

SCHOOL OF PUBLIC HEALTH  
DEPARTMENT OF EPIDEMIOLOGY AND DISEASE CONTROL  
UNIVERSITY OF GHANA, LEGON

FACTORS ASSOCIATED WITH CARE CONTINUUM OF HIV/AIDS  
PATIENTS RECEIVING ANTIRETROVIRAL THERAPY AT THE  
INTERNATIONAL HEALTH CARE CENTER (IHCC), GHANA

BY  
ALBERT KORLEY  
(10552364)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF  
GHANA, LEGON IN PARTIAL FULFILLMENT OF THE  
REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC  
HEALTH DEGREE

JULY, 2016

## DECLARATION

I, Albert Korley hereby declare that this work is a result of my independent work under the supervision of Dr. Bismark Y. Sarfo. References to other works have been duly acknowledged. I further declare that this work has not been submitted for award of any degree in this institution and other universities elsewhere.

.....  
ALBERT KORLEY  
(STUDENT)

.....  
DATE

.....  
DR. BISMARK Y. SARFO  
(ACADEMIC SUPERVISOR)

.....  
DATE



## **DEDICATION**

I dedicate this work to Mrs. Stella Korley (wife) for always being there for me and for Jael Akorfa Korley (daughter). Also for my family members especially Uncle Felix Korley and Auntie Bridget Katsriku.

I also dedicate this thesis to my siblings especially those who have supported me throughout the period of my academic programme.

Again, I appreciate the support received from my academic supervisor.



## ACKNOWLEDGEMENT

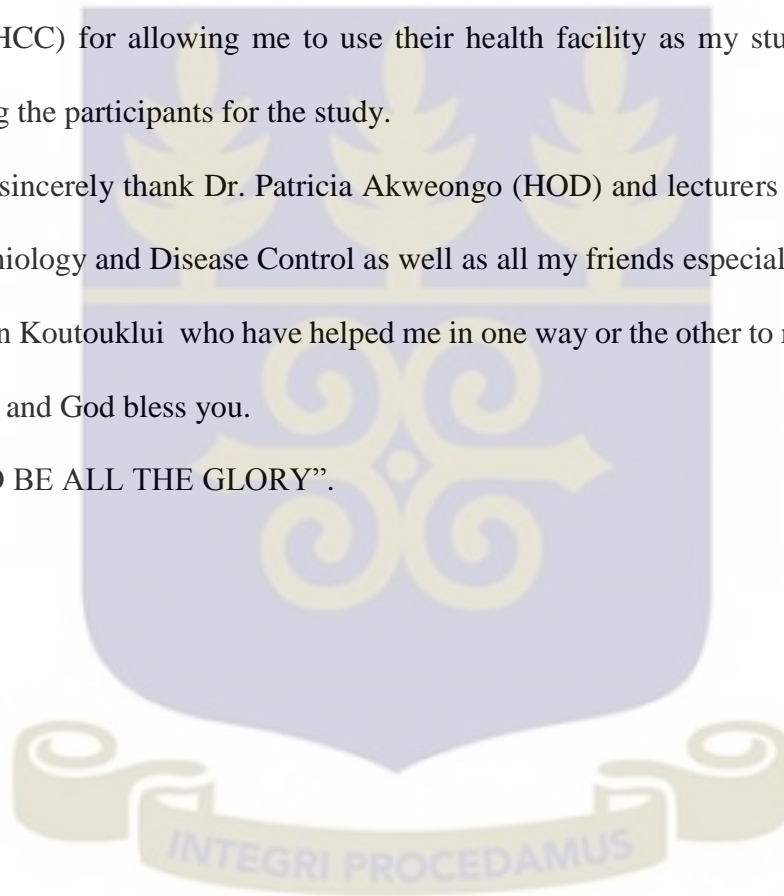
I wish to express my deepest gratitude to the Almighty God for the unflinching guidance and grace on me throughout my studies.

I cannot fail to thank Dr. Bismark Sarfo (Academic Supervisor) for his support, guidance and contribution to this work.

My sincere thanks also goes to the Management and staff of the International Health Care Center (IHCC) for allowing me to use their health facility as my study site as well as mobilizing the participants for the study.

Finally, I sincerely thank Dr. Patricia Akweongo (HOD) and lecturers of the Department of Epidemiology and Disease Control as well as all my friends especially Veronica Tseko and Martin Koutouklui who have helped me in one way or the other to reach this far, I say thank you and God bless you.

“TO GOD BE ALL THE GLORY”.



## LIST OF ABBREVIATIONS

HIV	-	Human Immunodeficiency Virus
AIDS	-	Acquired Immune Deficiency Syndrome
TB	-	Tuberculosis
USAID	-	Joint United Nations Programme on HIV/AIDS
STI	-	Sexual Transmitted Illness
NACP	-	National AIDS/STI Control Programme
PMTCT	-	Prevention of Mother-To-Child Transmission
PLHIV	-	Persons Living with HIV/AIDS
ART	-	Antiretroviral Therapy
HACC	-	HIV/AIDS Care Continuum /Care Cascade
WHO	-	World Health Organization
SSA	-	Sub-Saharan African
GAC	-	Ghana AIDS Commission
CD4	-	Cluster of Differentiation 4
MOH	-	Ministry of Health



**TABLE OF CONTENTS**

DECLARATION .....	i
DEDICATION .....	ii
ACKNOWLEDGEMENT .....	iii
LIST OF ABBREVIATIONS.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES .....	ix
ABSTRACT.....	x
CHAPTER ONE .....	1
INTRODUCTION .....	1
1.1 Background to Study.....	1
1.2 Problem Statement .....	4
1.3 Conceptual Framework .....	6
1.4 Justification of the Study.....	8
1.5 Study Objectives .....	9
1.6 Research Questions .....	9
CHAPTER TWO .....	11
LITERATURE REVIEW .....	11
2.1 HIV/AIDS as a Global Pandemic .....	11
2.2 HIV/AIDS in Sub-Saharan Africa.....	12
2.3 HIV/AIDS in Ghana.....	13
2.4 Antiretroviral Therapy.....	14
2.5 The HIV Cascade through Time .....	16
2.6 HIV Infected and Diagnosis .....	18
2.7 Linked and retained in care .....	19
2.7.1 Missed visit.....	20
2.7.2 Visit constancy .....	20

2.7.3 Appointment adherence .....	20
2.7.4 Gaps in care .....	20
2.7.5 Human Resources and Services Administration HIV/AIDS Bureau (HRSA .. HAB) .....	20
2.8 Factors Influencing Retention in Care .....	20
2.9 Conceptual Framework .....	21
2.9.1 Facility/Provider based factors .....	22
2.9.2 Social Support.....	22
2.9.3 Individual Based Factors .....	23
2.9.4 Drug Related Factors .....	23
<b>CHAPTER THREE .....</b>	<b>24</b>
<b>METHODOLOGY .....</b>	<b>24</b>
3.1 Study Sites and Population.....	24
3.1.1 International Health Care Center (IHCC).....	24
3.2 Research Design.....	26
3.3 Participant Selection.....	26
3.4 Questionnaire Administration .....	26
3.5 Variables.....	26
3.5.1 Dependent variables .....	26
3.5.2 Independent Variables .....	27
3.6 Sampling.....	27
3.6.1 Sampling size calculation .....	27
3.6.2 Sampling Method .....	28
3.6.2.1 Inclusion Criteria .....	28
3.6.2.2 Exclusion Criteria .....	28
3.7 Data Collection Tool .....	28
3.7.1 Medical record extraction .....	29
3.7.2 Questionnaire Administration.....	29
3.8 Data Storage and Analysis .....	29
3.9 Ethical Consideration .....	30

3.10 Consenting Process .....	30
3.11 Potential risks/ Benefits.....	30
3.12 Privacy/ Confidentiality .....	30
3.13 Voluntary withdrawal.....	31
CHAPTER FOUR.....	32
RESULTS.....	32
CHAPTER FIVE .....	41
DISCUSSION .....	41
5.1 Proportion of Patients Diagnosed and Linked to Care .....	41
5.2 Proportion of Patients Retained in Care .....	42
5.3 Proportion of Patients With Improvement in CD4 Count.....	42
5.4 Socio-Demographic Factors Associated with Retention in HIV Care Continuum.	42
5.5 Other Factors Associated With Retention in HIV Care Continuum .....	44
5.6 Socio-Demographic Factors Associated with Improvement in CD4 Count .....	46
5.7 Odds Ratios Results .....	46
CHAPTER SIX.....	48
CONCLUSION AND RECOMMENDATIONS.....	48
6.0 Conclusion.....	48
6.1 Recommendations .....	48
REFERENCES .....	51
APPENDICES .....	55
APPENDIX 1: Consent Form .....	55
APPENDIX 2: Data Extraction Tool and Interview Guide .....	57

**LIST OF TABLES**

Table 1: Recommended ARVs in Ghana..... 15

Table 2: Socio-demographic characteristics of participants. .... 33

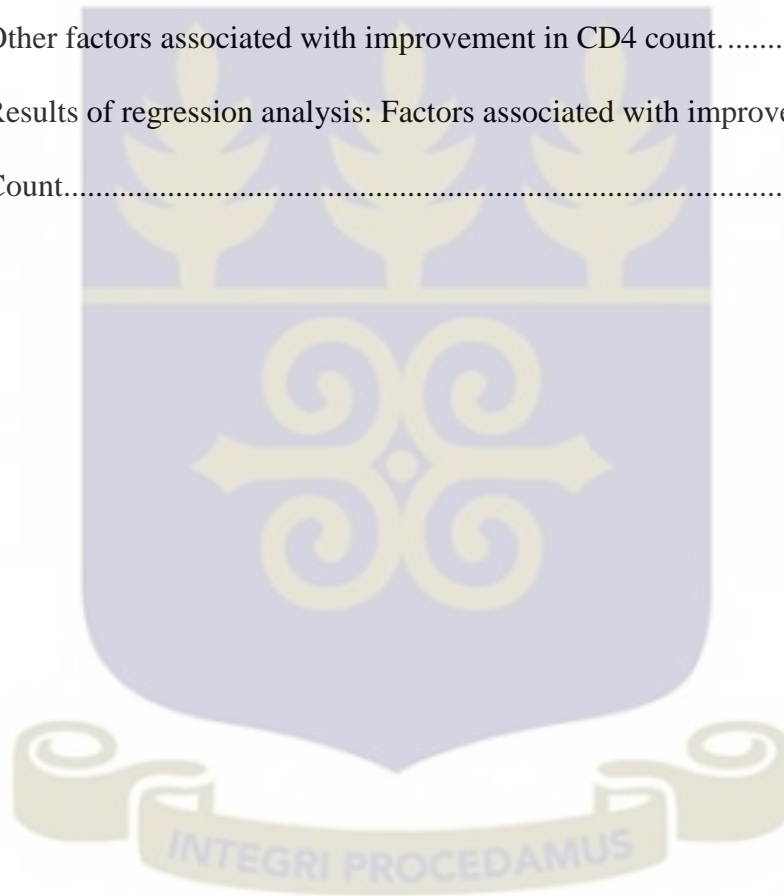
Table 3: Socio-demographic factors associated with retention in care..... 35

Table 4: Other factors associated with retention in care. .... 36

Table 5: Socio-demographic factors associated with improvement in CD4 count..... 37

Table 6: Other factors associated with improvement in CD4 count. .... 38

Table 7: Results of regression analysis: Factors associated with improvement in CD4  
Count..... 39



## LIST OF FIGURES

Figure 1: Conceptual Framework of HIV/AIDS Care Continuum.....	6
Figure 2: Fall-off along the HIV care continuum in the United States (National HIV/AIDS Strategy, 2013).....	17
Figure 3: Conceptual Framework of Factors Associated with HIV Care Continuum.....	21
Figure 4: Proportion of patients in various stages of care continuum receiving HIV care at the International Health Care Center, Haasto within a five year period (2011- 2015). .....	34



## ABSTRACT

**Background:** The advancement through the HIV Care Cascade, from HIV testing to permanent retention in Antiretroviral Therapy (ART) Care and treatment programs, is vital to the success of HIV treatment and prevention efforts. However, persons are lost to follow-up at each stage of the Continuum and little is known about the factors contributing to attrition at these stages in Ghana.

This study determined factors associated with Care Continuum of HIV/AIDS patients receiving antiretroviral therapy between 2011 and 2015 at the International Health Care Center (IHCC).

**Method:** This was a cross-sectional study. 152 participants were conveniently sampled and data extracted from their medical records and supplementary closed-ended interviews were performed. Data were analyzed using STATA and frequencies, proportions, percentages, chi square and regression analyses were performed.

**Results:** Among persons living with HIV/AIDS who visit the IHCC, 79% were tested positive and linked to care. Retention among study participants receiving care at the IHCC was 53% of which 42% had improvement in their CD4 count over the period of the study. The chi-square test revealed that marital status and drug line (drug related factor) were significantly associated with retention. Age and drug line were also significantly associated with CD4 count improvement. Regression analysis showed that the age group 35-44 years participants are most likely to achieve improvement in CD4 count (AOR=34.97, 95% CI 2.22-550.81;  $p<0.05$ ) and the first drug line choice was significantly associated with improvement in CD4 count (AOR= 0.17, 95% CI 0.04-0.63;  $p<0.05$ ).

**Conclusion:** Out of 1127 participants who have been tested and linked to care at IHCC, 53% of them were retained in care and 42% had improvement in their CD4 count. Marital status and choice of drug line were associated with retention in care while age and choice of drug line were associated with improvement in CD4 count.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to Study

In low and middle-income countries, HIV/AIDS is considered as one of the main health issues confronting the masses. Persons with HIV/AIDS now have healthier and longer life span and this can be attributed to the availability of antiretroviral therapy (ART). Globally, 35 million people are estimated to be living with HIV/AIDS and about 19 million people are ignorant of their HIV/AIDS status (UNAIDS, 2014). HIV/AIDS has escalated to become a global pandemic since it was realized in 1981 among gays in Los Angeles, when the United States Centre for Disease Control and Prevention (CDC) observed pneumonia in 5 gays caused by *pneumocystis jirovecii* (Merson, O'Malley, Serwadda, & Apisuk, 2008).

According to the 2014 UNAIDS gap report, just 10 countries in sub-Saharan African (SSA) account for about 56% of the entire global population living with the disease. Currently in Ghana, about 260,000 people live with the disease out of which 140,000 are on ART (Ghana AIDS Commission, 2013). As part of the universal access targets, it is estimated that by the year 2015 about 110,494 adults and 12,751 children will have access to ART. Regardless of the decrease in the prevalence of HIV infections in Ghana to 1.3% (UNAIDS, 2013), HIV counseling and testing in the general adult population still remains low, within the range of 4-10% as reported by GAC in 2013. The unavailability of a vaccine and a cure for HIV, persons who do not know their status pose the biggest huddle in the quest to fight against this condition. These people could be the source for any upsurge in the incidence/prevalence of HIV in the country in the future.

According to UNAIDS, Sharma, Soneja & Oosterhout (2014), among the main aims of any credible HIV/AIDS intervention tactic are: to decrease new infections, increase accessibility to care and make health conditions better for persons who are HIV-positive as well as reduce HIV-related health differences. This is done by either providing various options to tackle and prevent spread, and increase probability of a form of health care (i.e. provision of antiretroviral drugs, etc). The success of most HIV/AIDS interventions or management strategies is measured by the ability of that strategy to provide testing and management options e.g. antiretroviral therapy to diagnosed HIV/AIDS patients.

Information from the National HIV/AIDS/STI Control Programme, G. (2016), “Antiretroviral Therapy (ART) has been available in Ghana since June 2003 and the number of HIV/AIDS treatment sites has increased from 175 to 197”. Also the total number of persons on ART (adults and children) was 4,060 and this number increased over the period to 47,559 by December, 2010 (Addo, Yawson, Dornoo & Seneadza, 2014). This has greatly decreased HIV-related illnesses and deaths.

When persons living with HIV/AIDS are taken care of properly and treatment administered, this can prevent morbidity, mortality as well as the transmission of the HIV virus. The ideal care for persons and for societies with HIV involves identifying individuals who have been infected, linking them to initial HIV care, keeping them in care for long while ensuring treatment observance and this will finally result in viral suppression (Nosyk et al., 2013). This treatment steps leading to viral suppression is termed the HIV/AIDS care cascade or HIV/AIDS Care Continuum (HACC). The HACC is a strategy that summaries the different phases of medical care that people living with the condition go through. This starts from initial diagnosis of the infection to the point the individual achieves viral

suppression. The HACC also indicates the percentage of persons living with the condition who are at each stage of the care cascade. A study of these steps in HACC usually reveals that there is systematic loss of people progressively from one step to the other across the HIV/AIDS care system (Alemnji et al., 2014). Persons living with HIV/AIDS (PLWHA) who have been diagnosed to be HIV-positive, have to pass through these several steps before the commencement of ART (Alvarez-Uria, 2014).

The initial stage of the continuum is testing for HIV status and calls for linkage from the spot of HIV testing to enrolment in an HIV/AIDS clinic to start care. The next stage requires counseling as well as both clinical and laboratory observation for the disease progression on an ongoing basis to ascertain ART eligibility. The final stage is to put the individual suffering from the disease on ART based on existing guiding principle.

After the commencement of ART, there is the need for continuous monitoring and counseling to achieve and maintain reduction in viral load. This ensures that the individual obtains the full benefits from the treatment.

Having the right to care has been identified as a necessary factor in upholding and supporting health and as a facilitator to health care discrepancies. This worldwide strategy has been researched into using information from the populace in the community with stress related to having a normal source of care and dichotomous assessment of the reception of medical services at specific health care centers (i.e. primary care) over a particular period of time interval (e.g. within the past 12 months). The enrollment of an individual in HIV care is progressively acknowledged as a critical phase in exploiting individual patient's health outcomes. The term enrollment in care encompasses the different but interconnected

processes of linkage to care and sustenance in care (Mugavero, Davila, Nevin & Giordano, 2010).

A study of these steps in HIV/AIDS Care Continuum (HACC) revealed that there is systematic loss of people progressively from one step to the other across the HIV/AIDS care system beginning from testing through to viral suppression (Alemnji et al., 2014). These losses, are due to one of the following reasons: reluctant to enroll in HIV services whilst in good health, firm health facility policies, impolite conduct from health professionals, unavailability of drugs, stigma, other methods of healing, proximity to clinic and financial constraint (Layer et al., 2014).

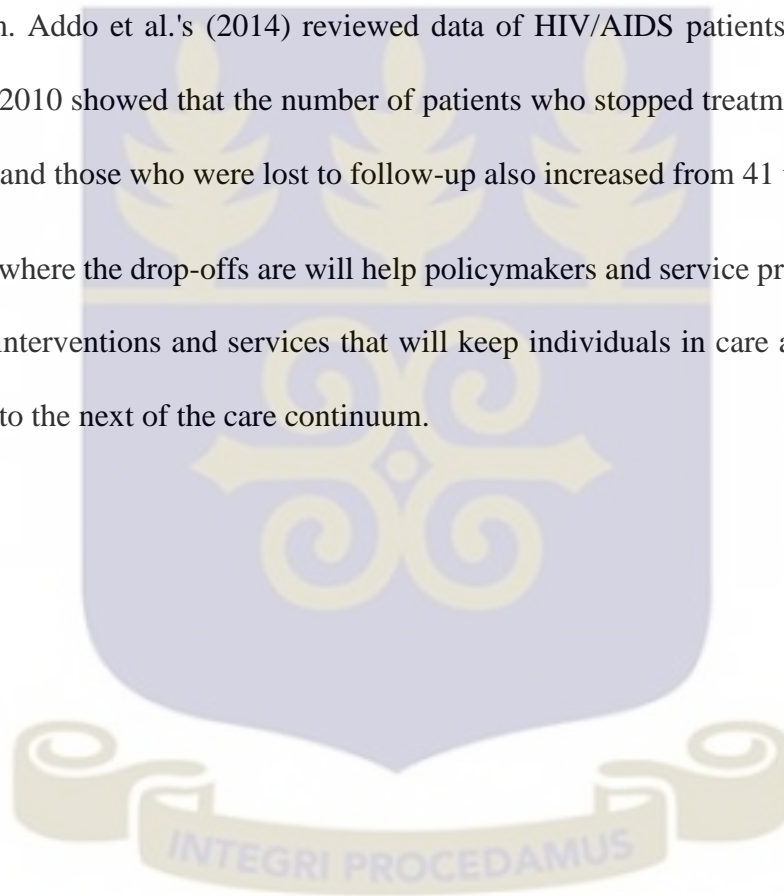
Improvements in each stage of the continuum must be obtained concurrently to improve results such as attainment of viral load suppression, improvement in CD4 count, reduction in mother-to-child spread of the disease and as well as reduction in HIV-related mortality (McNairy & El-Sadr, 2012).

## **1.2 Problem Statement**

Recognizing people with HIV, coupled with well-timed start of ART and lifelong care are vital features of the WHO/UNAIDS HIV/AIDS strategy towards the realization of global access. Keeping patients in care is a very essential component to these strategies and also it reduces the spread of the disease, through effective adherence to ART and the linkage to HIV prevention services. However, keeping people in care in resource-limited countries is faced with a number of challenges and though there are similar challenges at all stages of the care continuum, each stage is affected differently (World Health Organization, 2011). The HIV/ADS Care Continuum (HACC) or treatment cascade offers a way to examine very important questions such as: The number of persons living with HIV are tested,

diagnosed and linked to care? Of those linked to care, how many are retained? How many of those linked to care adhere to their treatment plan and achieve viral suppression as well as improvement in CD4 count? In Ghana, only few studies if any have examined the care continuum of HIV/AIDS patients; and the factors that are associated with this cascade are even yet to be identified. With the occasional shortages of antiretroviral medications coupled with the weak health care system, there are many factors that could affect the care continuum. Addo et al.'s (2014) reviewed data of HIV/AIDS patients on ART between 2005 and 2010 showed that the number of patients who stopped treatment increased from 57 to 243 and those who were lost to follow-up also increased from 41 to 4,191.

Knowing where the drop-offs are will help policymakers and service providers implement adequate interventions and services that will keep individuals in care as they move from one stage to the next of the care continuum.



### 1.3 Conceptual Framework

Figure 1: Conceptual Framework of HIV/AIDS Care Continuum



In the quest to realize utmost benefits from expanded ART programmes in terms of reduction in the population- level spread of the disease, challenges in enrollment and keeping the HIV infected people in care must be solved.

Currently in Ghana, there is limited knowledge about the percentage of persons who are HIV positive and are ignorant about their status. That notwithstanding, HIV counseling and testing in the general adult population is low, within the range of 4-10% as reported by GAC in 2013. In Ghana, about 220,000 persons are living with HIV/AIDS (UNAIDS, 2013).

**Terminologies:**

1. Early Linkage to HIV-CARE is defined as assessment of an initial CD4 count below  $350 \text{ cells/mm}^3 \geq 1$  within 6 months of diagnosis, this standard was chosen as it epitomizes the CD4 count below which commencement of anti- retroviral therapy is recommended in Ghana (Ministry of Health (MOH), 2010).
2. Retention in HIV care is defined as the number of CD4 tests care visits at least 6 months apart during the 12 months period. This measure, that is being referred to has been used universally to assess retention in HIV care ( Ulett, Willig, Lin, Routman, Abrams, Allison & Mugavero, 2009).
3. Improved CD4 count is defined as a consistent rise between 100 to  $150 \text{ cells/mm}^3$  in a 12 month period and this is considered as a progression to viral suppression (Adults, 2008).

#### **1.4 Justification of the Study**

Studies have indicated that HIV viral load suppression can be achieved and sustained, if patients are identified early enough, linked with HIV-care, and retained in care (Eyawo, Hogg, & Montaner, 2013). Achievement of viral suppression results in an infected HIV patient achieving immune reconstitution. The immune system reconstitution leads to long-term disease remission, improves the health conditions of patients at all levels of disease development, prolonged survival and reduce HIV transmission (Nosyk et al., 2013).

According to the 2013 Ghana AIDS Commission's HIV Sentinel Survey Report, 7,812 new infections (2,407 children between 0-14years and 5,405 in adults) were recorded and the need for ART is projected to be 125,396 (18,621 children between 0-14years) (Ghana AIDS Commission, 2013).

HIV/AIDS and HIV infected individuals remain reservoirs that could lead to any future upsurge in viral transmission in the country.

This cross sectional study will provide information about the care continuum of HIV/AIDS patients attending antiretroviral clinics. It could help develop a national HIV/AIDS care cascade which can provide more vigorous monitoring from the facility to national levels leading to informed policy development and execution of established and evolving interventions at each stage of the cascade to enhance HIV testing, linkage to and kept in care, ART use and adherence and eventually reduce viral load, improve clinical outcomes and reduce the spread of HIV infection.

## **1.5 Study Objectives**

### **1.5.1 General Objective**

To determine factors associated with care continuum of HIV/AIDS patients receiving antiretroviral therapy between 2011 and 2015 at the International Health Care Center (IHCC)

### **1.5.2 Specific Objectives;**

- To determine the proportion of patients who have been diagnosed with HIV/AIDS and linked to care for the past five years at the center.
- To determine the proportion of patients who have been retained in care within that period.
- To determine factors associated with the patients who have been retained in care within that period.
- To assess the proportion of patients who have been retained in care with improved CD4 count.
- To determine factors associated with the patients who have been retained in care with improved CD4 count.

## **1.6 Research Questions**

- What is the proportion of patients who have been diagnosed with HIV/AIDS at the IHCC between 2011 and 2015?
- What proportion of the new HIV positive patients was linked to care (ART treatment)?

- What proportion of those linked to care remained in care for the 12 months duration?
- What proportion of patients who tested positive went on to achieve improvement in CD4 count after 12 months of ART treatment?
- What factors are associated with patients who have remained in care?
- What factors are associated with patients who have achieved improvement in CD4 count?



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 HIV/AIDS as a Global Pandemic

HIV/AIDS epidemic was first realized in 1981 among gays in Los Angeles, when the United State Center for Disease Control and Prevention (CDC) observed pneumonia in 5 gay men caused by *pneumocystis jirowecii* (Merson et al., 2008).

Globally in 2015, 36.7 million people were estimated to be living with HIV/AIDS (UNAIDS, 2016) of which more than 90% live in low- or middle- income countries (Alvarez-Uria, Pakam, Midde, & Naik, 2013). About \$16.8 billion has so far been committed in fighting this global pandemic and 89% of this investment is allocated to treatment, care and support of HIV infected people in low- and middle-income countries (Alemnji et al., 2014).

A review of literature suggests global trends of HIV/AIDS are in retreat. This achievement came about as a result of many interventions such as education, provision of use of condoms and abstinence, huge successes in controlling mother-to-child transmissions and other preventive measures. All these interventions have led to a global decline in newly infected people with HIV from 3.4 million [3.3 million–3.6 million] in 2001 to 2.1 million [1.9 million–2.4 million] in 2013 UNAIDS, (2014).

From the global HIV Fact Sheet 2014, it was reported that new HIV transmission in Sub-Saharan Africa declined by 33% between 2005 and 2013 (UNAIDS, 2014).

## **2.2 HIV/AIDS in Sub-Saharan Africa**

Sub-Saharan Africa is considered as the continent most hit by the HIV/AIDS pandemic. Just 10 countries in the region account for about 56% of all the people in the world living with HIV/AIDS (UNAIDS, 2014). Of the 35 million people living with HIV globally, 24.7 million are living in sub-Saharan Africa (UNAIDS, 2014). 61% of adults living with HIV/AIDS in this region are mostly women and almost 90% of all HIV-positive persons children (Illife, 2006). The UNAIDS in 2013 reported a fall of AIDS-related deaths by 35% since 2005, and this is attributed mainly to the availability of anti-retroviral therapy programs that have been deployed in the heavily hit regions. As a result of these interventions, the proportion of people living with HIV/AIDS (PLHIV) who were not receiving antiretroviral therapy had decreased from 90% [90–91%] in 2006 to 63% [61–65%] at the end of 2013 (UNAIDS, 2014). It is also estimated that about 87% of Africans with HIV who are aware of their status are currently receiving antiretroviral therapy (ART), and nearly 76% of them have realized viral suppression (UNAIDS, 2013).

About 4.8 million HIV/AIDS related deaths in sub-Saharan Africa (SSA) have been avoided since 1995 to date due to the introduction of ARTs (Alvarez-Uria et al., 2013). But even with all the improvements, it is observed in 22 million, that three of five persons are living with HIV/AIDS and still not accessing antiretroviral therapy, while three of four children living with HIV(76%) are not receiving HIV treatment (Darak et al., 2012). Globally, 15% of all females with HIV are 15 years and above and of these, 80% live in sub-Saharan Africa. Sub-Saharan Africa again accounts for about 71% of all the people living with HIV/AIDS who newly accessed ART by close of 2013 (UNAIDS, 2013).

### **2.3 HIV/AIDS in Ghana**

In 1986, the first case of AIDS was reported in Ghana and since then there has been an increase in the number (National HIV/AIDS/STI Control Programme, 2010). Ghana AIDS Commission estimated that 224,488 persons made up of 189,931 adults with women accounting for about 58% and 34,557 Children (15%) are living with HIV in Ghana (GAC, 2013; National HIV/AIDS/ STI Control Programme, G., 2010).

The Joint United Nations Program on HIV/AIDS (UNAIDS) estimates Ghana's National HIV prevalence in 2013 is 1.3% (UNAIDS, 2013). This shows a steady but gradual decrease in HIV/AIDS prevalence of 1.37% in 2012. Although at first glance the HIV prevalence may seem alarming, it is not uncommon as it has been observed in more industrialized countries such as the USA and Canada when ART treatment was well implemented (Mayer, Mugavero, Amico, Horn, & Thompson, 2013). This can be a result of PLWHA living longer productive lives because of the increasing use of ART.

In Ghana, Eastern Region has the highest HIV prevalence of 3.7% and the Northern Regions have the lowest of 0.8% (Ghana Statistical Service (GSS), Ghana Health Service (GHS), & ICF Macro, 2013). Prevalence is normally higher in areas such as urban towns, mining communities, boarder towns and along main transportation routes. Heterosexual intercourse is the mode of transmission for about 80% of HIV cases, with mother-to-child transmission accounting for another 15% (GAC, 2013). Obuasi in the Ashanti Region, Agormanya in Eastern Region and Wenchi in Brong-Ahafo Region have seen a rise in prevalence (GAC, 2013). In 2013, the HIV prevalence amongst pregnant women attending Antenatal clinic was 1.9% which is a drop from 2.1% in 2012. It is the first recording below 2% in two decades (GAC, 2013). HIV prevalence by age group 45-49 is highest at 3.3%,

followed by 35-39 at 3.2% with 15-19 being the lowest at 0.8% (GAC, 2013). There has been a decrease in all age groups except for 15-19 and 45-49 (The highest prevalence is amongst the age 40-44 (females 12.5% and males 5.9%))

The middle income and middle educational groups have the highest infection rate, with the poor and unemployed having the less infection (Ghana Demographic and Health Survey, 2003). Among the many groups believed to be at high risk include sex workers, drivers, prisoners, sexual partners of people living with HIV/AIDS and men who have sex with men as well as their female sexual partners. Awareness of HIV/AIDS is estimated at greater than 95%—although fear and stigmatization of HIV-positive people remain high (Ghana Statistical Service (GSS) et al., 2013). Ghana as a country has it as its goal to prevent new HIV infections as well as to alleviate the socioeconomic and emotional effects of HIV/AIDS on individuals and communities. The national strategy headed by the Ghana AIDS Commission is to focus on prevention of new HIV infections, care and support for people living with HIV/AIDS, creation of a supporting atmosphere for a national response, devolution of implementation of HIV/AIDS activities through institutional arrangements, research as well as monitoring and evaluation of ongoing programs.

#### **2.4 Antiretroviral Therapy**

Antiretroviral therapy (ART) refers to the use of a combination of HIV/AIDS drugs that have specific inhibitory effects on HIV replication. These inhibitors belong to six distinct classes of drugs: the nucleoside and nucleotide reverse transcriptase inhibitors (NRTIs, NtRTIs), the non-nucleoside reverse transcriptase inhibitors (NNRTIs), the protease inhibitors (PIs), the fusion inhibitors (FIs), the CCR5 co-receptor antagonists and the integrase strand transfer inhibitors (INSTIs) (New York State Department of Health AIDS

Institute, 2015).The number of ART centers or treatment sites has increased from 175 in 2013 to 197 in 2015 (National HIV/AIDS/ STI Control Programme, G. 2016). In 2013, the World Health Organization in its guideline for the use of antiretroviral therapy recommended that ART be started for HIV/AIDS patients with CD4 count  $\leq 500$  cells/mm<sup>3</sup>, an increase from the previous  $\leq 350$  cells/mm<sup>3</sup> recommended in 2010 (WHO, 2013). However, in Ghana ART may be commenced for HIV/AIDS patients with CD4 count  $< 350$  cells/mm<sup>3</sup> (National HIV/AIDS/STI Control Programme, 2010).

**Table 1:** Recommended ARVs in Ghana

Nucleoside Reverse Transcriptase Inhibitors (NRTI)	Nucleotide Reverse Transcriptase Inhibitor (NtRTI)	Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI)	Protease Inhibitors (PI)
Zidovudine (AZT/ZDV)	Tenofovir (TDF)	Nevirapine (NVP)	Ritonavir boosted Lopinavir (LPV/r)
Lamivudine (3TC)		Efavirenz (EFV)	Ritonavir boosted Atazanavir (ATV/r)
Abacavir (ABC)			
Emtricitabine (FTC)			

Source: HIV/AIDS/ STI Control Programme, G. (2010)

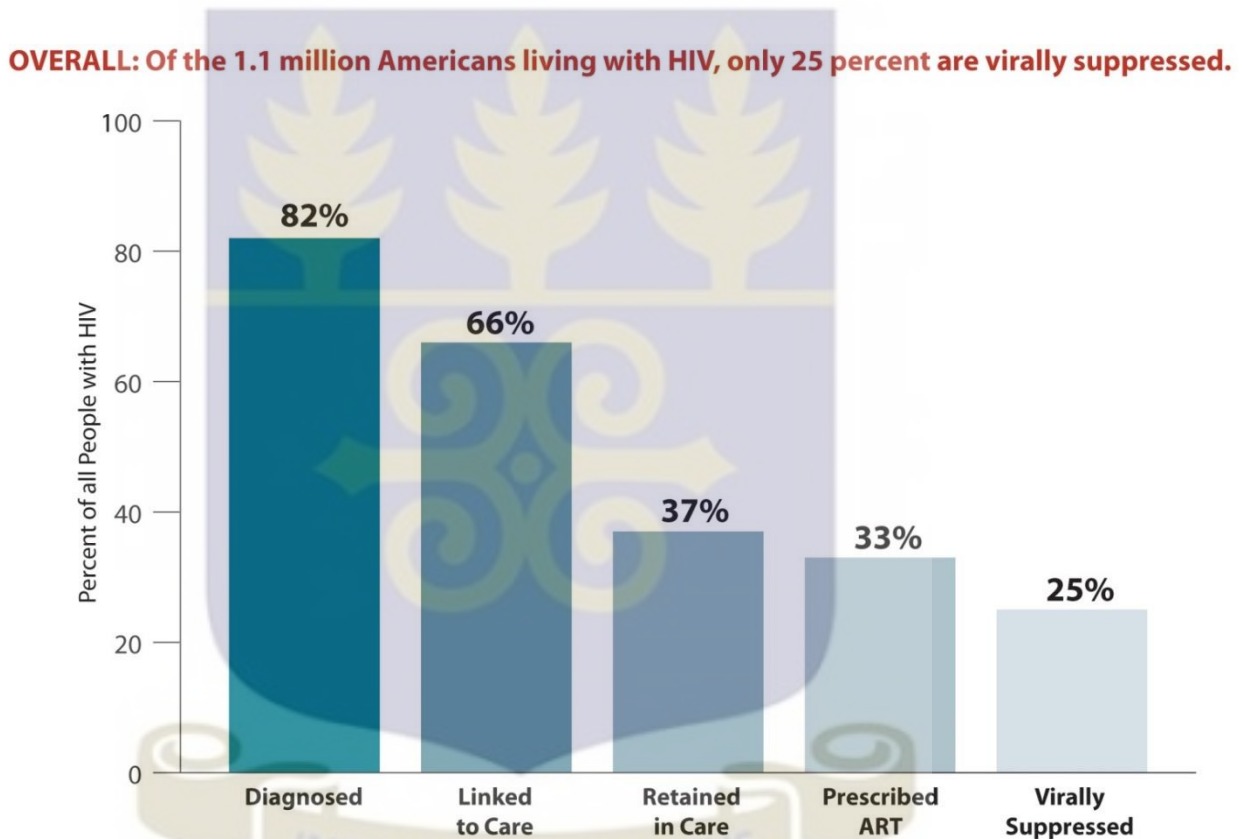
The Ghana AIDS Commission's (GAC) report for 2013 indicated that 140,000 people are on ART. It also estimates that about 110,494 adults and 12,751 children will be put on ART by the year 2015 in line with universal access targets.

## 2.5 The HIV Cascade through Time

The HIV care continuum has been used by many countries in the West to recognize occasions for improving the delivery of health care to people living with HIV/AIDS (Yehia et al., 2015). HIV care and treatment has led to great decrease in HIV-related diseases, deaths as well as virus transmission. The ideal health care for individuals and societies with HIV involves the finding of infected individuals, linking them to initial HIV care, ensuring that they are kept in care and adhere to treatment (Nosyk et al., 2013). Bohdan Nosyk and colleagues from the STOP HIV/AIDS Study Group conducted the first longitudinal examination of changes in the cascade of HIV care in British Columbia, Canada, from 1996 to 2011. The research evaluated the numbers and percentage of individuals in eight distinct stages of the cascade and these are: HIV infected, diagnosed, enrolled in HIV care, kept (retained) in care, antiretroviral treatment indicated, receiving antiretroviral treatment, adherent to antiretroviral treatment and virologically suppressed.

An obvious strength of this study was the widespread use of complete linked records from the national and provincial health programmes. Analysis shows that overall engagement in care and use of ART improved between within the period of study, however a substantial number of individuals are still lost from each stage of the care continuum. In 2011 an estimated 29% of HIV infected remained undiagnosed; 4-10% of undiagnosed were not linked to care; 20% of those linked to care were not retained in care. Ultimately, there was viral suppression increased from 1% to 35% of the HIV infected population over the study period. The consequences of persistent fall-outs in the care continuum stages before the administration of ART and viral suppression are particularly worrying. ART treatments have improved with time, hence giving the assurance of healthier life and improved life expectancy for people who have navigated steadily along the cascade. It is vital to

comprehend the restrictions of each step in the care continuum recognizing however that the factors that cause people to pull out vary in terms of geographical location and individual differences (Nosyk et al., 2013). Although cascades cannot be compared for several different locations, a cascades value lies in its ability to address problems arising from transitions as well as aid in the creation of pragmatic programs to improve the cascade (Gardner & Young, 2014).



**Figure 2: Fall-off along the HIV care continuum in the United States (National HIV/AIDS Strategy, 2013)**

The above graph shows a typical care cascade step analysis. The increasing rate of attrition due to mortality or LTFU after five years of follow-up was 16% from enrolling into care to ART initiation and 24.9% after ART initiation. Of all children diagnosed with HIV, it was estimated that 91.9% entered into care, 77.2% were retained until ART started, 58%

were kept in care after ART initiation, and 43.4% went on to achieve virological suppression. Roughly half of the attrition occurred before ART initiation and the other half after starting ART. Belonging to socially disadvantaged communities and living more than 90 minutes from the hospital were associated with a higher risk of attrition (Alvarez-Uria, 2014). These findings reveal that emphasis should be placed on promoting research and implementing interventions to improve the engagement of HIV infected individuals in pre-ART care.

For delivery timely and quality health services that are critical to decrease fall-out in the HIV treatment and prevention care continuum, robust laboratory facilities and structures are vital. However, challenges exist in ensuring effective laboratory health systems strengthening and linkages. In particular, linkages and referrals between laboratory testing and other services need to be considered in the context of an integrated health system that includes prevention, treatment and strategic information (Alemnji et al., 2014). Factors such as shortage of antiretroviral and lack or inadequate funding could also be responsible for such gaps.

## **2.6 HIV Infection and Diagnosis**

The poor HIV testing and counseling (HTC) services to provide testing services has been linked with the low rates of testing, low knowledge of HIV status and poor execution of HIV prevention strategies in Ghana. Data from more than 10 African countries indicate that more than 60% of people living with HIV (PLHIV) are ignorant of their HIV status (Alemnji et al., 2014). More than 50% of people living with HIV worldwide are also unaware about their HIV status (UNAIDS, 2013). In Uganda and Kenya there are between 80–90% PLHIV who do not know the HIV status of their partner(s) (Alemnji et al., 2014).

The Joint United Nations Programme on HIV and AIDS reported that Ghana is experiencing similar trends and these may be due to lack of education, fear of stigma and also absence or insufficient test kits at certain times of the year in some health facilities. Effective testing and diagnosis is the first step in the care cascade provides opportunity for linkage to care and early management of HIV. Data gathered from sub-Saharan Africa indicated that only 10% of young men and 15% of young women (15–24 years) had knowledge about their HIV status (UNAIDS, 2013).

### **2.7 Linked and retained in care**

Globally, only 38% adults (15 and older) and 24% children living with HIV have access to ART treatment. As of 2013, 12.9 million people had access to antiretroviral therapy (UNAIDS, 2013). Access to treatment is key to stop the spread of HIV and AIDS-related deaths. It prolongs life span and improves the quality of life. It is also a key to preventing and reducing morbidity. Successful HIV treatment and prevention requires individuals to get tested, receive their test results, be linked and retained in care. It is expected that there is a significant gap in engaging individuals with known HIV status in care programmes in Ghana and this is seen across all cascade studies done across the world (Hull, Wu & Montaner, 2012; Hallett & Eaton, 2013). Mugavero, Davila, Nevin & Giordano (2010), stated in their study that retention in care is being recognized as a crucial step in maximizing patient's outcomes in the care continuum and this can be measured using the following methods;

### **2.7.1 Missed visit**

- This is a method that captures the number of missed visits during an observation period of interest. In other words, the result simply count missed visits, regardless of how many visits have been scheduled.

### **2.7.2 Visit constancy**

- This method evaluates the proportion of time intervals with at least one completed clinic visit during an observation period of interest.

### **2.7.3 Appointment adherence**

- This technique measures the proportion of the number of completed visits in the numerator and the number of total scheduled visits in the denominator during an observation period of interest.

### **2.7.4 Gaps in care**

- This is a method that calculates the time interval between completed clinic visits. It measures the length of time interval or whether the time interval exceeds a pre-determine threshold, typically ranging between four to twelve months.

### **2.7.5 Human Resources and Services Administration HIV/AIDS Bureau (HRSA HAB)**

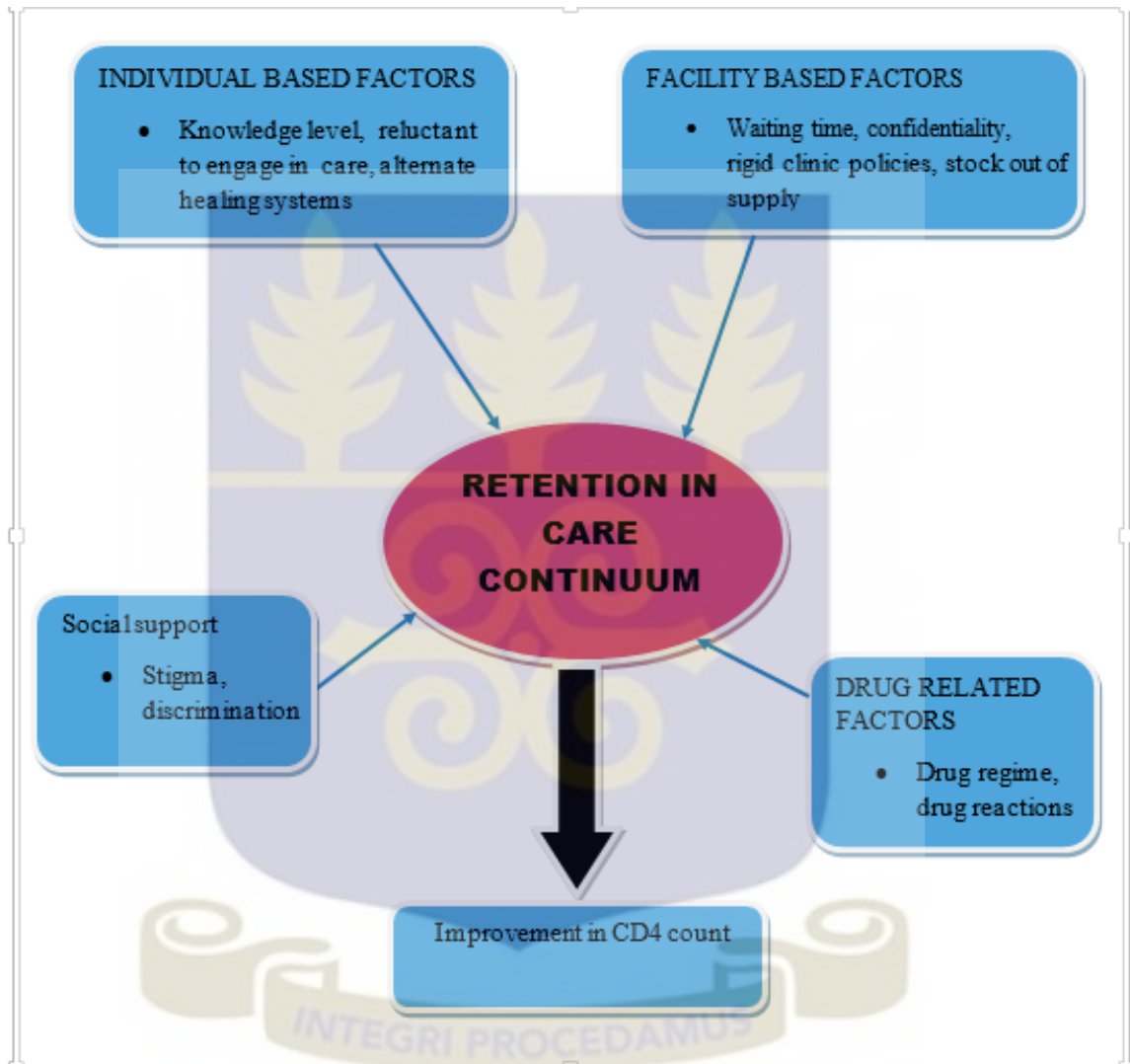
- This method measures whether a patient had two or more completed clinic visits separated by three or more months in time during a 12-month observation period.

## **2.8 Factors Influencing Retention in Care**

A WHO research in 2011 enumerated a number of reasons that make HIV/AIDS patients across the world are lost to follow-up along the care continuum. Among them are the

following: individual factors, provider factors, medication or drug factors and social support.

## 2.9 Conceptual Framework



**Figure 3: Conceptual Framework of Factors Associated with HIV Care Continuum**

Source: (Layer et al., 2010; Merten et al., 2010; WHO, 2011; Hardon et al., 2007; Okoronkwo et al., 2013).

### **2.9.1 Facility/Provider based factors**

According to Layer et al., (2014) rigid facility policies, persistent stock-out of supplies and disrespectful treatment of clients cause HIV/AIDS patients to discontinue with treatment. Long waiting time at the facility and lack of patients' confidentiality can also negatively affect retention. However, consistent development of confidential and trusting relationship with the patient may improve retention remarkably (Merten et al., 2010). These observations point to the fact that there is the need to improve health facility-client interactions as a means of decreasing fall-out from care. More flexibility in scheduling and rescheduling patient appointments could decrease some of this conflict and better accommodate client needs leading to retention in the continuum and a subsequent improvement in CD4 count (Layer et al., 2014).

### **2.9.2 Social Support**

Pervasive stigma and discrimination from family members, friends and community have been identified to contribute to lose to follow-up of HIV/AIDS patients on treatment. To ensure maximum retention in the HIV/AIDS care continuum, there is the need for stigma-reduction polices to accompany HIV prevention and treatment efforts (Layer et al., 2014). According to the World Health Organization, availability of social support from family members and friends contribute meaningfully to visit retention. Also when there is no stigmatization from the family, friends and the community, there is a great deal of positive retention influence (WHO, 2011).

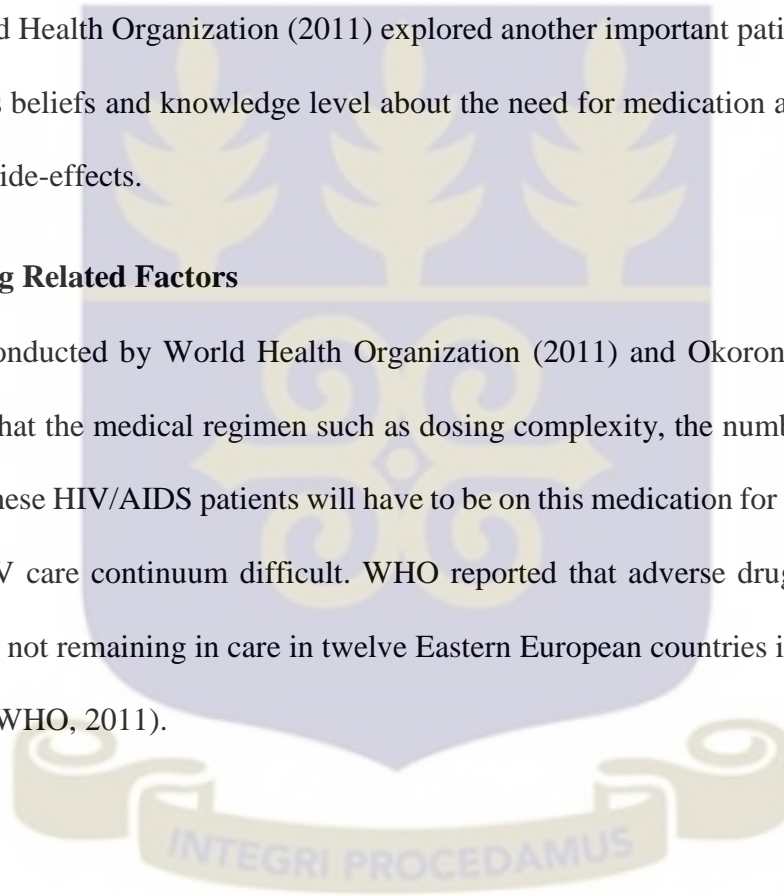
### **2.9.3 Individual Based Factors**

HIV/AIDS patients in care fail to continue with care due to inability to get to their facilities. Transportation cost is an important reason why patients on ART flop to visit their health care center for follow-up. The closer the facility is to the patient, the less the cost required to reach it. Patients who must travel long distances to receive care are often not able to raise the financial support required (Hardon et al., 2007).

The World Health Organization (2011) explored another important patient factor which is a person's beliefs and knowledge level about the need for medication and concerns about negative side-effects.

### **2.9.4 Drug Related Factors**

Studies conducted by World Health Organization (2011) and Okoronkwo et al., (2013) revealed that the medical regimen such as dosing complexity, the number of pills and the fact that these HIV/AIDS patients will have to be on this medication for life make retention in the HIV care continuum difficult. WHO reported that adverse drug reactions were a reason for not remaining in care in twelve Eastern European countries including Russia & Ukraine (WHO, 2011).



## CHAPTER THREE

### METHODOLOGY

#### 3.1 Study Sites and Population

##### 3.1.1 International Health Care Center (IHCC)

The International Health Care Center, one of the accredited ART Centers in the Greater Accra Region is located at Haatso, a peri - urban sub-municipality. Haatso is located in the Ga East District which has a land size of about 96 sq/km. It shares boundaries with La Nkwantanang, Ga West, Ayawaso West Wuogon and Aburi South.

**Population:** The projected sub-municipality population for 2014 is 32,699

**Ethnicity:** The main ethnic group in the sub-municipality are Ga and Akan. However other ethnic groups such as Ewe, Krobo and Guans can be found in the sub-municipality. (GSS, PHC, 2000).

**Socio-economic status:** The major occupation in the sub-municipality is farming, craftsmanship and artisanry as well as petty trading among women. A proportion of the population engages in white colour jobs. Unemployment rate among the youth of the sub-municipal is high, reflecting the high poverty level in the sub-municipality.

**Religious status:** Christians form the majority in terms of religion, followed by Muslims, Traditionalists, Krishna's and a few others.

**Health facilities:** The sub-municipal has a total of four (4) known health facilities. These facilities are all private health facilities with one being a missionary health facility. There are nine (9) outreach points for public health activities within the sub-municipal.

The International Health Care Center, started in 1998 as one of the first, if not only Hospice facility in Accra. Set up in the footsteps of its mother Hospice, the Care One Hospice in Riverside California USA, the founder had the vision of ensuring terminally ill clients in Accra had access to quality of care just before dying. Initially, full blown terminally ill AIDS patients were the main clients of the facility which offered 24-hour care, mostly palliative care.

The clinic eventually became an accredited ART center started in 2008 at the time when ARTs were making a huge difference in the lives of HIV infected individuals. It has been offering the following services since then: HIV testing and counselling, Sputum microscopy for acid-fast bacteria (AFB) for (TB Test), Provision of Directly Observed Therapy Short course (DOTs) for TB treatment, provision of ARVs, some aspects of Prevention of Mother-to-Child Transmission (PMTCT) services and community health education on HIV/AIDS and other infectious diseases including Tuberculosis.

The clinic also provides a full spectrum of laboratory services needed to ensure optimum care of HIV and TB infected persons such as CD4 count, haematology and chemistry tests and Sputum Smear Microscopy.

There are over 800 HIV/AIDS patients including 32 children receiving ART services at the center presently. Female to Male ratio is about 4 to 1.

Since its inception, IHCC has done very well in transforming from a Hospice to an outpatient ART center. The clinic has no specific HIV days unlike many other health facilities but has fully integrated HIV into its everyday clinical work. As a result, clients feel very comfortable accessing services at the facility.

### **3.2 Research Design**

The study design was a cross-sectional study which examines the relationship between factors that are associated with retention in care and improvement in CD4 count in the HIV/AIDS care continuum. This was done in two ways, namely extraction of data from medical records of participants and administration of closed-ended questionnaire.

### **3.3 Participant Selection**

Convenience sampling was used to recruit participants who receive care at the IHCC who met the inclusion criteria.

### **3.4 Questionnaire Administration**

Personal interviews were conducted to identify factors associated with those who were retained in care and also fill in gaps found in patients' records.

### **3.5 Variables**

#### **3.5.1 Dependent variables**

- Retention in HIV-CARE.
  - Retention in care measures the number of CD4 tests care visits at least 3 months apart during the 12 months period. This measure is also referred to as persistence in care and has been widely used to evaluate retention in HIV treatment (Ulett et al., 2009). However, in this study, retention was measured as been in care for least six months.
  
- Improved CD4 Count
  - CD4 count rising consistently between 100 to 150 cells /mm<sup>3</sup> in the 12 months is considered progression to viral suppression (Adults, 2008).

However, in this study improved CD4 count is measured as CD4 count > 350 cells/mm<sup>3</sup>

### 3.5.2 Independent Variables

- Individual factors : Transportation
- Patient Socio-demographic information: Age, Sex, Marital status, Education level and Employment status
- Facility Based Factors: Privacy of patients and Friendly environment
- Medication or Drug Related Factors: Side effect of drugs and First drug line
- Social Support: Funding

### 3.6 Sampling

#### 3.6.1 Sampling size calculation

The sample size was determined using the formula:

$$N = \frac{(z_{1-\alpha/2})^2 p (1-p)}{d^2}$$

Where;

N = required sample size

$z_{1-\alpha/2}$  = confidence level at 95% (standard normal deviation usually set at 1.96)

p = proportion of retention among PLHIV

d = degree of margin of error

The sample size was calculated with the following parameters p = 43% or 0.43 (Kelly et al., 2015) literature retention rate. A 95% confidence level (z) and a margin of error (d) of 5% were assumed.

$$N = \frac{(1.96)^2 \times 0.43 \times (0.57)}{0.05^2}$$

$$(0.05)^2$$

$$=377$$

$$\text{Finite population correction factor (n)} = \frac{n_o N}{n_o + (N-1)}$$

Where N = PLHIV population at International Health Care Center =800

$n_o$  = number of PHIV retained = 377

$$n = \frac{800 \times 377}{800 + (377-1)}$$

=256 participants

### 3.6.2 Sampling Method

#### 3.6.2.1 Inclusion Criteria

- All HIV positive patients who reported at IHCC ART-clinic within the study period
- All HIV positive patients who have tested or referred after testing for treatment at IHCC ART-clinic within the study period
- Patient records available at IHCC ART-clinic

#### 3.6.2.2 Exclusion Criteria

- All HIV-negative patients

### 3.7 Data Collection Tool

The study employed two approaches for the data collection, namely data extraction from patients' folders and administration of questionnaire.

However, preceding the medical extraction, the database of patients receiving HIV care at the IHCC within the period of the study was reviewed to determine the proportion of patients at each stage of the care.

### **3.7.1 Medical record extraction**

Participants' medical records were retrieved from the hospital cabinet after they had received medical care for the day. Relevant information such as patients' socio-demographic data, date and month of HIV test, ART treatment prescribed, WHO clinical stage of patient, CD4 counts and date of last hospital visit among others were extracted.

### **3.7.2 Questionnaire Administration**

After the data extraction, closed ended questionnaire was administered to collect data on whether the health facility provides conducive or friendly environment for the patient, any side effects from the antiretroviral drugs, personal challenges such transportation that could prevent patient from receiving care.

## **3.8 Data Storage and Analysis**

Prior to analysis, data was cleaned such that errors and omissions were verified against the original data source. This was then imported into Stata version 13 and labelled appropriately for analysis. Graph was plotted to determine the proportions of participants at each stage of the HIV/AIDS care continuum. Frequency tables were constructed for continuous measurement such as age and its mean, standard deviation, minimum and maximum values were presented and categorical variables were presented as percentages. Chi-square test was used to test the association between dependent variables and all independent factors that were significant ( $p < 0.05$ ) at 95% CI and were further analyzed

using multiple logistic regression to determine the crude odds ratios. Adjusted odds ratio was calculated for the variables found to have a significant association with the main outcome variable (improvement in CD4 count)  $> 350$  cells/mm<sup>3</sup>.

### **3.9 Ethical Consideration**

Ethical clearance was sought from the Ghana Health Service Ethics Review Committee (Number; GHS-ERC 54/12/15) before the study commenced.

### **3.10 Consenting Process**

Signed informed consent or oral consent was obtained from all participants of the study before they were interviewed and their medical records extracted. Consent was sought from parents/guardian of participants who were below 18 years.

The questionnaires were administered to participants after the consent form had been signed or thumb printed.

### **3.11 Potential risks/ Benefits**

There were no risks associated with participants who took part in the study. However, information gathered from the study will add up to already available knowledge, improve on health interventions of HIV/AIDS patients receiving care.

### **3.12 Privacy/ Confidentiality**

All data obtained from participants were kept in a locked file cabinet and access limited to only the principal investigator and trained staff. Electronic database was encrypted and restricted to only principal investigator and trained staff.

### **3.13 Voluntary withdrawal**

Information on voluntary participation and withdrawal from the study at anytime without any consequences was explained to the participants. Participants were not compelled to partake in the study and they had a choice of not answering some of the questions, cessation of the interview or not entering the study at all. Participants were informed of any potential discomforts whilst answering some of the questions



## CHAPTER FOUR

### RESULTS

This chapter provides detailed information on the findings of the study based on the objectives.

The table below shows the socio-demographic characteristics of the study participants. The age of the participants ranges between 14-63 years with a mean age of 34 years and a standard deviation (SD) of  $\pm 8.57$ . Most of the participants were within the age group 25-34 years representing 44.60%. Approximately 71% of the participants were females while 29% were males.

Eighty-three (83) of the PLHIV recruited representing approximately seventy-six 69.17% were married (married, cohabiting) or had married before (separated, widow, widower) and thirty-seven (37) were singles which represents approximately 30.83%.

Approximately ninety-three percent (93%) of the PLHIV in the study have had formal education to some level while only 7.48 % of the participants have not had any formal education.

Approximately 84% percent were employed; either self-employed or government employed and 16% were not employed.

**Table 2: Socio-demographic characteristics of participants.**

Variable	Observation	Mean	Std. Dev.	Min	Max
Age, years	152	34.47	8.57	14	63

Variable	Frequency	Percentage
<b>Age, years</b>		
14-24	16	11.51
25-34	62	44.60
35-44	43	30.94
45-63	18	12.95
<b>Sex</b>		
Male	43	29.45
Female	103	70.55
<b>Marital status</b>		
Single	37	30.83
Married/Cohabiting	66	55
Divorced/Separated/Widow(er)	17	14.17
<b>Education level</b>		
Nil	8	7.48
Primary/JHS/MLSC	59	55.14
SHS/Tech/Tertiary	40	37.38
<b>Employment status</b>		
Unemployed	15	15.63
Employed	81	84.38

Data base from the International Health Care Center (IHCC) was reviewed and used to determine the proportions of patients who have been diagnosed with AIH/AIDS and linked to care, those who have been retained in care and those who have improvement in CD4 counts. This information is represented in figure 4 below.

**Figure 4: Proportion of patients in various stages of care continuum receiving HIV care at the International Health Care Center, Haasto within a five year period (2011-2015).**

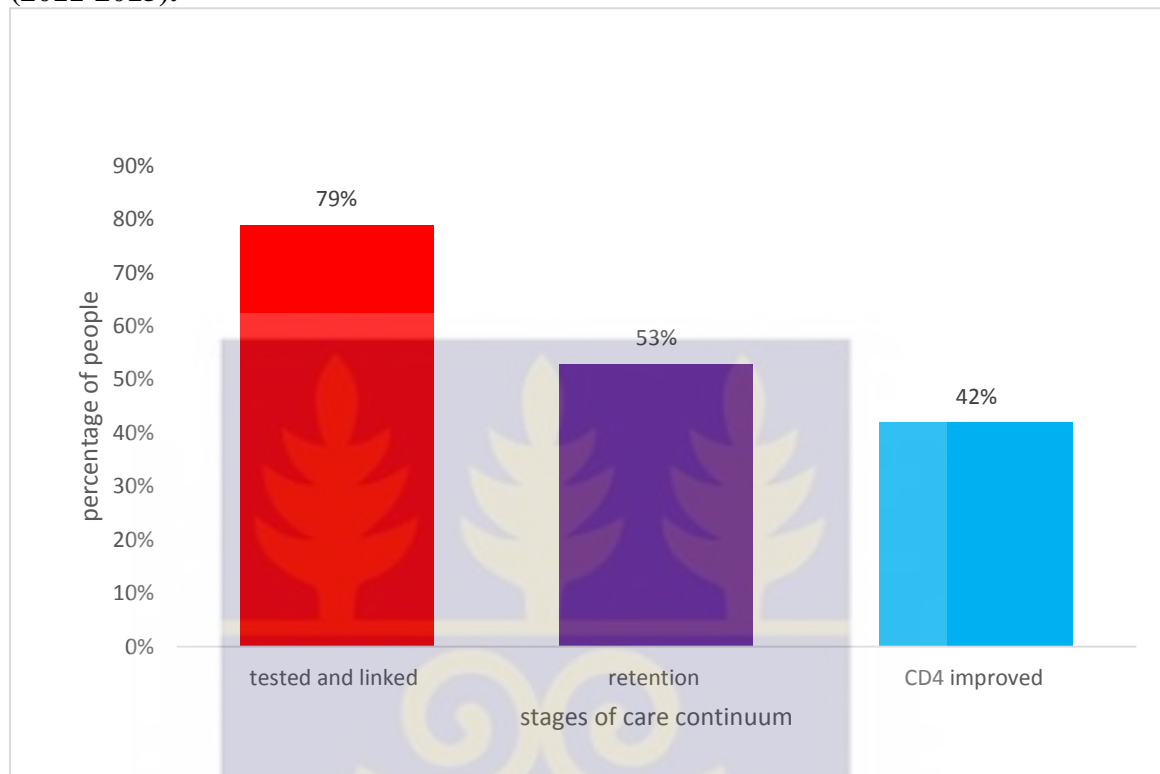


Figure 4 represents the overall HIV care continuum for International Health Care Center Haatso within the period of study.

Among persons living with HIV/AIDS who were diagnosed (1,432) within the period of the study, 1,127 (79%) were tested positive and linked to care. Five hundred and ninety-eight (598) persons of those linked to care were retained in care, representing 53% and two hundred and fifty-three (253) participants of those retained in care, representing 42% went on to achieve improved CD4 count ( $>350$  cells/mm<sup>3</sup>).

152 PLHIV were interviewed to determine the factors associated with retention and improvement in their CD4 counts. The results are represented in the table below.

**Table 3: Socio-demographic factors associated with retention in care.**

<b>Variable</b>	<b>No Retention in care</b>	<b>Retention in care</b>	<b>p value</b>
<b>Age, years</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.221</b>
14-24	4 (25)	12 (75)	
25-34	10 (16.13)	52 (83.87)	
35-44	4 (9.30)	39 (90.70)	
45-63	5 (27.78)	13 (72.22)	
<b>Sex</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.871</b>
Male	8 (18.60)	35 (81.40)	
Female	18 (17.48)	85 (82.52)	
<b>Marital status</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.031</b>
Single	4 (10.81)	33 (89.19)	
Married/Cohabiting	14 (20.90)	53 (79.10)	
Divorced/Separated/Widow(er)	2 (11.76)	15 (88.24)	
<b>Education level</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.809</b>
Nil	1 (12.50)	7 (87.50)	
Primary/JHS/MLSC	12 (20.34)	47 (79.66)	
SHS/Tech/Tertiary	4 (10)	36 (90)	
<b>Employment status</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>1.000</b>
Unemployed	2 (13.33)	13 (16.05)	
Employed	13 (16.05)	68 (83.95)	

NB: Retention is measured as been in care for at least six months

Table 3 above represents the association between socio-demographic characteristics and retention in care. The chi-square test showed that with regard to marital status, people who were married/cohabiting were more likely to be retained in care compared to those who were single or divorced ( $p = 0.03$ ).

**Table 4: Other factors associated with retention in care.**

Variable	No Retention in care	Retention in care	<i>p</i> value
<b><u>Drug related factors:</u></b>	(n, %)	(n,%)	
<b>Side effect of drugs</b>			<b>0.715</b>
0 (Don't know)	1 (50)	1 (50)	
Never	21 (20.59)	81(79.41)	
Rarely	2 (11.76)	15 (88.24)	
About half of the time	1 (11.11)	8 (88.9)	
Most of the time	0 (0)	1 (100)	
Always	1 (16.67)	5 (83.33)	
<b>First Drug line</b>	(n, %)	(n, %)	
First choice	1(4)	24 (96)	<b>0.025</b>
Second choice	24 (24.49)	74 (75.51)	
<b><u>Personal factor:</u></b>	(n, %)	(n, %)	<b>0.471</b>
<b>Transportation challenge</b>			
No	13 (20)	52 (80)	
Yes	13 (15.48)	71 (84.52)	
<b><u>Social support:</u></b>	(n, %)	(n, %)	<b>0.888</b>
<b>Funding</b>			
Medical insurance (NHIS)	5 (22.73)	17 (77.27)	
Out of pocket	6 (16.67)	30 (83.33)	
Special project	1 (16.67)	5 (83.33)	
<b><u>Facility based factors:</u></b>	(n, %)	(n, %)	
<b>Privacy</b>			
No	-		
Yes	26 (17.45)	123 (82.55)	
<b>Friendly environment</b>	(n, %)	(n, %)	
No	-		
Yes	27 (17.76)	125 (82.24)	

From the Table 4 above, the chi-square test revealed that only first drug line of the drug related factors was associated with retention and the association was statistically significant with a p-value of 0.025 ( $p < 0.05$ ).

**Table 5: Socio-demographic factors associated with improvement in CD4 count.**

Variable	No Improvement in CD4 count	Improvement in CD4 count	p-value
<b>Age, years</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.007</b>
14-24	10 (62.50)	6 (37.50)	
25-34	26 (41.94)	36 (58.06)	
35-44	8 (27.78)	35 (81.40)	
45-63	5 (27.78)	13 (72.22)	
<b>Sex</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.257</b>
Male	18 (41.86)	25 (58.14)	
Female	33 (32.04)	70 (67.96)	
<b>Marital status</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.103</b>
Single	15 (40.54)	22 (59.46)	
Married/Cohabiting	23 (34.85)	43 (65.15)	
Divorced/Separated/Widow(er)	2 (11.76)	15 (88.24)	
<b>Educational level</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.132</b>
Nil	2 (25)	6 (75)	
Primary/JHS/MLSC	23 (38.98)	36 (61.02)	
SHS/Tech/Tertiary	13 (32.5)	27 (67.5)	
<b>Employment status</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.677</b>
Unemployed	15 (26.67)	11 (73.33)	
Employed	26 (32.10)	55 (67.90)	

NB: Improvement in CD4 count (>350 cells/mm<sup>3</sup>)

Table 5 shows the association between the socio-demographic factors of participants who have been retained in care for at least 12 months and had improvement in CD4 count. The chi-square test showed that only age was associated with improvement in patients' CD4 count. This is statistically indicated by a p-value of 0.007 ( $p < 0.05$ ).

**Table 6: Other factors associated with improvement in CD4 count.**

<b>Variable</b>	<b>No improvement in CD4 count</b>	<b>Improvement in CD4 count</b>	<b><i>p</i> value</b>
<b><u>Drug related factors:</u></b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.320</b>
<b>Side effects of drugs</b>			
O (Don't know)	1 (50)	1 (50)	
Never	41 (40.20)	61 (59.80)	
Rarely	3 (17.65)	14 (82.35)	
About half of the time	2 (22.22)	7 (77.78)	
Most of the time	0 (0)	1 (100)	
Always	1 (16.67)	5 (83.33)	
<b>First Drug line</b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.002</b>
First choice	3 (12)	22 (88)	
Second choice	45 (45.92)	53 (54.08)	
<b><u>Personal factor:</u></b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.098</b>
<b>Transportation</b>			
No	27 (41.54)	38 (58.46)	
Yes	28 (28.57)	60 (71.43)	
<b><u>Social support:</u></b>	<b>(n, %)</b>	<b>(n, %)</b>	<b>0.264</b>
<b>Funding</b>			
Medical insurance (NHIS)	12 (54.55)	10 (45.45)	
Out of pocket	19 (52.78)	17 (47.22)	
Special project	1 (16.67)	5 (83.33)	
<b><u>Facility based factors:</u></b>	<b>(n, %)</b>	<b>(n, %)</b>	
<b>Privacy</b>			
No	-	-	
Yes	52 (34.90)	97 (65.10)	
<b>Friendly environment</b>	<b>(n, %)</b>	<b>(n, %)</b>	
No	-	-	
Yes	53 (34.87)	99 (65.13)	

Among the variables captured in table 6, drug related factor (first line of drug) shows an association between the choice level of antiretroviral and improvement in CD4 count with p-value 0.002 ( $p < 0.05$ ). Differences observed in improvement in CD4 count in other variables are not statistically significant and therefore could be due to chance.

**Table 7: Results of regression analysis: Factors associated with improvement in CD4 Count**

Variable	OR <sup>c</sup> (95% CI)	<i>P</i> value	OR <sup>a</sup> (95% CI)	<i>P</i> value
<b>Age, years</b>				
14-24	Ref			
25-34	2.31 (0.74-7.14)	0.147	10.59 (0.69-163.06)	0.091
35-44	7.29 (2.04-25.98)	0.002	34.97 (2.22-550.81)	0.012
45-63	4.33 (1.02-18.38)	0.047	8.36 (0.41-169.41)	0.166
<b>Drug line</b>				
Second choice	Ref			
First choice	0.16 (0.05-0.57)	0.005	0.17 (0.04-0.63)	0.009

Note: OR = Odds ratio; 95% CI = 95% confidence interval, <sup>c</sup> OR and OR<sup>a</sup> = crude and adjusted Odds ratios respectively.

In determining factors association with retention and improvement of CD4 count of PLHIV, both simple and multiple logistic regression analyses were done. From table 7, age group 35-44 years had higher odds of improvement in CD4 count compared to the other age groups. This was statistically significant (OR=7.29, 95% CI 2.04-25.98;  $p < 0.05$ ).

When other socio-demographic factors were controlled for, age group 35-44 years still had higher odds (35 times) of improvement in CD4 count (AOR=34.97, 95% CI 2.22-550.81;  $p < 0.05$ ). The other age groups (25-34 and 45-63 years) showed no statistical significance in relation to improvement in CD4 count of participants.

The table further reveals that drug line (first choice: Zidovudine + Lamivudine + Nevirapine or Zidovudine + Lamivudine + Efavirenz, second choice: Tenofovir + Lamivudine + Nevirapine or Tenofovir + Lamivudine + Efavirenz or Tenofovir + Emtricitabine + Nevirapine or Tenofovir + Emtricitabine + Efavirenz) was associated with improvement in CD4 count of participants (OR 0.16, 95% CI 0.05-0.57;  $p < 0.05$ ). When drug side effects, transportation, funding, privacy, friendly environment were controlled for, drug line still shows a positive association between improvement in CD4 count of patients.



## CHAPTER FIVE

### DISCUSSION

Findings from this study reveal that from one stage of the HIV/AIDS care continuum to another, patients are lost to follow-up. However, those who remain in care are influenced by certain factors. This study found out that, retention in HIV/AIDS care is statistically associated with patients' socio-demographic factors: marital status and drug line either;

First choice – Zidovudine + Lamivudine + Nevirapine or Zidovudine + Lamivudine + Efavirenz.

Second choice- Tenofovir + Lamivudine + Nevirapine or Tenofovir + Lamivudine + Efavirenz or Tenofovir + Emtricitabine + Nevirapine or Tenofovir + Emtricitabine + Efavirenz.

Also improvement in CD4 count was statistically significant with age of participants and drug line.

#### **5.1 Proportion of Patients Diagnosed and Linked to Care**

This study found out that one thousand one hundred and twenty-seven (1,127) patients have been diagnosed and linked to care from 2011-2015. About 58% decline in testing and linkage to care at the health care center. This could be attributed to many reasons such as patients being reluctant to come and test due to stigmatization from friends, co-workers and even family members among others.

## **5.2 Proportion of Patients Retained in Care**

Five hundred and ninety-eight (598) patients out of the total tested and linked to care were retained in care. This represents a retention rate of patients at the facility at 53% for the period that the study was conducted. The overall retention rate of 53% falls within the retention rates of 43% and 63% as reported by Kelly, et al., 2015 and Babatunde, et al., 2015 in Georgia-USA and Nigeria respectively. Kelly, et al., 2015 reported that, age is a determinant of retention and that retention increases with age and Babatunde, et al., 2015 also attributed the poor in retention to age, CD4 level at ART initiation, ART status, year of diagnosis and year of initiation of ART.

## **5.3 Proportion of Patients with Improvement in CD4 Count**

Two hundred and fifty-three (253) patients out of the five hundred and ninety-eight (598) retained in care had improved CD4 count. This number of improvement represents 42% of those retained in care within the period considered in the study. This improvement rate agrees with the 42% rate found by Kelly et al., 2015. However, this low improvement rate could be due to the fact that patients after being retained in care became complacent and therefore stopped taking their antiretroviral medication.

## **5.4 Socio-Demographic Factors Associated with Retention in HIV Care Continuum**

Findings from this study points to the fact that proportionally, more women than men of the sampled participants were retained in care. Same finding was reported by Babatunde et al., where 426 representing 68.6% were female and 195 representing 31% were males. Tiruneh et al., 2016 also revealed that out of 385 participants recruited, 248 (64.4%) were women. In this study, the high numbers of women were pregnant women. This high turnout in pregnant women could be attributed to one of the interventions of the National

HIV/AIDS/STIs Control Programme for pregnant women to get tested and all those who are positive be put on treatment for free. This is to prevent the transmission of the HIV virus from mother to the child.

According to Yehia et al., (2015), age is a necessary factor in keeping participants in HIV care, in that older patients are more likely to stay in care because their knowledge about the care is broadened helping them to really grasp the need and benefits of this care. This study found out that retention was high among age groups 25-34 years [25(83.87%)] and 35-44 years [39(90.70%)]. This could be attributed to the fact that these age groups are mostly the working class and therefore have financial freedom to fund their medical bills and not rely on Government support.

Retention was higher among participants who are either self-employed or government employed. Employment will enable them raise money to pay their medical bills and was confirmed in that about 83% of the patients were paying for their medical up keep. Study by the Vietnam Authority of HIV/AIDS Control, (2012) revealed that lack of money which is as a result of lack of employment prevents patients from travelling to their health care centres for the antiretroviral drugs as well as not being able to pay for other medical services they need. Also, some are not able to buy food to eat and therefore will refuse to continue to be in care because, the antiretroviral drugs are taken with food. However, in this study, occupation was found not to be statistically significant ( $p > 0.05$ ) in terms of retention in care.

The results of the study revealed that 68 of the patients who were retained in care had either married, divorced, separated or are widow(er) compared to those who are singles. This

finding agrees with the report by Mekuria et al., 2015 which indicated higher retention among married participants. However, there was no statistical significant association between retention and marital status.

Majority (92%) of the patients who were retained in care had some form of education.

This enabled them to appreciate the importance to first enroll in care and also do all it takes to remain in care. However, the association was not statistically significant which contradicts findings of Tiruneh et al., (2016) which says education was statistically significant with retention in care.

### **5.5 Other Factors Associated With Retention in HIV Care Continuum**

A report by Yehia et al., (2015), mentioned personal factor such as transportation as one of the barriers to retention. However, findings of this study revealed that out of the total number of 123 of patients retained in care, 71 of them representing approximately 85% said transportation was not a challenge or barrier for retention in care. This could be attributed to the fact that all these 71 patients stay close to the health care facility where they receive their HIV care. However, the finding was not statistically significant ( $p > 0.05$ ).

Social support such as funding is reported by Tiruneh et al., (2016) as instrumental in retention of people living with HIV in care. This study revealed that a bulk (83%) of those retained in care either paid for services provided from their pocket or they are on a special funding project, with only 17% patients' bills were paid for by the National Health Insurance Scheme (NHIS). However, there was no statistical significance ( $p > 0.05$ ) between those who paid by themselves or those on the NHIS. The difference in findings of

this study and other studies such as Tiruneh et al., (2016) could be assigned to the fact that charges at the International Health Care Center (IHCC) are relatively cheaper.

Findings from the study showed that 123 patients representing 83% who were retained responded in the affirmative to the fact that privacy is ensured at the facility they receive their care and this has kept them in care. Also 125 of the participants (82%) who were retained in care said that the friendly environment at the IHCC has kept them in care. These findings are in line with study conducted by Yehia et al., (2015) which stated that positive relationships with clinic staff is one of the most universally discussed facilitators of keeping patients in care and a sense of trust, allowing patients to honestly share their health experiences and adherence behaviors.

A study by Nabukeera-Barungi et al., (2015) reported that side effects of ART drugs are barriers to retention in care. Findings of this study showed majority (81) of the participants (73%) never had any side effect of the ART drugs while 30 of the participant (27%) have had side effect in one form or the other or do not know if they have had any side effect from the ART drugs. However, the difference was not statistically significant.

According to Wilhelmson, and colleagues, (2016), drug line is another drug related barrier to retention in HIV care. The results from this research indicated that out of 25 participants put on the first choice (Zidovudine + Lamivudine + Nevirapine or Zidovudine + Lamivudine + Efavirenz) of the first drug line, 24 of them representing 96% were retained in care compared to 74 participants (75%) out of 98 participants put on the second choice (Tenofovir + Lamivudine + Nevirapine or Tenofovir + Lamivudine + Efavirenz or Tenofovir + Emtricitabine + Nevirapine or Tenofovir + Emtricitabine + Efavirenz) of the

same first line drug who remained in care. This indicates that the second choice drug had little or no side effect on the patients and therefore the need to put majority of them on it. The difference between the choices of drug line was statistically significant ( $p < 0.05$ ) with retention.

### **5.6 Socio-Demographic Factors Associated with Improvement in Cd4 Count**

Age as stated by Kelly et al., (2015), is a predictor of retention in HIV care and this translated into improvement in CD4 count of participants in this study. Improvement of CD4 count among participants age 35-41 years was 81% and those between 45-63 years was 72% compared to age group 14-24 years (38%) and 25-34 years (58%). This confirms the fact that the longer one stays on the antiretroviral drugs, the greater the chance of improvement in CD4 count. The difference between the age categories and their association with improvement in CD4 count was statistically significant ( $p < 0.05$ ).

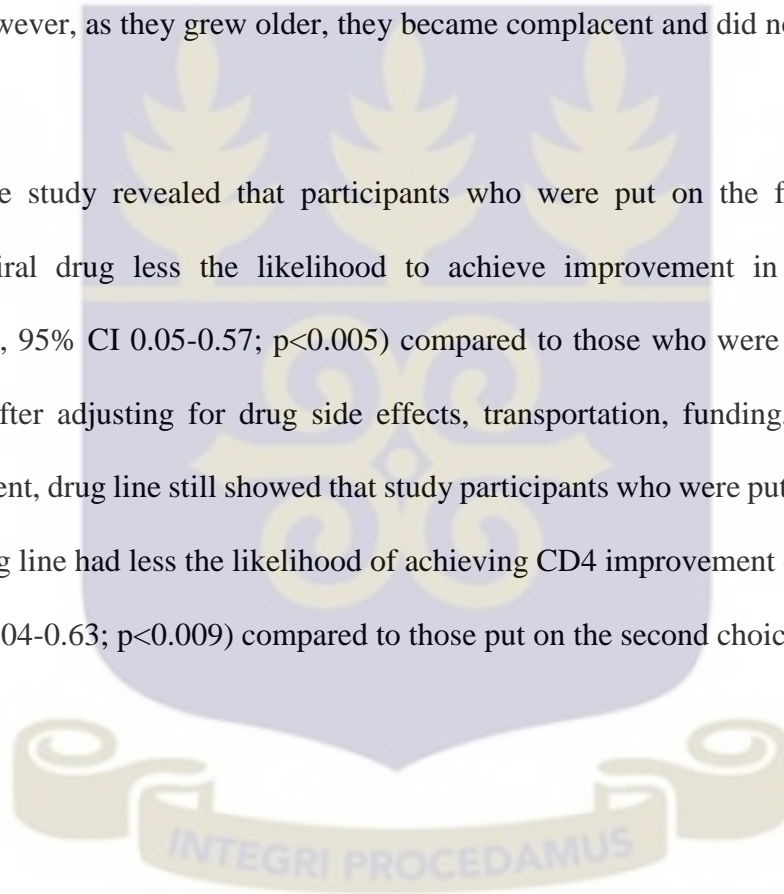
Studies such as one by Wilhelmson et al., 2016 have stated that drug line is a barrier to retention. However, findings from this study show that 88% of the patients who were put on first choice of first drug line medication had improvement in CD4 count and those put on second choice had 54% improvement in CD4 count. The difference was statistically significant ( $p < 0.05$ ).

### **5.7 Odds Ratios Results**

This study found out that age was a significant predictor of improvement in CD4 count. Age group 35-44 years had 7.29 the odds of achieving improvement in CD4 count with a p-value of 0.002 compared to the other age groups. After adjusting for socio-demographic factors, age group 35-44 years still showed association between the age group and improvement in CD4 count and this association was statistical significance (AOR=34.97,

95% CI 2.22-550.81;  $p < 0.05$ ). The other age groups (25-34 and 45-63 years) showed no association between the age groups and improvement in CD4 count and also the association was not statistically significant. This could be ascribed to the fact that the lower age group (25-34) years when put on the antiretroviral drugs did not adhere strictly to the drug regimen thinking that they were strong and did not need any drugs. Those of the upper age group (45-63) years were once between the ages 35-44 years and had improvement in CD4 count; however, as they grew older, they became complacent and did not keep to the drug regimen.

Again, the study revealed that participants who were put on the first choice of the antiretroviral drug less the likelihood to achieve improvement in their CD4 count (OR=0.16, 95% CI 0.05-0.57;  $p < 0.005$ ) compared to those who were put on the second choice. After adjusting for drug side effects, transportation, funding, privacy, friendly environment, drug line still showed that study participants who were put on the first choice of the drug line had less the likelihood of achieving CD4 improvement count (AOR=0.17, 95% CI 0.04-0.63;  $p < 0.009$ ) compared to those put on the second choice.



## CHAPTER SIX

### CONCLUSION AND RECOMMENDATIONS

#### 6.0 Conclusion

The study showed that retention and improvement in CD4 count of people living with HIV/AIDS receiving care at the International Health Care Center over a five year period (2011-2015) are 53% and 42% respectively.

Marital status and choice of drug line (first choice-Zidovudine + Lamivudine + Nevirapine or Zidovudine + Lamivudine + Efavirenz, second choice-Tenofovir + Lamivudine + Nevirapine or Tenofovi + Lamivudine + Efavirenz or Tenofovir + Emtricitabine + Nevirapine or Tenofovi + Emtricitabine + Efavirenz) were statistically significant factors in the retention of people living with HIV/AIDS receiving care at the International Health Care Center (IHCC).

Age (35-44 years) and choice of drug line (i.e. first or second) of the antiretroviral drug were important predictors in improving the CD4 count of the study participants.

#### 6.1 Recommendations

From the findings of this research, the underlisted recommendations are made:

- I. Government policies to ensure adequate funding of HIV care especially to support defaulters tracing. This is especially critical in the context of dwindling donor support. The government needs to allocate resources to support the above interventions that will ensure that patients are retained in care for improvement in CD4 count.

- II. Better health information systems that will ensure accurate documentation in the relevant records so that all patients are accounted for. This will ensure easy identification of any patients that are lost to care.
- III. All antiretroviral therapy (ART) centers should be equipped with the necessary reagent and equipment to render comprehensive care for HIV/AIDS patients.
- IV. Community based volunteers should be formed at all communities to serve as liaisons between the communities and the ART centers. They will be responsible to track all who have been diagnosed and linked to care in their communities. Their activities will monitor and either report to the ART centers for action to be taken not to lose anyone in care.
- V. ART centers should ensure that they create the conducive environment and staff trained to have the full technical know-how to help retain patients in care.
- VI. All ART centers should keep adequate and complete records on their patients. This record should be updated regularly which could serve as a data base for the National HIV/AIDS/STIs Control Programme and also for defaulters tracing.

### **Limitations**

- I. The study was limited to a single ART center/clinic and therefore the findings cannot be generalized to other ART centers/clinics.
- II. Incompleteness of medical record of participants was also a limitation to the study. This resulted in incomplete information about some study participants thereby affecting the sample size.

### **Future Research**

Many ART centers should be considered in such study to make findings more generalized.



## REFERENCES

- Addo, N. A., Yawson, A. E., Addo A. S., Dornoo, B. T., & Seneadza, H. NA. (2014). Original Articles a Review of National Programme data on the HIV epidemic in Ghana : 2005-2010, *3*(2), 73–81.
- Alemnji, G., Fonjungo, P., Van Der Pol, B., Peter, T., Kantor, R., & Nkengasong, J. (2014). The centrality of laboratory services in the HIV treatment and prevention cascade: The need for effective linkages and referrals in resource-limited settings. *AIDS Patient Care and STDs*, *28*(5), 268–73. <http://doi.org/10.1089/apc.2013.0356>
- Alvarez-Uria, G. (2014). Description of the cascade of care and factors associated with attrition before and after initiating antiretroviral therapy of HIV infected children in a cohort study in India. *PeerJ*, *2*, e304. <http://doi.org/10.7717/peerj.304>
- Alvarez-Uria, G., Pakam, R., Midde, M., & Naik, P. K. (2013). Entry, Retention, and Virological Suppression in an HIV Cohort Study in India: Description of the Cascade of Care and Implications for Reducing HIV-Related Mortality in Low- and Middle-Income Countries. *Interdisciplinary Perspectives on Infectious Diseases*, *2013*, 384805. <http://doi.org/10.1155/2013/384805>
- Babatunde, O., Ojo, O. J., Atoyebi, O. A., Ekpo, D. S., Ogundana, A. O., Olaniyan, T. O., & Owoade, J. A. (2015). Seven year review of retention in HIV care and treatment in federal medical centre Ido-Ekiti. *Pan African Medical Journal*. 2015; *22*:139 doi:10.11604/pamj.2015.22.139.4981
- Darak, S., Panditrao, M., Parchure, R., Kulkarni, V., Kulkarni, S., & Janssen, F. (2012). Systematic review of public health research on prevention of mother-to-child transmission of HIV in India with focus on provision and utilization of cascade of PMTCT services. *BMC Public Health*, *12*(1), 320. <http://doi.org/10.1186/1471-2458-12-320>
- Eyawo, O., Hogg, R. S., & Montaner, J. S. G. (2013). The Holy Grail : The Search for Undiagnosed Cases Is Paramount in, *104*(5), 418–419.
- Gardner, E. M., & Young, B. (2014). The HIV care cascade through time. *The Lancet Infectious Diseases*, *14*(1), 5–6. [http://doi.org/10.1016/S1473-3099\(13\)70272-X](http://doi.org/10.1016/S1473-3099(13)70272-X)
- Ghana Statistical Service (GSS), Ghana Health Service (GHS), & ICF Macro. (2013).

Ghana AIDS Commission, 2013.

Hallett, T. B., & Eaton, J. W. (2013). SUPPLEMENT ARTICLE A Side Door Into Care Cascade for HIV-Infected Patients?, 63, 228–232.

Hardon AP, Akurut D, Comoro C, Ekezie C, Irunde HF, Gerrits T, et al. Hunger, waiting time and transport costs: Time to confront challenges to ART adherence in Africa. *AIDS Care* 2007;19(5):658–665. [PubMed: 17505927]

Hull, M. W., Wu, Z., & Montaner, J. S. G. (2012). Optimizing the engagement of care cascade: a critical step to maximize the impact of HIV treatment as prevention. *Current Opinion in HIV and AIDS*, 7(6), 579–86. <http://doi.org/10.1097/COH.0b013e3283590617>

Ijeoma Okoronkwo, Uchenna Okeke, Anthonia Chinweuba, and Peace Iheanacho (2013). Nonadherence Factors and Sociodemographic Characteristics of HIV-Infected Adults Receiving Antiretroviral Therapy in Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria. <http://dx.doi.org/10.1155/2013/843794>

Illife, J. (2006). *The African AIDS epidemic: A history*. Athens: Ohio University Press, Oxford: James Currey, ..., 36, 387–389.

Kelly, J., Rane, D., Wortley, P., & Drenzek, C., (2015). The care continuum for people living with HIV in Georgia: How can we raise bar? *JGPHA*(2015) Vol 5, No.1

Layer, E. H., Kennedy, C. E., Beckham, S. W., Mbwambo, J. K., Likindikoki, S., Davis, W. W., ... Massawe, E. (2014). Multi-level factors affecting entry into and engagement in the HIV continuum of care in Iringa, Tanzania. *PLoS ONE*, 9(8). <http://doi.org/10.1371/journal.pone.0104961>

Mayer, K. H., Mugavero, M. J., Amico, K. R., Horn, T., & Thompson, M. a. (2013). The state of engagement in HIV care in the United States: From cascade to continuum to <http://doi.org/10.1093/cid/cit420>

McNairy, M. L., & El-Sadr, W. M. (2012). The HIV care continuum. *Aids*, 26(14), 1735–1738. <http://doi.org/10.1097/QAD.0b013e328355d67b>

- Merson, M. H., O'Malley, J., Serwadda, D., & Apisuk, C. (2008). The history and challenge of HIV prevention. *Lancet*, 372(9637), 475–88.  
[http://doi.org/10.1016/S0140-6736\(08\)60884-3](http://doi.org/10.1016/S0140-6736(08)60884-3)
- Legese A. Mekuria, Jan M. Prins, Alemayehu W. Yalew, Mirjam A. G. Sprangers, Pythia T. Nieuwkerk (2015). Retention in HIV Care and Predictors of Attrition from Care among HIV-Infected Adults Receiving Combination Anti-Retroviral Therapy in Addis Ababa. *PLoS ONE* 10(6): e0130649. doi:10.1371/journal.pone.0130649
- Na, A., Ae, Y., As, A., Bt, D., & Hna, S. (2014). Original Articles a Review of National Programme Data on the HIV Epidemic in Ghana: 2005-2010, 3(2), 73-81.
- Nabukeera-Barungi, N., Elyanu, P., Asire, B., Katureebe, C., Lukabwe, I., Namusoke, E.,... Tumwesigye, N., (2015). Adherence to antiretroviral therapy and retention in care for adolescents living with HIV from 10 districts in Uganda. *BMC Infectious Diseases* (2015) 15:520. DOI 10.1186/s12879-015-1265-5
- National HIV/AIDS/STI Control Programme.(2010). Guidelines for Antiretroviral.
- National HIV/AIDS/STI Control Programme.(2016). 2015 HIV Sentinel Survey Report.
- New York State Department of Health AIDS Institute. (2015)
- Nosyk, B., Montaner, J. S. G., Colley, G., Lima, V. D., Chan, K., Heath, K., ... Gilbert, M. (2013). The cascade of HIV care in British Columbia , Canada , 1996 – 2011 : a population-based retrospective cohort study. *The Lancet*, 3099(13), 70254–8.
- Ronald A. Cantrell, Moses Sinkala, Karen Megazinni, Sibi Lawson-Marriott, Sierra Washington, Benjamin H. Chi, Bushimbwa Tambatamba-Chapula, Jens Levy, Elizabeth M. Stringer, Lloyd Mulenga, and Jeffrey S. A. Stringer. (2008). A pilot study of food supplementation to improve adherence to antiretroviral therapy among food insecure adults in Lusaka, Zambia.  
doi:10.1097/QAI.0b013e31818455d2.
- Sten Wilhelmson, Anton Reepalu, Taye Tolera Balcha, Godana Jarso and Per Bjo" rkman (2016).Retention in care among HIV-positive patients initiating second-line antiretroviral therapy: a retrospective study from an Ethiopian public hospital clinic

Sonja Merten, Elise Kenter, Oran McKenzie, Maurice Musheke, Harriet Ntalasha and Adriane Martin-Hilber (2010). Patient-reported barriers and drivers of adherence to antiretrovirals in sub-Saharan Africa: a meta-ethnography. doi:10.1111/j.1365-3156.2010.02510

Tiruneh, Y. M. Galárraga, O. Genberg, B. Wilson, I. B. (2016). Retention in Care among HIV-Infected Adults in Ethiopia, 2005– 2011: A Mixed-Methods Study. *Plos ONE* 11(6): e0156619. doi:10.1371/journal.pone.0156619

UNAIDS. (2013). *The gap report*.

UNAIDS. (2014). *The Global HIV Fact Sheet*.

Ulett, K. B., Willig, J. H., Lin, H.-Y., Routman, J. S., Abroms, S., Allison, J., ... Mugavero, M. J. (2009). The therapeutic implications of timely linkage and early retention in HIV care. *AIDS Patient Care and STDs*, 23(1), 41–9. <http://doi.org/10.1089/apc.2008.0132>

Vietnam Authority of HIV/AIDS Control. (2012). Enrolment and Retention in HIV Care and Treatment Services in Vietnam-Facilitators and Barriers for People Living with HIV

World Health Organization. (2011). Retention in hiv programmes, Defining the challenges and identifying solutions. *World Health Organization*, (September), 71. <http://doi.org/10.1016/j.trstmh.2010.01.007>

Yehia, B. R., Stephens-Shields, A. J., Fleishman, J. a., Berry, S. a., Agwu, A. L., Metlay, J. P., ... Gebo, K. a. (2015). The HIV care continuum: changes over time in retention in care and viral suppression. *Plos One*, 10(6), e0129376. <http://doi.org/10.1371/journal.pone.0129376>

## APPENDICES

### **APPENDIX 1: Consent Form**

Dear Respondent,

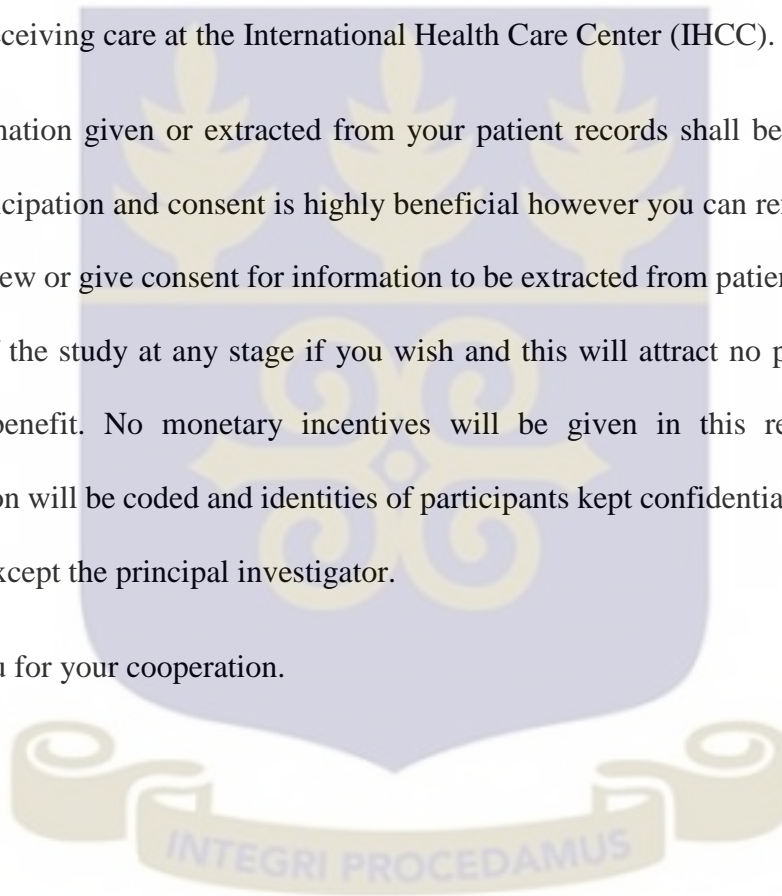
This is a research being conducted by a student of the School of Public Health, University of Ghana to explore the factors associated with the care continuum among HIV/AIDS patients receiving care at the International Health Care Center (IHCC).

All information given or extracted from your patient records shall be kept confidential. Your participation and consent is highly beneficial however you can refuse to take part in the interview or give consent for information to be extracted from patient folder. You may opt out of the study at any stage if you wish and this will attract no penalties or loss of medical benefit. No monetary incentives will be given in this research. Extracted information will be coded and identities of participants kept confidential to all who handle the data except the principal investigator.

Thank you for your cooperation.

Signed

(Principal investigator)



Dear Principal investigator,

I have read the foregoing information. I have had the opportunity to ask questions about it and all questions I have asked have been answered to my satisfaction. I consent voluntarily to participate as a subject in this study and understand that I have the right to withdraw from the study at any time without in any way it affecting my further medical care.

Signed

Thumb print

.....

.....

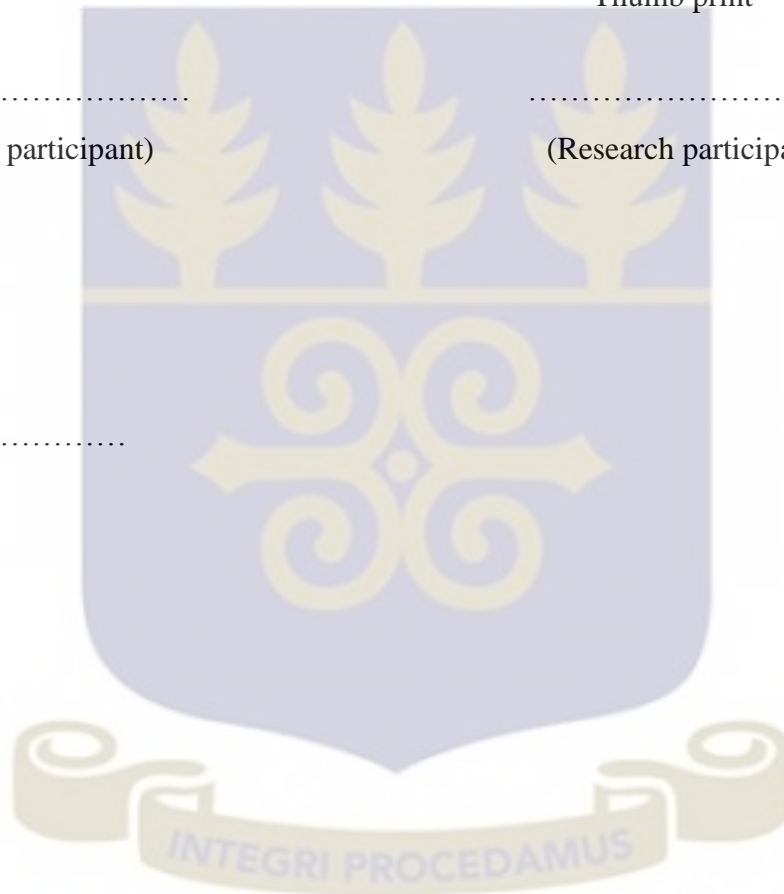
(Research participant)

(Research participant)

Signed

.....

(Witness)



## APPENDIX 2: Data Extraction Tool and Interview Guide

Topic: **Factors associated with Care Continuum of HIV/AIDS patients receiving antiretroviral therapy (ART) between 2011 and 2015 at the International Health Care Center (IHCC)**

Extraction date: .....

### Patient Identification

1. Patient's ID code: .....
2. Date of Birth: .....
3. Age: .....
4. Gender: Male/Female
5. Marital Status
  - Married
  - Single
  - Divorced
  - Separated
  - Widow (er)
  - Cohabiting
6. Educational Level
  - Nil
  - Primary
  - JHS
  - SHS/Tech
  - MSLC
  - Tertiary
7. Occupation
  - Full time
  - Part time
  - Self employed
  - Unemployed
8. Religion
  - Muslim
  - Christian
  - Traditional
  - Other
  - none
9. Referral Information
  - Diagnostic testing
  - Walk-in VCT site
  - PMTCT Program
  - Old patient

- Transfer in on ART
- Transfer in from paediatric
- From TB program
- STI testing

10. Funding Option

- Out of pocket
- Medical insurance
- Special project
- Employer sponsored

**Clinical Care**

11. Date of HIV test: .....

12. Past ARV experience. Yes/No

13. If yes in (12), Drugs and Dates

- i. Drug: ..... Duration: .....
- ii. Drug: ..... Duration: .....
- iii. Drug: ..... Duration: .....

14. If sexually active, disclosure to sexual partner? Yes / No

15. If sexually active, regular condom use? Yes / No

16. WHO clinical stage of patient

- Stage 1
- Stage 2
- Stage 3
- Stage 4

**CD4 test information**

17. Baseline CD4 count: .....

18. Baseline test Date: .....

19. Second CD4 count: .....

20. Date of second CD4 count: .....

21. Third CD4 count: .....

22. Date of third CD4 count: .....

23. Fourth CD4 count: .....

24. Date of fourth CD4 count: .....

25. Most recent CD4 count.....

26. Date of most recent CD4 count.....

27. Is Patient recommended for ART treatment? Yes / No

28. If yes was adherence counselling done? Yes / No

29. Is Patient on ART? Yes / No

**ARV treatment and Adherence**

30. Date of last visit: .....

31. Number of ARV doses missed since last visit: .....

**ARV status of patient**

32. Start date: .....

33. Patient length of time on continuous use of ART

- Between 1 to 3 months
- Between 4 to 6 months
- Between 7 to 9 months
- Between 10 to 12 months
- For more than 12 months
- discontinued ART completely

34. If ART discontinued, what was the reason?

.....

**ARV treatment prescribed**

35. First line ARV drugs

**First choice**

- AZT+3TC+NVP
- AZT+3TC+EFV

**Second choice**

- TDF+3TC+NVP
- TDF+3TC+EFV
- TDF+FTC+NVP
- TDF+FTC+EFV

36. Second line ARV drugs

**First choice**

- TDF+FTC+LPV/r
- TDF+3TC+LPV/r
- TDF+FTC+ATV/r
- TDF+3TC+ATV/r

**Second choice**

- AZT+3TC+LPV/r
- AZT+3TC+ATV/r

**INTERVIEW QUESTIONNAIRE FOR PATIENTS RECEIVING MEDICAL CARE FOR HIV/AIDS**

**“I’d like to thank you for taking part in this interview. Remember that all the information you give me will be confidential and your name won’t be recorded in the survey responses. The answers to some questions may seem obvious to you, but I need to ask you all of the questions. You are free to end this interview session at any point if you feel tired or uncomfortable”**

**Patient ID:** .....

**Extraction date:** .....

1. What month and year did you **first** test positive for HIV? Tell me when you got your result, not when you got your test.

\_\_\_ / \_\_\_  
(M M /Y Y)

2. When you tested positive in \_\_\_ / \_\_\_ \_\_\_ [INSERT DATE], at what type of facility were you tested?

- Private doctor’s office .....  1
- Primary care clinic or community health center .....  2
- Health department .....  3
- Labor/delivery setting .....  4
- OB-GYN or family planning clinic .....  5
- Emergency room .....  6
- Inpatient hospital (**not** labor/delivery or emergency room) ...  7
- HIV counseling and testing site .....  8
- STD clinic .....  9
- HIV/AIDS infectious disease clinic .....  10
- Mobile test site .....  11
- Correctional facility .....  12
- Blood donation facility .....  13
- Substance abuse treatment center .....  14
- Insurance or employee clinic .....  15
- Other (*Specify:* \_\_\_\_\_) .....  16
- Refused to answer .....  17
- Don’t know .....  18

3. When you tested positive in \_\_\_ / \_\_\_ \_\_\_ [INSERT DATE], what was the main reason you were tested?

- Concerned about exposure through sexual contact .....  1

- Concerned about exposure through IDU .....  2
- Part of STD screening or due to STD diagnosis .....  3
- Due to other illness (not STD) .....  4
- Due to pregnancy .....  5
- Personal initiative to routinely test .....  6
- Provider recommendation as part of routine care .....  7
- Health department partner notification (PCRS) .....  8
- Before blood donation.....  9
- Needle stick follow-up or occupational exposure .....  10
- Requirement (military, court order, or insurance). .....  11
- Other (*Specify:* \_\_\_\_\_) .....  12
- Refused to answer .....  13
- Don't know .....  14

4. Since testing positive for HIV, what month and year did you **first** visit a doctor, nurse, or other health care worker for HIV medical care? \_\_\_/\_\_\_/\_\_\_  
(MM / YYYY)

(Refer to question 1 to determine if it was within 3 months)

**If No to question 4 then ask 5**

5. What was the main reason you didn't go to a doctor, nurse, or other health care worker for HIV medical care **within 3 months** of testing positive for HIV?

- Felt good .....  1
- Initial CD4 count and viral load were good .....  2
- Didn't believe test result .....  3
- Didn't want to think about being HIV positive .....  4
- Didn't have enough money or health insurance .....  5
- Had other responsibilities such as child care or work.....  6
- Experienced homelessness .....  7
- Was drinking or using drugs .....  8
- Felt sick .....  9
- Forgot to go .....  10
- Missed appointment(s) .....  11
- Moved or out of town .....  12
- Unable to get transportation .....  13
- Facility is inconvenient (location, facility hours, wait-time) .  14
- Didn't know where to go .....  15
- Couldn't find the right HIV health care provider .....  16
- Unable to get earlier appointment .....  17
- Unaware of recommendation to enter care within 3 months .  18
- Other (*Specify:* \_\_\_\_\_) .....  19
- Refused to answer .....  20
- Don't know .....  21

6. When was your **most recent** visit to a doctor, nurse, or other health care worker for HIV medical care? Please tell me the month and year.

\_\_\_/\_\_\_/\_\_\_

(M M / Y Y Y Y)

7. In the past 12 months, between [*ONE YEAR PRIOR TO INTERVIEW DATE*] and today, how many times did you go to your HIV doctor or other care provider at [*USUAL SOURCE OF CARE FACILITY NAME*] for any sort of care?

— —

*“Now I’m going to ask you about general medical care. When I say, ‘general medical care,’ I mean care for any sort of general medical problem besides your HIV.”*

8. During the **past 12 months**, how many times did you go to an emergency room or urgent care center for HIV medical care?

— —

9. During the **past 12 months**, how many times were you admitted to a hospital because of an HIV-related illness? Please don’t include visits that were made only to the emergency room.

— —

**HIV Treatment and Adherence**

*“Now I’m going to ask some questions about medicines that you are taking for your HIV. These medicines are called antiretroviral medicines, also known as ART, HAART, or the AIDS cocktail.”*

10. Have you **ever** taken any antiretroviral medicines for your HIV?
- No.....  0
  - Yes.....  1
  - Refused to answer.....  2
  - Don’t know.....  3

11. If **No** why?
- Doctor advised to delay treatment .....  1
  - Participant believed he/she didn’t need medications because felt healthy or believed HIV laboratory results were good ...  2
  - Due to side effects of medication .....  3
  - Felt depressed or overwhelmed .....  4
  - Didn’t want to think about being HIV positive .....  5
  - Worried about ability to adhere .....  6
  - Drinking or using drugs .....  7
  - Money or insurance issues .....  8
  - Homeless .....  9
  - Taking alternative or complementary medicines .....  10
  - Other (*Specify:* \_\_\_\_\_) .....  11
  - Refused to answer .....  12
  - Don’t know .....  13

12. When was the first time you **ever** took any antiretroviral medicines for your HIV? Please tell me the month and year.

\_\_\_/\_\_\_  
(M M / Y Y Y Y)

13. Most antiretroviral medicines need to be taken on a schedule, such as “2 times a day” or “3 times a day” or “every 8 hours.” How closely did you follow your specific schedule during the **past 3 days**?

- Never .....  1
- Rarely .....  2
- About half of the time .....  3
- Most of the time .....  4
- Always .....  5
- Refused to answer .....  6
- Don't know .....  7

14. When was the **last time** you missed any of your antiretroviral medicines?

- Within the past **week** .....  1
- 1–2 **weeks** ago.....  2
- 3–4 **weeks** ago.....  3
- 1–3 **months** ago .....  4
- More than 3 **months** ago.....  5
- Never skip medicines .....  6
- Refused to answer .....  7
- Don't know .....  8

15. The **last time** you missed taking your antiretroviral medicines, what were the reasons?

- Problem with prescription or refill .....  1
- Felt sick or tired .....  2
- Change in daily routine including travel .....  3
- Due to side effects of medications .....  4
- Felt depressed or overwhelmed .....  5
- Drinking or using drugs .....  6
- Money or insurance issues .....  7
- Homeless .....  8
- Had too many pills to take .....  9
- Forgot to take them .....  10
- Other 1 (*Specify:* \_\_\_\_\_) .....  11
- Other 2 (*Specify:* \_\_\_\_\_) .....  12
- Refused to answer .....  13
- Don't know .....  14

16. During the **past 12 months**, how many times have you **missed treatment**?

- Once.....  1
- Twice.....  2
- Thrice .....  3

*“Now I’m going to ask you a question about the past 30 days. We will use the calendar to refer to the past 30 days.”*

17. How sure are you that you were able to take all or most of your medication as directed?

- Not at all sure .....  0
- Somewhat sure .....  1

- Very sure .....  2
- Extremely sure .....  3
- Refused to answer .....  4
- Don't know .....  5

**18.** During the **past 30 days**, how troubled were you by side effects from your antiretroviral medications?

- Never .....  1
- Rarely .....  2
- About half of the time .....  3
- Most of the time .....  4
- Always .....  5
- Been on medications less than 30 days .....  6
- Refused to answer .....  7
- Don't know .....  8

**19.** During the **past 12 months**, have you taken antiretroviral medicines?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**20.** During the **past 12 months**, have you ever purposefully taken a “drug holiday” from your antiretroviral medicines that wasn’t recommended by your doctor? That is, did you plan to not take any doses of one or more of your antiretroviral medicines for at least two whole days in a row?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**21.** If **yes for 12**, what was the main reason that you took a drug holiday from your antiretroviral medicines?

- Medicine has side effects or makes me feel bad .....  1
- Got tired of taking medicines or needed a break .....  2
- Was using drugs or alcohol .....  3
- Was on vacation .....  4
- Felt good .....  5
- Other (*Specify:* \_\_\_\_\_) .....  6
- Refused to answer .....  7
- Don't know .....  8

**22. (Both)**-Before you first tested positive for HIV, did you have sex with a male?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**23. (Male)**-Before you first tested positive for HIV, did you have sex with a female?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**24. (Both)**-Before you first tested positive for HIV, did any of your male partner(s) use needles to inject heroin, cocaine, steroids, or any other drug that was not prescribed by a doctor?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**25. (Male)**-Before you first tested positive for HIV, did any of your female partner(s) use needles to inject heroin, cocaine, steroids, or any other drug that was not prescribed by a doctor?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**26. (Both)**-Before you first tested positive for HIV, did any of your male sex partner(s) have sex with other female?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**27. (Both)**-Before you first tested positive for HIV, did any of your male sex partner(s) have sex with other men?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**28. (Male)**-Before you first tested positive for HIV, did any of your female sex partner(s) have sex with other men?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

**29. (Both)**-Before you first tested positive for HIV, did any of your male sex partner(s) have HIV or AIDS?

- No .....  0
- Yes .....  1
- Refused to answer .....  2
- Don't know .....  3

30. (Male)-Before you first tested positive for HIV, did any of your female sex partner(s) have HIV or AIDS?
- No .....  0
  - Yes .....  1
  - Refused to answer .....  2
  - Don't know .....  3

**“Now I am going to ask you questions about services provided by the healthcare”**

- 31. Do you get drugs supply anytime you attend clinic? Yes/ No
- 32. Conducive/ friendly environment is provided for patient and health worker. Yes/ No
- 33. Privacy is ensured by the health care provider during consultation counselling. Yes/No
- 34. The health care center provides appointment reminders. Yes/No

**“Now I am going to ask you about personal and family”**

- 35. Difficulty finding transportation to service providers. Yes/ No
- 36. My family members, friends and co-workers have been supportive from the day I was diagnosed as HIV positive. Yes/No
- 37. Do you have any other personal or family issues you would like to share? Yes/No
- 38. If yes to (37). .....

*Thank you for your time and participation in this exercise. You are promised that every information given will be treated confidential.*



**GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE**

*In case of reply the number and date of this Letter should be quoted.*



Research & Development Division  
Ghana Health Service  
P. O. Box MB 190  
Accra  
Tel: +233-302-681109  
Fax + 233-302-685424  
Email: [Hannah.Frimpong@ghsmail.org](mailto:Hannah.Frimpong@ghsmail.org)

My Ref. GHS/RDD/ERC/Admin/App/  
Your Ref. No.

Albert Korley  
University of Ghana  
School of Public Health  
Legon, Accra

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	<b>GHS-ERC 54/12/15</b>
Project Title	“Factors Associated with Care Continuum of HIV/AIDS Patients Receiving Antiretroviral at the International Health Care Center (IHCC), Ghana”
Approval Date	12 <sup>th</sup> April, 2016
Expiry Date	11 <sup>th</sup> April, 2017
GHS-ERC Decision	<b>Approved</b>

**This approval requires the following from the Principal Investigator**

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report **after completion** of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....  
DR. CYNTHIA BANNERMAN  
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra