

**ENSIGN GLOBAL UNIVERSITY, KPONG**

**DEPARTMENT OF COMMUNITY HEALTH**

**HEALTH LITERACY AND ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG  
PERSONS LIVING WITH HIV RECEIVING CARE AT TEMA GENERAL HOSPITAL**

**BY**

**NAA AMERLEY ANUWA-AMARH**

**247100277**

**A Thesis to the Department of Community Health in the Faculty of Public Health in Partial  
fulfilment of the Requirement for the Degree**

**MASTER OF PUBLIC HEALTH**

**APRIL 2025**

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## DECLARATION

I solemnly affirm that, this research project is a product of my independent work, except where references to the contributions of others have appropriately acknowledged. This research project submitted to the Ensign Global College, is the result of my investigation and has not been presented elsewhere for the reward of a degree.

Naa Amerley Anuwa-Amarh

(247100277)

(Student)



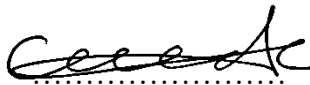
Signature

April 30, 2025

Date

Dr. Nuworza Kugbey

(Supervisor)



Signature

April 30, 2025

Date

Certified by:

Dr. Stephen Manortey

(Head of Academics)

.....

Signature

.....

Date

## **DEDICATION**

I commit this thesis to my beloved husband, Moses Mante-Anti and my ever-supportive parents Dr. and Mrs. Anuwa-Amarh and family.

## **ACKNOWLEDGEMENT**

The accomplishment of this thesis is a result of the support and guidance of countless individuals. My utmost gratitude goes to the Supreme God for His grace, strength, and guidance throughout the period.

With deep appreciation, I would like to acknowledge my supervisor, Dr. Nuworza Kugbey, and academic advisor, Dr. Stephen Manortey, for their devotion, direction, and support towards the realization of this work. It has been a great honour having to work with them.

I owe a great debt of gratitude to Ruth Panford, Nii Afotey Odai, Gifty Osae, Eben, and the entire team of Tema General Hospital's ART clinic for their guidance and deep support.

To my work colleagues Mershack, Daniel, Barbara, Anthony and my supervisor Dr. Lawrence Solgo, I am eternally in your debt for your immense support and advice.

To my friend Martina, all my course mates and staff of Ensign Global University, I acknowledge your support, input, and advice.

I cannot thank my husband, Moses Mante-Anti enough for his enormous support, encouragement, and provision in ensuring that I attain this feat.

May the Almighty God bless you all abundantly.

## **DEFINITION OF TERMS**

|                         |                                                                                                                                                                                                                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HIV                     | HIV is a virus that attacks the body's immune system, specifically a type of white blood cell called CD4, resulting in a diverse range of symptoms such as weight loss, fever, sore throat, etc.                                                                                                |
| ART                     | Also known as Antiretroviral Therapy. It is the primary lifelong treatment for HIV infection among PLWH.                                                                                                                                                                                        |
| MEDICATION<br>ADHERENCE | Medication adherence refers to the extent to which an individual's medication-taking habit aligns with the healthcare provider's recommendations, encompassing multiple dimensions including dosage regime, timing, frequency, and duration of prescribed treatments.                           |
| HEALTH<br>LITERACY      | The personal characteristics and social resources needed for individuals and communities to access, understand, appraise, and use information and services to make decisions about health. Health literacy includes the capacity to communicate, assert and enact healthcare-related decisions. |

## **LIST OF ABBREVIATIONS**

|           |                                                        |
|-----------|--------------------------------------------------------|
| ART       | Antiretroviral Therapy                                 |
| cART      | Combined Antiretroviral Therapy                        |
| CDC       | Centers for Disease Control and Prevention             |
| FDC       | Fixed Dose Combination                                 |
| GAC       | Ghana AIDS Commission                                  |
| HAART     | Highly Active Antiretroviral Therapy                   |
| HIV       | Human Immune Virus                                     |
| HIV/AIDS  | Human Immune Virus /Acquired Immunodeficiency Syndrome |
| HLQ       | Health Literacy Questionnaire                          |
| HLS-EU-47 | 47-item European Health Literacy Survey                |
| MMAS- 8   | 8-item Morisky Medication Adherence Scale              |
| NACP      | National AIDS Control Program                          |
| NVS       | Newest Vital Signs                                     |
| PLWH      | Persons living with HIV                                |
| REALM     | Rapid Estimate of Adult Literacy in Medicine           |
| TGH       | Tema General Hospital                                  |
| TOFHLA    | Test of Functional Health Literacy in Adults           |

UNAIDS

Joint United Nations Programme on HIV/AIDS

WHO

World Health Organization



## ABSTRACT

**Background:** In 2023, global statistics revealed an alarming 39.9 million individuals living with HIV, estimating that 1.3 million individuals were newly diagnosed. A remedy for addressing this global health threat is Antiretroviral therapy (ART). This is a regimen prescribed for persons living with HIV to help them attain viral suppression as well as to strengthen their immune system to reduce the occurrence of opportunistic disease. There is limited study on how health literacy affects ART adherence rate, especially within Sub-Saharan Africa and Ghana to be precise.

This research evaluated the connection of health literacy with the adherence to antiretroviral therapy among individuals living with HIV/AIDS receiving medical care at Tema General Hospital.

**Methods:** A cross-sectional study design was adopted in this research. A standardized questionnaire was utilized to gather data from the participants on the primary study variables of interest. Both descriptive and inferential statistical methods were applied to analyze the data that was collected.

**Results:** A total of 380 responses were received from the target participants who had given their consent to partake in the study. The participants had an average age of  $44.97 \pm 12.26$  years. The average duration of the study participants on ART was  $6.97 \pm 4.81$  years. The most frequent age group enrolled in the study was 45-54 years. Ninety-six (25.26%) participants scored low on medication adherence. One hundred and eighty-eight (49.48%) of the study participants scored medium on medication adherence, while 99 (25.26%) scored high on medication adherence. Five domains on the HLQ recorded optimum mean scores, suggesting strength in those areas. The remaining four domains recorded moderate mean scores, suggesting areas for improvement.

Elements encompassing age, sex, employment status, educational attainment, and marital status determined health literacy levels, with the greatest influence being educational, and the least being marital status. All but one of the domains of HLQ (social support for health) had strong positive correlation with drug-regimen adherence.

**Conclusion:** Health literacy levels demonstrated significant positive correlation with medication adherence suggesting that health literacy could greatly improve medication adherence levels among PLWH. Therefore, interventions to improve health literacy across board should be considered.

**KEYWORDS:** *Health literacy, Adherence, Antiretroviral therapy, HIV/AIDS, PLWH, Tema General Hospital*

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background Information

In the last two to three decades, HIV/AIDS has been of great concern to public health (Mwakalapuka *et al.*, 2017). HIV/AIDS is the shortened version for Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome. HIV is a virus that targets and declines the potency of the immune system, specifically damaging the CD4<sup>+</sup> cells, a type of white blood cell essential for immune defense. This results in a diverse range of symptoms such as weight loss, fever, sore throat, etc. The most severe form of HIV is AIDS, with CD4<sup>+</sup> count of less than two hundred cells/mm<sup>3</sup> and is characterized by a severely weakened immune system. This exposes infected individuals to opportunistic infections such as Tuberculosis (TB), bacterial infections and some forms of cancer (World Health Organization, 2024).

In 2023, global statistics estimated that approximately 39.9 million individuals were living with HIV, with 1.3 million new infections reported globally. 5.1 million persons had been living with HIV (PLWH) in Western and Central Africa, while 190,000 that was reported were new infections (Joint United Nations Programme on HIV/AIDS, 2024). Epidemiological characterization of HIV/AIDS in Ghana is seen sustained, transitional and broadly disseminated; with approximately 1.7% of the general population living with HIV/AIDS and 334,713 people being affected (Essuman *et al.*, 2024). Though HIV infections contribute to global morbidity and mortality, the introduction of antiretroviral therapy (ART) has drastically reduced these rates, together with improved clinical management of HIV infections (Daar, 2017).

ART, also identified as combination therapy or Highly Active Antiretroviral Therapy (HAART) is the day-to-day utilization of a blend of HIV medication or regimen to treat HIV infections (HIVinfo, 2021). Since the introduction of the first antiretroviral agent in the late 1980's, several studies have demonstrated the positive impacts these retroviral agents have on the clinical progression of HIV, including the reduction in disease progression, increased life expectancy, reduced transmission of HIV and improved wellbeing of PLWH (Abdulai *et al.*, 2022). The intent of antiretroviral therapy (ART) is to attain virologic control (undetectable plasma viral load) as well as to strengthen the immune system to reduce the occurrence to opportunistic diseases (Perez, Chagas and Pinheiro, 2021).

ART is a lifelong commitment and requires an adherence rate of not less than 80%, but desirably  $\geq 95\%$  to achieve the best results. Adherence describes the extent to which a patient follows the instructions for taking prescribed medication as intended by the prescriber. This includes practices such as adherence to dosages, schedules, and dietary instructions (Prah *et al.*, 2018). Prah *et al.* (2018) again reports that non-adherence to prescribed regime would highly likely result in drug resistance and subsequent treatment failure. Common ways used to assess adherence among PLWH include self-reporting, clinical assessment of patients, counting of pills, direct observed therapy (DOT), renewal of prescriptions, monitoring of biological markers, among others.

Several factors have been identified to have significant influence on ART adherence including socio-demographic (Heestermans *et al.*, 2016), social, psychological and health system factors (Mashele, Marincowitz and Marincowitz, 2024). Among the key pillars of health promotion found to be critical in influencing health behaviours and consequences is health literacy. Health literacy describes how an individual acquires, communicates, and manages rudimentary health information to make well-informed health choices (Mgbako *et al.*, 2022). It involves not only understanding

one's condition, but also navigating the interactions between health services, professionals and their patients or users (Silva *et al.*, 2022). This places some level of responsibility on the patient to fully understand health information to their own benefit. Having some degree of health literacy is useful in achieving success along the continuum of care for HIV/AIDS and is crucial for public health.

Miller, (2016), Perez, Chagas and Pinheiro (2021) and Van Leeuwen *et al.*, (2024) in their studies highlighted positive correlation linking health literacy to adherence to medication, resulting in improved health outcomes. Adherence to ART is seen to be better among persons who possess some level of skills, attitude and knowledge on their health (Dzansi, Tornu and Chipps, 2020). Poor health literacy among PLWH is likely to result in difficulty in comprehending medical instructions, compliance with medication, access to healthcare services, insufficient awareness of treatment as well as knowledge deficit of their HIV-related status such as viral loads resulting in diminished self-management of care, provoking over-reliance on care providers (Palumbo, 2015). Poor health literacy is seen as a “silent epidemic” affecting several healthcare systems across the world (Palumbo, 2015) , and undoubtedly the entirety of Ghana's health system is no exception. Therefore, it is indispensable to explore the level of impact health literacy could have on adherence to ART among PLWH receiving care in the Tema General Hospital.

## **1.2 Problem Statement**

The widespread availability of ART has significantly contributed to achieving viral suppression among PLWH. Despite the increased access to ART provided by international agencies, adherence to ART among PLWH attending Tema General Hospital (TGH) is still challenging. Tema Metropolis ranks among the top ten districts in Ghana with some of the highest HIV populations,

with 5,118 infections and ART coverage of 57.8% in 2023. Although ART coverage is projected to reach 73% by 2024 (GAC, 2023), achieving the Agenda 95-95-95 by 2025 seems increasingly unrealistic. These targets set by UNAIDS aim for 95% of PLWH to be aware of their status, 95% of those individuals diagnosed are initiated on ART and 95% of those individuals on ART to achieve viral suppression by 2030 (Boakye and Adjorlolo, 2023). Although general awareness of HIV/AIDS remains high in Ghana (over 98%), only a small proportion of the population demonstrates comprehensive knowledge on HIV i.e. 18% of women and 30% of men (Fenny, Crentsil and Asuman, 2017). As of 2023, Ghana's progress towards meeting the global targets stood at 65-45-40 (GAC, 2023). This demonstrates a persistent gap in HIV literacy which is essential for informed health behaviours among PLWH, including adherence to ART.

Compounding these challenges is the recent suspension of United States (US) aid, which has been widely known to influence several health programs globally- including health promotion, HIV prevention and treatment initiatives. Withdrawal of this funding interrupts with the supply chain for medicines and capacity building for the health workforce, amplifying the issue of poor adherence – a key factor in achieving Agenda 95-95-95.

Low health literacy is interlinked with poor health outcomes for instance soared hospitalizations, poor medication adherence and increased potential to misconstrue health information (Van Leeuwen *et al.*, 2024) and may worsen with reduced funding. Specifically, adequate literacy on HIV/AIDS facilitates the uptake of behaviours that reduce the risk of transmission of HIV, addresses misconceptions and misinformation surrounding HIV as well as inducing the right behavioural changes among PLWH (Fenny, Crentsil and Asuman, 2017). Comprehensive data on the connection between adherence and health literacy in Ghana remains scarce, leaving a knowledge gap. With weakened international support and gaps in knowledge, addressing health

literacy is even more crucial in achieving maximum adherence levels. Without a grasp of how health literacy impacts ART adherence, efforts to achieve the Agenda 95-95-95 may be undermined. It is therefore imperative to grasp the interplay of ART adherence and health literacy levels to facilitate the health outcomes among PLWH.

### **1.3 Rationale of Study**

The success of ART in controlling HIV depends heavily on consistent and right use of prescriptions. Wrong use of ART could result in poor health outcomes. Adherence to ART is likewise influenced by several other factors, with health literacy being a critical determinant. However, in the Tema General Hospital, there is a narrow body of evidence that explores how health literacy impacts adherence to ART. Given that health literacy has been proven to help patients understand their treatment regime and make informed health decisions without being overly reliant on health workers, it is exigent to explore how diverse levels of health literacy impacts adherence to ART for persons visiting Tema General Hospital.

The outcome from this study could be useful in addressing the knowledge gap about how health literacy influences adherence to ART, especially within Tema, Ghana. Evidence-based findings would be useful in providing recommendations for improving adherence through targeted interventions. Policy stakeholders could tailor educational materials for health workers, as well as PLWH to help enhance the understanding of these patients of their treatments, thereby improving their adherence. They could also use findings from the study to design or change existing intervention strategies for PLWH.

## **1.4 Conceptual framework**

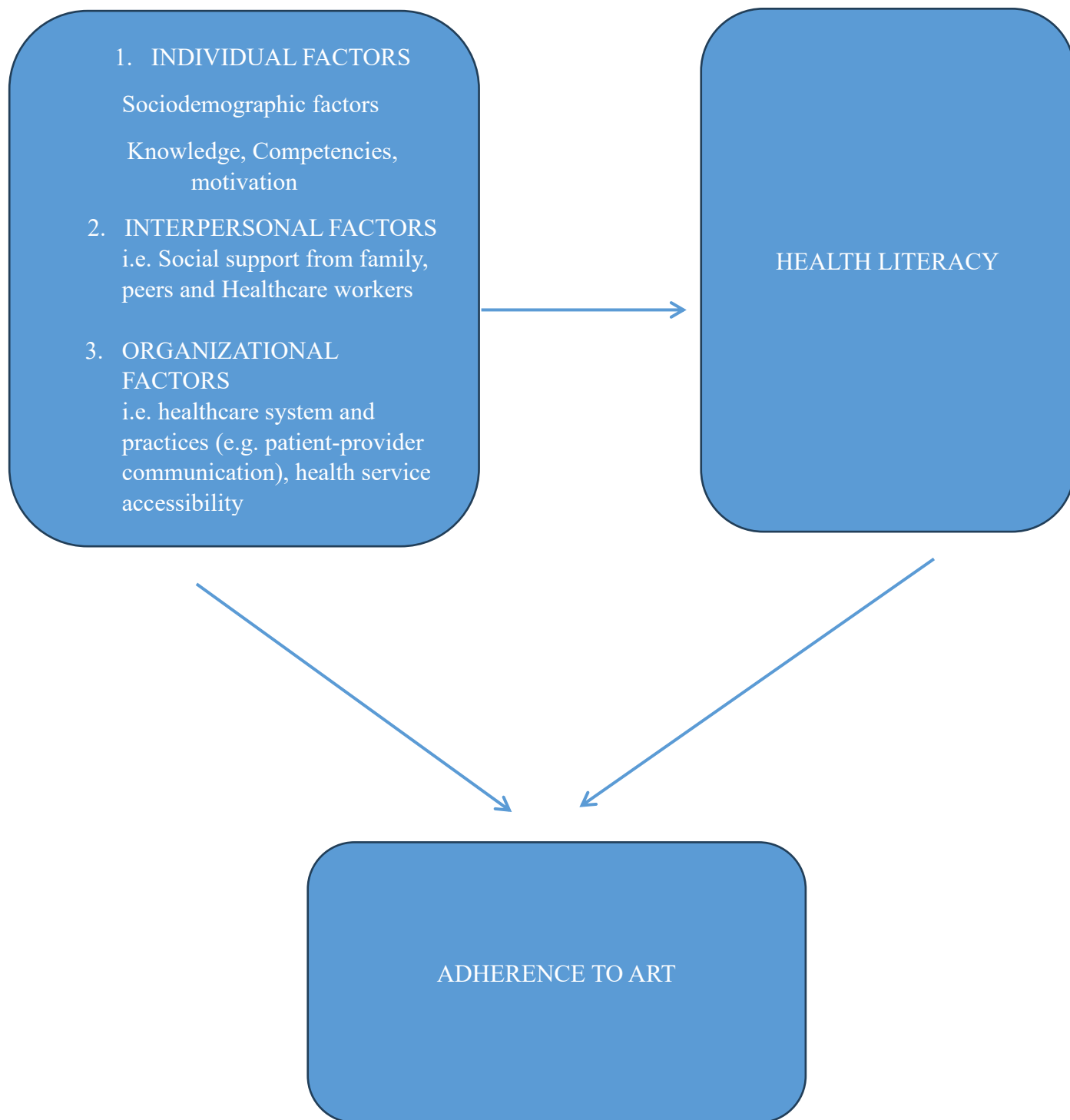
The guiding framework underpinning the research looks to explore how health literacy connects to adherence to antiretroviral therapy among PLWH at the Tema General Hospital. This framework is underpinned by the socio-ecological model of health, which highlights the combination and interaction of factors at the individual, interpersonal and organizational factors that shape certain health behaviours such as medication adherence.

Adherence to ART represents the dependent variable, with health literacy being the independent variable.

At the individual level, factors such as knowledge, competencies, motivation and sociodemographic factors are crucial in influencing an individual's level of health literacy along with medication adherence level. On the interpersonal level, support received from family, peers and health service providers mediates the connection between health literacy levels and medication adherence levels. At the organizational level, health system factors such as patient-provider communication strategies and service accessibility influences health literacy and adherence.

The validated tools used in this study (MMAS-8 and HLQ-44) assesses the elements (e.g. social support, access to healthcare services, behavioural and cognitive capacities) that aligns with different levels of the SEM. Beyond recognizing broader systemic and environmental drivers that influence adherence to ART and health literacy, it identifies multiple intervention points. By understanding how these variables interact, the study points to assessing how health literacy relates to adherence, underscoring the importance of health literacy in enhancing ART adherence.





*Figure 1.1 Conceptual framework on health literacy and adherence to antiretroviral therapy*

*Source: Author's design*

## **1.5 Research Questions**

- i. What is the adherence level to antiretroviral therapy among persons living with HIV visiting Tema General Hospital?
- ii. What is the health literacy level among persons living with HIV visiting Tema General Hospital?
- iii. What factors influence health literacy levels among persons living with HIV visiting Tema General Hospital?
- iv. What is the connection between health literacy levels and adherence to antiretroviral therapy?

## **1.6 General Objective**

This research aimed to assess the connection between health literacy and adherence to antiretroviral therapy among persons living with HIV/AIDS receiving care at Tema General Hospital.

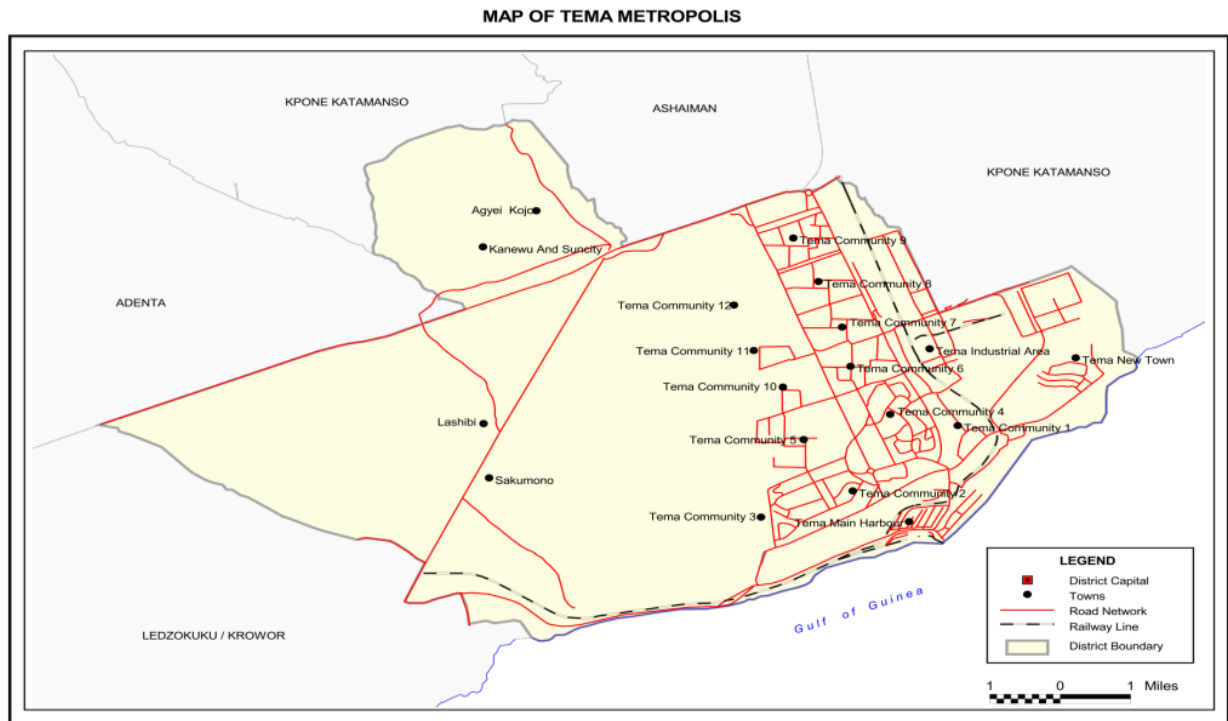
## **1.7 Specific objectives**

The specific objectives were as follows.

- i. To establish the level of adherence to antiretroviral therapy among persons living with HIV visiting Tema General Hospital
- ii. To examine the level of health literacy among people living with HIV visiting Tema General Hospital
- iii. To investigate the factors that influence health literacy levels among persons living with HIV receiving care at Tema General Hospital
- iv. To evaluate the connection between health literacy and adherence to antiretroviral therapy among persons living with HIV visiting Tema General Hospital.

## **1.8 Profile of Study area**

Tema Metropolis is among of the 261 Metropolitan, Municipal and District Assemblies (MMDAs) of Ghana, found in the Greater Accra Region. It is found on the coast, 25 kilometers East of Accra and shares boundaries with Shai Osudoku District on the Northeast, Ledzokuku Municipal on the Southwest, Akwapim South District on the North and Gulf of Guinea on the South. The Metropolis covers an area of about 87.8 km<sup>2</sup> with a population size of 177,924 (Ghana Statistical Service, 2021). The Greenwich Meridian (Longitude 0°) passes through the Tema Metropolis and intersects with the equator (Latitude 0°) within Ghanaian territorial waters. Its coastal position and flat terrain extending into the sea made it a strategic site for the development of a harbour, which significantly influenced the establishment of Tema Harbour in 1957, earning the area the title "Eastern Gateway of Ghana". Tema is the capital and administrative region of the Tema Metropolis, accommodating diverse ethnicity and religious groups. Common economic activities pursued by the people of Tema include fishing, agriculture, commerce/services/sales and craftworks (Tema Metropolitan Assembly, 2018). With over fifty health facilities spanning across the Tema Metropolis, the Tema General Hospital is the largest government hospital in the Metropolis. Tema General Hospital started operations in 1954. It boasts a total of over three hundred bed capacity and runs 24 hours, providing both general and specialized care services such as Obstetrics and Gynaecological care, Paediatric care, Surgery, Dental and Eye care, Diagnostics and Antenatal care. Its well-established public health unit provides expertise in adolescent and child health, family planning, Voluntary testing and counselling (VTC) together with Prevention of mother-to-child transmission. It also serves as the major referral center for health facilities in Afienya, Dawhenya, Ashaiman, Prampram, Kpone and their environs (Irene Marilyn Fofie Anuwa-Amarh, 2016). It runs the largest ART care clinic in the Metropolis, hence the preferred site for study.



*Figure 1.2 Map of study area and border districts.*

*Source: Image from Ghana Statistical Service*

## 1.9 Scope of study

The research focuses on investigating the connection between health literacy levels and the level of adherence to ART among PLWH visiting TGH. The scope includes assessing the medication adherence level to ART, assessing the health literacy levels among this populace, exploring the factors that influence the level of health literacy and assessing the correspondence between levels of health literacy and the levels of medication adherence among these persons. Using a cross-sectional study design, the standardized HLQ and MMAS-8 were used in gathering information on health literacy levels and medication adherence levels among PLWH. By identifying key barriers to health literacy and ART adherence, the study will provide insights into improving ART outcomes.

## **1.10 Organization of report**

The research has been assembled into six sections. Chapter One comprise the general introduction of the study, comprising of the background, statement of the problem, reasoning behind this study, the theoretical model underpinning the study, research enquiries, general and specific objectives, overview of the study area and the extent of the study.

Chapter Two provides adequate review of scholarly articles relevant to the study topic. These were sampled from relevant literature from various authors whose findings are related to the topic of the study. It provided an overview on HIV, provided insights into medication adherence and health literacy, touching on areas such as, some tools for measuring the levels of health literacy and that of medication adherence and the interactions between them.

Chapter Three describes the study method and design, sampling technique and explaining how the data was collected, touching on data analysis and ethical consideration as well.

Chapter Four primarily focuses on analysis of the data and its presentation

Chapter Five presents the discussion of the findings of the study.

Finally, Chapter Six summarizes the findings and presents a conclusion from the study, providing recommendations for public health, policy and further research.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Brief Introduction on HIV**

Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) has been of great burden to the global community in the last four decades. Since its first report by the Centers for Disease Control and Prevention (CDC) in the 1980s, Human Immunodeficiency Virus (HIV) has posed several challenges on the health and wealth of the global network. HIV is an infection which attacks the cells that protect the body from disease-causing organisms and foreign particles. These groups of cells form the immune system (Chung-Yi Chen, 2020).

HIV first originated from monkeys in the 1920s and was transmitted to humans and has since been a chief contributor to the global burden of diseases. A report issued by the Joint United Nations Programme on HIV/AIDS (2024) stated that, about 40 million individuals worldwide were infected with HIV in 2023, with 1.3 million people becoming newly infected in that same year and further reported 42.3 million deaths from AIDS-related illnesses since the inception of the epidemic. The African continent is home to about 18% of the global population (Hannah Ritchie, 2019), yet attributes to 67% of the global crisis of HIV infections, despite the fact that healthcare resources are disproportionately limited. The Joint United Nations Programme on HIV/AIDS (2024) again estimated about 26.1 million individuals living with HIV originated from Africa with about 663,000 new infections in 2023, with Eastern and Southern Africa being the epicenters of the epidemic.

The epidemic of HIV remains a significant public health concern in Ghana. As stated by the Ghana AIDS Commission (GAC), an approximated 334,095 persons were infected with HIV in the

country in 2023. Among this population, 5.3% were children under 15 years old, 10 % were youth aged 15 – 24 years and 84.7% being adults over 25 years old. In the same year, 17,774 new infections were reported, with 1,698 (9.6%) among children less than 15 years, 4,867 (27.4%) aged 15 – 24 years and 11,209 (63.1%) among adults. In the same year, Ghana reported 12,480 AIDS-related deaths (GAC, 2023). This sheds more light on the substantial burden of HIV in Ghana, particularly among its adult populace.

With an increase in HIV infections on the continent, several people are reported to be unaware of their status. For instance, a study reported that about 9.4 million PLWH were not aware of their status and a significant proportion of these people were in Sub-Saharan Africa (Tetteh *et al.*, 2022). In Ghana, out of 334,095 PLWH, about 218,183 knew their status (GAC, 2023) and the remaining did not; despite significant augmentation to voluntary HIV counselling, testing and HIV prevention measures. In Ghana, comprehensive knowledge of prevention and management of HIV remains worryingly low, particularly among young people, despite widespread awareness of HIV. Data from Ghana Demographic and Health Survey indicate that 36% of young women and 37% of young men aged 15-24 years exhibited knowledge about HIV prevention methods. An average of 63.5% of Ghanaians had heard of the utilization of ART for the treatment and management of HIV, and a woeful 18% of Ghanaians knew of the Pre-Exposure Prophylaxis (PrEP) as a potent strategy for HIV for HIV prevention (GSS, 2024).

Parker *et al.* (2021) alluded to interventions that have sprang up to curtail this burden since its inception in the 1980s. Unwavering global resolves, extensive educational campaigns and the evolution of improved tests and life-saving treatments have helped turn the corner in the battle against HIV. Global commitments such as ‘know your epidemic,’ ‘know your response’ and ‘agenda 95-95-95’ amplified efforts towards reducing the global burden of HIV. World Health Organization

(2022) emphasized on the need for innovative strategies aimed at improving testing and initiation of ART, as well as programmes to reduce new infections and address barriers to HIV care. These interventions, if implemented, will empower people to be responsible for their health.

Antiretroviral therapy (ART) is the primary lifelong treatment for HIV infection among PLWH. The standard approach, commonly termed as the combined antiretroviral therapy (cART) or highly active antiretroviral therapy (HAART), is a Fixed Dose Combination (FDC) involves combining three or more antiviral drugs into a single pill. This regimen has been demonstrated to be less toxic, better tolerated and offers long-lasting treatment with fewer side effects compared to earlier therapies (Weichseldorfer, Reitz and Latinovic, 2021). Other advantages reported included improved patient compliance, simplified dosing, and potentially lower costs (Chaudhry, 2023). A meta-analysis of 5,224 patients demonstrated that FDC therapy is effective, safe, and well-tolerated, with significant virologic control (Colli *et al.*, 2021). The surfacing of ART has changed the course of infection over the past decades, saving many lives and diverting the course of the disease.

ART is recommended as soon as possible after HIV is diagnosed and is indicated for all PLWH regardless of the presence or absence of clinical manifestations of the disease. Early initiation of ART reduces complications from HIV(AIDS) and results in shorter duration in achieving virologic control (Burke *et al.*, 2021). Due to the invention of ARTs, the world has reached a turning point on HIV. Now, HIV has metamorphosed into long-standing but manageable infection, rather than being a fatal. This feat has been greatly credited to deeper insights and knowledge of the morphology and its pathophysiology. The introduction of innovative and efficient antiretroviral regimens and the advancement of sensitive and precise methods for quantifying HIV genome in the blood together with the acceptance of 'People-First' philosophy by the medics as envisioned



by WHO (Ritin et al., 2022) has significantly driven this progress. While significant milestones have been achieved in the fight against HIV/AIDS, universal access to ART remains a game-changer for PLWH. ART remains a cornerstone of the global efforts to combat HIV/AIDS. Therefore, continuous support towards the advancements of research, education and access to treatments will be essential in sustaining the gains made over the years towards the goal of bringing an end to the global HIV epidemic.

## **2.2 Medication Adherence**

The invention of ART has succeeded in revolutionizing HIV from a life-threatening disease to a long-standing but manageable infection, which hinges on consistent medication adherence. Adherence to medication, as defined in a systematic review of literature and aligned with WHO's definition, refers to the extent to which an individual's medication-taking behaviour aligns with the healthcare provider's counsel, encompassing multiple dimensions including dosage regime, timing, frequency and duration of prescribed treatments (Yap, Thirumoorthy and Kwan, 2016; Gast and Mathes, 2019).

The degree of non-adherence can vary over a wide range. WHO reports an average medication adherence rate of about 50% among patients suffering from chronic conditions in more developed countries, while it is assumed to be lower in several countries where access to healthcare is limited (Hirapara *et al.*, 2024). For instance, among patients prescribed with antihypertensive drug, about half of them stop taking it within 1 year, with global prevalence of non-adherence to antihypertensives ranging between 27% - 40%. (Vrijens *et al.*, 2017; Burnier, 2024). Similarly, medication non-adherence among patients with chronic kidney disease is estimated to vary from 17% – 74% (Bista *et al.*, 2024; Roohi *et al.*, 2024). Further studies highlight poor medication adherence among patients with cancer, diabetes, autoimmune diseases and HIV (Iacob, Iacob and

Jugulete, 2017; Anghel, Farcaş and Oprean, 2018; Ming Moy *et al.*, 2022; Reshma *et al.*, 2024). Medication adherence is crucial for successful patient outcomes. When considering optimal adherence levels, research has shown varying requirements across various conditions. For instance, while taking  $\geq 80\%$  of medication is considered excellent adherence for most chronic diseases (Tseng, Seet and Phillips, 2015)., Prah *et al.* (2018) indicated that, an adherence of  $\geq 95\%$  is needed to achieve optimum results from ART among PLWH. Patients with “good-enough” ( $\geq 80\% - 90\%$ ) adherence rates however did not necessarily have worse virologic outcomes compared with patients with “near perfect” ( $\geq 95\%$ ) adherence. Sub-Saharan Africa reports rates ranging from 55% to 86% (Gudisa and Jun, 2023), with Ghana’s pooled adherence rate at 70% (Boadu *et al.*, 2023), beneath the recommended  $\geq 95\%$  to achieve viral suppression.

It is impossible to expect maximum clinical benefits from therapy in patients with poor medication adherence. Poor medication adherence is associated with adverse health outcomes that go beyond the control of clinical parameters (Vrijens *et al.*, 2017). Specifically, poor medication adherence results in exacerbation of disease; resulting in increased hospitalizations, increased healthcare costs, prolonged duration of the treatment, increased diseases and fatalities and reduced subjective well-being of the patients. Consequently, it also results in therapeutic failures and subsequently death (Ming Moy *et al.*, 2022; Shah *et al.*, 2023; Burnier, 2024). The economic impact of poor adherence is apparent. Globally, non-adherence to medication remains the leading cause of preventable medical expenses. It is projected that 4.6% of global healthcare expenses could be saved if medication adherence is improved (Kasahun *et al.*, 2022). A report by EU estimated that poor adherence to treatment accounted for 194,500 deaths at a cost of €125 billion annually (Moon *et al.*, 2017). Given these complexities, it is important to note that strict medication is required in the management of diseases.

### **2.2.1 Tools for Assessing Medication Adherence**

In spite of the consequential effects of medication non-adherence in a population, several medics are lacking professional training to evaluate medication non-adherence and rather depend on observational judgment. Medication adherence is a complex comprehensive conduct, which requires the use of precise and applicable tools for evaluating medication adherence in everyday medical settings to understand the medication-taking patterns of patient (Moon *et al.*, 2017). For more than four decades, research on how to accurately measure and quantify medication adherence has been conducted, yet neither has proven to be the gold standard (Kronish, Thorpe and Voils, 2021). The WHO classifies measures of medication adherence as subjective or objective, where subjective measurements require patients' or healthcare providers' evaluation of the medication-taking behaviour and objective measurements are measurable and quantifiable methods for adherence without necessarily relying on subjective assessments. These include pill counts, biochemical assay measurements and electronic monitoring (Malo, Kardas and Menditto, 2019; Roohi *et al.*, 2024). Other classification measures of adherence are direct or indirect measures. Direct methods involve direct observation of therapy or measurement of the concentration of a drug (or its metabolic product) or relevant biomarkers in biogenic samples such as blood or urine. Though direct methods may prove more accurate and reliable, they can be costly, require specialized expertise or equipment and may not provide real-time information needed to indicate care (Lam and Fresco, 2015). Indirect measures are habitually used in adherence research, and it includes pill counts, patient self-report, electronic monitoring methods, etc. (Anghel, Farcaş and Oprean, 2018).

The use of subjective methods has gained popularity in clinical practice due to their simplicity, practicality, flexibility and real-time feedback. Subjective measures usually provide information

not only on adherence patterns but are also able to identify individual patient concerns to help tailor appropriate interventions. Questionnaires and measurement scales are the commonly used subjective measures to adherence and have been validated in various contexts to understand barriers to medication adherence across various conditions (Lam and Fresco, 2015). While numerous scales for medication adherence exist, the availability of cross-culturally validated measures of adherence is limited.

### **2.3 Health Literacy among persons living with HIV**

There has been growing discussions around health literacy which have been necessitated somewhat due to the realization of the ethical requirement to include patients in decision-making. Considering patient participation enhances patient knowledge, increases their fulfilment with treatment decisions, reduces worry and also enhances treatment adherence, benefiting the individual and the public's health while ensuring the continuation of healthcare systems (Liu *et al.*, 2020; Meherali, Punjani and Mevawala, 2020).

Simonds was first to introduce the 'health literacy' construct, alleging that health education was essential in enhancing the efficacy of healthcare, and bridging health disparities. Considering its departure from the education field, health literacy was initially construed as the ability to use written and oral material to function in healthcare settings-functional health literacy (Palumbo, 2015).

Subsequently, definitions for health literacy have transitioned severally due to a discord of what health literacy should represent. Nutbeam, McGill and Premkumar (2017) introduced a dimension to health literacy, as the personal, cognitive and social skills which determine the ability of individuals to gain access to, understand, and use information to promote and maintain good

health, consistent with WHO's definition of health literacy (Kendir and Breton, 2020). This emphasizes the need for individuals to improve their knowledge, skills and confidence to act and change their personal lifestyles.

In 2012, Sorensen et al. admitted that one's health literacy was connected with literacy and entailed people possessing 'knowledge, motivation and competencies to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion towards the maintenance or improvement in one's quality of life during their entire life course' (Kendir and Breton, 2020). Maintaining and improving the subjective well-being of an individual in its entirety is a key outcome of this definition.

A recent meaning of health literacy by Dodson *et al* in 2015 defined health literacy as 'the personal characteristics and social resources needed for individuals and communities to access, understand, appraise and use information and services to make decisions about health. Health literacy includes the capacity to communicate, assert and enact these decisions' (Sørensen, 2019).

It can therefore be argued that health literacy came from two vastly distinct sources; one originating from clinical care with patient education as its core and the other one from the broader public health field from the health promotion outlook (Kendir and Breton, 2020).

These definitions suggest that health literacy entail several competencies that go beyond functional health literacy and mere acquisition of knowledge, to include interactive and critical skills as well that individuals can apply in healthcare, disease prevention and health promotion. The multidimensional, complex and heterogenous nature of health literacy integrating understanding of health-related content within specific contexts for individuals and societies (Sørensen, 2019). It

is now understood as a multidimensional concept encompassing knowledge, skills, and functions whose construct includes health knowledge, information processing, and self-management abilities (Liu *et al.*, 2020).

Literature demonstrates that sub-optimal health literacy is linked with inadequate knowledge about diseases, difficulty comprehending health information, poor knowledge and understanding about health and healthcare systems, poor access and utilization of health services, poor medication adherence and poor self-management of chronic diseases, (Liu *et al.*, 2020; Meherali, Punjani and Mevawala, 2020) contributing to poorer health outcomes, increased hospitalization, increased costs and health disparities as well as high risk of mortality. Present data advocates that health literacy is among the most assuring and profitable approaches in managing chronic conditions such as HIV (Liu *et al.*, 2020).

### **2.3.1 Health Literacy and Public Health**

Health literacy has now become more and more critical in public health and healthcare. The construct of health literacy is now moving away from an individualized perspective to a public or generalized viewpoint. This has been caused due to its importance in the proper utilization of healthcare services and inevitably foretells the general healthcare status of the community (Bonaccorsi *et al.*, 2018). The knowledge scale of public health literacy prioritizes knowledge about population level health consequences as against individual health outcomes. This suggests that although an individual with ample health literacy levels may be better equipped to understand, interpret health information and think critically in order make well-informed choices on health-related matters, their ability to take control over their health can be significantly hindered by day-to-day conditions relating to structural/environmental drivers such as scarce income, inadequate transportation or the absence of safe outdoor spaces. As a result, tackling HL as a shared

responsibility is needed. Systemic factors affecting health are powerful contributors of health disparities, evident in the social gradient observed in health literacy levels (Kendir and Breton, 2020).

Bonaccorsi et al. (2018) identified three crucial aspects in dealing with public health literacy namely, knowledge bias (distortion in the understanding of health information due to pre-existing factors), critical health literacy (critical analysis of health information to make reasoned decisions) and civic orientation (which enables awareness of public health issues among natives and involve them in the decision-making process). Again, they emphasized six fundamental priorities that are essential for developing a healthy literate society. At its core is the crucial task of defining what constitutes a health literate population, development of robust assessment tools, enhancing communication and listening skills among health professionals, a comprehensive approach in bridging the gap between theoretical knowledge and behavioural change, as well as extensive collaboration between public health and other professionals (Bonaccorsi *et al.*, 2018). This highlights that health literacy is not merely about information dissemination but rather a comprehensive strategy towards achieving better population health outcomes through understanding, communication and action.

### **2.3.2 Facilitators and Barriers to Health Literacy**

Health literacy does not remain fixed, neither does it reflect the innate characteristic of an individual. It evolves over time along one's life course. There is a vast school of literature that expresses diverse outcomes associated with poor health literacy, with fewer information on the enablers and deterrents to health literacy. Notwithstanding, interactions with the health system, the social environment, as well as individual capabilities are reported to influence one's health literacy skills (McKenna, Sixsmith and Barry, 2020). A person's health literacy level is also reliant on

situational and societal determinants, which in turn impacts on healthcare usage and costs, health behaviour and health status (Sørensen *et al.*, 2024).

### **2.3.3 Tools For Assessing Health Literacy**

Despite the challenges in finding one definition for health literacy categorization of individuals, a variety of measuring instruments have been established to allow categorization of health literacy levels as low, average or high. Health literacy levels are typically assessed using two main types of measures; first generation performance-based tools which estimate functional health literacy and self-report tools which evaluate health literacy as a multi-dimensional construct based on one's perception of their aptitudes, behaviour, attitudes and experiences but may sometimes include measurements of functional health literacy in a self-report format (Jessup *et al.*, 2024). Commonly used measures of health literacy are Newest Vital Signs (NVS), Test of Functional Health Literacy in Adults (TOFHLA),-Real Estimate of Adult Literacy in Medicine (REALM), European Health Literacy Survey (HLS-EU-47) and the Health Literacy Questionnaire (HLQ) (Malik, 2017; Muhanga and Malungo, 2017). Health literacy questionnaire (HLQ) was applied in this study.

### **2.4 Health Literacy & Medication Adherence**

Conclusions from scientific literature on the interplay of health literacy levels and medication adherence levels are conflicting. Some literatures have established a link on how health literacy influences adherence to treatment among PLWH. Whiles (Pellowski, Kalichman and Grebler, 2016; Waldrop-Valverde *et al.*, 2018) report positive links between health literacy levels and medication adherence levels, other studies reveal unclear associations between the two (Rebeiro *et al.*, 2018; Hyvert *et al.*, 2022). Effectively managing HIV infections relies on the patient's capability to pursue medical care, comprehending the instructions given by the clinician and adhering to the treatment plan (Palumbo, 2015). Poor health literacy renders the patient unable to



execute these tasks. On the average, several articles reported a positive and strong link between health literacy level and medication adherence level (Miller, 2016; Mgbako *et al.*, 2022; Ngoatle *et al.*, 2023; Poojar *et al.*, 2023). People with diminished levels of HL were unlikely to adhere to their treatments rightly or at all, resulting in poor health outcomes.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

This segment outlines the research design, methods, and procedures used to conduct the study.

The segment describes the study area, the target population, the sampling techniques employed, data collection instruments, and data analysis methods. Ethical considerations and measures to ensure the validity and reliability of the study are also discussed. The approach was chosen to ensure that the research objectives were effectively addressed, and that the findings were credible and applicable.

#### **3.2 Research Design**

This research used a hospital-based, cross-sectional design to assess health literacy and medication adherence among people living with HIV (PLWH) receiving care at Tema General Hospital. A cross-sectional design, as outlined by Creswell (2014), involves gathering of data at a single point in time, making it ideal for measuring prevalence and exploring associations between variables. This design was preferred for its efficiency in assessing health literacy and medication adherence simultaneously, without the need for extended follow-up (Bryman, 2016).

However, as Bryman (2016) notes, the cross-sectional design has limitations, particularly in its inability to prove causal relationships. Additionally, recall bias and the lack of temporal data may limit the study's ability to observe changes over time.

#### **3.3 Data Collection Techniques and Tools**

Data for the study were gathered using a structured, standardized questionnaire, administered electronically via the mobile application KoboCollect. Three trained research assistants were

involved in the data collection process. Data collection took place on ART clinic days (Tuesdays, Wednesdays, and Thursdays), when patients attending the ART clinic at Tema General Hospital received treatment. The sampling technique employed was simple random sampling. A list of all qualified participants was compiled from the ART clinic's patient records, producing about 2,378 qualified participants. Participants were selected randomly for recruitment until the required sample size was achieved.

The questionnaire used in the research consisted of three distinct sections aimed at capturing demographic details, adherence to ART, and health literacy levels:

1. **Demographic Information:** The first section of the questionnaire focused on demographic data, including the participants' age, sex, marital status, educational status, employment status, and one's duration of their ART treatment. These data points were essential for understanding the characteristics of the sample population and for examining the potential demographic influences on adherence to ART and health literacy.
2. **Adherence to ART:** The second section collected data which measured the participant's level of adherence to ART using the 8-item Morisky Medication Adherence Scale (MMAS-8). This scale was developed in 2009 by Morisky *et al.* from a four-item scale which was previously validated and is widely used in clinical research to evaluate medication adherence across a range of chronic conditions. MMAS-8 consists of eight items, with the first seven items requiring a Yes/No response and the final item utilizing a 5-point Likert scale.

MMAS-8 was chosen for its outstanding validity and reliability in chronic diseases management and has been shown to have a sensitivity of 93% and specificity of 53% in validating adherence among very low-income minority patients treated for hypertension

(Roohi *et al.*, 2024). Its Cronbach's alpha value is 0.83, which is above the accepted minimum of 0.7 (Moon *et al.*, 2017). Consequently, it is proven to be the most accepted and widely used self-report measure of medication adherence.. Unlike other measures of adherence that define an absolute cut off for adherence, MMAS-8 ranks the degree of adherence (Lam and Fresco, 2015; Moon *et al.*, 2017). Each “no” response is scored as one and for each “yes” response, it is scored as zero except for item 5, where the wording is reversed to prevent response bias. For item 8, the code (0-4) has to be standardized by dividing the result by four to calculate a computed score. Total scores on the MMAS-8 range from 0 to 8, where a score of 8 reflects high adherence, 7 or 6 indicates medium adherence, and a score below 6 indicates low adherence (De las Cuevas and Peñate, 2015). The MMAS-8 has been used in several studies to assess medication adherence across various populations in Africa and Ghanaian settings, making it culturally appropriate for this study (Anghel, Farcaş and Oprean, 2018; Biney *et al.*, 2021).

3. Health Literacy assessment: The third section of the questionnaire gathered data which was employed in the assessment of the health literacy levels of participants using the Health Literacy Questionnaire (HLQ), developed by Osborne et al. The HLQ is a comprehensive tool designed to measure a person's ability to understand, access, and utilize health information and services. It was chosen for its robust construct validity, reliability, and high acceptability among both patients and healthcare providers. The HLQ data can be used in pre-to-post assessments and to develop health literacy profile strengths and needs, as well as to recount the health literacy of individuals and whole populations (Budhathoki *et al.*, 2022).

According to Osborne *et al.* (2022), HLQ has nine scales consisting of forty-four items, modeled to assess the encounters individuals have when they engage in understanding, accessing and using health information and services. These scales include: 1. Feeling understood and supported by health care providers; 2. Having sufficient information to manage my health; 3. Actively managing my health; 4. Social support for health; 5. Appraisal of health information; 6. Ability to actively engage with healthcare providers; 7. Navigating the healthcare system; 8. Ability to find good health information; and 9. Understand health information well enough to know what to do (Budhathoki *et al.*, 2022). The HLQ was designed using a grounded validity-driven approach to reflect the multidimensional nature of health literacy, incorporating viewpoints of both clinicians and patients while ensuring that the tool accurately represented the complexity of the concept (Jessup *et al.*, 2024).

Scales 1 – 5 are responded to along a 4-point Likert scale ranging from ‘strongly agree to strongly disagree’. For scales 6–9, which measure more task-specific aspects of health literacy, participants respond using a 5-point scale, indicating the perceived difficulty or ease of completing various health-related tasks (Osborne *et al.*, 2022).

For each scale, the item scores are summed and averaged. A lower score indicates potential weaknesses or areas of need, while a higher score suggests greater strength in that specific health literacy domain (Jessup *et al.*, 2024). This enables a clear assessment of both strengths and limitations in participants’ health literacy level.

One of the strengths of the HLQ is its ability to assess not only the patient’s knowledge and skills related to health but the limitations that may exist within health services themselves

also, such as the need for improved communication skills from healthcare providers (Kendir and Breton, 2020).

Reliability of the Questionnaires: The Cronbach's alpha value of 0.83 for the MMAS-8 demonstrates strong internal consistency and reliability, meeting the widely accepted threshold of 0.7 for reliable scales (Moon *et al.*, 2017). The construct validity and reliability of the HLQ have been well-established through rigorous testing, and the tool is widely accepted by both clinicians and patients as a reliable measure of health literacy (Osborne *et al.*, 2022; Jessup *et al.*, 2024).

These questionnaires were selected due to their demonstrated reliability, validity, and widespread use in similar studies, making them ideal for assessing ART adherence and health literacy in the context of PLWH in Ghana.

### **3.3 Study Population**

The study population comprised of PLWH who were undergoing treatment at Tema General Hospital.

#### *Inclusion criteria*

- a. PLWH receiving care at Tema General Hospital
- b. PLWH on ART, 18 years and older

#### *Exclusion criteria*

- a. PLWH under 18 years
- b. PLWH who are lost to follow-up.
- c. PLWH who did not give consent to participate in the study.

### 3.4 Study Variables

***Dependent variables:*** Adherence to ART is the dependent variable because it is expected or primary outcome for the study.

***Independent variables:*** Health literacy levels represent the independent variables. These variables are hypothesized to influence the outcome i.e., adherence to ART.

***Control variables:*** The demographic data are the control variables. They are external factors that have the possibility of influencing both health literacy and adherence to ART.

### 3.5 Sampling

The sampling for the study was done using a simple random sampling method to select the participants. Participants who were 18 years and above attending the ART clinic at Tema General Hospital, currently receiving ART treatment were eligible for the study. Such participants were able to provide informed consent also. A list of all eligible participants was obtained from the clinic's record, and the participants were selected randomly for recruitment into the study until the desired sample size was reached. Sampling was done on ART clinic days (Tuesdays, Wednesdays, and Thursdays), when patients attending the ART clinic at Tema General Hospital received treatment. Each participant recruited into the study gave their consent to participate in the study. They underwent a face-to-face interview with the researchers where they gave information on some sociodemographic characteristics and self-report on their medication-taking behaviour and health literacy. Each participant spent about 20 – 30 minutes in the study.

Cochran's formula was employed to estimate the minimum required sample size for the study. The sample size was calculated using findings from an earlier report that estimated Ghana's pooled ART adherence to be 70% (Boadu et al., 2023)

The sample size was calculated using the formula shown below.

$$n = \frac{Z^2 \times p \times (1-p)}{e^2}$$

Where,

n = minimum sample size

Z = the z-score that corresponds with 95% confidence interval which is 1.96

p= Prevalence in the population based on previous study of 70%, representing 0.70

e= desired level of precision/margin of error of 5% (0.05)

$$N = \frac{1.96^2 \times 0.7 \times (1 - 0.7)}{0.05^2}$$

$$= \frac{3.842 \times 0.7 \times 0.3}{0.0025} = 322.7, \text{ approximating } 323$$

A non-response rate of 10% resulted in about 32 additional respondents bringing the minimum projected sample size required for the study to **355**.

### **3.6 Pre-testing**

Pretesting was conducted at the Bengali Hospital, which is one of the ART centers in the Tema Metropolis. Data from the pre-testing was not added in the principal investigation. The essence of the pretest was to assess the participants' level of understanding of the questionnaire and to make corrections where necessary before the main study.



The following Cronbach's alphas were obtained for the questionnaires used in the pretest:

**Morisky Medication Adherence Scale (MMAS-8):** The Cronbach's alpha value for the MMAS-8 in the pretest was 0.82, indicating good internal consistency and reliability.

**Health Literacy Questionnaire (HLQ):** The Cronbach's alpha value for the HLQ in the pretest was 0.89, reflecting strong internal consistency and reliability. These values are above the accepted threshold of 0.7, indicating that both instruments demonstrated good reliability in the pretest. Data from the pretest were not included in the main study.

### **3.7 Data Handling**

All data collected was screened for errors, consistency and completeness. The principal investigator was responsible for cleaning the data. All forms of data obtained from this study were stored on a password protected laptop, with backups available on a designated external drive and the principal investigator's personal email.

### **3.8 Data analysis**

Descriptive and inferential statistical methods were employed in analyzing the dataset that was obtained from the study.

Descriptive statistics used were means, percentages and frequencies, providing an overview of the dataset, specifically on socio-demographic characteristics, medication adherence and health literacy levels.

Inferential statistics were also used in the study. ANOVA was employed to analyze the socio-demographic factors linked with health literacy among the participants of this study. ANOVA is useful in comparing means across multiple groups, and appropriate in efficiency and reliability

(Herzog, Clarke and Gregory, 2019). Pearson correlation was also employed to assess the interplay between health literacy and adherence to antiretroviral therapy.

### **3.9 Ethical consideration**

Ethical consideration for this study was obtained from the Ethics and Protocol Review Committee of Ensign Global College (ENSIGN/IRB/EL/SN-277/01) as shown in Appendix A, and Ghana Health Service. Permission was sought from Bengali Hospital to carry pretesting. Permission was granted by TGH (Appendix B) to conduct the study in their setting. Written consent (Appendix E) was sought from participants of the study before they were recruited into the study. The goals, procedure, potential risks, discomforts and benefits of the study (Appendix D) were explained to the participants while ensuring and assuring them of anonymity and confidentiality for information provided. They were also informed of their rights to withdraw without penalty, if they felt the need to withdraw at any point in time of the study.

### **3.10 Limitations of study**

The cross-sectional nature of the design made it impossible to determine the temporal interactions between health literacy and adherence. The self-report measure for adherence may cause bias, which may overestimate adherence compared to objective measures like viral load monitoring. Also, the researcher's dual role as the primary researcher and a staff member of the study area may be of potential limitation; in that participants may provide socially desirable responses. However, every effort was made to maintain objectivity - including adherence to standardized data collection procedures and tools, and assurances of confidentiality.

## CHAPTER FOUR

### RESULTS

#### 4.1 Introduction

This chapter presents the key findings from the study, based on the research objectives. It covers respondents' demographic characteristics and their levels of medication adherence and health literacy across various domains. Results are summarized using descriptive and inferential statistics, with tables highlighting key patterns. The findings reveal both strengths and gaps in health literacy among PLWH at TGH, providing a basis for the discussion in the next chapter.

#### 4.2 Socio-demographic Characteristics of Participants

Table 4.1 shows the socio-demographic and selected characteristics of the participants, providing useful information about the study population. The knowledge of these characteristics is key to understanding the study findings, with variables such as age, education level, marital status, employment status, and months on antiretroviral therapy (ART) having roles in affecting health literacy and adherence.

Table 4.1: Socio-demographic and Selected Characteristics of Study Participants

| Characteristics         | n             | %   |       |
|-------------------------|---------------|-----|-------|
| Mean age (years)        | 44.97 ± 12.26 |     |       |
| Mean ART Period (years) | 6.97 ± 4.81   |     |       |
| Age-group (years)       | 18-24         | 22  | 5.79  |
|                         | 25-34         | 56  | 14.74 |
|                         | 35-44         | 98  | 25.79 |
|                         | 45-54         | 122 | 32.11 |
|                         | 55-65         | 62  | 16.32 |

|                                |            |     |       |
|--------------------------------|------------|-----|-------|
|                                | ≥66        | 20  | 5.26  |
| <b>Educational level</b>       | None       | 53  | 13.95 |
|                                | Primary    | 187 | 49.21 |
|                                | Secondary  | 110 | 28.95 |
|                                | Tertiary   | 30  | 7.89  |
| <b>Marital Status</b>          | Single     | 110 | 28.95 |
|                                | Married    | 155 | 40.79 |
|                                | Divorced   | 58  | 15.26 |
|                                | Widowed    | 57  | 15.00 |
| <b>Sex</b>                     | Female     | 297 | 78.16 |
|                                | Male       | 83  | 21.84 |
| <b>Participants on ART</b>     | Yes        | 380 | 100   |
|                                | No         | 0   | 0     |
| <b>Employment Status</b>       | Unemployed | 60  | 15.79 |
|                                | Employed   | 304 | 80.00 |
|                                | Retired    | 10  | 2.63  |
|                                | Student    | 6   | 1.58  |
| <b>Duration on ART (years)</b> | ≤ 1-6      | 200 | 52.63 |
|                                | 7-12       | 125 | 32.89 |
|                                | 13-18      | 49  | 12.89 |
|                                | 19-24      | 6   | 1.58  |

*n=number of participants, %= percentage*

The average age of the study population was  $44.97 \pm 12.26$  years with a predominance of middle-aged adults. The most frequent age was 45-54 years (32.11%), followed by 35-44 years (25.79%). Young adult (18-34 years) enrolled was 20.53%, while those aged 55+ enrolled 21.58%. About half (49.21%) of participants had primary education alone, followed by 28.95% with secondary school education. A paltry 7.89% had tertiary education, while 13.95% had no education.. Most (80%) were employed, reflecting Ghana's working-age HIV epidemic. But 15.79% were unemployed, and this may indicate financial barriers to consistent healthcare use. Few were retired (2.63%) or in school (1.58%).

Married was the most prominent category (40.79%), followed by unmarried (28.95%), widow(er) (15%), and divorced (15.26%).

Participants' ART duration was  $6.97 \pm 4.81$  years. The majority, 52.63% had been on ART for  $\leq 6$  years, 32.89% in the category of 7-12 years. Fewer percentages (14.47%) of the cohort had been on ART for 13+ years, including among them 1.58% on treatment for 19-24 years.

#### **4.3 Level of adherence to antiretroviral therapy among persons living with HIV visiting TGH**

Table 4.2 indicates the ART adherence levels among PLHIV under treatment at Tema General Hospital (TGH). The statistics categorize adherence levels as low, moderate, and high to gauge how patients stick to their prescribed therapies. The MMAS-8 yields a total score ranging from 0 to 8, where scores of 8 reflects high adherence, 7 or 6 indicate medium adherence, and  $< 6$  represents low adherences (De las Cuevas and Peñate, 2015).

**Table 4.2: Level of adherence to antiretroviral therapy among persons living with HIV visiting TGH**

|                          | <b>Low</b>   | <b>Medium</b> | <b>High</b>  |
|--------------------------|--------------|---------------|--------------|
|                          | <b>n (%)</b> | <b>n (%)</b>  | <b>n (%)</b> |
| <b>Rate of Adherence</b> | 96 (25.26)   | 188 (49.48)   | 96 (25.26)   |

*n=number of participants, %= percentage*

One in four participants (96 of 380) showed low adherence to ART. It is a worrying factor because non-adherence results in treatment failure, higher viral load, and greater risk of HIV transmission.

About half of the patients (188/380) had medium adherence. While this suggests that the majority of patients are adhering to some extent, it also suggests room for improvement.

The same proportion with low adherence (96 out of 380) also showed high adherence, i.e., they followed through on taking drugs as prescribed consistently. The data reveal that while 49.48% of the patients have medium adherence, 50.52% of the participants have either low or high adherence. This reveals that adherence patterns are vastly different in PLHIV at TGH.

#### **4.4 Level of health literacy among people living with HIV visiting TGH.**

Health literacy is at the core of effective management of chronic conditions such as HIV. Table 4.3 presents a multi-dimensional profiling of the level of health literacy among 380 people living with HIV (PLHIV) receiving care at Tema General Hospital (TGH). The findings present strengths and areas of improvement in the nine domains of health literacy, which will be helpful in developing focused interventions.

**Table 4.3: Level of health literacy among people living with HIV visiting TGH.**

| <b>Health Literacy Domain</b>                                                                                  | <b>Mean Score per<br/>item scale</b> | <b>Mean Score per<br/>item scale (%)</b> |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------|
| 1. Feeling understood and supported by<br>healthcare providers                                                 | 2.74                                 | 68.5                                     |
| 2. Having sufficient information to<br>manage my health                                                        | 2.61                                 | 65.3                                     |
| 3. Actively managing my health                                                                                 | 3.00                                 | 75.0                                     |
| 4. Social support for<br>Health                                                                                | 2.73                                 | 68.3                                     |
| 5. Appraisal of health information                                                                             | 2.70                                 | 67.5                                     |
| 6. Ability to actively engage with<br>healthcare providers                                                     | 3.90                                 | 78.0                                     |
| 7. Navigating the healthcare system                                                                            | 3.59                                 | 71.8                                     |
| 8. Ability to find good health information                                                                     | 3.50                                 | 70.0                                     |
| 9. Understanding health information well<br>enough to know what to do                                          | 3.96                                 | 79.2                                     |
| <i>n=number of participants, %= percentage, Domains 1 – 5 scored out of 4, Domains 5-9 scored<br/>out of 5</i> |                                      |                                          |

Table 4.3 demonstrates the health literacy levels of the participants across all 9 domains. Health literacy domains 1-5 are scored out of 4, while domains 6 – 9 are scored out of 5. A lower score on the scale indicates a potential need in relation to the scale construct while a higher score indicates a potential strength (Jessup *et al.*, 2024).

The analysis of the health literacy domains among persons living with HIV (PLHIV) at Tema General Hospital (TGH) revealed varying levels of competencies across different dimensions:

More than half of the domains demonstrated good mean scores. The domain ‘Understanding health information well enough to know what to do’ recorded the highest mean score (3.96). Similarly, ‘Ability to actively engage with healthcare providers’ (3.90), ‘Ability to find good health information’ (3.50), ‘Actively managing my health’ (3.00) and ability to ‘Navigate the health care system’ (3.59) demonstrated relatively high mean scores which are crucial in making informed health decisions.

Moderate mean scores were also observed for the domains ‘Feeling understood and supported by healthcare providers’ (2.74), ‘Social support for health’ (2.73), and ‘Appraisal of health information’ (2.70) highlighting the need for strengthening in these areas; with the lowest domain score being ‘Having sufficient information to manage my health’ (2.61).



**Table 4.4: Summary of ANOVA of Factors associated with Health literacy among the participants.**

| Variables             | HL1              | HL2              | HL3              | HL4              | HL5              | HL6              | HL7              | HL8               | HL9                |
|-----------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|--------------------|
| <b>Age category</b>   | <i>p</i> =.12    | <i>p</i> =.03*   | <i>p</i> =.39    | <i>p</i> =.52    | <i>p</i> =.05    | <i>p</i> =.60    | <i>p</i> <.01*   | <i>p</i> =.05*    | <i>p</i> =.48      |
| 18-24years            | 2.78<br>(SD=.78) | 2.84<br>(SD=.73) | 2.93<br>(SD=.49) | 2.78<br>(SD=.98) | 2.76<br>(SD=.89) | 3.79<br>(SD=.73) | 3.83<br>(SD=.74) | 3.89<br>(SD=.90)  | 4.13<br>(SD=.73)   |
| 25-34years            | 3.02<br>(SD=.78) | 2.79<br>(SD=.67) | 3.14<br>(SD=.37) | 2.77<br>(SD=.63) | 2.88<br>(SD=.56) | 4.00<br>(SD=.54) | 3.88<br>(SD=.49) | 3.69<br>(SD=.94)  | 4.01<br>(SD=.53)   |
| 35-44years            | 2.76<br>(SD=.77) | 2.71<br>(SD=.80) | 3.10<br>(SD=.46) | 2.74<br>(SD=.79) | 2.81<br>(SD=.65) | 3.96<br>(SD=.58) | 3.59<br>(SD=.73) | 3.61<br>(SD=.93)  | 4.03<br>(SD=.72)   |
| 45-54years            | 2.66<br>(SD=.86) | 2.55<br>(SD=.75) | 3.03<br>(SD=.58) | 2.63<br>(SD=.76) | 2.59<br>(SD=.72) | 3.89<br>(SD=.71) | 3.51<br>(SD=.74) | 3.36<br>(SD=.99)  | 3.87<br>(SD=.74)   |
| 55-65years            | 2.66<br>(SD=.82) | 2.46<br>(SD=.72) | 2.96<br>(SD=.64) | 2.82<br>(SD=.77) | 2.63<br>(SD=.60) | 3.82<br>(SD=.74) | 3.50<br>(SD=.59) | 3.36<br>(SD=.86)  | 3.95<br>(SD=.51)   |
| ≥66years              | 2.66<br>(SD=.90) | 2.38<br>(SD=.89) | 3.02<br>(SD=.64) | 2.91<br>(SD=.88) | 2.57<br>(SD=.81) | 3.85<br>(SD=.73) | 3.33<br>(SD=.85) | 3.40<br>(SD=.27)  | 3.90<br>(SD=.1.07) |
| <b>Sex</b>            | <i>p</i> =.74    | <i>p</i> =.08    | <i>p</i> =.37    | <i>p</i> =.55    | <i>p</i> =.39    | <i>p</i> =.23    | <i>p</i> <.01*   | <i>p</i> =.01*    | <i>p</i> =.01*     |
| Male                  | 2.72<br>(SD=.85) | 2.75<br>(SD=.67) | 3.09<br>(SD=.52) | 2.78<br>(SD=.82) | 2.76<br>(SD=.65) | 3.98<br>(SD=.56) | 3.79<br>(SD=.49) | 3.74<br>(SD=.81)  | 4.13<br>(SD=.44)   |
| Female                | 2.75<br>(SD=.82) | 2.58<br>(SD=.78) | 3.02<br>(SD=.54) | 2.72<br>(SD=.76) | 2.69<br>(SD=.69) | 3.88<br>(SD=.69) | 3.54<br>(SD=.74) | 3.44<br>(SD=.99)  | 3.92<br>(SD=.74)   |
| <b>Marital Status</b> | <i>p</i> =.75    | <i>p</i> =.17    | <i>p</i> =.74    | <i>p</i> =.36    | <i>p</i> =.38    | <i>p</i> =.27    | <i>p</i> =.01*   | <i>p</i> =.08     | <i>p</i> =.92      |
| Single                | 2.18<br>(SD=.84) | 2.73<br>(SD=.83) | 3.01<br>(SD=.56) | 2.66<br>(SD=.80) | 2.78<br>(SD=.73) | 3.90<br>(SD=.71) | 3.68<br>(SD=.81) | 3.67<br>(SD=.96)  | 3.93<br>(SD=.81)   |
| Married               | 2.70<br>(SD=.80) | 2.62<br>(SD=.72) | 3.06<br>(SD=.53) | 2.81<br>(SD=.73) | 2.71<br>(SD=.66) | 3.97<br>(SD=.61) | 3.65<br>(SD=.64) | 3.51<br>(SD=.98)  | 3.97<br>(SD=.66)   |
| Divorced              | 2.72<br>(SD=.77) | 2.54<br>(SD=.65) | 3.10<br>(SD=.53) | 2.66<br>(SD=.78) | 2.64<br>(SD=.62) | 3.83<br>(SD=.63) | 3.52<br>(SD=.62) | 3.32<br>(SD=.91)  | 3.95<br>(SD=.59)   |
| Widowed               | 2.74<br>(SD=.92) | 2.47<br>(SD=.83) | 3.02<br>(SD=.51) | 2.75<br>(SD=.80) | 2.61<br>(SD=.70) | 3.80<br>(SD=.71) | 3.33<br>(SD=.67) | 3.35<br>(SD=.95)  | 4.01<br>(SD=.65)   |
| <b>Education</b>      | <i>p</i> =.07    | <i>p</i> <.001*  | <i>p</i> =.07    | <i>p</i> =.33    | <i>p</i> <.001   | <i>p</i> <.001   | <i>p</i> <.001   | <i>p</i> <.001    | <i>p</i> <.01      |
| No formal             | 2.54<br>(SD=.74) | 2.26<br>(SD=.69) | 2.92<br>(SD=.62) | 2.61<br>(SD=.87) | 2.29<br>(SD=.69) | 3.64<br>(SD=.76) | 3.26<br>(SD=.80) | 2.98<br>(SD=1.10) | 3.73<br>(SD=.83)   |
| Primary               | 2.74<br>(SD=.78) | 2.54<br>(SD=.72) | 3.03<br>(SD=.46) | 2.72<br>(SD=.70) | 2.66<br>(SD=.63) | 3.83<br>(SD=.68) | 3.50<br>(SD=.68) | 3.36<br>(SD=.93)  | 3.93<br>(SD=.73)   |
| Secondary             | 2.77<br>(SD=.91) | 2.83<br>(SD=.78) | 3.08<br>(SD=.61) | 2.78<br>(SD=.80) | 2.91<br>(SD=.66) | 4.11<br>(SD=.54) | 3.78<br>(SD=.61) | 3.83<br>(SD=.83)  | 4.06<br>(SD=.52)   |

|                     |                   |                  |                         |                  |                  |                  |                         |                  |                  |
|---------------------|-------------------|------------------|-------------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|
| Tertiary            | 3.03<br>(SD=.86)  | 2.97<br>(SD=.77) | 3.23<br>(SD=.46)        | 2.91<br>(SD=.90) | 2.95<br>(SD=.72) | 4.02<br>(SD=.57) | 4.01<br>(SD=.56)        | 4.13<br>(SD=.65) | 4.24<br>(SD=.66) |
| <b>Employment</b>   | <i>p</i> =.26     | <i>p</i> =.21    | <b><i>p</i> &lt;.05</b> | <i>p</i> =.06    | <i>p</i> =.88    | <i>p</i> =.35    | <b><i>p</i> &lt;.05</b> | <i>p</i> =.44    | <i>p</i> =.69    |
| Unemployed          | 2.60<br>(SD=.81)  | 2.49<br>(SD=.74) | 2.87<br>(SD=.65)        | 2.83<br>(SD=.76) | 2.67<br>(SD=.73) | 3.79<br>(SD=.70) | 3.37<br>(SD=.79)        | 3.41<br>(SD=.99) | 3.90<br>(SD=.77) |
| Employed            | 2.78<br>(SD=.82)  | 2.64<br>(SD=.77) | 3.08<br>(SD=.49)        | 2.70<br>(SD=.77) | 2.71<br>(SD=.68) | 3.92<br>(SD=.66) | 3.63<br>(SD=.68)        | 3.52<br>(SD=.96) | 3.97<br>(SD=.69) |
| Retired             | 2.65<br>(SD=.88)  | 2.88<br>(SD=.60) | 3.18<br>(SD=.75)        | 3.25<br>(SD=.78) | 2.76<br>(SD=.44) | 3.93<br>(SD=.53) | 3.88<br>(SD=.27)        | 3.80<br>(SD=.73) | 4.05<br>(SD=.29) |
| <b>ART Duration</b> | <i>p</i> =.87     | <i>p</i> =.74    | <i>p</i> =.46           | <i>p</i> =.81    | <i>p</i> =.31    | <i>p</i> =.49    | <i>p</i> =.95           | <i>p</i> =.63    | <i>p</i> =.66    |
| ≤ 1-6years          | 2.75<br>(SD=.78)  | 2.60<br>(SD=.74) | 3.01<br>(SD=.51)        | 2.72<br>(SD=.77) | 2.71<br>(SD=.67) | 3.86<br>(SD=.64) | 3.60<br>(SD=.70)        | 3.48<br>(SD=.95) | 3.95<br>(SD=.67) |
| 7-12years           | 2.72<br>(SD=.81)  | 2.61<br>(SD=.75) | 3.08<br>(SD=.54)        | 2.77<br>(SD=.76) | 2.75<br>(SD=.70) | 3.94<br>(SD=.72) | 3.59<br>(SD=.72)        | 3.57<br>(SD=.98) | 4.01<br>(SD=.69) |
| ≥13years            | 2.78<br>(SD=1.00) | 2.69<br>(SD=.88) | 3.08<br>(SD=.61)        | 2.72<br>(SD=.79) | 2.58<br>(SD=.70) | 3.95<br>(SD=.08) | 3.56<br>(SD=.69)        | 3.44<br>(SD=.99) | 3.92<br>(SD=.80) |

**NB:** HL1-Feeling understood and supported by healthcare providers, HL2- Having sufficient information to manage my health, HL3- Actively managing my health, HL4- Social support for Health, HL5- Appraisal of health information, HL6- Ability to actively engage with healthcare providers, HL7- Navigating the healthcare system, HL8- Ability to find good health information and HL9-Understanding health information well enough to know what to do. [\* = significant at 0.5, 0.1 and .001 levels of significance]

Results from the ANOVA table shows that age of the participants has statistically significant effects on three out of the nine domains of health literacy, that is, 'Having sufficient information to manage my health' ( $p < .05$ ), 'Navigating the healthcare system' ( $p < 0.1$ ) and 'Ability to find good health information' ( $p < 0.5$ ). Analysis of the mean health literacy scores shows that increasing age is associated decreased health literacy in the three domains.

It also observed that sex had significant effects on three out of all the nine domains of health literacy, that is that is 'Navigating the healthcare system' ( $p < 0.01$ ), 'Ability to find good health information' ( $p = 0.001$ ) and the 'Ability to understand health information well enough to know what to do' ( $p < 0.01$ ). Analysis of the mean scores indicated that males had slightly higher mean scores in these dimensions compared with females.

Education also showed strong influence on most of the health literacy domains namely; 'Having sufficient information to manage one's health' ( $p < 0.001$ ), 'Appraisal of health information' ( $< 0.001$ ), 'Ability to actively engage with healthcare professionals' ( $p < 0.001$ ), 'Navigating the healthcare system' ( $p < 0.001$ ), 'Ability to find good health information' ( $p < 0.001$ ) and 'Understanding health information to make informed decisions' ( $p < 0.01$ ), suggesting that higher education is strongly linked to an individual's health literacy across multiple dimensions.

Marital status had limited significant effects on health literacy, with only HL7 (Navigating the healthcare system) showing significance ( $p = 0.01$ ). Single participants had higher mean scores on 'Navigating the healthcare system' compared to married, divorced and widowed participants. The results also demonstrated that employment is influenced 'Actively managing my health' ( $p < 0.05$ ) and 'Navigate the healthcare system' ( $p < 0.05$ ). Duration on ART however did not show to influence any of the health literacy domains.

**Table 4.5: Pearson Correlation Matrix of the relationships between Health Literacy domains and adherence to treatment**

| Variables                    | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10 |
|------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----|
| Treatment Adherence -1       | 1       |         |         |         |         |         |         |         |         |    |
| Feeling understood -2        | 0.12*   | 1       |         |         |         |         |         |         |         |    |
| Sufficient information -3    | 0.16**  | 0.40*** | 1       |         |         |         |         |         |         |    |
| Active management -4         | 0.26*** | 0.35*** | 0.45*** | 1       |         |         |         |         |         |    |
| Social support -5            | 0.07    | 0.25*** | 0.26*** | 0.24*** | 1       |         |         |         |         |    |
| Appraisal of health info. -6 | 0.17*** | 0.28*** | 0.57*** | 0.44*** | 0.29*** | 1       |         |         |         |    |
| Actively engage HWs-7        | 0.21*** | 0.27*** | 0.39*** | 0.39*** | 0.18*** | 0.51*** | 1       |         |         |    |
| Navigating the healthcare -8 | 0.13**  | 0.21*** | 0.39*** | 0.39*** | 0.24*** | 0.49*** | 0.48*** | 1       |         |    |
| Finding good health info. -9 | 0.16**  | 0.18*** | 0.58*** | 0.37*** | 0.15**  | 0.63*** | 0.52*** | 0.62*** | 1       |    |
| Understand health info. -10  | 0.13**  | 0.27*** | 0.42*** | 0.43*** | 0.25*** | 0.51*** | 0.52*** | 0.52*** | 0.61*** | 1  |

**NB:** 1- Treatment Adherence, 2- Feeling understood and supported by healthcare providers, 3- Having sufficient information to manage my health, 4- Actively managing my health, 5- Social support for Health, 6- Appraisal of health information, 7- Ability to actively engage with healthcare providers, 8- Navigating the healthcare system, 9- Ability to find good health information and 10-Understanding health information well enough to know what to do. [ $*$  =  $p < .05$ ,  $**$  =  $p < .01$ , and  $***$  =  $p < .001$ ].

From the correlation matrix table above, it was observed that all the domains of health literacy, except for social support for health was statistically and positively correlated with the level of treatment adherence among the participants. That is, feeling understood and supported by healthcare providers was positively and significantly correlated with adherence ( $r = 0.12, p < 0.05$ ). Having sufficient information to manage my health was positively and significantly correlated with adherence ( $r = 0.16, p < .01$ ). Actively managing my health was positively and significantly correlated with adherence ( $r = 0.26, p < .001$ ). Appraisal of health information was positively and significantly correlated with adherence ( $r = 0.17, p < .001$ ). Ability to actively engage with healthcare providers was positively and significantly correlated with adherence ( $r = 0.21, p < .001$ ). Navigating the healthcare system was positively and significantly correlated with adherence ( $r = 0.13, p < .01$ ). Ability to find good health information was positively and significantly correlated with adherence ( $r = 0.16, p < .01$ ). Also, understanding health information well enough to know what to do was significantly and positively correlated with adherence ( $r = 0.13, p < .01$ ). However, Social support for Health was positively correlated with adherence but not statistically significant ( $r = 0.07, p > .05$ ).

## **CHAPTER FIVE**

### **DISCUSSION**

#### **5.1 Introduction**

This research sought to assess health literacy levels and adherence to antiretroviral therapy levels among persons living with HIV receiving care at Tema General Hospital. The study assessed the level of medication adherence among the study population, assessed their health literacy levels, identified factors that influenced their health literacy levels and assessed the association of health literacy and medication adherence among the study population.

#### **5.2 Level of adherence to antiretroviral therapy among persons living with HIV visiting TGH**

This survey assessed adherence to antiretroviral therapy (ART) levels among people living with HIV (PLWH) at Tema General Hospital (TGH). The findings revealed a distinct pattern of adherence levels, with 25.26% of participants reporting low adherence, 49.48% medium adherence, and 25.26% high adherence. These results suggest a lower overall adherence rate than the national average of 70% reported by (Boadu *et al.*, 2023) in a recent meta-analysis of ART adherence in Ghana. While the majority of participants exhibited medium adherence—comparable to findings by Byrd *et al.* (2020)—the proportion of individuals with low adherence is concerning. Low adherence has significant clinical implications. According to World Health Organization (2024), irregular use of ART is closely associated with drug resistance, treatment failure, and increased HIV transmission. Conversely, the 25.26% of participants who demonstrated high adherence illustrate the potential for positive outcomes when patients receive sufficient support and guidance.

The discrepancy between adherence rates at TGH and national estimates may be attributed to regional variations in access to care, socioeconomic conditions, or urban-specific barriers. Heestermans et al. (2016) note that urban environments often intensify psychosocial factors that interfere with medication adherence. Similarly, Dzansi, Tornu and Chipps (2020) identified structural barriers—such as long waiting times at clinics and transportation costs—as key inhibitors of ART adherence in Ghana, especially among urban populations like Tema.

These findings further underscore the critical role of health literacy in supporting ART adherence. Global reports have consistently shown a strong link between low health literacy and poor adherence outcomes. Miller (2016) and Perez, Chagas and Pinheiro (2021) emphasize that inadequate understanding of treatment instructions, dosing schedules, and viral suppression often leads to non-adherence. Mgbako *et al.* (2022) similarly found that misconceptions about ART, particularly in resource-limited settings, directly contribute to treatment interruptions.

The results of this study support these international findings and highlight the need for targeted health literacy interventions. By improving patients' understanding of HIV treatment and addressing structural barriers to care, Ghana can move closer to achieving its UNAIDS 95-95-95 targets (Ghana AIDS Commission, 2023). These findings call for patient-centered strategies that integrate health literacy education and structural reforms to optimize ART adherence outcomes.

### **5.3 Level of health literacy among people living with HIV visiting TGH**

The findings from this study on the level of health literacy (HL) among people living with HIV (PLWH) visiting TGH demonstrate a mixed pattern of adequacy and gaps across the nine health literacy domains. Specifically, five domains- 'Actively managing my health', 'Actively engaging with healthcare providers', 'Navigating the healthcare system', 'Finding good health information', and 'Understanding health information well enough to know what to do' - showed relatively higher



mean scores. These results point to adequate HL in these areas and support the World Health Organization's (WHO) comprehensive framing of HL as comprising both intellectual and social competencies that empower individuals to access, understand, and use information for health decisions. This supports the need for additional efforts of the healthcare system, educational systems, and society at large to facilitate health literacy (Demian, Jean Shapiro and Thornton, 2016).

Compared with global findings, this study's results show partial alignment with Rafhi *et al.* (2024). They reported high levels of health literacy in domains such as “Feeling understood and supported by healthcare providers”, ‘Appraisal of health information’, ‘Ability to engage with healthcare providers actively’, and ‘Understanding health information well enough to know what to do’. Similarly, Debussche *et al.* (2018) found elevated scores in ‘Feeling understood and supported by healthcare professionals’, ‘Understanding health information well enough to know what to do’, and ‘Navigating the healthcare system’. These similarities suggest that some health literacy competencies—especially those related to understanding and engaging with healthcare providers—are consistently strong among PLWH. However, local factors such as the healthcare system, patient-provider trust, and communication styles may influence variations in areas like provider support and critical appraisal of information.

One noteworthy observation is the relatively high confidence of PLWH at TGH in engaging healthcare professionals—an encouraging deviation from prevailing stereotypes about patient-provider dynamics in many low-resource settings. This confidence may reflect the impact of recent health sector reforms in Ghana that have enhanced the accessibility of healthcare services and improved interpersonal interactions between patients and providers. This potentially explains the elevated scores in self-management, system navigation, and information-seeking domains.

However, the study also revealed low-to-moderate mean scores in domains such as ‘Social support for health from health providers and family’ and ‘Appraisal of health information’. These findings suggest ongoing challenges in building supportive social ecosystems around patients and in enhancing their capacity to critically analyze the reliability and accuracy of health information. This contrasts with findings by Rafhi *et al.* (2024), where patients exhibited higher appraisal scores, and indicates an area where localized interventions—such as family-involved care education and health literacy campaigns focused on critical thinking—are needed.

Furthermore, these findings reinforce the importance of trust, identity recognition, and relational continuity in care, as emphasized by Rodkjaer *et al.* (2023). Their research underscores that building strong interpersonal relationships and understanding the multifaceted social identities of patients are critical to enhancing health literacy outcomes. This points to the need for healthcare providers in Ghana to strengthen their relational and communication skills to support health literacy initiatives.

On the whole, the TGH findings are broadly consistent with international studies in several domains but diverge in areas such as provider-support and critical appraisal. This underlines the importance of context-specific strategies to address the multifaceted nature of health literacy among PLWH.

#### **5.4 Factors that Influence Health Literacy among Persons Living with HIV**

This study found that age, sex, education, employment, and marital status each had varying degrees of influence on the health literacy (HL) levels of people living with HIV (PLWH) at Tema General Hospital (TGH). Among these variables, educational attainment emerged as the most significant determinant of health literacy. Individuals who had higher educational attainment exhibited markedly stronger competencies across most health literacy domains. This finding is consistent

with several international studies that underscore the pivotal role of education in shaping health literacy outcomes. Sudhakar *et al.* (2020) and Okamoto *et al.* (2024) also reported that persons with higher education were significantly more likely to demonstrate adequate or high health literacy levels. Similarly, Debussche *et al.* (2018) observed that higher education correlated positively with key health literacy domains, including the ability to appraise health information, navigate healthcare systems, and engage with healthcare providers.

However, this study's sex-disaggregated results diverge from earlier findings. Contrary to studies by Lee, Lee and Kim (2015) and Fleisher *et al.* (2016), which reported higher HL levels among females, the present research found that males outperformed females in several health literacy domains such as 'Navigating the healthcare system', 'Finding good information', and 'Understanding health information well enough to make informed decisions'. Although females constituted a larger portion of the study population, males demonstrated higher mean scores in these domains. This contrast may reflect sociocultural dynamics in Ghana, where historical and systemic preferences for male education may continue to influence present-day health literacy capacities.

Employment status also played a significant role in shaping health literacy levels. PLWH who were employed exhibited higher levels of health literacy than their unemployed counterparts, particularly in their ability to actively manage their health and navigate the healthcare system. Employment often facilitates access to workplace wellness programs and health information, while also providing financial resources to afford healthcare services. These findings align with existing global literature suggesting that socioeconomic status and occupational engagement are facilitators of better health literacy outcomes (Stormacq *et al.*, 2020).

Interestingly, marital status and perceived social support were not found to be strong predictors of health literacy in this study. Although social support is widely regarded as a key facilitator of health literacy (Nutbeam, McGill and Premkumar, 2017), this research found only limited significance between marriage and health literacy, and low-to-moderate mean scores in the domains of ‘Social support for health’ and ‘Feeling understood by healthcare providers’. Notably, single individuals had higher mean scores for ‘Navigating the healthcare system’ than their married counterparts. This could suggest that self-efficacy, rather than relationship status, plays a more critical role in developing and applying health literacy skills. Improving self-efficacy among PLWH may enhance their confidence in engaging with healthcare services and making informed health decisions, as supported by Bandura’s theory of self-efficacy.

### **5.5 Correlation Between Health Literacy and Adherence to ART**

The current study found a strong positive interplay between health literacy (HL) and medication adherence among people living with HIV (PLWH), with all but one HL domain showing significant associations with adherence. This finding aligns with a growing body of global literature that affirms the critical role of health literacy in promoting optimal health behaviours, particularly medication adherence. Prior research by Pellowski, Kalichman and Grebler (2016) found that persons with higher health literacy were significantly more likely to adhere to antiretroviral therapy (ART) regimens, emphasizing the role of health literacy in treatment engagement and long-term viral suppression. Similarly, (Waldrop-Valverde *et al.*, 2018) identified health literacy as a significant predictor of ART adherence, particularly in the domains of understanding and processing health-related information necessary for self-management.

This consistency across studies underscores the importance of health literacy not just in HIV care but also in other chronic conditions. For instance, Nandyala *et al.* (2018) reported similar associations between health literacy and medication adherence in patients with diabetes, further suggesting that health literacy is a foundational element in managing lifelong treatment regimens. These findings collectively reinforce the necessity of strengthening health literacy among PLWH, especially in resource-constrained settings, where barriers to care and information may be more pronounced.

By confirming that nearly all health literacy domains—ranging from accessing and understanding health information to navigating healthcare systems—are positively associated with adherence, the current study contributes to the evidence base supporting health literacy as a modifiable determinant of health outcomes. In contexts such as Ghana, where healthcare infrastructure may present access challenges, enhancing health literacy through targeted interventions could significantly improve ART adherence and overall patient outcomes.

Therefore, the findings of this study are consistent with global trends and further validate the strategic importance of integrating health literacy into HIV care programs. Promoting health literacy not only facilitates informed health decisions but also directly influences the adherence behaviours crucial for managing HIV effectively.

## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

#### **Conclusion**

This study demonstrates that health literacy is a primary determinant of ART adherence for PLHIV in the setting of Tema General Hospital, with increased education and proper management of health as primary drivers towards better health outcomes. While there are strengths in some of the domains of health literacy, persistent gaps in appraisal of health information and lack of social support by providers and society demonstrate the need for intervention strategies in those areas. By placing education at the forefront and facilitating patient empowerment, Ghana can bridge the gap between the current trends of adherence and the UNAIDS 95-95-95 targets. The findings demand a paradigm shift—away from viewing health literacy as a person's attribute to leveraging it as a therapeutic agent in HIV treatment. Patients must overcome systemic blocks in future as they tap the resilience and promise of PLWH to secure sustained viral suppression and improved quality of life.

#### ***Finding Implications***

- Tailor health promotion programs to equip PLWH with self-management capabilities. This will equip them with the needed self-efficiency skills required to make informed decisions.
- Interventions for improving ‘Social support for health must be re-evaluated to maximize the benefits of health literacy completely.

### **Public Health Recommendations**

- Education: TGH can collaborate with local schools and other stakeholders to provide health talks with emphasis on health literacy. The facility could also set up a health literacy corner within the health promotion/ART unit to offer tailored health education
- Training: Healthcare workers in TGH must be equipped as health literacy educators, offering educational talks during patient one-on-one encounters and waiting hours.
- Peer Support Networks: Reinforce the use of high-adherence patients as peer educators to supplement gaps in key health literacy.

### **Directions for Future Research**

1. Longitudinal Research: Trace health literacy and adherence trajectories to identify critical intervention windows.
2. Mixed-Methods Research: Resolve the administrative confidence-non-adherence conundrum by conducting patient interviews.
3. Regional Comparisons: Investigate urban-rural differences in the association between health literacy and adherence.

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