEAN, GRADUATE SCHOOL**

c.c. Chairman, Community Health Department

Supervisors:

1. Prof. Ephantus W. Kabiru  
C/o Dean, School of Public Health
2. Dr. Joyce Mwaniki  
C/o Plant & Microbial Sciences Dept.

JMO/cww

**Appendix 5: Introduction letter to NACOSTI**



**KENYATTA UNIVERSITY  
GRADUATE SCHOOL**

E-mail: [admissions-graduate@ku.ac.ke](mailto:admissions-graduate@ku.ac.ke)  
[dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)  
 Website: [www.ku.ac.ke](http://www.ku.ac.ke)

**P.O. Box 43844, 00100  
 NAIROBI, KENYA  
 Tel. 8710901 Ext. 57530**

**Our Ref: I57/6044/03**

**Date: 23<sup>rd</sup> May, 2012**

The Permanent Secretary,  
 Ministry of Higher Education, Science & Technology,  
 P.O. Box 30040,  
**NAIROBI**

Dear Sir/Madam,

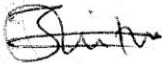
**RE: RESEARCH AUTHORIZATION**  
**MS. EVANGELINE KANANU N. MUGOH - REG. NO. I57/6044/03**

I write to introduce **Ms. Evangeline Kananu N. Mugoh** who is a Postgraduate Student of this University. She is registered for a M.P.H. degree programme in the Department of Community Health in the School of Public Health.

Ms. Mugoh intends to conduct research for a Thesis entitled, **“Factors Influencing Adherence to Antiretroviral Treatment (ARV’S) in Embu Provincial General Hospital (EPGH), Embu County-Kenya.”**

Any assistance given will be highly appreciated.

Yours faithfully,

  
**MRS. LUCY N. MBAABU**  
**FOR: DEAN, GRADUATE SCHOOL**

LNM/cww

Appendix 6: NACOSTI Certification

PAGE 2 PAGE 3

**THIS IS TO CERTIFY THAT** **Research Permit No. NCST/RCD/12A/012/10**

**Prof./Dr./Mr./Mrs./Miss/Institution** **Date of issue** **31<sup>st</sup> August 2012**

**Evangeline Kananu Njue Mugoh** **Fee received** **KSh. 1,000**

**of (Address) Kenyatta University**

**P.O.Box 43844-00100, Nairobi.**

**has been permitted to conduct research in**

**Location**

**District**

**Embu County**

**on the topic: Factors influencing adherence to**

**Antiretroviral Treatment (ARVs) in Embu Provincial**

**General Hospital (EPGH), Embu County, Kenya.**

**Signature** **Secretary**

**Signature** **National Council for Science & Technology**

**for a period ending: 31<sup>st</sup> December, 2012**



*[Handwritten signature]*  
 Applicant's Signature  
 Secretary  
 National Council for Science & Technology

## Appendix 7: Research Authorization from NACOSTI

REPUBLIC OF KENYA



### NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471,2241349  
254-020-310571,2213123, 2219420  
Fax: 254-020-318245,318249  
when replying please quote  
secretary@ncst.go.ke

P.O. Box 30623-00100  
NAIROBI-KENYA  
Website: www.ncst.go.ke

Our Ref: NCST/RCD/12A/012/107

Date: 31<sup>st</sup> August 2012

Evangeline Kananu Njue Mugo  
Kenyatta University  
P.O.Box 43844-00100  
Nairobi.

#### RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Factors influencing adherence to Antiretroviral Treatment (ARV's) in Embu Provincial General Hospital (EPGH), Embu County, Kenya,*" I am pleased to inform you that you have been authorized to undertake research in **Embu County** for a period ending **31<sup>st</sup> December, 2012**.

You are advised to report to the **District Commissioners, the District Education Officers and the District Medical Officers of Health, Embu County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

**DR. M. K. RUGUTT, PhD, HSC.**  
**DEPUTY COUNCIL SECRETARY**

Copy to:

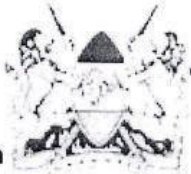
The District Commissioners  
The District Education Officers  
The District Medical Officers of Health  
Embu County.

*"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development".*

**Appendix 8: Research Authorization from Embu West DC**

**OFFICE OF THE PRESIDENT**

Telegrams: "Districter", Embu  
 Telephone: Embu 0202310839  
 FAX 30040  
 Email: dcembuwest@ymail.com  
 When replying please quote



DISTRICT COMMISSIONER  
 EMBU WEST  
 P.O. BOX 3 – 60100  
 EMBU

Ref: ADM 1/55/VOL.II (123)

12<sup>th</sup> September, 2012

District Officer  
 Central / Nembure Division

**RE: RESEARCH AUTHORIZATION**

Please be informed that **Evangeline Kananu Njue Mugo** of Kenyatta University has been authorized to carryout research in this District for a period ending 31<sup>st</sup> December, 2012.

Her research is on "**factors influencing adherence to Antiretroviral Treatment (ARV's) in Embu Provincial General Hospital (EPGH), Embu County, Kenya**"

You are, therefore, asked to accord her the necessary assistance.

D.M. OBUDO  
 AG. DISTRICT COMMISSIONER  
**EMBU WEST DISTRICT**

**C.C.**

Evangeline Kananu Njue Mugo

Appendix 9: Research Authorization Ministry of Education  
**MINISTRY OF EDUCATION**

Telegrams:  
Telephone: EMBU 30962/30502  
E-Mail: deoembuwest@gmail.com



DISTRICT EDUCATION OFFICE  
P. O. BOX 8  
EMBU WEST

When replying please quote

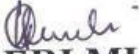
Ref.NO. EDU/EBU/W/R/3/34  
And date

12<sup>th</sup> September, 2012

**Evangeline Kanunu Njue Mugo**  
**Kenyatta University**  
**PO BOX 43844-00100**  
**NAIROBI**

**RE: RESEARCH AUTHORIZATION**

Following the approval by National Council for Science and Technology to carry out a research on “**Factors Influencing Adherence to ARV at EPGH**”, this office has no objection.

  
**JACOB IRERI MURIUKI**  
**FOR: DISTRICT EDUCATION OFFICER**  
**EMBU WEST**

DISTRICT EDUCATION OFFICER  
EMBU WEST  
P.O. Box 8, EMBU

## **Appendix 10: Publications**

### **Journal 1: Therapy and Health System-Related Factors Influencing Adherence to ART Treatment among HIV/AIDS Patients in Embu Teaching and Referral Hospital Comprehensive Care Clinic**

American Journal of Nursing Science

Volume 5, Issue 5, October 2016, Pages: 169-174

Received: Jul. 26, 2016; Accepted: Aug. 4, 2016; Published: Aug. 21, 2016

#### **Authors**

Evangeline Kananu Njue Mugoh, Department of Community Health, Kenyatta University, Nairobi, Kenya

Ephantus Kabiru, Department of Community Health, Kenyatta University, Nairobi, Kenya

Joyce Mwaniki, Department of Plant Sciences, Kenyatta University, Nairobi, Kenya

#### **Abstract**

Adherence to antiretroviral therapy is a major predictor of the survival of individuals living with HIV/AIDS. Appropriate use of antiretroviral (ARV's) has improved the health of many human immunodeficiency virus (HIV) positive individuals. The effectiveness of HIV treatment depends on sustenance of high levels of adherence to ARV; however, ARV regimens are often complicated and can be affected by varying dosing schedules, failing to have proper dietary requirements and patients developing adverse effects. The objective of this study was to determine therapy and health system related factors influencing adherence to Anti-retroviral drugs among adult HIV/ AIDS patients in Embu County Teaching and Referral Hospital Comprehensive Care Clinic. The study applied cross sectional descriptive design with stratified random sampling used to obtain relative proportion of male and female adult respondents in the sample population. 332 HIV positive patients were chosen from a total of 1694 patients who were active in ART for more than one year. A semi-structured interview schedules was used to obtain patients view on various dimension or ART services at the facility. ART adherence was at 48.2%. There was significant association between adherence to ART treatment and the type of drug a respondent was in with AZT, ddl, NFV having the highest proportion of sub-optimal adherence to treatment while respondents on D4T, 3TC, NVP had the lowest proportion of sub-optimal adherence to treatment. Convenience of the facilities for people with chronic ailments and waiting time at the facilities were reported to be good (73.0%) and excellent (75.3%) respectively.

#### **Keywords**

*ART Adherence, Treatment-Related Factors, Health System Factors*

**Journal 2: Patient Factors Influencing Adherence to ART Treatment among HIV/AIDS Patients in Embu Teaching and Referral Hospital Comprehensive Care Clinic**

Science Journal of Public Health

Volume 4, Issue 5, September 2016, Pages: 375-380

Received: Jul. 18, 2016; Accepted: Jul. 28, 2016; Published: Aug. 17, 2016

**Authors**

Evangeline Kananu Njue Mugoh, Department of Community Health, Kenyatta University, Nairobi, Kenya

Ephantus Kabiru, Department of Community Health, Kenyatta University, Nairobi, Kenya

Joyce Mwaniki, Department of Plant Sciences, Kenyatta University, Nairobi, Kenya

**Abstract**

Adherence to antiretroviral therapy is a major predictor of the survival of individuals living with HIV/AIDS. Appropriate use of antiretroviral drugs (ARVs) has improved the health of many HIV positive individuals. The effectiveness of HIV treatment depends on sustenance of high levels of adherence to ARVs, however, ARV regimens are often complicated and can be affected by varying dosing schedules, failing to have proper dietary requirements and patients developing adverse effects. The main objective of this study was to determine patient's demographic, social and economic factors influencing adherence to Anti-retroviral drugs among HIV/AIDS adult patients. A cross sectional study was carried out at Embu County Teaching and Referral Hospital in Kenya. Stratified random sampling was used to obtain relative proportion of male and female respondents. 332 HIV positive patients were chosen from a total of 1694 patients who were active in ART for more than one year. A semi-structured interview schedules was used to obtain information. The study revealed that almost half (48.2%) of the respondents had optimal adherence to ART treatment. 34.9% cited traveling as an hindrance to optimal adherence to treatment. Adherence to ART treatment was significantly associated with age of the respondents, marital status, main occupation and average monthly income of the respondents. The study recommends that HIV patients should be given more information on the importance of consistency and nearly perfect adherence to ART. The patients should be enlightened on the importance of carrying their ARV drugs even when going for short travels.

**Keywords**

*ART Adherence, Demographic Characteristics, Economic Characteristics, Social Factors*