

ENSIGN GLOBAL UNIVERSITY, KPONG

EASTERN REGION, GHANA

FACULTY OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

**ASSESSING ATTRITION AND VIRAL LOAD SUPPRESSION AMONG PATIENTS
RECEIVING ANTIRETROVIRAL THERAPY AT SOMANYA POLYCLINIC IN
THE YILO KROBO MUNICIPALITY OF THE EASTERN REGION OF GHANA**

By

EMMANUEL NARH TEYE

(257100353)

MAY, 2026

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**A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH, FACULTY
OF PUBLIC HEALTH, ENSIGN GLOBAL UNIVERSITY IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE
MASTER OF PUBLIC HEALTH DEGREE**

MAY, 2026

DECLARATION

I, Emmanuel Narh Teye, hereby certify that, except for references to other people's work, which I have duly cited, this project submitted to the Department of Community Health, Ensign Global University, Kpong is the result of my own investigation, and has not been presented for any other degree elsewhere.

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DEDICATION

This work is dedicated to the Almighty God for His guidance and strength, and to my family for their support and encouragement throughout my academic journey.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to the Almighty God for His grace, strength, and guidance throughout this academic journey. I am deeply indebted to my supervisor, Dr. Edward Sutherland, for his invaluable guidance and constructive criticisms throughout the research process. His expertise and support greatly contributed to the quality of this work.

I also extend my appreciation to the management and staff of Somanya Polyclinic, the Yilo Krobo Municipal Health Directorate, and the National AIDS/STI Control Programme for granting permission and providing access to the data used in this study.

DEFINITION OF TERMS

Adherence: The extent to which a patient correctly follows prescribed ART regimens in terms of dosage, timing, and consistency.

AIDS (Acquired Immunodeficiency Syndrome): The advanced stage of HIV infection characterized by severe damage to the immune system and the occurrence of opportunistic infections.

Antiretroviral Therapy (ART): The use of a combination of antiretroviral drugs to treat HIV infection and suppress viral replication.

Attrition: A composite outcome referring to patients who have discontinued care due to loss to follow-up, death, or treatment interruption.

Defaulter Tracing: A follow-up mechanism used by healthcare providers to track and re-engage patients who miss scheduled clinic appointments.

E-Tracker: An electronic health information system used in Ghana for monitoring and managing HIV patient data.

HIV (Human Immunodeficiency Virus): A virus that attacks the immune system, specifically the CD4 cells, weakening the body's ability to fight infections and diseases.

Loss to Follow-Up (LTFU): Patients who have missed scheduled clinic visits for a specified period (commonly 90 days or more) and are no longer actively engaged in care. Patients confirmed to have died are classified as deaths and are not counted as loss to follow-up.

People Living with HIV (PLHIV): Individuals who have been diagnosed with HIV infection.

Retention in Care: The continuous engagement of patients in HIV treatment and care services over a defined period.

Treat All Policy: A World Health Organization recommendation that all individuals diagnosed with HIV should initiate ART regardless of CD4 count or clinical stage.

Viral Load: The amount of HIV RNA present in a patient's blood, used to monitor disease progression and treatment effectiveness.

Viral Load Suppression: A condition where the viral load is reduced to less than 200 copies per millilitre of blood, indicating effective treatment.

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AIDS	Acquired Immunodeficiency Syndrome
HIV	Human Immunodeficiency Virus
LTFU	Loss to Follow-Up
ART	Antiretroviral Therapy
ARV	Antiretroviral
PLWHIV	Persons Living with HIV
GAC	Ghana AIDS Commission
NACP	National AIDS/STI Control Programme
NHIS	National Health Insurance Scheme
WHO	World Health Organization
CI	Confidence Interval
SDG	Sustainable Development Goal
HAART	Highly Active Antiretroviral Therapy
UN	United Nations
	Joint United Nations Programme on HIV/AIDS
UNAIDS	(includes UNICEF, UNDP, UNFPA, UNDCP, ILO, UNESCO, WHO, World Bank)

ABSTRACT

Background: Attrition from clinical care undermines efforts to achieve sustained viral load suppression and epidemic control within ART programmes. Retention in care and viral suppression among people living with HIV (PLHIV) are critical for achieving global targets to end the HIV epidemic by 2030.

Aim: This study assessed attrition and viral load suppression among patients receiving ART at Somanya Polyclinic, Yilo Krobo Municipality, Eastern Region of Ghana, from 2021 to 2024.

Methods: A retrospective cohort design used secondary data from the National AIDS/STI Control Programme (NACP). Routine data on PLHIV aged 10 years and above enrolled at Somanya Polyclinic between January 2021 and December 2024 were extracted from the Electronic Tracker database, cleaned in Excel, and analysed in STATA 18. Descriptive statistics, chi-square tests, survival analysis, and multivariable logistic regression examined factors associated with attrition and viral suppression at 5% significance.

Results: Of 566 patients, 162 (28.62%) were retained in care while 404 (71.38%) experienced attrition. Among those retained, 120 had documented viral load results, of whom 88 (73.33%) achieved suppression. Occupation was significantly associated with attrition; compared to employed individuals, traders/business persons (AOR = 1.88; $p = 0.021$) and the unemployed (AOR = 5.27; $p = 0.004$) had higher odds of attrition. For viral load non-suppression, previously married (AOR = 3.98; $p = 0.035$) and single individuals (AOR = 4.85; $p = 0.009$), and students (AOR = 17.89; $p = 0.013$), had higher odds than married/cohabiting individuals.

Conclusion: Retention in care was low, with substantial attrition, and a notable proportion of tested patients remained unsuppressed. Findings highlight the need for targeted interventions for

economically vulnerable groups, additional support for patients outside stable marital relationships, and strengthened routine viral load monitoring.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

The Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) have, over the past four decades, evolved from a newly identified medical condition into one of the most complex global public health and development challenges. Since its recognition in the mid-1980s, HIV/AIDS has profoundly affected health systems, economies, and social structures across the world, particularly in low- and middle-income countries (De Cock, Jaffe & Curran, 2012; UNAIDS, 2023). Beyond its clinical manifestations, the epidemic has been associated with long-term social and economic consequences, including loss of productive labour, increased healthcare expenditure, and heightened vulnerability among already disadvantaged populations (UNAIDS, 2023).

In the early years of the epidemic, HIV infection was almost universally fatal due to the absence of effective treatment. However, the development and scale-up of antiretroviral therapy (ART) transformed HIV from a rapidly fatal disease into a manageable chronic condition. The widespread availability of ART has resulted in substantial reductions in HIV-related morbidity and mortality and has significantly improved the quality of life and life expectancy of people living with HIV. Consequently, global HIV responses have increasingly shifted from a focus on short-term survival to sustained engagement in long-term care and treatment. (Ford et al., 2020; UNAIDS, 2023)

Despite these advances, HIV remains a major global public health concern. Millions of people continue to live with the virus, and new infections and AIDS-related deaths are still recorded each year, highlighting the continued need for effective prevention, treatment, and care strategies (UNAIDS, 2021). The burden of the epidemic, however, is unevenly distributed across regions (Cork et al., 2020).

Sub-Saharan Africa bears a disproportionate share of the global HIV burden and remains the epicentre of the epidemic. The region accounts for the majority of people living with HIV worldwide and continues to experience high levels of HIV-related morbidity and mortality. HIV in Sub-Saharan Africa disproportionately affects individuals in their most economically productive and reproductive years, thereby exerting profound social and economic impacts on households and communities (Cork et al., 2020). Although access to antiretroviral therapy has expanded significantly across the region, HIV continues to pose substantial challenges to health systems due to the chronic nature of the disease and the need for sustained care (Ali et al., 2019).

In Ghana, HIV has remained a persistent public health challenge since the first reported case in 1986. Over the years, the country has implemented a comprehensive national response aimed at preventing new infections, expanding access to treatment, and improving the well-being of people living with HIV. The introduction of Highly Active Antiretroviral Therapy (HAART) in 2003 marked a major milestone in HIV care in Ghana, enabling infected individuals to achieve improved clinical outcomes and prolonged survival. National estimates indicate that HIV prevalence remains relatively low at the population level but varies across regions and population groups, with higher

prevalence observed among key populations such as female sex workers and men who have sex with men (Ali et al., 2019; Ghana AIDS Commission, 2019).

In response to the need to further strengthen HIV treatment outcomes, the World Health Organization (WHO) in 2015 recommended the “Treat All” policy, which advocates for the initiation of antiretroviral therapy for all persons living with HIV regardless of CD4 cell count or clinical stage (WHO, 2015). Ghana adopted this policy in 2016, alongside same-day initiation of treatment, as part of efforts to promote early treatment uptake, improve long-term health outcomes, and reduce HIV transmission (Ayisi Addo et al., 2018a). This policy shift reflects a broader global understanding of HIV as a lifelong condition that requires sustained access to care and continuous engagement with health services.

At the global level, renewed commitment to ending the HIV epidemic is reflected in international development frameworks such as the Sustainable Development Goals (SDGs), particularly Goal 3, which seeks to ensure healthy lives and promote well-being for all (United Nations, 2015). In support of this goal, the Joint United Nations Programme on HIV/AIDS (UNAIDS) introduced ambitious treatment and care targets aimed at expanding diagnosis, treatment coverage, and viral load suppression among people living with HIV. These initiatives underscore the importance of effective HIV care systems that support individuals not only to initiate treatment but also to remain engaged in care over time.

These global, regional, and national developments highlight the progress made in the prevention and management of HIV infection, particularly through the expansion of antiretroviral therapy and supportive policy frameworks. As HIV is increasingly

managed as a chronic condition, sustained engagement in care and effective treatment outcomes have become central to the success of HIV programs. Within this context, understanding how HIV care and treatment are delivered and experienced at the facility level remains essential for strengthening national and sub-national HIV responses.

1.2 Problem Statement

Attrition from clinical care within antiretroviral therapy (ART) programmes remains a major public health challenge globally and poses a significant threat to the effectiveness of HIV treatment efforts. While the scale-up of ART has led to marked reductions in HIV-related morbidity and mortality, sustained retention in care has proven difficult in many settings. Patients who disengage from care are less likely to achieve viral load suppression, increasing the risk of disease progression, drug resistance, and onward transmission of HIV (Kananu, 2016).

Evidence from Sub-Saharan Africa indicates that attrition rates from ART programmes remain unacceptably high despite expanded access to treatment. Studies conducted across 13 African countries have shown that, on average, only about 60% of patients remain retained in care 12 months after initiating ART. Other studies have reported attrition rates as high as 75% at 12 months and 67% at 24 months following treatment initiation, highlighting substantial losses along the HIV care continuum (Musheke et al., 2012). These levels of attrition undermine the long-term success of ART programmes and compromise efforts to achieve population-level viral suppression.

In Ghana, the introduction of Highly Active Antiretroviral Therapy (HAART) in 2003 and subsequent expansion of HIV services through the National AIDS/STI Control

Programme (NACP) led to a steady increase in the number of people living with HIV enrolled in care (Ayisi Addo et al., 2018b). These interventions contributed to notable declines in HIV-related morbidity and mortality over time (Hassan et al., 2015). However, retention in care has remained a persistent challenge. By 2020, Ghana was unable to achieve the UNAIDS 90-90-90 targets, particularly the third target relating to sustained viral suppression. High levels of attrition were identified as a major contributing factor, driven by issues such as stigma and discrimination, abandonment of treatment for faith-based healing, and misconceptions about cure (Ghana AIDS Commission, 2020).

The consequences of attrition extend beyond individual patient outcomes to affect the accuracy and reliability of routine HIV programme data used for planning and evaluation. High rates of loss to follow-up can result in biased estimates of treatment outcomes and survival. For example, evidence from South Africa demonstrated that up to 78% of patients classified as lost to follow-up within three months of ART initiation were later found to have died, indicating substantial misclassification and underestimation of mortality in routine data systems (Cornell et al., 2014). Such inaccuracies hinder effective programme monitoring and resource allocation.

At the facility level in Ghana, including Somanya Polyclinic in the Yilo Krobo Municipality, various strategies have been implemented to improve patient retention. These include appointment reminders, defaulter tracing by data officers, and the engagement of trained persons living with HIV to support follow-up efforts. Despite these interventions, programmatic reports indicate that attrition remains a significant challenge at the facility and this can threaten the successful implementation of ART

services and the attainment of optimal treatment outcomes (Hassan et al., 2015). Similar studies conducted in Ghana have reported substantial levels of attrition among patients receiving antiretroviral therapy, particularly within the first two years of treatment initiation, with loss to follow-up identified as a major contributor to poor retention in care (Ofori-Asenso et al., 2020; Asamoah et al., 2022).

Although the Eastern Region has been identified as one of the regions with relatively high HIV prevalence in Ghana (Ali et al., 2019; Ghana AIDS Commission, 2019), there is limited empirical evidence on the magnitude of attrition, levels of viral load suppression, and the factors associated with these outcomes at Somanya Polyclinic. The absence of facility-specific data constrains the ability of programme managers and policymakers to design targeted, evidence-based interventions to strengthen retention in care. This study therefore seeks to assess attrition and viral load suppression among patients receiving antiretroviral therapy at Somanya Polyclinic in the Eastern Region of Ghana.

1.3 Justification of the Study

A central principle underpinning the global HIV/AIDS response and the Sustainable Development Goals (SDGs) is the commitment to ensure that no one is left behind in access to prevention, treatment, and care services. Sustained retention of people living with HIV within the care continuum is therefore a critical requirement for achieving these global development and public health goals (Collins, 2018). Without consistent engagement in care, the benefits of antiretroviral therapy cannot be fully realized, undermining both individual health outcomes and broader population-level HIV control efforts.

Understanding the factors that contribute to attrition and suboptimal viral load suppression is particularly important in the context of the UNAIDS 95-95-95 targets, which aim for 95% of individuals on treatment to achieve viral suppression by 2030. Identifying and addressing the drivers of loss to follow-up is essential not only for improving retention in care but also for strengthening the accuracy and reliability of routine HIV programme data used for planning, monitoring, and evaluation (Cornell et al. (2014). Improved data quality enhances evidence-based decision-making and supports more efficient allocation of limited health resources (World Health Organization, 2021). This study is justified by the need to generate facility-specific evidence on attrition and viral load suppression among patients receiving antiretroviral therapy at Somanya Polyclinic. By examining the patterns and factors associated with disengagement from care and treatment outcomes, the study seeks to provide practical insights that can inform targeted interventions to improve retention and treatment success at the facility level.

The findings of this study will be of direct relevance to key stakeholders involved in HIV programme implementation and policy formulation, including the ART clinic at Somanya Polyclinic, the National AIDS/STI Control Programme (NACP), and the Ghana AIDS Commission. In addition, the study will contribute to the existing body of literature on HIV care and treatment in Ghana and serve as a useful reference for academic institutions, researchers, and future studies aimed at strengthening HIV service delivery and health promotion efforts. More specifically, the facility-level evidence generated will directly inform district and facility-level programme decision-making: the ART clinic and Yilo Krobo Municipal Health Directorate can use the findings to target defaulter-tracing resources at the occupational and marital-status groups identified as high risk, the

NACP can incorporate the results into routine performance review and resource allocation across similar facilities, and the Ghana AIDS Commission can draw on the evidence when refining retention-focused components of the national HIV response.

1.4 Conceptual Framework

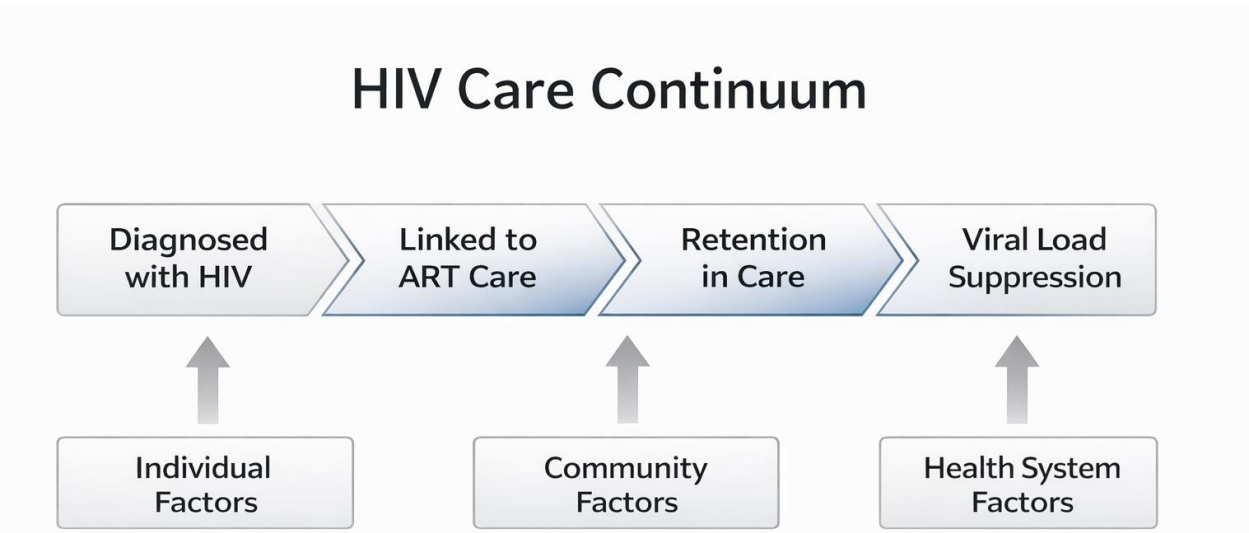


Figure 1.1: HIV Care Continuum Model (Adapted from UNAIDS, 2023; World Health Organization, 2021).

1.4 Conceptual Framework

The HIV Care Continuum (Treatment Cascade) Model

This study is guided by the HIV Care Continuum model, also referred to as the HIV Treatment Cascade. The HIV Care Continuum conceptualises HIV treatment as a sequential process comprising interrelated stages: diagnosis of HIV infection, linkage to care, initiation of antiretroviral therapy (ART), retention in care and achievement of sustained viral load suppression. Progression across these stages is essential for improving individual health outcomes and reducing onward HIV transmission at the population level (UNAIDS, 2023; World Health Organization, 2021).

The Care Continuum framework has become central to global HIV monitoring and evaluation strategies, particularly in the context of the UNAIDS 95–95–95 targets. These targets aim for 95% of people living with HIV to know their status, 95% of those diagnosed to receive sustained ART and 95% of those on ART to achieve viral suppression (UNAIDS, 2023). Attrition from care disrupts this continuum and undermines progress towards viral suppression, thereby weakening both individual-level treatment success and broader public health control efforts.

Retention in care occupies a critical midpoint in the continuum. Evidence from multi-country cohort analyses demonstrates that disengagement from care remains one of the most significant bottlenecks in achieving sustained viral suppression, particularly during the first 12–24 months of treatment (Haas et al., 2021; Fox and Rosen, 2022). Patients who are lost to follow-up are more likely to experience treatment interruption, virological failure and increased mortality risk.

Viral load suppression represents the ultimate clinical objective of ART and is widely regarded as the most reliable indicator of treatment effectiveness. Sustained viral suppression (defined as <200 copies/ml) reduces HIV-related morbidity, prevents drug

resistance and effectively eliminates sexual transmission risk when consistently maintained (World Health Organization, 2021; UNAIDS, 2023). However, achieving viral suppression depends heavily on consistent retention in care and adherence to ART.

Determinants Within the Care Continuum

Although the Care Continuum presents a structured progression of care stages, movement across these stages is influenced by multiple interacting determinants operating at individual, community and health system levels.

Individual-Level Determinants

Socio-demographic characteristics such as age, sex, marital status, educational level and employment status influence health-seeking behaviour, treatment adherence and sustained clinic attendance. Empirical studies in sub-Saharan Africa consistently report higher attrition among younger patients and men, largely due to mobility, stigma and delayed health engagement (Haas et al., 2021; Bulsara et al., 2021). Education and economic stability have also been associated with improved retention and viral suppression, reflecting increased treatment literacy and capacity to navigate healthcare systems effectively (Asamoah et al., 2022).

Community-Level Determinants

Geographical accessibility and social context influence continuity of care. Distance to health facilities, transportation costs and community-level stigma have been repeatedly identified as predictors of loss to follow-up in ART programmes (Fox and Rosen, 2022;

Nyblade et al., 2019). Patients residing farther from treatment centres may face logistical barriers that increase missed appointments and treatment interruption, thereby disrupting progression within the care continuum.

Structural and Health System Determinants

Health system characteristics including clinic organisation, availability of differentiated service delivery models, patient tracking systems and ART regimen tolerability significantly affect retention and treatment outcomes. Studies indicate that early treatment vulnerability, medication side effects and weak defaulter tracing mechanisms contribute to attrition and delayed viral suppression (Haas et al., 2021; World Health Organization, 2021). Strengthened health systems are therefore essential for sustaining engagement across the treatment cascade.

Application to the Present Study

In this study, attrition and viral load suppression are conceptualised as interconnected outcomes within the HIV Care Continuum. Attrition (including loss to follow-up and death) represents disruption of the continuum, while viral suppression represents successful progression to its final stage.

The framework assumes that socio-demographic characteristics, community context (such as proximity to the facility) and structural treatment-related factors (such as duration on ART) influence progression across the continuum. Retention in care is expected to mediate the relationship between these determinants and viral load suppression outcomes.

By grounding the study within the HIV Care Continuum model, the analysis moves beyond a purely descriptive examination of attrition towards an evaluation of treatment cascade performance at the facility level. This perspective provides a structured and integrated understanding of how retention and virological outcomes interact within ART service delivery at Somanya Polyclinic.

1.5 Research Questions

1. What proportion of patients initiated on ART at Somanya Polyclinic experienced attrition during the study period?
2. What proportion of patients receiving ART are retained in care during the study period?
3. What proportion of patients receiving ART achieve viral load suppression?
4. What socio-demographic, clinical and structural factors are associated with attrition and viral load non-suppression?

1.6 General Objective

To evaluate retention in care and viral load suppression among patients receiving antiretroviral therapy at Somanya Polyclinic within the HIV care continuum framework.

1.7 Specific Objectives

1. To determine the proportion of patients experiencing attrition among those initiated on ART during the study period.
2. To assess retention in care among patients receiving ART.
3. To determine the proportion of patients achieving viral load suppression.

4. To identify factors associated with attrition and viral load non-suppression among patients receiving ART.

1.8 Profile of Study Area

The Somaya Polyclinic located in the Eastern Region of Ghana, is the only facility in the Yilo Krobo Municipality that provides HIV/AIDS services. It was selected for the study due to its high rates of HIV/AIDS infections within the YKM and it has been equipped by government since 2010 for HIV testing, counselling, treatment and referral of HIV/AIDS cases in the municipality and its environs (Owusu, 2020). It currently has a bed capacity of 20, and an average daily OPD attendance of 90 patients.

This facility is noted to record several HIV positive clients accessing healthcare.

Established in 2010, the clinic is also known to be among one of the sites that piloted the Prevention of Mother to Child Transmission (PMTCT) program. It hence serves the people within the Krobo catchment area and beyond. As a district referral centre, it provides the following services; General OPD services, Eye clinic, Dental clinic, ENT clinic, Antenatal clinic and Child Welfare Clinic, Blood Bank, Public Health services, Comprehensive Abortion Care (CAC) services, Laboratory services, Pharmacy, just to mention but a few. This facility, unlike most hospitals in Ghana, does not have special days for People Living with HIV to access health care; meaning clients can access the facility throughout the week (Monday-Friday)

The people in the Yilo Krobo Municipality are predominantly Krobo (70.5%) but co-exist with other tribes like the Ewe (18.2), Akan's (7.7%) and others (3.6%). The major occupations in the municipality are farming, fishing, trading, and artisan jobs. There are also public and civil servants. Farming is traditionally in the domain of men.

1.9 Scope of the Study

This study focused on assessing attrition and viral load suppression among patients receiving antiretroviral therapy (ART) at Somanya Polyclinic in the Yilo Krobo Municipality of the Eastern Region of Ghana. The study was limited to persons living with HIV aged 10 years and above who were newly initiated on ART between January 2021 and December 2024.

The study utilised secondary data extracted from the Electronic Tracker (E-Tracker) database of the National AIDS/STI Control Programme (NACP). The scope of the study was restricted to selected socio-demographic variables, including age, sex, marital status, educational level, and occupation, as well as treatment outcomes such as attrition and viral load suppression.

Geographically, the study was confined to Somanya Polyclinic and did not include other health facilities within or outside the municipality. In addition, the study was limited by the availability and completeness of routine programme data, particularly with respect to viral load testing and other clinical variables not captured in the dataset.

1.10 Organisation of the Study

This study is organised into six chapters. Chapter One presents the introduction, which includes the background to the study, problem statement, rationale, conceptual framework, research questions, objectives, scope of the study, and organisation of the study.

Chapter Two reviews relevant literature on HIV care and treatment, attrition, retention in care, viral load suppression, and associated determinants, drawing on global, regional, and Ghanaian perspectives.

Chapter Three describes the methodology of the study, including the research design, study setting, study population, sampling approach, data collection procedures, data management, statistical analysis, and ethical considerations.

Chapter Four presents the results of the study, including socio-demographic characteristics of respondents, levels of attrition, viral load suppression, and factors associated with these outcomes.

Chapter Five discusses the findings of the study in relation to existing literature and the study objectives.

Chapter Six provides the conclusions and recommendations based on the findings of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The success of antiretroviral therapy (ART) programmes depends not only on early initiation of treatment but also on sustained retention in care and the achievement of viral load suppression. While global and national HIV responses have expanded access to ART, evidence from diverse settings indicates that disengagement from care and suboptimal treatment outcomes continue to undermine progress toward epidemic control (UNAIDS, 2023; World Health Organization, 2021; Fox and Rosen, 2022; Haas et al., 2021). This chapter reviews empirical and theoretical literature relevant to attrition and viral load suppression among patients receiving ART, with particular attention to low- and middle-income countries.

2.2 The HIV Care Continuum and Treatment Outcomes

The scale-up of antiretroviral therapy (ART) over the past two decades has transformed HIV infection from a rapidly fatal disease into a manageable chronic condition. Globally, expanded access to ART has resulted in substantial reductions in HIV-related morbidity and mortality, with millions of people living with HIV (PLHIV) now receiving life-saving treatment (UNAIDS, 2023). Despite these advances, the effectiveness of HIV treatment programmes depends not only on ART

initiation but also on sustained engagement in care and achievement of viral load suppression (World Health Organization, 2021; UNAIDS, 2023).

The HIV Care Continuum, also referred to as the HIV Treatment Cascade, provides a structured framework for understanding progression through HIV care. The continuum conceptualises treatment as a sequential process involving diagnosis, linkage to care, initiation of ART, retention in care and sustained viral load suppression (World Health Organization, 2021; UNAIDS, 2023). Movement across these stages is critical for achieving optimal clinical outcomes and preventing onward transmission.

Globally, the UNAIDS 95–95–95 targets have reinforced the importance of monitoring treatment cascade performance. These targets aim for 95% of individuals living with HIV to know their status, 95% of those diagnosed to receive ART and 95% of those on treatment to achieve viral suppression (UNAIDS, 2023). While substantial progress has been made toward the first two targets, retention in care and sustained viral suppression remain persistent challenges in many settings.

Evidence from multi-country analyses indicates that attrition from care constitutes a major bottleneck within the continuum, particularly during the first 12 to 24 months after ART initiation (Haas et al., 2021; Fox and Rosen, 2022). Patients who disengage from care are more likely to experience treatment interruption, virological failure and increased mortality risk. Retention in care is therefore central to the success of ART programmes and serves as a key mediator between treatment initiation and viral suppression (Haas et al., 2021; World Health Organization, 2021).

Viral load suppression represents the ultimate goal of ART and is widely recognised as the most reliable indicator of treatment effectiveness. Sustained viral suppression (defined as <200

copies/ml) is associated with improved immune recovery, reduced opportunistic infections and elimination of sexual transmission risk when consistently maintained (World Health Organization, 2021). However, achieving suppression depends heavily on continuous adherence and uninterrupted engagement in care.

2.2.1 Global Perspective on HIV Care and Treatment

Globally, the scale-up of antiretroviral therapy has been one of the most significant public health achievements of the past two decades. By 2022, approximately 29.8 million people living with HIV were receiving ART worldwide, representing a substantial increase from previous years (UNAIDS, 2023). This expansion has contributed to marked declines in HIV-related mortality and morbidity, with global AIDS-related deaths decreasing by over 50% since their peak in the mid-2000s (UNAIDS, 2022; Ford et al., 2020).

Despite these gains, recent studies indicate that progress in HIV treatment outcomes has been uneven. While ART initiation rates have improved, retention in care and long-term viral load suppression remain challenging in many settings. A global systematic review by Fox and Rosen (2022) found that attrition from ART programmes continues to occur at all stages of the HIV care continuum, particularly within the first 12–24 months of treatment initiation. Similarly, a multi-country analysis by Haas et al. (2021) reported that gaps in retention significantly limit the proportion of patients who achieve sustained viral suppression, even in countries with high ART coverage.

The global HIV response has increasingly prioritised treatment outcomes through the UNAIDS 95-95-95 targets, which aim for 95% of people living with HIV to know their status, 95% of those diagnosed to receive ART, and 95% of those on treatment to achieve viral suppression. However,

recent estimates suggest that many countries remain off track, particularly with respect to the third target, largely due to losses from care and inconsistent treatment adherence (UNAIDS, 2023; Heath, Levi & Hill, 2021). These findings underscore the importance of understanding factors that influence sustained engagement in HIV care.

2.2.2 HIV Care and Treatment in Sub-Saharan Africa

Sub-Saharan Africa continues to bear the greatest burden of HIV globally, accounting for approximately two-thirds of all people living with HIV worldwide (UNAIDS, 2023). The region has experienced substantial expansion of ART services over the past decade, supported by national governments and international partners. As of 2022, ART coverage in Sub-Saharan Africa exceeded 80% in several countries, reflecting major progress toward universal treatment access (UNAIDS, 2022).

Despite these achievements, retention in HIV care remains a persistent challenge across the region. Evidence from cohort studies and systematic reviews indicates that attrition rates in Sub-Saharan Africa remain high, particularly during the early stages of ART initiation. A systematic review by Bulsara et al. (2021) reported that retention rates at 12 months ranged between 60% and 75% across several African countries. Similarly, a multi-country cohort study by Brown et al. (2020) found that loss to follow-up was one of the primary contributors to poor long-term treatment outcomes, with substantial variation across facilities and health systems.

Recent studies have also highlighted structural and health system constraints affecting HIV care in Sub-Saharan Africa. These include limited health workforce capacity, challenges with decentralised service delivery, and socioeconomic barriers faced by patients, such as transportation costs and competing livelihood demands (Haas et al., 2021; Fox & Rosen, 2022). Collectively,

these factors continue to hinder sustained retention in care and achievement of viral load suppression, despite high levels of ART coverage.

2.2.3 HIV Care and Treatment in Ghana

Ghana has made notable progress in expanding access to HIV treatment through the National AIDS/STI Control Programme. Following the adoption of the WHO Treat All policy and same-day ART initiation, enrolment into HIV care has increased steadily across the country. National programme data indicate improvements in ART coverage and viral load testing in recent years, reflecting strengthened HIV service delivery systems (Ghana AIDS Commission, 2021; NACP, 2022).

However, recent facility-based and national studies suggest that retention in care remains a key challenge in Ghana. A retrospective cohort study conducted in multiple ART clinics in Ghana by Ofori-Asenso et al. (2020) found that a substantial proportion of patients disengaged from care within the first two years of ART initiation. Similarly, Asamoah et al. (2022) reported that loss to follow-up and inconsistent clinic attendance were significant barriers to achieving optimal viral load suppression among patients receiving ART.

Regional disparities in HIV treatment outcomes have also been documented. Studies indicate that facilities in high-burden regions and peri-urban settings experience higher levels of attrition compared to more resourced urban centres, potentially due to health system constraints and patient-level socioeconomic factors (Ghana AIDS Commission, 2019; Agyeman et al., 2021).

These findings highlight the need for facility-specific evidence to better understand the dynamics of attrition and viral load suppression within local HIV care contexts.

2.3 Concept of Attrition and Loss to Follow-Up in HIV Care

Attrition from HIV care remains a critical challenge that undermines the effectiveness of antiretroviral therapy (ART) programmes and threatens progress towards epidemic control. In HIV treatment contexts, attrition broadly refers to patients who disengage from care due to loss to follow-up (LTFU), death or transfer out of a treatment facility. Loss to follow-up specifically describes patients who miss scheduled clinic visits for a defined period and are no longer actively engaged in care. Although definitions of LTFU vary across studies and programmes, most contemporary HIV research defines LTFU as missing clinic appointments for 90 days or more after the last scheduled visit (Fox & Rosen, 2022; World Health Organization, 2021).

Variations in definitions and measurement approaches have posed challenges for comparing attrition estimates across settings. Nevertheless, attrition is widely recognised as a key indicator of ART programme performance because it directly affects treatment continuity, viral load suppression and survival outcomes (Haas et al., 2021). Patients who disengage from care are at increased risk of treatment interruption, virological failure and disease progression, thereby elevating risks of HIV-related morbidity, mortality and onward transmission (UNAIDS, 2023; Fox and Rosen, 2022).

Globally, attrition from ART programmes remains substantial despite expanded treatment access. Evidence indicates that retention declines progressively over time, particularly within the first two years following ART initiation. A global systematic review and meta-analysis reported that between 20% and 40% of patients initiating ART were no longer retained in care after 24 months, with the highest losses occurring within the first year of treatment (Fox and Rosen, 2022; Bulsara et al., 2021). These findings suggest that early retention represents a critical vulnerability period within the HIV care continuum.

In sub-Saharan Africa, attrition remains substantial despite expanded ART coverage. Multi-country analyses indicate considerable variability in 12-month retention across facilities, with early disengagement contributing significantly to overall treatment gaps (Haas et al., 2021; Bulsara et al., 2021). These findings reinforce the vulnerability of patients during the initial years of ART initiation within resource-constrained settings.

Evidence also suggests that a proportion of patients classified as lost to follow-up in routine programme data may have died or silently transferred to other facilities. Patient tracing studies in African ART programmes have demonstrated substantial outcome misclassification, leading to underestimation of mortality and distortion of programme performance indicators (Haas et al., 2021). Such inaccuracies have important implications for monitoring retention and evaluating ART programme effectiveness.

In Ghana, attrition from HIV care continues to limit optimal treatment outcomes. Facility-based and national studies indicate that a considerable proportion of patients disengage from ART care within the first two years of treatment initiation. A retrospective cohort study by Ofori-Asenso et al. (2020) reported that loss to follow-up accounted for a significant share of attrition among adults receiving ART, with younger age and socioeconomic vulnerability contributing to disengagement.

National programme reports similarly highlight retention gaps that constrain progress towards viral load suppression targets (Ghana AIDS Commission, 2021; National AIDS/STI Control Programme, 2022).

Beyond clinical consequences, high levels of attrition have broader health system implications. Loss to follow-up compromises the accuracy of routine HIV programme data, potentially biasing estimates of treatment coverage, retention and survival. These distortions affect planning, resource allocation and evaluation of HIV interventions, particularly in settings heavily reliant on routine health information systems (Fox and Rosen, 2022). Addressing attrition is therefore essential not only for improving patient outcomes but also for strengthening the reliability of HIV programme management.

The literature indicates that attrition and loss to follow-up remain persistent challenges across global, regional and national contexts. Despite substantial investments in ART scale-up and policy reforms such as the Treat All approach, sustained retention in care continues to limit long-term treatment success. These challenges underscore the importance of examining facility-level patterns and determinants of attrition to inform targeted strategies aimed at strengthening retention within the HIV care continuum.

2.4 Determinants of Retention and Viral Suppression

2.4.1 Individual-Level Determinants of Retention and Viral Suppression

Socio-demographic characteristics are consistently identified as important determinants of retention in HIV care and viral load suppression among patients receiving antiretroviral therapy (ART). Individual-level factors influence health-seeking behaviour, treatment adherence and sustained engagement in care through mechanisms such as treatment literacy, social support,

economic stability and competing livelihood demands. These determinants shape both the risk of attrition and the likelihood of achieving sustained viral suppression.

Age has been widely reported as a significant predictor of ART outcomes. Evidence from multi-country cohort analyses indicates that younger adults are more likely to disengage from care compared to older patients. Haas et al. (2021) reported elevated rates of loss to follow-up among patients aged 15–29 years, particularly within the first year of ART initiation. Similarly, Bulsara et al. (2021) found that younger age was associated with poorer retention and lower probability of viral suppression, potentially due to mobility, stigma and unstable socioeconomic conditions. In contrast, older patients generally demonstrate better adherence and sustained engagement in care, reflecting greater health system familiarity and stability (Fox and Rosen, 2022).

Sex and gender differences also influence retention and virological outcomes. Several studies conducted in sub-Saharan Africa have documented higher attrition among men compared to women. Brown et al. (2020) reported that men were significantly more likely to be lost to follow-up even after adjusting for clinical factors. Haas et al. (2021) similarly observed poorer retention among male patients, attributing this pattern to delayed health-seeking behaviour, occupational mobility and sociocultural norms that discourage routine engagement with health services. Although women often demonstrate higher retention rates, gender-related vulnerabilities, including caregiving burdens and stigma, may also affect continuity of care in certain contexts (Asamoah et al., 2022; UNAIDS, 2023).

Marital status and social support structures have been shown to influence ART outcomes. Married or cohabiting individuals often experience improved retention compared to those who are single, divorced or widowed. Evidence from Ghana suggests that spousal support facilitates medication adherence, appointment attendance and disclosure of HIV status, thereby reducing the likelihood

of disengagement from care (Ofori-Asenso et al., 2020; Agyeman et al., 2021). Conversely, limited social support may increase vulnerability to treatment interruption and unsuppressed viral load (Fox and Rosen, 2022).

Educational attainment is similarly associated with treatment outcomes. Higher levels of education are linked to improved understanding of ART benefits, enhanced treatment literacy and greater ability to navigate healthcare systems. Asamoah et al. (2022) reported higher viral suppression rates among patients with secondary or tertiary education compared to those with lower educational attainment. Limited education has been associated with misconceptions about ART, suboptimal adherence and increased risk of attrition in several sub-Saharan African studies (Bulsara et al., 2021; Haas et al., 2021).

Employment status and economic conditions exert complex influences on retention in care. While employment may enhance financial capacity to access services, unstable or informal employment can conflict with clinic schedules and increase missed appointments. Ofori-Asenso et al. (2020) observed higher attrition among economically vulnerable patients, while Fox and Rosen (2022) highlighted the role of indirect costs, including transportation and lost income, in contributing to disengagement from care. These findings suggest that economic insecurity may compromise sustained engagement despite expanded ART availability.

In the Ghanaian context, health insurance coverage represents an additional socio-demographic factor influencing care continuity. Possession of a valid National Health Insurance Scheme (NHIS) card has been associated with improved utilisation of health services and continuity of care (Agyeman et al., 2021; Ghana AIDS Commission, 2021). Although ART itself may be provided at no direct cost, indirect costs and ancillary services can pose financial barriers, particularly for uninsured patients.

Collectively, the evidence indicates that socio-demographic characteristics influence both the risk of attrition and the probability of achieving viral suppression through interconnected behavioural and structural pathways. These factors do not operate in isolation but interact with health system and contextual determinants to shape engagement within the HIV care continuum. Evaluating the role of individual-level characteristics in specific facility settings is therefore essential for identifying vulnerable subgroups and designing targeted retention strategies aimed at strengthening treatment outcomes.

2.4.2 Clinical and Treatment-Related Determinants of Retention and Viral Suppression

Clinical characteristics at the time of ART initiation and treatment-related factors play a significant role in shaping retention in care and viral load suppression outcomes. These determinants influence both biological response to therapy and patients' capacity to sustain long-term engagement in care within the HIV treatment continuum.

Baseline WHO clinical stage has been widely associated with treatment outcomes. Patients initiating ART at advanced stages of HIV disease often present with opportunistic infections and compromised immune function, which increase the risk of early mortality and treatment interruption (Haas et al., 2021). Advanced disease at initiation has also been linked to delayed health-seeking behaviour, which may negatively affect long-term retention. Conversely, early diagnosis and initiation of ART at lower WHO stages are associated with improved retention and higher likelihood of sustained viral suppression (World Health Organization, 2021).

Immunological status at treatment initiation, commonly measured using CD4 cell count, further influences outcomes. Individuals with very low baseline CD4 counts are more susceptible to early

clinical complications and death, increasing the risk of attrition during the initial months of therapy (Bulsara et al., 2021). Although the Treat-All policy recommends immediate ART initiation regardless of CD4 level, baseline immunosuppression remains an important predictor of early adverse outcomes in many low- and middle-income settings.

ART regimen type and tolerability are also critical determinants of virological outcomes. The transition toward integrase strand transfer inhibitor–based regimens, particularly dolutegravir-containing combinations, has been associated with improved viral suppression rates and reduced treatment failure across diverse settings (World Health Organization, 2021; UNAIDS, 2023). However, regimen-related side effects, pill burden and concerns about drug safety may negatively influence adherence and retention, particularly where pharmacovigilance systems are limited.

Duration on ART represents another key determinant of treatment success. Evidence consistently indicates that viral suppression improves with sustained treatment exposure, while the risk of attrition is highest during the first year of therapy (Fox and Rosen, 2022; Haas et al., 2021). Patients who remain engaged in care beyond the early treatment period are significantly more likely to achieve durable viral suppression. This pattern highlights the importance of early retention interventions to stabilise engagement during the initial months following ART initiation.

Year of ART initiation may also reflect broader programmatic changes, including implementation of Treat-All policies, decentralisation of services and expansion of differentiated service delivery models. These structural reforms have been associated with improvements in retention and viral suppression in several settings, although effects vary across contexts (World Health Organization, 2021).

Collectively, clinical and treatment-related determinants interact with individual characteristics to influence progression along the HIV care continuum. Evaluating these factors at facility level is essential for identifying patients at increased risk of attrition or virological non-suppression and for informing targeted clinical management strategies.

2.4.3 Health System and Access-Related Determinants of Retention and Viral Suppression

Health system characteristics and access-related factors play a critical role in shaping retention in HIV care and viral load suppression outcomes. Even in settings where antiretroviral therapy (ART) is provided free of charge, indirect costs, service delivery constraints and structural barriers may influence sustained engagement in care.

Geographical accessibility remains one of the most consistently documented determinants of retention. Distance to treatment facilities has been associated with missed appointments, delayed follow-up and increased likelihood of loss to follow-up in several sub-Saharan African settings (Fox and Rosen, 2022; Haas et al., 2021). Long travel distances and transportation costs may discourage routine clinic attendance, particularly among economically vulnerable patients. However, some studies suggest that decentralised service delivery and differentiated care models can mitigate these effects by bringing services closer to communities (World Health Organization, 2021).

Financial barriers also influence continuity of care. Although ART medications may be provided without direct cost, patients often incur expenses related to transportation, laboratory tests and time away from work. In Ghana, enrolment in the National Health Insurance Scheme (NHIS) has been associated with improved access to health services and greater continuity of care (Ghana AIDS Commission, 2021; Agyeman et al., 2021). Insured patients may be better positioned to absorb indirect costs, thereby reducing the risk of treatment interruption. Conversely, lack of insurance coverage may exacerbate economic vulnerability and contribute to disengagement from care.

Health facility factors, including clinic organisation, appointment scheduling systems and patient tracking mechanisms, further influence retention outcomes. Weak defaulter tracing systems and incomplete documentation can contribute to underestimation of attrition and delayed re-engagement of patients who miss appointments (Haas et al., 2021). Facilities with stronger monitoring systems and structured follow-up protocols tend to report improved retention and viral suppression rates.

Service delivery innovations such as multi-month dispensing and differentiated service delivery models have also been implemented in many settings to improve convenience and reduce clinic burden. Evidence suggests that these strategies can enhance retention and treatment adherence, particularly among stable patients (World Health Organization, 2021). However, implementation effectiveness varies across facilities depending on resource availability and health system capacity.

Collectively, health system and access-related determinants influence patient progression along the HIV care continuum by shaping the practical feasibility of sustained engagement in care. Evaluating these contextual factors at the facility level is essential for identifying structural bottlenecks that may undermine retention and viral suppression outcomes.

2.5 Empirical Review of Related Studies

Empirical research examining attrition, retention in care and viral load suppression among people living with HIV has expanded substantially across Sub-Saharan Africa over the past decade. These studies, employing retrospective cohort analyses, multi-country collaborative datasets, cross-sectional facility-based designs and systematic reviews, provide important insight into ART programme performance. However, variations in methodological approaches, definitions of outcomes and contextual focus highlight persistent gaps that warrant further facility-level investigation.

Large-scale cohort analyses have generated robust estimates of retention patterns within African ART programmes. Haas et al. (2021), using multi-country collaborative cohort data from Sub-Saharan Africa, reported substantial early attrition following ART initiation, with loss to follow-up accounting for a considerable proportion of disengagement from care. The authors also noted variability in retention outcomes across participating facilities, suggesting that contextual and programme-level factors may influence patient engagement.

Similarly, Fox and Rosen (2022), in a systematic review and meta-analysis of retention in low- and middle-income countries, observed that attrition remains a persistent challenge across ART programmes. Estimates from several included studies suggested that a sizeable proportion of patients initiating ART were no longer retained in care within two years, with early disengagement frequently documented. The review also highlighted inconsistencies in definitions of loss to follow-up across studies, which may limit comparability of reported retention rates.

A number of empirical studies have examined predictors of attrition using multivariable regression approaches. Bulsara et al. (2021), in a systematic review of observational studies conducted in

Sub-Saharan Africa, identified younger age, male sex and socioeconomic vulnerability as commonly reported predictors of loss to follow-up. Other facility-based cohort studies have suggested that patient-level characteristics may interact with health system or facility-related factors to influence retention outcomes (Brown et al., 2020). Collectively, these findings indicate that attrition is shaped by a combination of individual and contextual determinants.

Empirical investigations of viral load suppression similarly suggest progress alongside persistent gaps. Asamoah et al. (2022), in a cross-sectional study conducted in Ghana, reported that while a majority of patients achieved viral suppression, a proportion remained unsuppressed. Shorter duration on treatment and inconsistent clinic attendance was reported as factors associated with poorer virological outcomes. However, cross-sectional designs do not permit assessment of longitudinal retention patterns that may precede viral suppression.

In Ghana, empirical evidence has largely been derived from retrospective cohort analyses based on routine programme data. Ofori-Asenso et al. (2020) reported that loss to follow-up constituted a major component of attrition among adults receiving ART, particularly during the early years of treatment. Agyeman et al. (2021) further documented regional variation in retention and suppression outcomes, suggesting that facility context and service delivery factors may influence treatment performance. Nonetheless, many such studies have analysed attrition and viral suppression separately rather than within an integrated framework.

Across the literature, several methodological limitations are apparent. First, attrition and viral load suppression are frequently examined as independent outcomes, with limited integration of both within a unified analytical model. Second, variability in definitions of loss to follow-up and differences in follow-up duration reduce comparability across settings. Third, some studies rely primarily on socio-demographic predictors without simultaneously incorporating clinical and

health system or access-related determinants within a single analysis. Fourth, facility-level evidence from peri-urban districts remains comparatively limited, despite the potential influence of contextual and service delivery factors on treatment outcomes.

Taken together, the existing empirical literature underscores the continued challenge of sustaining retention and achieving optimal viral suppression within ART programmes. The present study seeks to address these gaps by evaluating both outcomes within a single analytical framework at Somanya Polyclinic, while examining the combined influence of individual, clinical and health system determinants on treatment outcomes in a peri-urban Ghanaian setting.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter describes the methodology employed in conducting the study. It outlines the research design, study setting, study population, sampling approach, inclusion and exclusion criteria, study variables, data collection procedures, data handling, statistical analysis, and ethical considerations. The methodological choices adopted in this study were informed by the study objectives and the nature of the available data.

3.2 Study Design

The study adopted a quantitative retrospective cohort study design using secondary data obtained from the National AIDS/STI Control Programme (NACP). The design involved reviewing routine programme data of people living with HIV who were enrolled into antiretroviral therapy (ART) care at Somanya Polyclinic over a defined period.

A retrospective cohort design was considered appropriate because it allows for the assessment of treatment outcomes by following patients from the time of ART initiation to the occurrence of specific outcomes, such as loss to follow-up, viral load suppression, or death. This design also permits the examination of associations between baseline characteristics and subsequent outcomes using existing data, making it suitable for analysing routine HIV programme records (Gordis, 2014).

3.3 Study Setting

The study was conducted at Somanya Polyclinic, located in the Yilo Krobo Municipality of the Eastern Region of Ghana. The facility serves as a major referral and treatment centre for HIV care within the municipality and surrounding communities. Somanya Polyclinic provides comprehensive HIV services, including HIV testing and counselling, antiretroviral therapy, viral load monitoring, adherence counselling, and defaulter tracing, in line with national treatment guidelines.

3.4 Study Population

The study population comprised all persons living with HIV aged 10 years and above who were newly initiated on antiretroviral therapy (ART) at Somanya Polyclinic between January 2021 and December 2024. Patients who were already receiving ART prior to January 2021 were not included in the cohort to ensure a uniform baseline for follow-up and time-to-event analysis. Because patients entered the cohort at different points between January 2021 and December 2024, their length of follow-up was not equal: patients enrolled earlier in the study period had a longer observation window than those enrolled closer to December 2024, who were right-censored at the end of the study. The Kaplan–Meier and Cox proportional hazards analyses (Sections 4.2 and 4.7) account for this variation in follow-up time when estimating attrition risk.

3.5 Study Unit

The unit of analysis for the study was an individual person living with HIV who was enrolled into ART care at Somanya Polyclinic within the study period.

3.6 Sampling Technique

A census approach was employed for this study. All eligible patient records that met the inclusion criteria during the study period were included in the analysis. Sampling was therefore not applied, as the study utilised complete routine programme data for the defined cohort.

3.7 Inclusion and Exclusion Criteria

Inclusion criteria

- All HIV-positive patients aged 10 years and above
- Patients newly initiated on ART at Somanya Polyclinic between January 2021 and December 2024

Exclusion criteria

- HIV-positive patients below 10 years of age

3.8 Study Variables

The study variables were categorised into dependent (outcome) and independent (predictor) variables.

Dependent variables

- Attrition status (retained in care or attrition)
- Viral load suppression status (suppressed or not suppressed)

Independent variables

- Age
- Sex
- Marital status
- Educational level
- Occupation

Attrition was defined as a composite outcome including loss to follow-up and death. Viral load suppression was defined as a viral load result of less than 200 copies/ml. Age was categorised into seven bands (0–14, 15–24, 25–34, 35–44, 45–54, 55–64, and 65 years and above) to allow comparison of attrition and viral load suppression across the life course while maintaining adequate cell sizes for analysis. Clinical variables such as baseline CD4 count, ART regimen, and duration on ART, although discussed in the conceptual framework, were not included as independent variables because the E-Tracker database, which was rolled out nationally from 2017, is a relatively recently introduced system and does not yet consistently or completely capture these fields at the facility level; their exclusion is addressed further as a limitation in Section 3.13.

3.9 Data Collection Procedure and Tools

Secondary data was extracted from the Electronic Tracker (E-Tracker) database of the National AIDS/STI Control Programme. Data extraction was conducted using a structured data extraction checklist. The extracted data was exported into Microsoft Excel for cleaning and verification before being transferred to STATA version 18 for statistical analysis.

3.10 Data Handling and Management

Extracted data were checked for completeness, consistency, and accuracy. Data cleaning involved removing duplicates, correcting entry errors, and handling missing values. Cleaned data was stored on password-protected computers accessible only to the researcher. All data handling procedures complied with the data-sharing agreement between the researcher and the National AIDS/STI Control Programme. Missing data were assessed for completeness prior to analysis. Records with missing key outcome variables were excluded as per the exclusion criteria. For independent variables, complete-case analysis was applied in regression models, whereby only observations with complete data on variables included in the respective model were analysed. The extent of missing data was examined to minimise potential bias. Missingness was most notable for viral load results: of the 566 patients in the cohort, only 120 (21.2%) had a documented viral load test result, including 42 of the 162 patients retained in care (25.9% of those retained) who had no viral load result recorded. Because viral load testing could not be verified for patients who had already disengaged from care, the viral load suppression analysis (Section 4.3 onward) was restricted to the 120 patients with documented results, using complete-case analysis; this restriction is discussed further as a limitation in Section 3.13.

Data will be securely stored for a period of five years and subsequently destroyed in accordance with ethical guidelines.

3.11 Statistical Analysis

Data analysis was conducted using STATA version 18. Descriptive statistics were used to summarise participants' socio-demographic and clinical characteristics. These included

frequencies, percentages, means, standard deviations, medians, and interquartile ranges as appropriate.

Attrition Analysis

Attrition was defined as a composite outcome comprising loss to follow-up and death. A binary attrition variable was created, where patients classified as lost to follow-up or dead were coded as having experienced attrition, while those who remained active in care were coded as retained.

The proportion of patients experiencing attrition was estimated. Bivariate analysis using Pearson's chi-square test was conducted to assess associations between attrition status and independent variables. Variables with p-values less than 0.20 at the bivariate level, as well as those identified from existing literature and clinical relevance, were included in a multivariable logistic regression model to identify factors independently associated with attrition. A liberal $p < 0.20$ threshold, rather than the conventional $p < 0.05$, was used for variable selection at this stage because a stricter cut-off risks prematurely excluding variables that are confounders or that become significant only after adjustment for other covariates; this approach is widely recommended in epidemiological model-building (Bursac et al., 2008). Results were reported as crude odds ratios (COR) and adjusted odds ratios (AOR) with 95% confidence intervals, and statistical significance was set at $p < 0.05$.

Viral Load Suppression Analysis

Viral load status was dichotomised as suppressed (<200 copies/ml) or not suppressed (≥ 200 copies/ml). The proportion of patients achieving viral load suppression was determined.

Bivariate analysis using Pearson's chi-square test was conducted to assess associations between viral load suppression and independent variables. Variables with p-values less than 0.20 at the bivariate level, as well as those supported by literature and clinical relevance, were included in a

multivariable logistic regression model to control for potential confounding. Adjusted odds ratios (AOR) with 95% confidence intervals were reported, and statistical significance was set at $p < 0.05$.

3.12 Ethical Considerations

Ethical approval for the study was obtained from the Ethical Review Board of Ensign Global University. Administrative permission was also sought from Somanya Polyclinic, the Yilo Krobo Municipal Health Directorate, and the National AIDS/STI Control Programme prior to data extraction.

To ensure confidentiality, patient identifiers such as names and folder numbers were excluded from the dataset. All electronic data were stored on password-protected devices accessible only to the researcher. The study complied with national and institutional ethical guidelines for the use of secondary health data.

3.13 Limitation of the Study

This study has several limitations that should be considered when interpreting the findings. First, the study relied on secondary data extracted from the Electronic Tracker (E-Tracker) database, which limited the analysis to variables routinely captured within the system. Important variables such as place of residence were not included in the dataset retrieved, restricting the ability to examine its influence on attrition and viral load suppression.

Second, the use of routine programme data may be subject to data quality issues, including incomplete records, missing values, and potential errors in data entry. In particular, a relatively

small proportion of patients had documented viral load test results, which may affect the generalisability of findings related to viral load suppression.

Third, the study was conducted in a single health facility (Somanya Polyclinic), which may limit the external validity of the findings and their applicability to other settings with different patient populations or health system characteristics.

Finally, attrition was defined as a composite outcome of loss to follow-up and death. However, some patients classified as lost to follow-up may have transferred to other facilities without documentation, potentially leading to misclassification and overestimation of attrition.

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-Demographic Characteristics

The socio-demographic profile of respondents indicates notable variations across sex, marital status, education, and occupation.

The age distribution of respondents indicates that the majority were aged 65 years and above (65.55%). Participants aged 35–44 years constituted 11.48% of the sample, while those aged 25–34 years accounted for 7.24%. Younger age groups were minimally represented, with individuals aged 15–24 years and 0–14 years comprising 1.41% and 0.53% respectively. Females constituted the majority of the study population, accounting for 72.61%, while males represented 27.39%. With respect to marital status, the largest proportion of respondents were married or cohabiting (42.68%), followed by single individuals (35.37%), and those previously married (21.75%).

In terms of educational attainment, more than half of the respondents had secondary education (51.65%), while 27.69% had primary education and 17.80% had no formal education. Only a small proportion (2.86%) had attained tertiary education.

Regarding occupation, the majority of respondents were either employed (40.64%) or engaged in trading/business activities (34.81%), indicating that most participants were economically active. However, 7.42% were unemployed, and smaller proportions were students (1.24%) and retired (0.35%).

Table 4.1 Socio-Demographic Characteristics

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	10–14	3	0.53

(n=566)	15–24	8	1.41
	25–34	41	7.24
	35–44	65	11.48
	45–54	43	7.60
	55–64	35	6.18
	65+	371	65.55
Sex (n=566)	Male	155	27.39
	Female	411	72.61
Marital Status	Single	265	35.37
(n=566)	Married/Cohabiting	102	42.68
	Previously Married	199	21.75
Education	None	109	17.80
(n=566)	Primary	154	27.69
	Secondary	263	51.65
	Tertiary	40	2.86
Occupation	Employed	515	90.99
(n=566)	Unemployed	51	9.01

4.2 Percentage of Patients Who Experienced Attrition Study Period

The results indicate a high level of attrition among patients receiving antiretroviral therapy at the study facility. Out of the total respondents, 71.38% experienced attrition, while only 28.62% were retained in care during the study period.

To further examine attrition over time, a survival analysis was conducted using the Cox proportional hazards model. This approach accounts for differences in follow-up time among patients and provides estimates of the risk of attrition over time.

Table 4.2 Attrition Status of Respondents

Attrition Status	Frequency (n)	Percentage (%)
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Retained in care	162	28.62
Attrition	404	71.38
Total	566	100.00

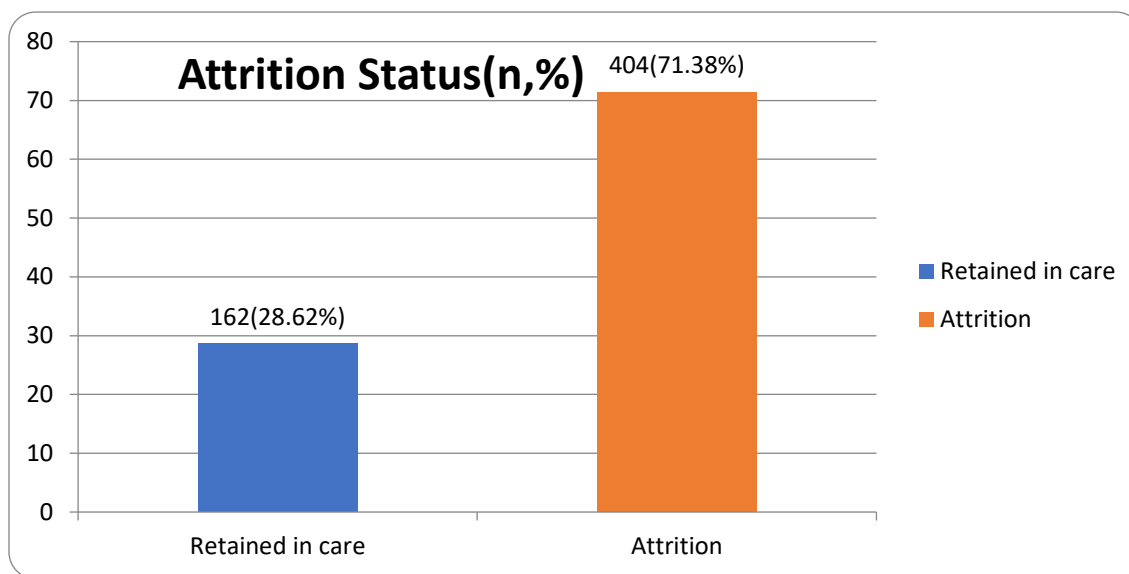


Figure 4.1 Attrition Status (%)

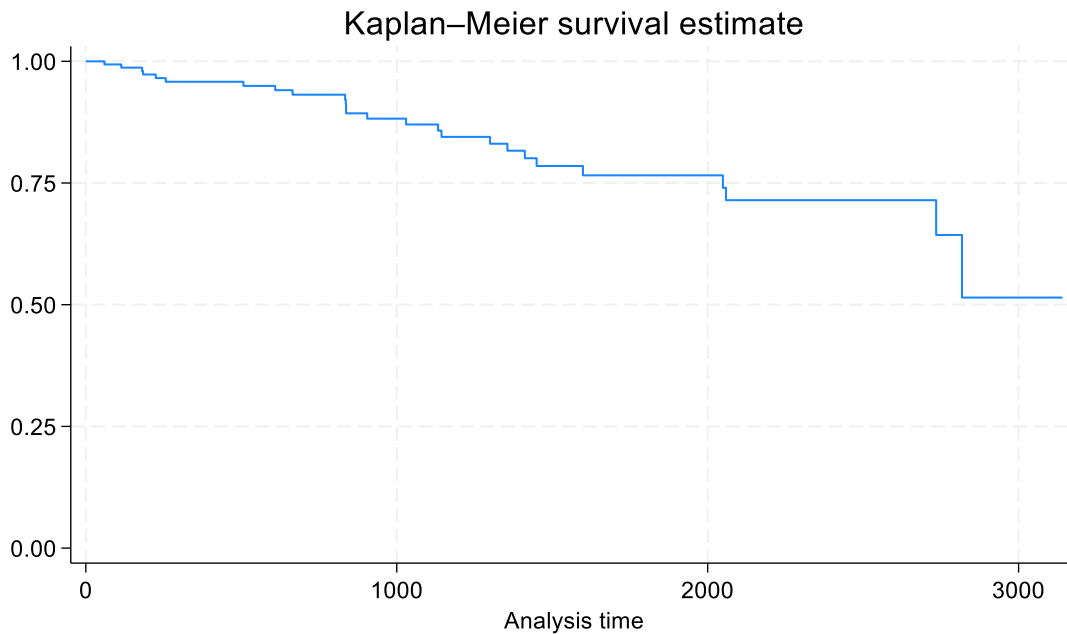


Figure 4.2 Kaplan–Meier Survival Curve Showing Time to Attrition Among Patients Receiving Antiretroviral Therapy

The Kaplan–Meier survival curve illustrates the probability of patients remaining in care over the follow-up period. At the beginning of the study, all patients were retained in care (survival probability = 1.0). However, the probability of retention declined progressively over time, indicating ongoing attrition among patients receiving antiretroviral therapy.

The curve shows a gradual decrease in survival probability, suggesting that attrition occurred continuously rather than at a single point in time. By the end of the follow-up period, approximately half of the patients remained in care, reflecting a substantial level of attrition. The steady downward trend highlights persistent disengagement from care throughout the treatment period.

4.3 Percentage of Patients Who Attain Viral Load Suppression

Viral load suppression was assessed among patients who had available viral load test results.

The findings show that 73.33% of patients achieved viral load suppression, while 26.67% were not suppressed.

Table 4.3 Percentage of Patients Who Attain Viral Load Suppression

Viral Load Status	Frequency (n)	Percentage (%)
Not Suppressed	32	26.67
Suppressed	88	73.33
Total	120	100.00

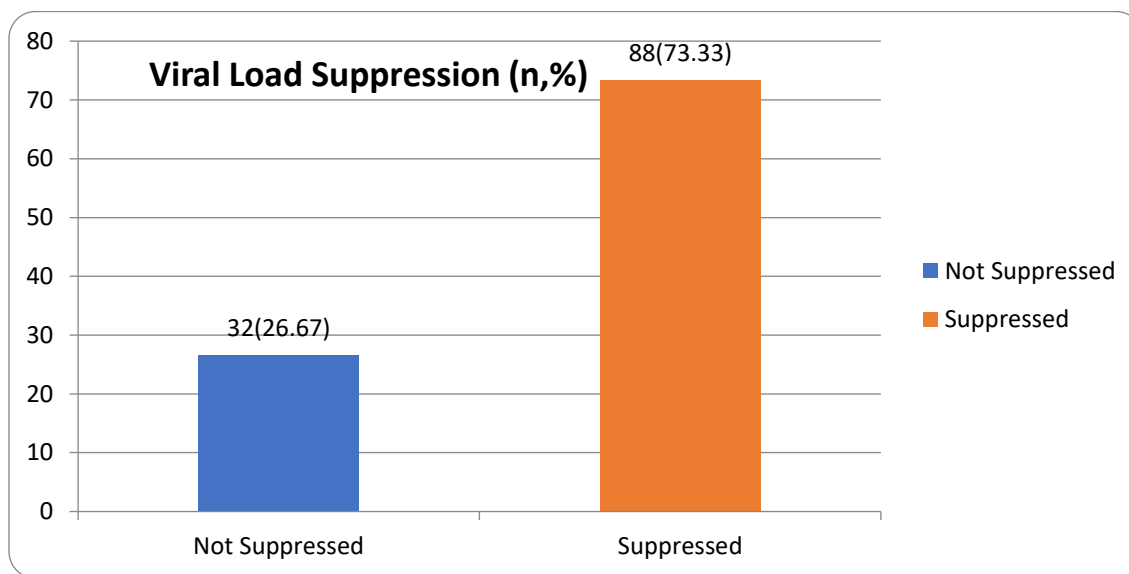


Figure 4.3 Viral Load Suppression (%)

4.4 Factors Associated with Attrition and Viral Load Non-Suppression Among Patients Receiving ART

The chi-square analysis revealed a statistically significant association between age group and attrition among patients receiving antiretroviral therapy ($\chi^2 = 27.026$, $p < 0.001$). Occupation was also significantly associated with attrition ($\chi^2 = 7.50$, $p = 0.005$). In contrast, sex ($p = 0.622$), marital status ($p = 0.765$), and educational level ($p = 0.821$) were not significantly associated with attrition.

Table 4.4 Factors Associated with Attrition and Viral Load Non-Suppression Among Patients Receiving ART

Variables	Attrition n (%)	Retained in Care n (%)	Chi-square (χ^2)	P-value
Age Group			27.026	0.000*
0–14	3 (100.00)	0 (0.00)		
15–24	6 (75.00)	2 (25.00)		
25–34	24 (58.54)	17 (41.46)		
35–44	34 (52.31)	31 (47.69)		
45–54	29 (67.44)	14 (32.56)		
55–64	20 (57.14)	15 (42.86)		
65+	288 (77.63)	83 (22.37)		
Sex			0.243	0.622
Male	113 (27.97)	42 (25.93)		
Female	291 (72.03)	120 (74.07)		
Marital Status			1.150	0.765
Single	120 (34.38)	54 (37.76)		
Married/Cohabiting	153 (43.84)	57 (39.86)		
Previously Married	75 (21.49)	32 (22.38)		
Missing	1 (0.29)	0 (0.00)		
Education			0.917	0.821
None	60 (18.07)	21 (17.07)		
Primary	92 (27.71)	34 (27.64)		
Secondary	172 (51.81)	63 (51.22)		
Tertiary	8 (2.41)	5 (4.07)		
Occupation				
Unemployed	45 (88.24)	6 (11.76)	7.80	0.005*
Employed	359 (69.71)	156 (30.29)		

4.5 Factors Associated with Viral Load Non-Suppression Among Patients Receiving ART

The chi-square analysis showed that sex ($\chi^2 = 4.983$, $p = 0.026$) and age group ($\chi^2 = 27.026$, $p = 0.00$) were the only variables significantly associated with viral load suppression ($\chi^2 = 4.983$, $p = 0.026$).

In contrast, marital status ($p = 0.064$), educational level ($p = 0.399$), and occupation ($p = 0.478$) were not significantly associated with viral load suppression. Although marital status was close association, it did not reach statistical significance.

Table 4.5 Factors Associated Viral Load Non-Suppression Among Patients Receiving ART

Variables	Suppressed n (%)	Not Suppressed n (%)	Chi- square (χ^2)	P-value
Age Group			26.738	0.000
0–14	3 (100.00)	0 (0.00)		
15–24	6 (75.00)	2 (25.00)		
25–34	36 (87.80)	5 (12.20)		
35–44	61 (93.85)	4 (6.15)		
45–54	38 (88.37)	5 (11.63)		
55–64	29 (82.86)	6 (17.14)		
65+	361 (97.30)	10 (2.70)		
Sex			4.983	0.026
Male	18 (20.45)	13 (40.62)		
Female	70 (79.55)	19 (59.38)		
Marital Status			7.262	0.064
Single	26 (31.71)	14 (51.85)		
Married/Cohabiting	38 (46.34)	5 (18.52)		
Previously Married	17 (20.73)	8 (29.63)		
Missing	1 (1.22)	0 (0.00)		
Education			2.953	0.399
None	14 (18.42)	8 (29.63)		
Primary	19 (25.00)	5 (18.52)		
Secondary	39 (51.32)	14 (51.85)		
Tertiary	4 (5.26)	0 (0.00)		
Occupation			0.5037	0.478
Unemployed	47 (92.16)	4 (7.84)	—	—

Employed	487 (94.56)	28 (5.44)		
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4.6 Logistic Regression of Factors Associated with Attrition Among Patients

Receiving ART

Multivariate logistic regression analysis was conducted to identify independent predictors of attrition among patients receiving antiretroviral therapy. After adjusting for potential confounders, age group and occupation were significantly associated with attrition.

Compared to patients aged 65 years and above, those aged 25–34 years (AOR = 0.28; 95% CI: 0.12–0.65; $p = 0.003$), 35–44 years (AOR = 0.26; 95% CI: 0.13–0.49; $p < 0.001$), 45–54 years (AOR = 0.35; 95% CI: 0.16–0.78; $p = 0.009$), and 55–64 years (AOR = 0.29; 95% CI: 0.12–0.70; $p = 0.006$) had significantly lower odds of attrition, indicating that older patients (65+) were more likely to experience attrition.

With respect to occupation, employed individuals were significantly less likely to experience attrition compared to unemployed individuals (AOR = 0.29; 95% CI: 0.11–0.79; $p = 0.015$), suggesting a protective effect of employment.

In contrast, sex, educational level, and marital status were not significantly associated with attrition in the adjusted model.

Table 4.6 Logistic Regression of Factors Associated with Attrition Among Patients Receiving ART

Variable	Category	COR (95% CI)	COR p- value	AOR (95% CI)	AOR p- value
Age Group	65+ (Ref)	—	—	—	—
	10-14	2.54 (0.43– 7.82)	0.268	0.48 (0.30– 7.64)	0.843
	15–24	1.04 (0.11– 9.99)	0.975	0.93 (0.10– 8.84)	0.948
	25–34	0.27 (0.12– 0.65)	0.003	0.28 (0.12– 0.65)	0.003
	35–44	0.23 (0.12– 0.44)	0.000	0.26 (0.13– 0.49)	0.000
	45–54	0.37 (0.17– 0.81)	0.013	0.35 (0.16– 0.78)	0.009
	55–64	0.28 (0.11– 0.68)	0.005	0.29 (0.12– 0.70)	0.006
Sex	Reference: Female				
	Male	1.11 (0.73– 1.68)	0.622	1.54 (0.89– 2.68)	0.124
Education	Reference: None				
	Primary	0.95 (0.50– 1.78)	0.866	1.04 (0.53– 2.03)	0.903
	Secondary	0.96 (0.54– 1.70)	0.877	1.00 (0.52– 1.91)	0.999
	Tertiary	0.56 (0.16– 1.90)	0.353	0.98 (0.21– 4.63)	0.977
Marital Status	Reference: Married/Cohabiting				
	Previously Married	0.87 (0.52– 1.46)	0.605	0.77 (0.43– 1.40)	0.391

	Single	0.83 (0.53– 1.29)	0.403	0.76 (0.46– 1.26)	0.281
Occupation	Unemployed (Ref)	—	—	—	—
	Employed	0.31 (0.13– 0.73)	0.008	0.29 (0.11– 0.79)	0.015

4.7 Cox Proportional Hazards Regression of Factors Associated with Attrition

A Cox proportional hazards regression analysis was conducted to assess factors associated with time to attrition among patients receiving antiretroviral therapy.

Age group was significantly associated with time to attrition (HR = 1.45; 95% CI: 1.05–1.99; $p = 0.025$). This indicates that with increasing age category, the hazard of attrition increased by approximately 45%, suggesting that older patients were more likely to experience attrition over time.

Occupation was also a significant predictor of attrition (HR = 0.69; 95% CI: 0.51–0.92; $p = 0.010$). Patients who were employed had a 31% lower hazard of attrition compared to unemployed individuals, indicating a protective effect of employment on retention in care.

In contrast, sex (HR = 0.64; 95% CI: 0.21–1.91; $p = 0.421$) and marital status (HR = 0.97; 95% CI: 0.69–1.35; $p = 0.844$) were not significantly associated with time to attrition.

Table 4.7 Cox Proportional Hazards Regression of Factors Associated with Attrition

Variable	Hazard Ratio (HR)	95% CI	p-value
Age group	1.45	1.05 – 1.99	0.025
Sex	0.64	0.21 – 1.91	0.421
Marital status	0.97	0.69 – 1.35	0.844
Occupation	0.69	0.51 – 0.92	0.010

4.8 Logistic Regression Analysis of Factors Associated with Viral Non-Suppression

Multivariate logistic regression analysis was conducted to identify factors associated with viral non-suppression among patients receiving antiretroviral therapy. After adjusting for potential confounders, age group, sex, and marital status were significantly associated with viral non-suppression, while education and occupation were not statistically significant.

With respect to age, compared to the reference group (65 years and above), patients aged 25–34 years (AOR = 8.84; 95% CI: 2.16–36.19; $p = 0.002$), 45–54 years (AOR = 4.85; 95% CI: 1.21–19.49; $p = 0.026$), and 55–64 years (AOR = 13.23; 95% CI: 3.45–50.84; $p < 0.001$) had significantly higher odds of viral non-suppression. The 35–44 age group was not statistically significant ($p = 0.079$), although it showed increased odds.

Regarding sex, males were significantly more likely to experience viral non-suppression compared to females (AOR = 4.72; 95% CI: 1.81–12.30; $p = 0.001$).

In relation to marital status, both previously married and single individuals had significantly higher odds of viral non-suppression compared to those who were married or cohabiting. Previously married participants had nearly four times higher odds (AOR = 3.98; 95% CI: 1.10–14.35; $p = 0.035$), while single participants had almost five times higher odds (AOR = 4.85; 95% CI: 1.47–15.98; $p = 0.009$).

Although occupation showed a protective direction, with employed individuals having lower odds of viral non-suppression compared to unemployed individuals (AOR = 0.45; 95% CI: 0.13–1.52), this association was not statistically significant ($p = 0.196$).

Similarly, education level was not significantly associated with viral non-suppression in the adjusted model.

Table 4.8 Logistic Regression Analysis of Factors Associated with Viral Non-Suppression

Variable	Category	COR (95% CI)	COR p- value	AOR (95% CI)	AOR p- value
Age Group	Ref (10-14)	—	—	—	—
	25–34	2.00 (0.26– 15.62)	0.509	8.84 (2.16– 36.19)	0.002
	35–44	5.00 (0.63– 39.67)	0.128	3.27 (0.87– 12.30)	0.079
	45–54	2.27 (0.29– 17.58)	0.434	4.85 (1.21– 19.49)	0.026
	55–64	0.78 (0.10– 6.32)	0.814	13.23 (3.45– 50.84)	0.000
	65+	1.07 (0.15– 7.54)	0.948	—	—
Sex	Reference: Female				
	Male	1.89 (0.91– 3.92)	0.088	4.72 (1.81– 12.30)	0.001*
Education	Reference: Tertiary				
	Primary	0.38 (0.12– 1.20)	0.098	0.32 (0.09– 1.10)	0.070
	Secondary	0.58 (0.23– 1.43)	0.237	0.47 (0.16– 1.43)	0.184
Marital Status	Reference: Married/Cohabiting				

	Previously Married	3.31 (1.06– 10.39)	0.040*	3.98 (1.10– 14.35)	0.035*
	Single	3.59 (1.27– 10.17)	0.016*	4.85 (1.47– 15.98)	0.009*
Occupation	Unemployed (Ref)	—	—	—	—
	Employed	0.68 (0.23– 2.01)	0.480	0.45 (0.13– 1.52)	0.196

CHAPTER FIVE

5.0 DISCUSSION

5.1 Percentage of Patients Who Experienced Attrition During the Study Period

The study found that a high proportion of patients (71.38%) experienced attrition during the study period, with only 28.62% remaining retained in care. This level of attrition is considerably high and suggests substantial disengagement from HIV care among patients receiving antiretroviral therapy at the facility. Several factors may explain this pattern. First, the early period following ART initiation is often characterised by unstable engagement, as patients adjust to lifelong treatment. Challenges such as treatment fatigue, side effects, and inadequate counselling may contribute to missed appointments and eventual loss to follow-up. In addition, the socio-economic context of the study population may have played a role. Given that a large proportion of participants were employed (91%), job demands may have limited their ability to attend regular clinic visits.

The findings of this study are consistent with existing evidence that highlights attrition as a major challenge in HIV treatment programmes across sub-Saharan Africa. For instance, Andreas D. Haas et al. (2018) reported attrition levels of approximately 40–50% over a five-year period among patients receiving ART. Similarly, Matthew P. Fox and Sydney Rosen (2015) found that between 20% and 40% of patients in low- and middle-income countries disengage from care within the first two years of treatment initiation. In this study, an attrition rate of 71.38% was recorded, suggesting substantially greater challenges in sustaining long-term engagement in care at the study site. This comparatively higher attrition may reflect contextual factors such as socioeconomic vulnerability,

inconsistent clinic attendance, gaps in defaulter tracing systems, and potential data limitations including undocumented patient transfers.

Furthermore, evidence from recent systematic reviews suggests that programme design plays an important role in influencing retention outcomes. Bwire et al. (2023) found that differentiated service delivery models, including decentralised care and multi-month dispensing of antiretroviral drugs, are associated with improved retention and reduced attrition. The high attrition observed in this study may indicate gaps in the availability or effectiveness of such patient-centred approaches at the facility. In addition, adherence-related challenges may contribute to disengagement from care. A systematic review conducted in Ghana by Boadu et al. (2023) reported that suboptimal adherence is a concern among people living with HIV, and this may ultimately lead to missed visits and loss to follow-up.

Within the framework of the HIV care continuum, retention in care is a critical stage linking treatment initiation to viral load suppression. The high level of attrition observed in this study suggests a major disruption along this continuum, limiting the ability of patients to achieve sustained viral suppression. Patients who disengage from care are more likely to experience treatment interruption, which increases the risk of virological failure and poor clinical outcomes.

The findings generally indicate that attrition remains a significant barrier to effective HIV treatment at the study facility. Addressing this challenge will require targeted interventions that strengthen retention strategies, including improved patient follow-up systems, expansion of differentiated service delivery models, and interventions that address socio-economic barriers to care.

5.2 Percentage of Patients Who Attain Viral Load Suppression

The study found that 73.33% of patients achieved viral load suppression, while 26.67% remained unsuppressed among those with available viral load results. This level of suppression suggests a moderate treatment success, indicating that although a majority of patients on ART are benefiting from therapy, a substantial proportion are not achieving optimal virological outcomes. From a clinical and public health perspective, this gap is important because viral suppression is the ultimate goal of HIV treatment and a key indicator of programme effectiveness.

In this study context, adherence may be influenced by socio-economic realities such as busy work schedules, mobility, and competing livelihood demands, especially among traders and informal workers. In addition, challenges such as drug side effects, stigma, and limited social support may negatively affect adherence and, consequently, viral load outcomes.

The level of viral load suppression observed in this study is broadly consistent with findings from similar settings in sub-Saharan Africa, although it remains below global targets. For instance, Kyere et al. (2024) reported an overall viral suppression rate of approximately 78.6% over a five-year period in Ghana, with notable fluctuations across years, including a decline to 40.0% in 2020 and subsequent recovery to 82.7% in 2021, before stabilising around 66–68% in later years. Similarly, other studies in Ghana have reported viral suppression levels ranging between approximately 64.9% and 76.4%, depending on the facility and population studied.. Evidence from broader sub-Saharan Africa indicates that while many ART programmes achieve moderate levels of suppression, they often fall short of the UNAIDS target of 95% viral suppression among patients on treatment. This suggests

that the 73.33% observed in this study reflects ongoing challenges in achieving optimal treatment outcomes.

Comparatively, studies examining determinants of viral suppression highlight the importance of both individual and programme-level factors. Boadu et al. (2023), in a systematic review of ART adherence in Ghana, found that suboptimal adherence remains a key barrier to achieving viral suppression. This aligns with the findings of the present study, where a notable proportion of patients remained unsuppressed, likely reflecting underlying adherence challenges. In addition, Ondo et al. (2020) emphasized that access to viral load monitoring and timely switching to second-line therapy are essential for achieving and sustaining suppression. In settings where monitoring systems are weak or delayed, patients with high viral loads may remain on failing regimens for prolonged periods, thereby reducing overall suppression rates.

Further evidence suggests that programme design can significantly influence viral suppression outcomes. Bwire et al. (2023) demonstrated that differentiated service delivery models, which make care more accessible and patient-centred, are associated with improved adherence and higher rates of viral suppression. The moderate level of suppression observed in this study may therefore indicate opportunities to strengthen service delivery approaches, particularly for patients who face barriers to regular clinic attendance.

Within the HIV care continuum, viral load suppression represents the final stage and ultimate goal of treatment. Achieving suppression depends heavily on successful progression through earlier stages, particularly retention in care and sustained adherence. The relatively moderate suppression rate observed in this study, when considered alongside the high attrition rate, suggests that gaps in retention may be undermining virological outcomes. Patients who

disengage from care are less likely to maintain consistent treatment, thereby reducing the likelihood of achieving suppression. Patients who disengage from care are less likely to maintain consistent treatment, thereby reducing the likelihood of achieving viral load suppression. However, this relationship should be interpreted with caution due to limitations in the variables used in this study. Specifically, attrition was measured as a composite outcome of loss to follow-up and death, and it was not possible to distinguish between patients who were truly disengaged from care and those who may have transferred to other facilities without documentation. In addition, viral load data were only available for a subset of patients, which may introduce selection bias and limit the generalisability of the findings.

5.3 Factors Associated with Attrition and Viral Load Non-Suppression Among Patients

Receiving ART

The study found that occupation was the only socio-demographic factor significantly associated with attrition, with higher proportions observed among traders/business individuals and employed participants, and relatively higher attrition also seen among the unemployed. This suggests that economic activity and livelihood demand play a central role in shaping retention in care. A plausible explanation is that traders and business persons often travel between markets or maintain irregular, income-dependent schedules that conflict with fixed clinic appointment times, making consistent attendance difficult. Unemployed individuals, on the other hand, are more likely to face transport costs and food insecurity that directly compete with the ability to prioritise clinic visits, and may also experience greater psychosocial stress and stigma linked to their economic circumstances, all of which can weaken sustained engagement in care.

These findings are consistent with broader evidence that highlights the role of socio-economic factors in influencing retention in HIV care. Studies in sub-Saharan Africa have shown that indirect

costs, mobility, and competing livelihood demands are key drivers of loss to follow-up, particularly among economically active populations. For instance, Fox and Rosen (2015) emphasised that structural and economic barriers significantly affect long-term retention in ART programmes. Similarly, Kerschberger et al. (2022) reported that retention outcomes vary across patient groups and are influenced by contextual and programme-level factors, including accessibility of services and patient livelihoods. Evidence from systematic reviews, such as Bwire et al. (2023), further suggests that interventions which reduce the burden of frequent clinic visits are associated with improved retention, reinforcing the idea that occupation-related constraints may be mitigated through more flexible care models.

Beyond the cross-sectional associations, the Cox proportional hazards regression analysis further demonstrated that occupation remained a significant predictor of time to attrition. Employed individuals had a significantly lower hazard of attrition compared to unemployed individuals, indicating that employment serves as a protective factor not only in terms of likelihood of attrition but also in delaying the timing of disengagement from care. This finding highlights the dynamic nature of attrition and suggests that economically vulnerable individuals may be at risk of earlier disengagement from treatment services.

The Kaplan–Meier survival analysis supports this observation by showing a steady decline in retention over time, indicating that attrition occurred progressively throughout the follow-up period rather than being concentrated at a specific point. This pattern underscores the persistent nature of disengagement from care and emphasises the need for sustained retention interventions across the entire treatment period.

Interestingly, sex, marital status, and educational level were not significantly associated with attrition in this study. This contrasts with some existing literature which often reports higher

attrition among males and younger individuals. For example, large cohort analyses such as Haas et al. (2018) have documented gender disparities in retention, with men typically showing poorer engagement in care. The absence of such associations in the present study may suggest that context-specific factors, particularly economic conditions, exert a stronger influence on retention than traditional socio-demographic variables within this setting.

With respect to viral load suppression, the study found that sex was the only factor significantly associated with the outcome, with females more likely to achieve viral load suppression compared to males. Women are often more engaged with health services due to routine contact through reproductive and maternal health programmes, which may facilitate earlier diagnosis, better adherence counselling, and sustained follow-up. In contrast, men may delay care-seeking, have poorer adherence, and experience greater stigma-related barriers, all of which can negatively affect treatment outcomes.

This pattern aligns with findings from other studies in sub-Saharan Africa, where male patients have been shown to have lower rates of viral suppression compared to females. For instance, Mukuku et al. (2023) highlighted disparities in viral suppression across different population groups. In addition, behavioural factors such as self-management and treatment engagement have been shown to influence suppression, as noted by Spence et al. (2021), further supporting the observed gender differences.

In contrast, marital status, education, and occupation were not significantly associated with viral load suppression, although marital status showed a borderline association. The lack of strong associations for these variables may suggest that viral suppression is more directly influenced by behavioural and clinical factors, particularly adherence, rather than socio-demographic characteristics alone. This is consistent with evidence from Boadu et al. (2023), which emphasises

adherence as the most critical determinant of viral suppression among people living with HIV in Ghana. It is therefore possible that the effects of education or occupation on viral suppression operate indirectly through adherence pathways, which were not directly measured in this study.

At the bivariate level, sex was significantly associated with viral load suppression, consistent with findings from other studies in sub-Saharan Africa where male patients have shown lower rates of viral suppression compared to females (Mukuku et al., 2023; Spence et al., 2021). However, after adjusting for other covariates in the multivariable model, marital status emerged as the significant independent predictor of viral load non-suppression, while sex, education, and occupation were not. Specifically, previously married and single individuals had higher odds of non-suppression than married or cohabiting individuals. This pattern may reflect weaker social and treatment-supervision support outside stable partnerships: married or cohabiting patients often benefit from a partner who reminds them of clinic appointments and medication schedules, provides household stability, and shares disclosure-related stress, whereas previously married and single individuals may lack this consistent support and may also be adjusting to renewed stigma or disclosure concerns following separation, divorce, or bereavement, all of which can undermine adherence and, consequently, viral suppression. This is consistent with evidence from Boadu et al. (2023), which emphasises adherence as the most critical determinant of viral suppression among people living with HIV in Ghana.

From the perspective of the HIV care continuum, these findings highlight distinct but interconnected pathways influencing treatment outcomes. Occupation appears to affect the retention stage of the continuum, determining whether patients remain engaged in care, while sex influences the final stage of viral suppression, likely through adherence-related mechanisms.

Together, these results underscore the importance of addressing both structural barriers to retention and behavioural factors affecting adherence in order to optimise treatment outcomes.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study assessed attrition and viral load suppression among patients receiving antiretroviral therapy (ART) at Somanya Polyclinic within the HIV care continuum framework. The study found a high level of attrition (71.38%), indicating that a substantial proportion of patients disengaged from care during the study period. In terms of treatment outcomes, 73.33% of patients achieved viral load suppression, indicating a moderate level of treatment success. While this suggests that ART is effective among those who remain in care, the proportion of patients who are not suppressed remains considerable and highlights ongoing challenges related to adherence, monitoring, and continuity of care.

The study further identified key determinants of attrition and viral non-suppression. Occupation emerged as the only significant predictor of attrition, with traders, business individuals, and unemployed patients being more likely to disengage from care. In contrast, sex, marital status, and occupation were significantly associated with viral non-suppression.

The findings of this study confirm that retention in care is the main challenge within the HIV care continuum at the facility. With a high attrition rate of 71.38% , many patients do not remain in care long enough to achieve viral suppression, limiting overall programme effectiveness. The significant role of factors such as occupation and marital status further suggests that both economic constraints and social support influence continuity of care. Therefore, improving retention by addressing these structural and behavioural factors is essential for enhancing treatment outcomes.

6.2 Recommendations

1. The Somanya Polyclinic ART clinic should strengthen defaulter tracing systems. This should include timely phone calls, appointment reminders, and follow-up through community health workers to re-engage patients promptly.
2. Healthcare providers at the ART clinic should implement targeted adherence counselling and follow-up for male patients, who were found to be less likely to achieve viral load suppression. This should include tailored counselling, adherence monitoring, and support mechanisms to improve treatment outcomes among men.
3. The National AIDS/STI Control Programme (NACP), together with the Municipal Health Directorate, should strengthen continuous retention and monitoring systems across the treatment period, including improved viral load testing coverage and documentation. This is necessary given the observed progressive attrition over time and gaps in viral load data.

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