ANALYSIS OF THE LOSSES IN THE HIV AND AIDS CARE CONTINUUM: A CROSS SECTIONAL STUDY AT THE EFFIA-NKWANTA REGIONAL HOSPITAL, WESTERN REGION

BY

IRENE AMEDZRO
(10637336)

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DECLARATION

I Irene Amedzro, hereby declare that this proposal is the result of my independent work done under supervision, except for other peoples’ work which I have duly acknowledged. I further declare that this proposal does not contain any materials which has been accepted for award of any degree in this institution and other universities elsewhere.

Irene Amedzro  
(Student)

Dr. Francis Anto  
(Academic Supervisor)

Dr. Samuel Oko Sackey  
(Academic Co-supervisor)
DEDICATION

This dissertation is dedicated to my family: my husband Godfred Kofi Doe Amedzro, my children, Eyram and Etornam and my mother for their immense support during my time of study.
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I thank God for seeing me through the MPhil. Applied Epidemiology and Disease Control program.

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ABSTRACT

Background: In 2017, about 37 million people were living with the HIV infection globally. Anti-retroviral therapy (ART) has proven to improve the clinical outcomes of People Living with HIV/AIDS (PLHIV) by suppressing viral replication. Identifying PLHIV in the population, linking and retaining them in care to ensure viral suppression are stages in the HIV/AIDS Care Continuum (HACC). An analysis of the care continuum usually reveals fall outs of PLHIV from one stage to the other. The aim of this study was to analyze the losses in the care continuum at the ART center of the Effia-Nkwanta Regional Hospital and to assess factors contributing to the losses.

Method: Patient records covering the period January to December 2017 on HIV services at the hospital were reviewed. Folders of PLHIV diagnosed at the hospital were reviewed and data on socio-demographic and clinical information extracted onto a data extraction form. Data analysis was done using STATA v15. Pearson Chi-square was used to determine factors associated with the losses at a significance of p<0.05. Logistic regression was used to determine the strength of association.

Results: In 2017, at Effia-Nkwanta Regional Hospital, 33.1% (365/1,104) of PLHIV were diagnosed, 88.8% (324/365) linked to care, 84.3% (273/324) initiated on ARVs, 67.8% (185/273) retained in care with 88.5% (85/96) of them attaining viral suppression after a year on ARVs. Three hundred and twenty-four patient folders were reviewed. The median age of the patients was 37 years (IQR: 28-46) with 65.7% (213/324) being females. Viral load results at 12 months was available for 96 out of 198 eligible clients. Overall, proportion of lost to follow-up was 40.1%. Young age (15-24 years), having no comorbidities, inadequate staff and referral system contributed to lost to follow-up.

Conclusion: In 2017, diagnosis and retention stages of the HACC were the most affected, however, more diagnosed PLHIV were linked to HIV care. Being young, having no
comorbidities, inadequate staff and referral system contributed to the losses in the HACC. In order to reduce the proportion lost to follow-up, strengthening of health information system to track PLHIV who miss appointments, active monitoring of younger clients and those without comorbidities, and development of a system to track clients due for viral load test were recommended.
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LIST OF ABBREVIATIONS

3TC………………….Lamivudine
ABC…………………Abacavir
ART …………………Anti-retroviral Therapy
ATV/r……………….Ritonavir boosted Atazanavir
AZT………………….Zidovudine
BWARFF…………..British West African Royal Frontier Force
CCC…………………..Comprehensive Care Center
CCR5………………..Chemokine Receptor antagonists
DRV/r……………….Ritonavir boosted Darunavir
EFV………………… Efavirenz
ENRH………………..Effia-Nkwanta Regional Hospital
FI…………………… Fusion Inhibitors
FSW………………….Female Sex Workers
FTC………………….Emtricitabine
GAC………………….Ghana AIDS Commission
GHS………………….Ghana Health Service
HACC……………….HIV/AIDS Care Continuum
HRSA HAB………… Human Resources and Services Administration HIV/AIDS Bureau
HTC………………….HIV Testing and Counseling
HTC………………….HIV Testing and Counseling
IDU………………….Intravenous Drug User
INSTI……………… Integrase Strand Transfer Inhibitors
KP..................Key population
LMIC..................Lower and Middle-Income Countries
LTFU..................Lost-To-Follow-up
LVP/r.................Ritonavir boosted Lopinavir
MSM..................Men who have Sex with Men
NACP..................National HIV/AIDS/STI Control Programme
NNRTI.................Non-Nucleoside Reverse Transcriptase Inhibitors
NRTI..................Nucleoside Reverse Transcriptase Inhibitors
NtRTI...............Nucleotide Reverse Transcriptase Inhibitors
NVP..................Nevirapine
PHC..................Population and Housing Census
PI....................Protease Inhibitors
PLHIV...............Person(s) Living with HIV/AIDS
PMTCT...............Prevention of Mother-to-Child Transmission of HIV
SSA..................Sub Saharan Africa
STI...................Sexually Transmitted Infections
STM.................Sekondi-Takoradi Metropolis
TDF.................Tenofovir
WHO...............World Health Organisation
ZDV...............Zidovudine
CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Deficiency Syndrome (AIDS) has become a public health issue affecting the masses in resource-limited settings. HIV infection is a long-term condition that requires lifelong therapy. In 2017, 36.7 million people were living with the condition globally, with 9 million people being ignorant of their status. Africa is considered as the continent mostly affected, with 19.6 million (53%) are from eastern and southern parts and West and Central Africa recording 6.1 million (14%). In Ghana, about 310,000 people live with the infection at the end of 2017, out of which almost 130,000 are on treatment (UNAIDS, 2017). As at 2013, HIV counseling and testing among adults is still low; about 4-10% even though the linear trend of HIV prevalence showed a steady decline (Ghana AIDS Commission, 2013). The unavailability of a cure for HIV coupled with the ignorance of some people about their HIV status pose a major threat to the successes attained over the years because these individuals can be a source of any upsurge in the incidence/prevalence in the future.

The global response to the HIV pandemic is based on evidence from scientific and operational research, without which the pace of prevention and control interventions would have remained slow. Generally, the main aims of HIV and AIDS interventions are to decrease the incidence of new infections, make HIV care more accessible and improve health conditions of PLHIV. These aims are achieved mainly by providing options to prevent the spread of the infection and provide HIV services at the various levels of health care (e.g provision of antiretrovirals). Ghana, as part of interventions to combat the infection implemented interventions which focused on condom
use, safe blood transfusion, promotion of safe sex and Preventing Mother-To-Child Transmission (PMTCT). All these are targeted at reducing the incidence of new infections. People Living with HIV (PLHIV) now have healthier lives and better clinical outcomes with the introduction of antiretroviral therapy (ART). Provision of ART services in Ghana began in 2003, with the number of sites offering ART services increasing from 2 to 363 as at the end of 2017. In 2017, 26,969 PLHIV were newly enrolled on ART, contributing to a cumulative number of 125,667 as at December 2017 (Ghana Health Service/National AIDS/STI Control Programme, 2018).

When PLHIV are initiated on ART and adherence ensured, the chances of transmitting the infection to others, incidence of HIV, and HIV-related deaths are greatly reduced.

Key elements in the approach towards attaining universal access to HIV care by WHO include early identification of infected individuals, prompt initiation of antiretrovirals and lifelong care. These elements are widely recognized as a means to end the pandemic.

Critical to the success of HIV treatment is entry into HIV care and subsequent retention in care. Initiation and optimum adherence to therapy (ART) are also important steps in improving the clinical outcomes of infected individuals. Care for PLHIV involves identifying individuals who have been infected, linking and retaining them in HIV care while ensuring optimal adherence to treatment eventually resulting in viral suppression (Nosyk et al., 2013). These treatment steps ending in viral suppression is termed HIV/AIDS Care Cascade or HIV/AIDS Care Continuum (HACC) (Appendix I). HACC is a strategy which summarizes the various stages of medical management that PLHIV go through. It begins with the identification of infected individuals in the population through testing. Once infected individuals are identified, they are linked and enrolled into HIV care. Depending on existing guidelines on ART initiation, the PLHIV is started on ART. It is important to continuously engage (retain) PLHIV who are linked to HIV
care for them to fully benefit from HIV treatment since the viral load will be reduced, thereby greatly decreasing the chances of infecting others. The current study sought to determine the losses in the HACC and associated factors at the Effia-Nkwanta Regional Hospital.

1.2 Problem statement:
As part of strategies in the fight against the HIV and AIDS pandemic, WHO introduced the 90-90-90 strategy in 2015. By this, 90% of people who are infected should be aware of their status with 90% of this number being on lifelong therapy (ART), and 90% of those initiated on ART should achieve viral suppression by the year 2020 (UNAIDS, 2017). An analysis of the care continuum, however, usually reveals a systematic loss of people progressively from one step to the other (Alemnji et al. 2014) posing a challenge to the 90-90-90 target. In the US, 82% of estimated PLHIV were diagnosed, 66% linked to care, 37% retained with 25% attaining viral suppression (US National HIV/AIDS Strategy, 2015). In Cote d’Ivoire, 58% of PLHIV were diagnosed, 71% retained in care and 78% were virally suppressed (UNAIDS 2017). In Ghana, 45% of PLHIV were diagnosed, 77% retained in care with no data on viral suppression (UNAIDS 2017). At the Effia-Nkwanta Regional Hospital, review of HIV data showed that for 2016, 22% of PLHIV were diagnosed out of the number tested, 55% remained in care and 74% attained viral suppression. Several individual and system factors have been identified to contribute to the losses in the HACC. These include age, sex, reluctance of people who seem to be in good health to enroll for care, stigma against those who have enrolled for care, poor access to services including assessment of viral load, side effects of the drugs and financial constraints. Individuals who are unaware of their HIV status contribute to future upsurge in HIV incidence. Those lost to HIV care have an increased risk of serious clinical complications with an
associated high risk of death. This study sought to determine losses at the stages of the HACC, and factors contributing to the losses at the Effia-Nkwanta Regional Hospital to aid in evidence-based decision making in the control of HIV in the Western Region.

1.3 Conceptual Framework

**INDIVIDUAL FACTORS**
1. Socio-demographics
2. Comorbidity

**HEALTH FACILITY FACTORS**
1. Shortage of ARVs
2. Adequacy of staff

**DRUG RELATED FACTORS**
1. ARVs prescribed

![Conceptual Framework for HIV Care Continuum](image)

**Figure 1:** Conceptual Framework for HIV Care Continuum

The HACC begins with diagnosis of PLHIV in the population, linkage of positive clients to HIV care, being retained in care and ends at attainment of viral suppression, but various factors can affect the various stages in the care continuum. Comorbidities like Tuberculosis threatens HIV care services. This is because per the national guidelines, PLHIV with TB are to be treated for the TB first before been initiated on ART or continuing on the ART. In the course of shuffling between the TB treatment center and the ART center, the client could be lost.
Again, some PLHIVs miss being diagnosed due to limited testing points in the hospital and in some cases inadequate personnel to do the testing. Those who are diagnosed may be lost to follow up due to shortages in ARVs.

Each ARV has its side effects like insomnia. The drug regimen prescribed for the client may produce side effects that make them uncomfortable. They may decide to discontinue the ARVs and entirely drop out of HIV care.

### 1.4 Justification

Western Region is considered a priority region as far as HIV is concerned because it has a regional HIV prevalence higher than the national figure (3.2% compared to 2.1% for 2018). The region has a sub-population of the Lesbians-Gay-Bisexual-Transgender (LGBT) community and Sekondi-Takoradi, the regional capital, is home to most members of this community. There is also a community of female sex workers as well as intravenous drug users and all these key populations are important drivers of HIV incidence and prevalence. One way of controlling the spread of HIV is to retain those infected in care whilst on ART to aid in viral suppression. Effia-Nkwanta Regional Hospital is the largest health facility in Western region providing HIV services. Findings from this study will provide evidence for interventions targeted at identifying and retaining identified PLHIV in care which will eventually aid in the control of HIV in the Sekondi-Takoradi metropolis and the region.

### 1.5 Research questions

1. What is the proportion of HIV clients diagnosed in 2017 at the hospital?

2. What is the proportion of diagnosed HIV patients at each stage of the HIV Care Continuum?
3. What are the factors associated with the losses at the stages of the care continuum?

1.6 Study objectives

1.6.1 Main objective:
To determine the losses in the HIV/AIDS Care Continuum and the factors associated with losses at Effia-Nkwanta Regional Hospital.

1.6.2 Specific objectives:
1. To determine the proportion of HIV clients diagnosed in 2017 at Effia-Nkwanta Regional Hospital
2. To determine the proportion of diagnosed patients at each stage of the HIV care continuum at the hospital
3. To determine factors (individual, health facility and drug related) associated with the losses at the stages of the care continuum
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 HIV and AIDS global pandemic

The HIV and AIDS pandemic has become a public health challenge since it was first realized in 1981 among gays in Los Angeles, USA. According to WHO, globally about 37 million people had the infection as at 2017, with 35.1 million being adults (≥ 15 years) and majority are in low and middle-income countries. Approximately 75% of PLHIV knew their status globally, with the remaining 25% needing HIV testing and counseling services (UNAIDS, 2017).

Over the years, the incidence of new infections has declined. In 2017, new infections had declined by 47% since the peak in 1996. This decline has been possible due to various interventions put in place to stop new infections and ensure that PLHIV have access to HIV treatment. These interventions include education on HIV and AIDS, provision and use of condoms as well as strategies to prevent mother-to-child transmissions. In 2004, HIV and AIDS-related deaths peaked but there’s been a reduction of more than 51% since then. Nine hundred and forty thousand HIV and AIDS-related mortalities were recorded globally in 2017, compared to 1.9 million in 2004 and 1.4 million in 2010.

According to UNAIDS, $21.3 billion was available for the management PLHIV in care in low- and middle-income countries at the end of 2017. It also estimates that about $26 billion will be needed in 2020 (UNAIDS, 2017).

2.2 HIV/AIDS in Ghana

Ghana recorded its first case of HIV in 1986 (GHS/NACP, 2016). The prevalence of the condition continued to increase until it started declining in 2009. Ghana AIDS Commission (GAC) in 2017 estimated there are approximately 310,000 PLHIV in Ghana of which 280,000
are adults (15 years and over). Among the adults, 190,000 (67.8%) were women (GAC, 2017; UNAIDS, 2018). Available data indicates the prevalence of HIV in Ghana has been fairly stable from 2013 to 2017 (1.9 to 2.1) (GHS/National AIDS/STI Control Programme, 2018). Among the regions in Ghana, Greater Accra recorded the highest HIV prevalence (3.2%) whilst the Northern Region recorded the lowest (0.6%) in 2017. Four regions (Greater Accra, Western, Ashanti and Volta) are seen as “priority regions” as far as HIV is concerned. This is because they have regional prevalence’s higher than the national figure (NACP, 2018). Whilst Volta and Western regions recorded prevalence’s of 2.3% and 2.4% respectively, Greater Accra and Ashanti regions recorded prevalence’s of 3.2% (GHS/National AIDS/STI Control Programme, 2018).

2.3 Antiretroviral Therapy in Ghana

Antiretroviral therapy (ART) entails the use of medications that have specific inhibitory effects on the replication of the virus, thereby stopping the progression of HIV disease and preventing onward transmission of HIV (World Health Organization (WHO), 2014). The medications belong to six groups of drugs; the chemokine receptor antagonists (CCR5 antagonists), nucleoside reverse transcriptase inhibitors (NRTIs), integrase and transfer inhibitors (INSTIs), protease inhibitors (PIs), non-nucleoside reverse transcriptase inhibitors (NNRTIs), and fusion inhibitors (FIs) (Appendix III).

ART has been available in Ghana since 2003. Among HIV positive pregnant women, coverage of ART tripled (between 2009 to 2012), resulting in 76% reduction in the number of new infections among children (GHS/NACP, 2016). The number of facilities providing ART services at the end of 2015 was 197.
In 2013, WHO in its guideline for ART use recommended treatment for clients with CD4 cell count of $\leq 500$ cells/mm$^3$. However, its current guidelines on ART introduced in 2015, all diagnosed PLHIV are to initiate ART without any restrictions. Ghana adopted this guideline in 2016. The strategy is to treat all HIV diagnosed clients without any restrictions of CD4 cell count or WHO clinical stage. Viral load test is done for clients to monitor their clinical management. Currently, the National HIV Strategic Plan and Health Sector Strategic framework 2016-2020 aims to enroll 90% of all diagnosed clients on ART and 90% of those on ART to attain viral suppression by 2020 in accordance with the new 90-90-90 targets (GHS/NACP, 2016).

2.4 HIV Cascade through time

Advancement in HIV research has resulted in the development of ART. Treatment with ART has reduced the complications associated with HIV/AIDS, increased chances of survival and reduced risk of HIV transmission. The successful identification and transitioning of PLHIV through the stages in the HACC ensures infected individuals fully benefit from ART i.e be diagnosed of the infection, linked to HIV care, retained in care and virally suppressed (Nosyk et al., 2014). A number of countries in the West have used the HACC at the national and sub-national level to identify opportunities to improve healthcare delivery for PLHIV (Yehia et al., 2015). Although the HACC is represented in a linear manner, PLHIV often go through the stages in a less streamlined manner. Some PLHIV miss some of the stages, some temporarily exit for some time and revert to an earlier stage whilst others are permanently lost to care (Kay, Batey, & Mugavero, 2016). The proportion of PLHIV at each stage of the care continuum decreases with time.
A study by Bohdan Nosyk et al. in British Columbia, Canada, examined changes in the HIV care continuum from 1996 to 2011 (Nosyk et al., 2014). Being the first longitudinal study of the HACC, it assessed the proportions of PLHIV at eight stages: HIV infection, diagnosis of infection, linkage to HIV care, retention in care, ART indicated, receipt of ART, adherence to ART and viral suppression. The use of data which is linked completely at the national and provincial levels was a strength of this study. Analysis showed proportions of PLHIV at the various stages of the continuum had improved during the study period. For instance, using prevalence estimates at the HIV infection stage, there was a decrease (from 49% in 1996 to 29% in 2011) in the proportion of undiagnosed yet positive HIV-positive individuals, 4-10% of those diagnosed were unable to link to care, whilst the proportion of virally suppressed clients increased from 1% to 35% in 2011 (Nosyk et al., 2014).

Treatment with ART has improved with time, giving the assurance that individuals who go through the care continuum successfully can enjoy healthier life and improved chances of survival. It is therefore important to know the challenges of each step in the care continuum whilst keeping in mind that predictors of the fall outs vary in terms of individual differences and geographical location (Nosyk et al., 2014). Although the HIV Care Continuum for different locations cannot be compared (Gardner & Young, 2014), identifying the magnitude of losses and gaps in the HACC aids in the development and eventual operationalization of strategies, and action plans towards expanding HIV testing and treatment services (World Health Organization (WHO), 2014). For instance, of the estimated 1.1 million PLHIV in the US in 2014, 85% were diagnosed, 62% linked to care, 48% retained in care, with 49% attaining viral suppression. The highest fall-off was observed between the diagnosis and linkage to care stage where 23% of diagnosed HIV clients were not enrolled into care. Out of the proportion of diagnosed clients
receiving care, 14% were not retained in care (Appendix II). These findings reveal that emphasis should be placed on implementing interventions targeted at linking more if not all diagnosed HIV clients.

2.5 HIV Diagnosis

HIV testing and counselling (HTC) has helped to greatly reduce HIV/AIDS incidence and its associated mortality since it functions as the first step to all forms of HIV/AIDS care. Globally, about a quarter of PLHIV do not know their status ((UNAIDS), 2017) and according to Alemnji (2014), more than 60% of PLHIV in more than 10 African countries do not know they are infected (Alemnji et al., 2014). In Kenya and Uganda, between 80-90% of PLHIV are aware of the HIV status of their partner(s) (Alemnji et al., 2014).

In Ghana, HTC is integrated into the healthcare system from the primary care level to the top. Facilities without ART services refer clients to the next level for care.

2.6 Linkage and retention in HIV care

Successful HIV treatment requires PLHIV to be tested, receive test results, be linked to HIV care, initiate ART and continue it. The Test and Treat strategy by WHO recommends that every diagnosed PLHIV be initiated on ART. All diagnosed PLHIV should therefore be introduced to an HIV care provider and subsequently retained in care for effective clinical management. Globally, in 2017, 21.7 million diagnosed PLHIV were accessing ART, this is an increase from 8 million in 2010, to 2.3 million since 2016 ((UNAIDS), 2017). Delays in linking to HIV care and suboptimal retention whilst in care results in disease progression, incidence and prevalence of opportunistic infections, and death (Kay et al., 2016).
Poor engagement of PLHIV in care has been seen as a setback in improving the clinical outcomes of PLHIV (Gardner, Burman, McLees, del Rio, & Steiner, 2011), and this presents a challenge to the effectiveness of the Test and Treat strategy. In Denver, a retrospective cohort study reported 73% of 352 newly diagnosed PLHIV entered HIV care within 6 months, 13% after 6 months, with 14% not linked to care. The study concluded that initial entry into HIV care was slow (when compared to national targets), retention in care was suboptimal with time and loss to follow up was common (Gardner et al., 2013). In a study in a district in South Africa which assessed the rate of linkage to care among newly diagnosed individuals over a period of two years, linkage was low (27%) at the beginning but rose to 85% in the second year after an intervention was put in place (Shamu et al., 2019). According to Mugavero et. al., retaining PLHIV in care is critical in optimizing treatment outcomes in the HACC (Mugavero, Amico, Horn, & Thompson, 2013).

2.7 Viral suppression

ART aims to suppress replication of the virus thereby preventing further damage to the immune system, decrease chances of onward transmission, and avert HIV/AIDS-related illnesses and death. Data on viral suppression in resource-limited settings is readily not available because access to laboratory services for monitoring of HIV viral load is limited (Ranarajan et al., 2016). Viral load testing is performed either as a routine for monitoring patients on ART, when there is treatment failure or change in drug regimen due to adverse clinical events. In Ghana, viral load testing is done using the COBAS Ampliprep/COBAS Taqman machine by Roche diagnostics. An individual is considered virally suppressed when the quantity of the virus per milliliter of blood is below or equal to 1000 copies/ml of blood (GHS/NACP, 2016). It does not mean the
person is cured. WHO guidelines recommend viral load tests 6 months after ART initiation. The individual is suppressed if the results show viral load is less than or equal to 1000 copies/ml. If that happens then the client repeats the test annually. If the result is more than 1000 copies/ml, the client then undergoes enhanced adherence counselling should be considered after which the test is repeated 3-6 months (WHO, 2015).

2.8 Factors contributing to the loss of PLHIV from the HACC

From documented evidence, some factors have been identified as contributing to attrition of PLHIV in care. These factors can be individual-related, health facility or drug-related, among others.

2.8.1 Individual-related factors

Several studies of the HACC have indicated gender is associated with LTFU. Being male has been associated with LTFU in Nigeria (Odafe, Idoko, et al., 2012), Tigray region of Ethiopia (Tsadik, Berhane, Worku, & Terefe, 2017) and in Tanzania (Siril et al., 2017). Age has also been found to be a predictor of lost to follow up. In South Carolina, USA, PLHIV less than 25 years usually have low retention rates (Tripathi, Youmans, Gibson, & Duffus, 2011). In a retrospective cohort study in Zimbabwe, which investigated rates of LTFU among children and adolescents, higher attrition rates from HIV care was observed among adolescents within 10-14 years and 15-19 years age groups (Kranzer et al., 2017). Research has proven that comorbidities are associated with sub-optimal rates of retention, as well as lost to follow-up. Some comorbidities cited include sexually transmitted infections, psychiatric disorders, substance abuse disorders, cardiovascular disease, diabetes, etc. A study in the United States associated psychiatric disorder with dropping out of HIV care (Pecoraro et al., 2013) whilst in Gabon, being co-infected with tuberculosis was found to be a predictor of LTFU (Janssen et al., 2015).
2.8.2 Health facility factors
A report on a research by WHO on Retention in HIV Programs carried out in some countries revealed some health service delivery challenges. In Mozambique, shortage of health care workers was one of the challenges. In Malawi, weak procurement and supply chain management was leading to shortages in supplies used in HIV care, as well as shortage of health workers were some of the challenges (Tayler-Smith et al., 2010). In a qualitative study in Kenya among women living with HIV, lack of patient-centered care, delays at the clinic among others were facility level-factors identified to contribute to LTFU (Janssen et al., 2015). In Ethiopia, high workload was associated with LTFU (Tsadik et al., 2017) whilst in Uganda, long waiting times and stigmatization were identified as factors associated with LTFU (Opio et al., 2019).

2.8.3 Drug-related factors
ART is a life-long therapy and the drug regimen such as dosing complexity, pill load and side effects or adverse clinical events associated with the drug contribute to attrition of PLHIV in HIV care. In 12 Eastern European countries including Russia and Ukraine, adverse drug reactions have been reported as contributing to PLHIV attrition (Tayler-Smith et al., 2010). Findings from a retrospective cohort study indicated a higher risk of attrition for patients on Stavudine and Tenofovir based regimen during the first year of follow-up. In the second year of follow-up however, patients on Zidovudine were more likely to be lost from HIV care (Odafe, Torpey, et al., 2012) probably because of the mild to severe anaemia associated with the drug (Minga et al., 2010). In a retrospective cohort study in Ethiopia, patients whose regimen were substituted for reasons such as drug toxicities were at a higher risk of being LTFU (Berheto, T.M., 2014).
CHAPTER THREE

METHODS

3.1 Study Design

This analytical cross-sectional study was conducted at the Effia-Nkwanta Regional Hospital, in the Sekondi-Takoradi Metropolis, Western Region. HIV service data for 2017 was reviewed to determine the proportions of clients at each stage of the HACC. Folders of patients were reviewed and data on socio-demographics, WHO clinical staging, comorbidities and drug regimen were extracted onto a data extraction form. Key informant interviews were conducted among service providers to gather information on health facility factors that influence lost to follow-up using an interview guide. Data collection was carried out in four weeks in April 2019.

3.2 Study setting

The study was conducted at the Effia-Nkwanta Regional Hospital located in the Sekondi-Takoradi Metropolis (STM). Sekondi-Takoradi, the twin city, is the regional capital of the Western Region of Ghana. It has an estimated population of 593,797 inhabitants (PHC, 2010) on a land size of 219 square kilometers. The metropolis has 4 sub-metros. The main ethnic group in STM is Ahanta, but all other ethnic groups in Ghana are present. STM has the second largest harbor in Ghana, the Takoradi harbor. In STM, there are sub groups of key populations (KPs) notably Female Sex Workers (FSW), Intravenous Drug Users (IDU) and Men who have Sex with Men (MSM). The metropolis has 71 health facilities, with Effia-Nkwanta Regional Hospital (ENRH) being the Regional hospital.

ENRH which serves as a major referral hospital in the Western Region is located specifically in the Sekondi sub-metro of STM. The hospital was established by the then British West African
Royal Frontier Force (BWARFF) in 1938 as a military hospital and later handed over to the British Colonial Administration after World War II. In 1957, after Ghana’s independence, the hospital was finally handed over to the government and people of Ghana and eventually developed to its present state. ENRH covers a land size of 202 hectares, has a bed capacity of 330 with a total workforce of 849. It offers practical training for health service administrators, student nurses, medical housemen as well as pharmacy, laboratory and radiology interns.

ENRH offers services like Obstetrics and Gynaecology, Paediatric, General Surgery, Laboratory, Urology, Physiotherapy, HIV and AIDS among others. The hospital has been offering HIV services for over 10 years. These services include testing and counselling of HIV for the general population, pregnant women and KPs. HIV testing is done at all points of care in the hospital. Rapid testing is performed for individuals 18 months and above, and Polymerase Chain Reaction (PCR) is done for children below 18 months (especially those born to HIV positive mothers). When individuals are diagnosed with HIV, they are referred to the ART center known as the Comprehensive Care Center (CCC) where they are enrolled into HIV care and offered ART services. Currently, there are over 5,000 PLHIV accessing care at the hospital’s ART center. Screening and treatment services for Sexually Transmitted Infections (STI) screening and treatment are also offered at CCC.
3.3 Study population

The study population were HIV positive clients who were diagnosed at the Effia-Nkwanta Regional Hospital in 2017.

3.3.1 Inclusion criteria:

1. All HIV positive clients diagnosed at the hospital in 2017 whose medical records are available at the hospital’s ART center.
3.3.2 Exclusion criteria:

1. All HIV positive clients diagnosed in the hospital in 2017 but are less than 15 years old.
2. Pregnant women who tested positive in the hospital and are enrolled in the PMTCT program

3.4 Data collection techniques and tools

Database for HIV testing services among individuals aged 15 years and above, and those enrolled into HIV care was reviewed to determine the proportion of clients diagnosed and those linked to care respectively. Data for clients registered at the ART center in 2017 was also reviewed to assess the proportions of HIV diagnosed clients linked to and retained in care, as well as the proportion virally suppressed.

A data extraction form was used for collection of variables of interest recorded in the folders of eligible clients. This included general information and clinical information. The general information included date of HIV diagnosis, date of registration into HIV care at the ART center and socio-demographics at the time of registration, as well as date of last visit to the center. Clinical information included comorbidities recorded in the folder from the time of registration to the time of the study, drug regimen, and results of viral load test. Laboratory registers were reviewed to extract data on date of diagnosis and results of viral load test when they were not recorded in the folders. Information from the data extraction form was entered into an electronic form designed in Microsoft Excel. Key informant interviews were conducted among six service providers (one clinician, two counselors, two biomedical scientists and one pharmacist) who are involved in HIV care at the hospital and were available and willing to participate in the study, to collect information on shortages of ARVs and adequacy of staff.
### 3.5 Variables:

#### Table 1: Description of variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Operational definition</th>
<th>Type of variable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Refers to age at which participant was first registered at ART center</td>
<td>Quantitative continuous</td>
</tr>
<tr>
<td>Sex</td>
<td>Sex of participant as indicated in the folder</td>
<td>Categorical (dichotomous)</td>
</tr>
<tr>
<td>Educational background</td>
<td>Refers to the highest level of education attained</td>
<td>Categorical</td>
</tr>
<tr>
<td>Religious background</td>
<td>Religious affiliation</td>
<td>Categorical</td>
</tr>
<tr>
<td>Occupation</td>
<td>Employment</td>
<td>Categorical</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>Any acute or chronic disease patient has been diagnosed of. It could be one or more condition(s)</td>
<td>Categorical</td>
</tr>
<tr>
<td>Availability of ARVs</td>
<td>Presence of ARVs at the facility at all times</td>
<td>Categorical</td>
</tr>
<tr>
<td>Adequacy of staff</td>
<td>Perception about adequacy of number of staff</td>
<td>Categorical</td>
</tr>
<tr>
<td><strong>Dependent variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lost to follow-up (LTFU)</td>
<td>Not being retained in care for at least 3 months (90 days) without any indication of death or transfer to another facility</td>
<td>Proportion</td>
</tr>
</tbody>
</table>
Table 2: Operational definitions of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Operational definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linkage to HIV care</td>
<td>Initial face to face interaction with an HIV care provider leading to registration at the ART center</td>
</tr>
<tr>
<td>Retention in care</td>
<td>Alive and having indication of attending clinic at least 3 months prior to the time of study</td>
</tr>
<tr>
<td>Viral suppression</td>
<td>Having a viral load test result of a maximum of 1,000 copies of RNA per milliliter of plasma</td>
</tr>
<tr>
<td>Lost to follow-up</td>
<td>Not attending clinic for at least 90 days after the last scheduled visit without an indication of death or transfer to another ART center</td>
</tr>
</tbody>
</table>

3.6 Sample size calculation

The sample size was calculated using Cochrane’s (1977) formula for sample size determination. The formula is:

\[ n = \frac{(Z_{\alpha/2})^2 \times p(1-p)}{d^2} \]

where; \( n \) = minimum sample size required

\( Z_{\alpha/2} \) = value at confidence level of 95% (from standard normal table) = 1.96

\( p \) = proportion of lost to follow up among PLHIV

\( d \) = margin of error = 0.05

According to Nosyk et al. (2013), the proportion of clients lost-to-follow-up (LTFU) in an HIV care center in Canada is 29%. Setting the power of the study at 80%, the minimum sample size was

\[ n = \frac{(1.96)^2 \times 0.29 \times (1-0.29)}{(0.05)^2} \]

\[ n = 316 \]
3.7 Sampling:

3.7.1 Sampling procedure for selection of folders:
A census of all eligible folders of clients diagnosed with HIV in 2017 at the Effia-Nkwanta Regional Hospital were however reviewed due to the fact that the study utilized a year’s service data and the number of clients may make sampling difficult.

3.7.2 Sampling procedure for selection of service providers:
Convenience sampling was used to select service providers for the key informant interview. Participants who were involved in HIV care at the hospital for at least six months and were available and willing to participate in the study were included in the interviews for the study.

3.8 Quality control:
The data extraction form and the semi-structured questionnaire were pretested at the ART center of the hospital before the start of the study. Data collected during the pretesting was analyzed to inform the study, but the data was not included in the study results. Data collection was done by two research assistants who were trained on the data extraction form as well as the semi-structured questionnaire before the start of the study. The principal investigator entered the data in the electronic form. Where inaccuracies existed, the principal investigator cross-checked the data with the folder of the participant. An edit check system was also included in the electronic form.

3.9 Data processing and analysis
STATA version 15 was used for computing both descriptive and analytic statistics. Age, which is the only continuous variable was grouped into 5 categories of age groups: 15-24 years, 25-34
years, 35-44 years, 45-54 years, ≥55 years. Descriptive statistics was done, and categorical variables were summarized as frequencies and proportions. Bivariate analysis of each of the independent variables (factors) and the dependent variable (LTFU) was performed using the Pearson Chi-square test to determine factors significantly associated with LTFU. Factors with p-value less than 0.05 was considered statistically significant. Multivariate analysis was done for significant factors using multiple logistic regression. The measure of association was the Odds Ratio at the corresponding 95% confidence level.

3.10 Ethical consideration
The Ghana Health Service Ethics Review Committee gave approval for this study (GHS-ERC023/02/19). Permission was obtained from the Western Regional Health Directorate, as well as management of Effia-Nkwanta Regional Hospital before commencement of the study. Written informed consent was obtained from HIV care providers who participated in the study. The care providers were thoroughly briefed on the objectives of the study and ample time given them to decide whether or not to participate in the study. The purpose of the study was explained to them to enable them to make informed decision. The research assistants explained to the participants that the study is for research purposes and that findings from the study will provide information to improve HIV services in the hospital and region as a whole.

3.10.1 Voluntary consent/ Withdrawal
Service providers who were willing to participate in this study were made aware that participation was voluntary and that they had the right to refuse to participate, participate or withdraw from the study at any point in time without any explanation. They were also made aware of the fact that there was no direct benefit(s) or risk(s) involved in the study. Codes were given to each participant and the data obtained was only be used for the set objectives of the
study. Data was stored both electronically and in hard copies and access to the data was only to the research team.

3.10.2 Possible Risk and discomfort
There was no direct harm to the research participants. They had the right to refuse to answer any question if they felt uncomfortable about it.

3.10.3 Possible Benefits
Participants were made aware of the fact that there were no direct benefits to them. Findings from this study will benefit the HIV management team in the hospital and the region, in improving HIV service delivery. PLHIV will also benefit from findings from this study with improved HIV care services.

3.10.4 Confidentiality
Participants were assured of confidentiality, and this was maintained throughout this study. The information obtained was securely stored and only accessible to the research team. Findings from this study was disseminated in such a way that no information was linked to the identity of the participants.

3.10.5 Compensation
Participation in this study was purely voluntary and there were no monetary compensation to the participants for accepting to be part of this study.

3.10.6 Choice of Participation
Service providers did not participate in this study if they did not wish to. They were informed that their refusal to participate will not attract any penalty. If they agreed to participate, they can withdraw consent and discontinue participation at any time. This will not affect them in any way.
CHAPTER FOUR

4.0 RESULTS

4.1 Overview of HIV care at Effia-Nkwanta Regional Hospital

At the time of the study, HIV testing was offered at all points of care within the hospital including the laboratory. Patients from the Out-Patient Department who were required to undertake HIV testing were given pretest information before the testing is done at the unit. In-patients who required HIV testing were given pretest information by the nurses and tested at the unit. Pregnant women are also routinely tested for HIV by trained midwives at the ANC. With the exception of those diagnosed at the ANC, clients diagnosed from all the other units are referred to the ART center for further management. At the ART center counseling sessions (at least three) on adherence to ARVs are scheduled once the client is registered or enrolled into HIV care. Diagnosed pregnant women are initiated on ARVs and managed by the midwives until six weeks after delivery where they are referred to the ART center for management of the babies as well. Clients undergo laboratory assessments, after which they are initiated on ARVs and appointments at specified intervals are scheduled. There is a health information system (in the form of Excel spreadsheet) to track those who miss their appointment, but this is not sufficiently utilized because frequency of tracking is irregular.

4.2 Socio-demographic and clinical characteristics of study participants

4.2.1 Socio-demographic characteristics of study participants

Overall, a total of 365 patients were diagnosed in 2017. A total of 324 patient folders met the criteria and were reviewed for this study. Most (65.7%, 213/324) of the patients were females. The median age of the patients was 37 years (IQR: 28-46). A higher percentage of them (30.9%, 100/324) were aged between 25 to 34 years whilst 8% (26/324) were aged 54 years and above.
One hundred and thirty of the patients (40.1%) were single with the majority of them (84.6%, 274/324) being Christians. About a third of the participants, 33.3% (108/324) had Senior High School or Technical education (SHS/Tech) as the highest level of education whilst 15.7% (51/324) had no formal education. Most of the clients, 76.5% (248/324) were engaged in some form of employment (Table 3).

Table 3: Socio-demographic characteristics of study participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency (N = 324)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>213</td>
<td>65.7</td>
</tr>
<tr>
<td>Male</td>
<td>111</td>
<td>34.3</td>
</tr>
<tr>
<td><strong>Age groups in years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 to 24</td>
<td>41</td>
<td>12.7</td>
</tr>
<tr>
<td>25 to 34</td>
<td>100</td>
<td>30.9</td>
</tr>
<tr>
<td>35 to 44</td>
<td>89</td>
<td>27.5</td>
</tr>
<tr>
<td>45 to 55</td>
<td>68</td>
<td>20.9</td>
</tr>
<tr>
<td>&gt;54</td>
<td>26</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>130</td>
<td>40.1</td>
</tr>
<tr>
<td>Married/Cohabiting</td>
<td>132</td>
<td>40.7</td>
</tr>
<tr>
<td>Widowed/Divorced/Separated</td>
<td>62</td>
<td>19.1</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>274</td>
<td>84.5</td>
</tr>
<tr>
<td>Muslim</td>
<td>29</td>
<td>9.0</td>
</tr>
<tr>
<td>Others/Traditionalist</td>
<td>21</td>
<td>6.5</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>51</td>
<td>15.7</td>
</tr>
<tr>
<td>Primary</td>
<td>41</td>
<td>12.7</td>
</tr>
<tr>
<td>JHS</td>
<td>90</td>
<td>27.8</td>
</tr>
<tr>
<td>SHS/TECH</td>
<td>108</td>
<td>33.3</td>
</tr>
<tr>
<td>Tertiary</td>
<td>34</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>248</td>
<td>76.5</td>
</tr>
<tr>
<td>Unemployed</td>
<td>76</td>
<td>23.5</td>
</tr>
</tbody>
</table>
4.2.2 Clinical characteristics of patients

Of the 324 folders reviewed, 90.1% (292/324) of the patients were diagnosed of HIV Type 1. Folders without any indication of the type of HIV infection was 4.3% (14/324). Folders with no indication of WHO clinical staging at the time of registration was 15.7% (51/324) whilst 48.8% (158/324) were classified as stage 1 (asymptomatic stage). Participants with comorbidities (any acute or chronic condition) were 20.7% (67/324). Most of the patients (82.4%, 267/324) were initiated on the first line ARVs (Table 4).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency (N = 324)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIV type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1</td>
<td>292</td>
<td>90.2</td>
</tr>
<tr>
<td>Type 2</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>Type 1&amp;2</td>
<td>14</td>
<td>4.3</td>
</tr>
<tr>
<td>Not indicated</td>
<td>14</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>WHO stage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>158</td>
<td>48.8</td>
</tr>
<tr>
<td>Stage 2</td>
<td>30</td>
<td>9.3</td>
</tr>
<tr>
<td>Stage 3</td>
<td>68</td>
<td>21.0</td>
</tr>
<tr>
<td>Stage 4</td>
<td>17</td>
<td>5.2</td>
</tr>
<tr>
<td>Not indicated</td>
<td>51</td>
<td>15.7</td>
</tr>
<tr>
<td><strong>Comorbidity status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comorbid</td>
<td>67</td>
<td>20.7</td>
</tr>
<tr>
<td>Not comorbid</td>
<td>257</td>
<td>79.3</td>
</tr>
<tr>
<td><strong>ARVs prescribed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First line first choice</td>
<td>255</td>
<td>78.7</td>
</tr>
<tr>
<td>first line second choice</td>
<td>12</td>
<td>3.7</td>
</tr>
<tr>
<td>Second line first choice</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Second line second choice</td>
<td>5</td>
<td>1.5</td>
</tr>
<tr>
<td>No ARVs</td>
<td>51</td>
<td>15.7</td>
</tr>
</tbody>
</table>
4.3 Proportion of patients at the diagnosis stage of the HACC

The facility was given a target to identify 1,104 positive clients for the year 2017 (92 positives per month). This target was set by National AIDS Control Program (NACP) using a spectrum matrix which takes into account estimated new infections in the Western region as well as number of PLHIV. Out of 1,439 patients aged 15 years and above who were tested for HIV in 2017 at the laboratory and ART center, 365 were diagnosed as HIV positive, representing 33.1% (365/1,104) of the target (Figure 5). Those who were not linked to care after diagnosis were 11.2% (41/365).

4.4 Proportion of diagnosed patients at each stage of the HACC

A review of HIV service data at the facility showed that of those diagnosed with HIV, 88.8% (324/365) were linked to care (registered at the ART clinic) for further management, out of which 84.3% (273/324) were initiated on ARVs. Of those initiated on ARVs, 67.8% (185/273) were retained in care. After 12 months on ARVs, 118 clients were eligible for viral load assessment but 48.5% (96/118) were tested. Out of those tested, 88.5% (85/96) had viral load results of less than 1000 copies per ml (Figure 5).
Figure 3: Proportions of PLHIV at various stages of the HACC at ENRH for 2017

4.4.1 Proportion linked to care

Overall, 42.0% (136/324) of those linked to care were linked on the same day of diagnosis whilst 52.5% (170/324) were linked within 2 weeks (15 days) (Table 5). The average time interval between diagnosis and registration at the ART (linked to care) center was 4 days.
Table 5: Time interval between diagnosis and linked to care

<table>
<thead>
<tr>
<th>Time interval before linkage</th>
<th>Frequency (N=324)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days (same day)</td>
<td>136</td>
<td>42.0</td>
</tr>
<tr>
<td>1-15 days</td>
<td>170</td>
<td>52.5</td>
</tr>
<tr>
<td>16-30 days</td>
<td>13</td>
<td>4.0</td>
</tr>
<tr>
<td>More than 30 days</td>
<td>5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

4.4.2 Proportion of linked clients initiated on ARVs

Of those linked to HIV care, majority, 84.3% (273/324) were initiated on ARVs after adherence counseling sessions whilst 15.7% (51/324) were lost before ARV initiation. Among those initiated on ARVs, 97.8% (267/273) were prescribed the various regimen of first line drugs and 2.2% (6/273) on second line drugs. A greater proportion of participants, 53.8% (147/273) were initiated on ARVs within two weeks after they were linked to care (Table 6). Of the 273 initiated on ARVs, 1.8% (5/273) had their ARVs changed for reasons like adverse clinical event and drug toxicity.

Table 6: Time interval between linkage and ARV initiation

<table>
<thead>
<tr>
<th>Time interval before ARV initiation</th>
<th>Frequency (N=273)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days (same day)</td>
<td>39</td>
<td>14.3</td>
</tr>
<tr>
<td>1-15 days</td>
<td>147</td>
<td>53.8</td>
</tr>
<tr>
<td>16-30 days</td>
<td>60</td>
<td>22</td>
</tr>
<tr>
<td>More than 30 days</td>
<td>27</td>
<td>9.9</td>
</tr>
</tbody>
</table>
4.4.3 Proportion of clients retained in care

Of the 273 clients initiated on ARVs, nine (3.3%) had died, none had officially transferred out to another clinic whilst 67.8% (185/273) had indications in their folder that they were still in care at the time of the study (Figure 5). Those who were lost to follow-up at this stage were 79, (28.9%).

4.4.4 Proportion of clients attaining viral suppression

According to Ghana’s algorithm for viral load testing to assess viral suppression, a newly diagnosed client should have the initial viral load test six months after ARV initiation and then at 12 months. The test is subsequently requested twice a year. For the unsuppressed clients (viral load greater than 1000 copies per ml), the test is repeated 3 months after the first one and clinical monitoring is done. Among the 273 clients initiated on ARVs, 2.6% (7/273) died before six months whilst 22.7% (62/273) were lost to follow-up within six months. Of the remaining 211 clients, 75.8% (160/211) were tested for viral load with 31.9% (51/160) having undetectable (less than 7 copies per ml) levels of the virus. Those with detectable levels but less than 1,000 (7 to 1000 copies per ml) were 48.1% (77/160) (Table 7). Overall viral suppression at 6 months was 60.7% (128/211).

At 12 months, 6.2% (13/211) more of the clients were lost to care. Of the remaining 198 clients, 96, (48.5%) of the clients had been tested again for viral load. Out of the 96, 39.6% (38/96) had undetectable levels of the virus and those with detectable levels but less than 1,000 copies of virus per milliliter of plasma were 49% (47/96) (Table 6). Viral suppression at 12 months was therefore 88.5% (85/96) (Figure 1). At six months, 32 clients did not attain viral suppression. Out of this, 65.6% (21/32) attained viral suppression at 12 months.
Table 7: Viral load testing and results of participants

<table>
<thead>
<tr>
<th>Viral load results*</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 6 months (N=160)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undetectable levels (less than 7 copies/ml)</td>
<td>51</td>
<td>31.9</td>
</tr>
<tr>
<td>Detectable levels (7-1000 copies/ml)</td>
<td>77</td>
<td>48.1</td>
</tr>
<tr>
<td>More than 1000 copies/ml</td>
<td>32</td>
<td>20.0</td>
</tr>
<tr>
<td>At 12 months (N=96)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undetectable levels (less than 7 copies/ml)</td>
<td>38</td>
<td>39.6</td>
</tr>
<tr>
<td>Detectable levels (7-1000 copies/ml)</td>
<td>47</td>
<td>49.0</td>
</tr>
<tr>
<td>More than 1000 copies/ml</td>
<td>11</td>
<td>11.4</td>
</tr>
</tbody>
</table>

* samples tested using the COBAS Ampliprep/COBAS Taqman machine

4.8 Follow-up status of study participants

Overall, of the 365 diagnosed, 46.8% (171/365) PLHIV were lost to care in the subsequent stages of the HACC after they were diagnosed. Out of this, 24.0% (41/171) were not linked to HIV care whilst 29.8% (51/171) were lost before ARVs could be initiated (Figure 4). At the time of the study, 2.8% (9/365) of those diagnosed had died from various causes.
Overall, out of the 324 participants who were linked to HIV care, 40.1% (130/324) were lost at various stages in the HACC. Table 8 shows the socio-demographic and clinical characteristics of the 130 clients.
Table 8: Socio-demographic and clinical characteristics of study participants lost to follow-up.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
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<tr>
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<tr>
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4.10 Association between socio-demographic and clinical characteristics and LTFU

Pearson’s chi-square was used to assess factors that were significantly associated with the follow-up status of PLHIV. From Table 8 below, age group in years, comorbidity status and ARV prescribed were statistically significantly associated with the follow-up status of the study participants (p-value <0.05).

The percentage of respondents who were lost to follow-up was higher among the younger age group as 61.0% (25) of the respondents within the age range 15 to 24 years were lost to follow-up, 43.0% (43) of those within the age range 25 to 34 years, 34.8% (31) of those within the age range 35 to 44 years, 30.9% (21) of those within the age range 45 to 55 years and 38.5% (10) of the patients more than 54 years were all lost to follow-ups. The percentage of patients lost to follow-up within the age range varied statistically significantly hence age was significantly associated with the follow-up status of participants (p-value = 0.024) (Table 9).

Also, a higher proportion of patients with no comorbidities were lost to follow-up compared to those patients with comorbidity (43.97% vs. 25.37%; p-value = 0.006).
Table 9: Association between characteristics of study participants and lost to follow-up

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<th>Variable</th>
<th>Total (N)</th>
<th>Lost to follow-up</th>
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<th></th>
<th>P-value</th>
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<td>Yes: n (%)</td>
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<tr>
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<td></td>
<td></td>
<td></td>
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<tr>
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</tr>
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<td>46 (41.4)</td>
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<td></td>
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<td>Age group (years)</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td>17 (41.5)</td>
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<td></td>
<td><strong>0.006</strong>**</td>
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<td>17 (25.4)</td>
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<tr>
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<td></td>
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<td><strong>&lt;0.001</strong>***</td>
</tr>
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<td>5 (9.8)</td>
<td>46 (90.2)</td>
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<td></td>
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</tbody>
</table>

N: frequency. %: row percentage. *: p <0.05. **: p<0.01. ***: p<0.001
4.11 Factors influencing lost to follow-up

Simple and multiple binary logistic regression models were used to obtain the crude and adjusted odds ratios respectively to assess the strength of association between the background characteristics of patients and loss of PLHIV from the HACC. From Table 8 below, age group, comorbidity status and ARV prescribed for patients were factors that had significant influence on the lost to follow-up of patients based on the crude odds ratios. PLHIV who were 25 years old or more were less likely to be lost from HIV care as compared to those less than 25 years (15-24 years). PLHIV who had other acute or chronic conditions (comorbidity) were 60% less likely to be lost to HIV care as compared to those who did not have any comorbidity. The odds of clients who were on second line drugs being lost to follow-up was 2.4 times higher as compared to those on the first line first choice drugs.

Variables that were adjusted for in the multiple logistic regression model were sex of participant, age group, marital status, religion, educational level, employment status, comorbidity status, and ARV prescribed for the patients. From the adjusted model, age group and comorbidity status were the factors that had significant association with lost to follow-up of patients (p-value <0.05).

Overall, patients who were 25 years and above were less likely to be lost to follow-up compared to patients who were within the age range 15 to 24 years; those within 25-34 years were 70% less likely to be lost (AOR: 0.3; 95% CI: [0.11-0.84]; p-value = 0.022), within the age range 35-44 years were 90% less likely (AOR: 0.1; 95% CI: [0.05-0.44]; p-value = 0.001), whilst those within the age range 45 to 54 years and those above 54 years were 90% less likely to be lost (AOR: 0.1; 95% CI: [0.04-0.47]; p-value = 0.002) and (AOR: 0.1; 95% CI: [0.04-0.76]; p-value = 0.020).
respectively. In all, the adjusted odds significantly differ across the different age groups (p-value = 0.012).

Patients with comorbidity were 70% (AOR: 0.3; 95% CI: [0.17-0.84]; p-value = 0.018) less likely to be lost to follow-up when compared to those patients without any comorbidity (Table 10). When the other factors are controlled for, Muslims and other/traditional religions were 60% (AOR: 0.4; 95% CI: [0.13-1.23]) and 80% (AOR: 0.2; 95% CI: 0.04-1.03) respectively less likely to be lost as compared to the Christians.
Table 10: Factors influencing lost to follow-up of HIV patients on ARV

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<th>Adjusted Odds Ratio (AOR)</th>
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<tr>
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<td>P-value</td>
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</tr>
<tr>
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<td>0.3 [0.1 - 0.8]</td>
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<tr>
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<td>0.006***</td>
<td>0.001**</td>
</tr>
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CI: confidence interval. *: p<0.05. **: p<0.01. ***: p<0.001. P-value in bold are overall significance of variable
4.12 Health facility factors

Six key informant interviews (KII) involving one clinician, two counselors, two medical laboratory scientists and one pharmacist who provide HIV services in the facility were conducted. Some of the factors they outlined as contributing to lost to follow-up included:

4.12.1 Adequacy of staff

Some of the participants mentioned that the facility does not have enough staff involved in HIV activities and this impact negatively on the length of time PLHIVs spend at the facility during visits. Below are some of the quotes from some participants.

“Generally, there aren’t many clinicians involved in HIV care in this facility; about two clinicians on a good day. On a typical clinic day, some counselors are busy checking the vitals of the clients whilst others are undertaking counseling sessions. The counselors also do consultation but that will mean they have to finish their primary task before they can consult. Clients therefore spend more time waiting to see the clinician especially when they have a problem, and this makes them start complaining. Once they know that’s how things are going to be, it may discourage them from coming back to seek care and may end up being lost to care” (Clinician, ENRH ART center).

“Apart from the counselors who are permanently stationed at the ART center, all the other cadres of staff are involved in other activities or tasks and so on clinic days, there could be competing interests, and this may cause delays in serving clients. Already some may not be comfortable with their condition and so something little triggers their decision to stop seeking care” (Pharmacist, ENRH ART center).

4.12.2 Referral of TB clients to TB treatment centers

The referral system at the facility was also identified as one of the factors contributing to lost to follow-up.

“The TB treatment center is not located on the premises of the hospital. For clients co-infected with TB especially, we refer them after diagnosis of the TB and some don’t come back again” (Clinician, ENRH ART center)

4.12.3 Shortage of ARVs

Shortages in ARVs was not identified as a challenge by participants. According to them, they rarely encounter shortages but in the event of shortages, request is made to other facilities to transfer some stock whilst waiting for restock. This does not affect service delivery. Again,
there is a system in place where the quantities of drugs given are rationed in such a way that every client gets some quantities of drugs. Below are some quotes from participants:

“We know ahead of time when there will be shortages because of our inventory system. In those situations, we contact other facilities and make transfers of what we are short of as an immediate action. Service delivery is therefore not affected. Every client gets drugs to take home even though in reduced quantities. We explain to them and they understand” (Pharmacist, ENRH Art center)

“There is a system in place where in situations of shortages, we ration the drugs. The rationing is done in order of priority; pregnant women, children, other women, men but at the end of the day, everybody gets some. The only issue is they will have to come back within a short time for another supply”. (Counselor, ENRH ART center)
CHAPTER FIVE

5.0 DISCUSSION

This study was carried out at Effia-Nkwanta Regional Hospital (ENRH) in the Sekondi-Takoradi Metropolis of the Western Region, Ghana. Data for HIV services offered by the facility in 2017 were reviewed. Folders of 324 HIV positive clients diagnosed in 2017 were reviewed to extract data on socio-demographics and clinical history. The losses in the stages of the HACC was assessed and associations between the socio-demographics and clinical history and being lost to follow-up were determined. HIV service providers were interviewed for service factors likely to contribute to the losses.

5.1 Main findings

Overall, HIV testing services (in the light of the 90-90-90 strategy by WHO) was low. Once diagnosed, 88.8% of the clients were linked to care, 84.3% of those linked to care were initiated on ARVs, whilst 67.8% of those initiated on ARVs were retained in care at the time of the study. overall proportion of clients lost to follow-up after linkage to care was 40.1%. Having no comorbidity, being young (15-24 years), inadequate staff as well as referral system were factors that contributed to the losses.

5.2 Proportion of PLHIV diagnosed

Of the target of 1,104 for 2017, about 33.1% were diagnosed after testing. This low figure could be due to the fact that people are reluctant to know their HIV status due to the stigma attached to the condition, as well as the fear of being positive due to risky behaviors they are or were involved in and this makes it difficult to identify those living with the infection. Again, the number of testing points within the facility could be a contributory factor to the low percentage diagnosed. In 2017, HIV testing for the general population was done at only
two points (laboratory and ART center). Clinicians normally refer patients for testing when they show symptoms. Opportunities for identifying asymptomatic patients who are at the hospital for other reasons are therefore missed. In a study in Ghana by Yawson et. al., (2014) which looked at the gaps in HIV testing and counseling (HTC) using national program data, they found out that generally, HIV positive testing rates were higher in diagnostic centers (health facilities) as compared to the other strategies even though facilities had restricted points where HIV testing was done. They therefore recommended a well-structured and targeted expansion of facility-based HTC services to identify more PLHIV (Yawson, Dako-Gyeke, Addo, Dornoo, & Addo, 2014). Similarly, findings from a study in six sub-saharan countries by Church et. al., (2017) indicated a weak HIV testing policy and practice across health facilities in those countries even though the facilities performed well in strategies that support the progression of PLHIV from one stage of the HACC to the other (Church et al., 2017). At the time of this study, ENRH had started an HTC strategy (the “Opt Out” strategy) at all service delivery points (Out and In-patient departments, as well as Accident and Emergency). By this, patients specifically at the Outpatients Department are given a talk on diseases including HIV/AIDS and they are tested for HIV in addition to the other conditions unless they didn’t want to. At the In-patient departments, patients on admission are counseled and tested.

5.3 Proportion of diagnosed PLHIV linked to care

In 2017, the facility was able to link 88.8% of all those diagnosed with the infection to care. This high rate of linkage could be due to the good collaboration between the laboratory and ART center. Once patients are diagnosed at the laboratory, they are taken to the ART center for further counseling and this makes it easier for the counselors to educate them on the need for them to register for further management. Findings from this study was similar to an
HACC study in Colorado, US, where 90% of a newly diagnosed cohort of PLHIV were linked to care. In a study in Thailand involving clients ≥ 15 years, a relatively lower number of people (80%) were linked to care (Srivanichakorn, Thepthien, Subhaluksaksorn, Udomsuppayakul, & Chantcharas, 2014). In Tanzania, a study by Sanga et. al., (2017) found that 84% of individuals who were tested at health facilities were linked to care, which is lower than findings from this study.

5.4 Proportion of PLHIV linked to care and initiated on ARVs

At the end of this study, 84.3% of those linked to care had been initiated on ARVs. Out of this, 14.3% and 53.8% were initiated on ARVs on the same day and within two weeks respectively after they were linked to care. The greater proportion of clients were initiated on ARVs probably because the same personnel who linked them to care were involved in administering the ARVs and so the clients had built some rapport with the personnel and this made it easier to accept to initiate ARVs. In contrast to findings from this study is a study in India, in which 78% of adults were initiated on ARVs (Alvarez-Uria, Pakam, Midde, & Naik, 2013) and another study in Eswatini (formerly Swaziland) where 96% of clients were initiated under the Test and Treat strategy with 87% initiated on the same day and 83% initiated between day one to day six (MacKellar et al., 2018).

5.5 Proportion of PLHIV on ARVs retained in care

Retention of PLHIV in HIV care is essential in reducing the incidence of HIV and HIV-related mortality. For patients diagnosed in 2017 at the Effia-Nkwanta Regional Hospital, this study found retention to be 67.8%. Comparable to this finding is results from a seven-year review of retention in HIV care in a tertiary health facility in south-west Nigeria, in which Babatunde et al., 2015) reported that 63% of PLHIV were retained in care. In contrast to
findings from this study however is a study in Georgia, USA, by Kelly et. al., (2011) in which 43% of PLHIV were retained in care and another one in South Africa where retention from HIV diagnosis to 6-12 months after ART initiation was 36.9% (Lessells, Mutevedzi, Cooke, & Newell, 2011). Findings from a systematic review of studies on retention in HIV care from 2007-2009 across Africa estimated median retention for 12 months after initiation on ARVs to be 79.4% , with a range of 55-93% (Rosen & Fox, 2011). Younger age has been shown to be associated with poor retention. In the analysis of this study, 62.1% of clients aged 35 years or older were retained. Babatunde et. al., (2015) in their study found retention to increase with age; 42.9% in <15 years and 65.3% in ≤50 years. The Indian National AIDS Control Organization in two studies conducted in 2011 and 2012 showed that younger adults do not access health services efficiently when compared to older adults and so are poorly retained in HIV care (India National AIDS Control Organization, 2011 & 2012).

5.6 Proportion of virally suppressed PLHIV

The overall goal of initiating patients diagnosed of HIV infection is for them to attain viral suppression which reduces the chances of onward transmission of the infection. This study found 88.5% viral suppression among patients diagnosed with HIV in 2017, a little short of the 90% target as contained in the 90-90-90 strategy. In the District of Columbia, USA, Hess and Hall (2018) reviewed HIV surveillance data and found a comparably lower viral suppression rate of 57.9% among patients diagnosed in 2014 (Hess & Hall, 2018). In Vietnam however, overall HIV viral suppression in four provinces was 93% and ranged from 88% to 100% (Rangarajan et al., 2016). Findings from this study were consistent with findings from a systematic review of viral suppression in low and middle-income countries by (McMahon, Elliott, Bertagnolio, Kubiak, & Jordan, 2013), and a multi-country study that included 3 sites in Vietnam by (Aghokeng et al., 2014) in which suppression was 84% and
88.5% respectively after 12 months on ARVs. Even though this study did not explore factors associated with viral suppression, older age (Amirkhanian et al., 2018) and optimal adherence to ARVs (Bulage et al., 2017) have been identified as predictors of viral suppression.

5.7 Factors influencing Lost to follow-up

The proportion of LTFU of 40.1% from this study was higher than 22.6% in Ethiopia, (Assemie, Muchie, & Ayele, 2018), 27.6% in South Africa (Dalal et al., 2008), 32.8% in southeast Nigeria (Onoka et al., 2012) and 36.6% in Cameroon (Bekolo, Webster, Batenganya, Sume, & Kollo, 2013).

5.7.1 Socio-demographic and clinical factors influencing lost to follow-up

The chi-square analysis revealed age, having no comorbidity and ARV prescribed had significant associations with LTFU. From the multivariate analysis, being LTFU decreased with age. Patients older than 25 years were less likely to be lost when compared with those in the 15-24 age group. This finding was consistent with reports from a study in Ethiopia in which age category 15-28 years was an independent predictor of LTFU (Assemie et al., 2018). Similarly, studies in southern Nigeria and South Africa found younger age to be a predictor of LTFU (Meloni et al., 2014; Wang et al., 2011). This could probably be due to their inability to fully understand and embrace the benefits of being retained in care as compared to the older ones. According to Yehia et. al., (2015), age plays a significant role in keeping people in HIV care because older people have a broader knowledge of HIV care and so tend to be retained as compared to younger ones. Fear of stigma and discrimination (as people in the 15-24 age group are mostly dependent on others) could also be the reason why they are mostly lost to HIV care as supported by findings from a qualitative study which
indicated people in younger age groups who fear stigmatization are more likely to be LTFU (Wubshet, Berhane, Worku, & Kebede, 2013).

From this study, patients with comorbidities were 62% less likely to be LTFU (when other factors are controlled for) as compared to those without comorbidities. This is probably due to a feeling of wellness by those without comorbidities, and so find no reason to continue to be in HIV care. From Tanzania, a cohort study reports anemia, arterial hypertension and malnutrition contributes to LTFU (Sascha et al., 2019).

In the bivariate model, clients on second line ARVs significantly had 2.4 higher odds of being lost as compared to those on first line drugs even though in the adjusted model, it was not significant.

5.7.2 Health facility factors

Some health facility factors have been identified as contributing to LTFU of PLHIV from HIV care. Findings from the Key Informant Interviews in this study showed inadequate staff and referral system were contributing factors to LTFU.

5.7.2.1 Inadequate staff

Patients attending ART clinics have had to wait longer hours before they are attended to by service providers. This has made some patients leave HIV care because they feel the whole HIV care process is a “wasting of time”. The longer hours spent at the facility by clients is primarily because of relatively smaller numbers of staff involved with HIV activities. Service providers are tagged “HIV people” by some other staff and so this discourages staff from getting involved in HIV activities. WHO introduced the concept of Task-shifting where staff offer assistance to each other in tasks that are not their primary role. Though a good concept,
the limitation is that some staff do not want to be involved in anything HIV and so in terms of functionality of the concept, it may be sub-optimal. Various studies in Africa have reported inadequate staff (Govindasamy, Ford, & Kranzer, 2012; Kunihira, Nuwaha, Mayanja, & Peterson, 2010; Posse & Baltussen, 2009), and long clinic waiting (Duff, Kipp, Wild, Rubaale, & Okech-Ojony, 2010; Lubega et al., 2010; McGuire et al., 2010) as barriers to the stages in the HACC.

5.7.2.2 Referral system

Though most health services are integrated, there are some services that necessitates referral of patients to a next level facility either for further management or for laboratory services. Patients diagnosed of HIV are sometimes referred for reasons such as linkage to HIV care and ART services as well as laboratory services, and depending on the service required, patients may have to temporarily or permanently seek services, and for varying lengths of time. It is in the process of seeking services elsewhere that some PLHIV are lost to care. At the Effia-Nkwanta Regional Hospital, the TB clinic is not on the premises of the clinic and so especially for those who are co-infected with TB and referred for TB care, some never return to HIV care. There could also be instances where clients are lost from care but not TB related. They are lost to care possibly because there are no systems in place to monitor referred patients. In contrast to this finding study is a report from a study conducted in three East African countries where clients referred to TB clinics had reduced hazard (0.91, 0.83-0.99) of being lost (Rachlis et al., 2016)
5.8 Limitation of the study

1. This study utilized routine viral load test results which was not available for all the clients. Estimate for viral suppression could therefore be an underestimation or overestimation.
CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Effia-Nkwanta Regional Hospital diagnosed 365 out of the 2017 target of 1,104 (33.1%) People living with HIV population, linked 324 out of the 365 (88.8%) diagnosed PLHIV to care and initiated on ARVs, 273 out of 324 (84.3%) linked to care. Of the 273 initiated on ARVs, 185 (67.8%) were retained in care with 88.5% attaining viral load suppression after 12 months on ARVs. The diagnosis and retention stages of the HACC were the most affected. Viral load results at 12 months was not available for some patients even though a functional equipment for viral load testing was available at the facility. Information for some indicators (HIV type and WHO clinical stage) were not indicated for some clients. Overall, rate of loss to follow-up was 40.1%. Young age and not having comorbidities were individual level factors significantly associated with lost to follow-up. Inadequate staff and facility referral system were identified as health facility factors contributing to lost to follow-up.

6.2 Recommendations

Based on findings from this study, the following recommendations are made:

To the Management of Effia-Nkwanta Regional Hospital

1. Strengthen health information system for HIV care in which those who miss appointments can be easily identified and called up before they are lost.

2. Assign more staff, specifically clinicians, to the ART center on clinic days.

3. Develop a system to track those who are due to be tested for viral load.

4. Provide systems to actively monitor younger clients and those without comorbidities in HIV care.
5. All indicators pertaining to registration and follow up visits should be completely filled in the folders by the service providers at the ART center.
REFERENCES


Duff, P., Kipp, W., Wild, T. C., Rubaale, T., & Okech-Ojony, J. (2010). Barriers to accessing highly active antiretroviral therapy by HIV-positive women attending an antenatal clinic
https://doi.org/10.1186/1758-2652-13-37


https://doi.org/10.1093/cid/ciq243


https://doi.org/10.1097/QAD.0b013e3283578b9b


https://doi.org/10.1371/journal.pone.0059197


https://doi.org/10.1371/journal.pone.0129376
Appendix I

Steps in the HIV and AIDS Care Continuum

(Source: infectiousdiseaseadvisor.com)
### Appendix II

**Recommended ARVs in Ghana**

<table>
<thead>
<tr>
<th>Nucleoside Reverse Transcriptase Inhibitor (NRTI)</th>
<th>Nucleotide Reverse Transcriptase Inhibitor (NtRTI)</th>
<th>Non-Nucleoside Reverse Transcriptase Inhibitor (NNRTI)</th>
<th>Protease Inhibitors (PI)</th>
<th>Integrase Strand Transfer Inhibitors (INSTI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zidovudine (AZT/ZDV)</td>
<td>Tenofovir (TDF)</td>
<td>Nevirapine (NVP)</td>
<td>Ritonavir boosted Lopinavir (LVP/r)</td>
<td>Dolutegravir (DTG)</td>
</tr>
<tr>
<td>Lamivudine (3TC)</td>
<td></td>
<td>Efavirenz (EFV)</td>
<td>Ritonavir boosted Atazanavir (ATV/r)</td>
<td>Raltegravir (RAL)</td>
</tr>
<tr>
<td>Abacavir (ABC)</td>
<td></td>
<td></td>
<td>Ritonavir boosted Darunavir (DRV/r)</td>
<td></td>
</tr>
<tr>
<td>Emtricitabine (FTC)</td>
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<td></td>
</tr>
</tbody>
</table>
Appendix III

HIV Care Continuum, United States, 2014
An estimated 1.1 million people are living with HIV in the United States.

- 85% Diagnosed
- 62% Receiving Care
- 48% Retained in Care
- 49% Virally Suppressed
Appendix IV

Information sheet

ANALYSIS OF LOSSES IN THE HIV/AIDS CARE CONTINUUM: A CROSS-SECTIONAL STUDY AT THE EFFIA-NKWANTA REGIONAL HOSPITAL, WESTERN REGION

I am Irene Amedzro, an MPhil Applied Epidemiology and Disease Control student of School of Public Health, University of Ghana. My contacts are +233 (0)208 418471/ +233 (0)244 084455 and email is irene.amedzro@gmail.com

Background of research: Anti-retroviral therapy (ART) has been shown through research to improve the health outcomes of PLHIV. It is therefore important to identify PLHIV, initiate them on ART and retain them in HIV care in order to attain viral suppression. All these steps constitute the HIV/AIDS Care Continuum (HACC). An analysis of HACC usually reveals loss of PLHIV as they progress from one step to the other and so many factors contribute to this. This study seeks to analyze the losses of PLHIV in HIV care and factors contributing to the losses in order to develop interventions targeted at retaining PLHIV in care in the control of HIV.

Nature of research: this research is a cross-sectional study using a quantitative approach. The research seeks to analyze the magnitude of PLHIV lost to HIV care and to assess the factors that contribute to the losses. A data extraction form and a semi-structured questionnaire would be used to review and collect the needed information from patient folders and service providers respectively.
**Possible Risk and Discomforts:** If you agree to participate in this study, there are no known risks to you personally.

**Possible Benefits:** There will be no personal benefits if you agree to participate in this study. You will be contributing in improving the delivery of care to PLHIV in this facility and the Western Region as a whole.

**Costs:** There will be no costs to you if you agree to participate in this study.

**Compensation:** No compensation will be paid to you if you agree to participate in this research.

**Confidentiality:** We assure you that all the information we obtain from you will be stored in files and put under lock and key. Any personal identifying information will be destroyed at the end of the study. All information related to your participation will be kept confidential and will not be revealed to anyone. Your identity will also not be revealed in any reports or publications resulting from the study. The data collected, which will be in both hard copy and digital format, will be kept for the purpose of analyses only.

**Voluntary Participation:** Your decision to participate in this study is entirely voluntary. To help you better understand the process, you can talk to any one you feel comfortable with. You can also ask as many questions as you want concerning your participation in this study. You are not under any obligation to participate and you also have the right to refuse this invitation. If at any point in time during the study you take the decision not to participate any further, you are free to do so immediately without any further discussion and this will have no consequences to you.
Duration of Participation and Responsibilities: Your participation in the study will be for only one day and your role is to provide us with appropriate responses to some questions. You are entreated to be as truthful as possible. The study will however last for 6 months.

Outcome and feedback: The outcome of the study will be published in scientific journals and may be discussed during district, regional and national annual review meetings. However, any participant may request a copy of the report from the principal investigator through verbal discussion or electronic form.

Conflict of interest: Data generated from this study will solely be for the PI, supervisors of the PI (Dr. Francis Anto and Dr. Samuel Oko Sackey), and the school to which the PI is affiliated (University of Ghana).

Additional Information: If you need any clarification, contact the principal investigator on 0208418471 or 024208445, or through irene.amedzro@gmail.com. To get more information about your rights as a participant, you can also contact

Hannah Frimpong

Ghana Health Service Ethics Review Committee Administrator

Research and Development Division

Ghana Health Service, Accra

Office: +233 302 681109

Mobile: +233 (0)507041225

Email: HannahFrimpong@ghsmail.org
Appendix V

Consent form

Analysis of the losses in the HIV/AIDS Care Continuum: a cross sectional study
at the Effia-Nkwanta Regional Hospital, Western Region

Details regarding this research has been explained to me. My questions have been answered
to my satisfaction and I understand. I may also ask further questions at any time.

I certify that I willingly agree to be part of this research and agree to answer questions on
condition that no reference will be made to my real identity with regards to my contribution
or participation or any be made to other persons outside this research as promised by the
researcher.

I understand that I will be given copies of participant’s information and signed/ thumb
printed consent form for my personal record before the administration of the research
questionnaires.

Respondent’s signature/ thumb print ..................................................

Date ..................................

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to understand the procedures of the
study and has agreed to participate. All questions and clarifications raised by the participant
have been duly addressed.

Signature of person who sought consent ...........................................

Date ..................................
Appendix VI

DATA EXTRACTION FORM

Title: Analysis of the losses in the HIV/AIDS Care Continuum: a cross sectional study at the Effia-Nkwanta Regional Hospital, Western Region, 2019

Data extraction date: 

SECTION 1: IDENTIFICATION AND DEMOGRAPHIC DATA

1.1 Patient ID

1.2 Date of birth (if known):

1.3 Age (in years):

1.4 Sex: 1. Male 2. Female

1.5 Marital status:

|-----------|------------|-------------|--------------|------------|---------------|

1.6 Educational level

<table>
<thead>
<tr>
<th>1. No formal education</th>
<th>2. Primary</th>
<th>3. JHS</th>
<th>4. SHS/Tech</th>
<th>5. Tertiary</th>
</tr>
</thead>
</table>

1.7 Occupation

<table>
<thead>
<tr>
<th>1. Unemployed</th>
<th>2. Self-employed</th>
<th>3. Employed</th>
</tr>
</thead>
</table>
1.8 Religion


SECTION 2: FUNDING

2.1 Source of funding

1. Out of pocket  2. Medical insurance  3. Special project

SECTION 3: MEDICAL INFORMATION AND INITIAL CLINICAL CARE

3.1 Date of HIV test:

\[ \begin{array}{ccccccc}
\text{d} & \text{d} & \text{m} & \text{m} & \text{y} & \text{y} & \text{y} \\
\end{array} \]

3.2 HIV type:

1. HIV 1  2. HIV 2  3. HIV 1&2

3.3 Date of registration at ART center:

\[ \begin{array}{ccccccc}
\text{d} & \text{d} & \text{m} & \text{m} & \text{y} & \text{y} & \text{y} \\
\end{array} \]

3.4 Comorbidities:

1. Yes  2. No

3.5 Disclosure of status

1. None  2. Partner  3. Family  4. Other (specify)

3.6 Sources of emotional support

1. Partner  2. Family  3. Other (specify)

3.7 WHO clinical stage of patient (at initial registration)

1. Stage 1  2. Stage 2  3. Stage 3  4. Stage 4

3.8 Adherence counseling done

1. Yes  2. No
SECTION 4: FOLLOW-UP CLINICAL CARE

4.1 Date of ARV initiation

<p>| | | | | |</p>
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<td>m</td>
<td>m</td>
<td>y</td>
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</table>

4.2 ARV prescribed

1. FIRST LINE

First choice
- TDF+3TC+EFV
- TDF+FTC+EFV

Second choice
- TDF+3TC+NVP
- TDF+FTC+NVP
- AZT+3TC+EFV
- AZT+3TC=EFV

2. SECOND LINE

First choice
- AZT+3TC+LPV/r
- AZT+FTC+LPV/r
- AZT+3TC+ATV/r
- AZT+FTC+ATV/r

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

4.3 Reported missed doses?

1. Yes  2. No

4.3.1 If yes, number of missed doses ........................................
4.3.2 Reported reason(s) for missing doses

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<tbody>
<tr>
<td>1</td>
<td>None</td>
<td>2</td>
<td>Too many pills</td>
<td>3</td>
<td>Felt well</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Forgot to take</td>
</tr>
<tr>
<td>5</td>
<td>Too busy to take</td>
<td></td>
<td></td>
<td>6</td>
<td>Felt sick</td>
</tr>
<tr>
<td>7</td>
<td>Ran out of pills</td>
<td>8</td>
<td>Felt depressed/anxious</td>
<td>9</td>
<td>Didn’t want to take it</td>
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<td></td>
<td>10</td>
<td>Shared pills with others</td>
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<td></td>
<td></td>
<td>11</td>
<td>To avoid side effects</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>12</td>
<td>Unable to pay</td>
</tr>
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</table>

4.4 If side effects of drugs, specify: …………………

4.5 ARVs changed?  
1. Yes 2. No

4.5.1 If Yes, reason(s) for changing ARV

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<tbody>
<tr>
<td>1</td>
<td>Drug toxicity</td>
<td>2</td>
<td>Treatment failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>TB diagnosis</td>
<td>4</td>
<td>Drug stockout</td>
</tr>
</tbody>
</table>

4.6 Date of first viral load test  

4.7 Results of first viral load test………………………………….cp/ml

4.8 Results of viral load test at 12 months …………………….. cp/ml

4.9 Number of scheduled visits (within 12 months) …………………

4.10 Last visit date…………………………

4.11 Outcome: Dead/Alive/Transferred/Missed Appointment/LTFU

**SECTION 5: REPORTER IDENTIFICATION**

5.1 Name of reporter: _______________________________________________

Signature:............................... Date: ...../...../......
**Appendix VII**

**QUESTIONNAIRE FOR HIV SERVICE PROVIDERS**

**Title:** Analysis of the losses in the HIV/AIDS Care Continuum: a cross sectional study

**at the Effia-Nkwanta Regional Hospital, Western Region, 2019**

**SECTION 1: PARTICIPANT INFORMATION**

1. Date:

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<td>d</td>
<td>d</td>
<td>m</td>
<td>m</td>
<td>y</td>
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1.2 Participant ID:

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1.3 Cadre of participant:

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</table>

1.4 How long have you been working as an HIV care provider (in months) ....................... 

**SECTION 2: HIV TESTING SERVICES**

2.1 How many people aged 15 years and above were tested for HIV in 2017? .........................

2.2. How many of these were HIV positive? ..........................................

2.3. What is the turnaround time for HIV testing? ..........................................

**SECTION 3: AVAILABILITY OF TEST KITS/REAGENTS/ARV/LOGISTICS**

3.1 Do you get regular supply of test kits/reagents/ARVs? Yes/No

3.2 Do you keep track of the test kits/reagents/ARVs consumption? Yes/No

3.2.1 If Yes, when did you last request for some? ..................

3.2.2 If No, why? ..........................................

3.3 Have you run out of stock for test kits/reagents/ARVs in 2017? Yes/No

3.3.1 If yes, for how long were you out of stock? ..................

3.3.2 Did the stock out affect service delivery? Yes/No
3.2.2.1 If Yes, how did it affect service delivery? ...........................................

3.4 Is there a PCR equipment for performing HIV viral load test in this facility? Yes/No

3.5 Did the equipment broken down at any point in 2017? Yes/No

3.6 Do you get regular supply of client folders and appointment cards? Yes/No

3.7 What is the turn-around time for HIV viral load testing? .................................

3.8 Did you run out of folders and appointment cards 2017? Yes/No

3.8.1 Did it affect service delivery? Yes/No

3.8.1.1 If yes how?.................................

**SECTION 4: LOST TO FOLLOW-UP**

4.1 Why do you think HIV positive clients get lost to care

........................................................................................................................................

4.2 Is there any peculiar thing about this facility that contributes to lost to follow-up?

........................................................................................................................................

**SECTION 4: INTERVIEWER IDENTIFICATION**

4.1 Name of interviewer: ____________________________________________________________

Signature:........................................... Date: ....../....../.......

University of Ghana http://ugspace.ug.edu.gh
GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax = 233-302-585424
Email: ghberc@gmail.com
11th March, 2019

Irene Amedro
University of Ghana
School of Public Health

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

<table>
<thead>
<tr>
<th>GHS-ERC Number</th>
<th>GHS-ERC023/02/19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title</td>
<td>Analysis of Losses in the HIV/AIDS Care Continuum: A Cross Sectional Study at the Effiah-Nkwanta Regional Hospital, Western Region.</td>
</tr>
<tr>
<td>Approval Date</td>
<td>11th March, 2019</td>
</tr>
<tr>
<td>Expiry Date</td>
<td>10th March, 2020</td>
</tr>
<tr>
<td>GHS-ERC Decision</td>
<td>Approved</td>
</tr>
</tbody>
</table>

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