ENSIGN GLOBAL UNIVERSITY, KPONG

EASTERN REGION, GHANA

FACULTY OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

PREVALENCE AND DETERMINANTS OF HIV TESTING FOR THE PREVENTION OF MOTHER-TO-CHILD TRANSMISSION AMONG WOMEN IN GHANA

BY

VANESSA OPAREBEA ADDO-DJAN

247100298

NOVEMBER, 2025

ENSIGN GLOBAL UNIVERSITY, KPONG

EASTERN REGION, GHANA

PREVALENCE AND DETERMINANTS OF HIV TESTING FOR THE PREVENTION OF MOTHER-TO-CHILD TRANSMISSION AMONG WOMEN IN GHANA

BY

VANESSA OPAREBEA ADDO-DJAN

247100298

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

NOVEMBER, 2025

DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Ensign Global University, Kpong or any other educational institution, except where due acknowledgment is made in the thesis.

VANESSA OPAREBEA ADDO-DJAN (247100298) 09/10/2025

(Student) Signature Date

Certified by:

DR. SANDRA BOATEMAA KUSHITOR …… ……

(Supervisor) Signature Date

Certified by:

DR. STEPHEN MANORTEY …… ……

(Head of Academic Program) Signature Date

DEDICATION

I dedicate this work to Almighty God for His guidance and strength throughout my journey, and to my family for their unwavering love, care, and support. This work is also devoted to all Ghanaian mothers, whose resilience and sacrifices inspire the pursuit of better health outcomes for future generations.

ACKNOWLEDGEMENT

I wish to express my deepest gratitude to my supervisor, Dr. Sandra Boatemaa Kushitor, for her invaluable guidance, support, and patience throughout the preparation of this research proposal. I am equally grateful to the Department of Community Health, Ensign Global University, for providing the academic environment and resources that enabled the completion of this work.

I also acknowledge the Demographic and Health Surveys (DHS) Program, the Ghana Statistical Service, and the Ghana Health Service for making available the 2022 Ghana Demographic and Health Survey dataset, which forms the basis of this study.

Finally, I give all glory and honour to Almighty God for His grace, wisdom, and strength in bringing this work to fruition.

LIST OF ABBREVIATIONS

Abbreviation	Full Meaning
AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
DHS	Demographic and Health Survey
ANC	Antenatal Care
GDHS	Ghana Demographic and Health Survey
GAC	Ghana AIDS Commission
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HTC	HIV Testing and Counselling
HIV	Human Immunodeficiency Virus
IR	Individual Recode (dataset from DHS)
MTCT	Mother-to-Child Transmission
NHIS	National Health Insurance Scheme
PMTCT	Prevention of Mother-to-Child Transmission
SSA	Sub-Saharan Africa
TBA	Traditional Birth Attendant
UNAIDS	Joint United Nations Programme on HIV/AIDS
WHO	World Health Organization
95-95-95	UNAIDS global treatment and prevention

	targets
SDG	Sustainable Development Goals

ABSTRACT

Prevalence and Determinants of HIV Testing for the Prevention of Mother-to-Child Transmission among Women in Ghana

Background: Despite global progress in prevention and treatment, mother-to-child transmission of the Human Immunodeficiency Virus (HIV) remains a major public health challenge, particularly in low- and middle-income countries. Although HIV testing has been integrated into routine antenatal care, disparities persist across regions and socio-economic groups, underscoring the need to ensure equitable access to prevention services for women in Ghana.

Aim: This study assessed the prevalence and determinants of HIV testing for the prevention of mother-to-child transmission among women in Ghana, and examined women's knowledge and socio-demographic inequalities in the uptake of HIV testing.

Methodology: An analytical cross-sectional study was conducted using data from the 2022 Ghana Demographic and Health Survey (GDHS), involving a weighted sample of 8,580 women aged 15–49 years who had a live birth within the five years preceding the survey. Descriptive and logistic regression analyses were used to identify predictors of HIV knowledge and testing.

Results: The study showed that 88.4% of women were tested for HIV and received their results, but only 36.3% demonstrated comprehensive knowledge of HIV transmission and prevention. Women aged 20–29 years, those with secondary or higher education, and those from middle to richest wealth quintiles were significantly more likely to have comprehensive knowledge and to undergo HIV testing. Conversely, women living with a partner and those from the poorest households were less likely to do so. Place of residence and most ethnic groups showed no independent associations with testing after adjustment.

Conclusion: Ghana has made considerable progress in expanding antenatal HIV testing; however, persistent inequalities in knowledge and uptake remain. Strengthening targeted education, addressing socio-economic barriers, and promoting male involvement will be critical to achieving universal prevention of mother-to-child transmission of HIV.

Keywords:

HIV testing; prevention of mother-to-child transmission; maternal health; G

TABLE OF CONTENTS

DECLARATION iii

DEDICATION iv

ACKNOWLEDGEMENT v

LIST OF ABBREVIATIONS vi

ABSTRACT viii

LIST OF TABLES xiii

LIST OF FIGURES xv

LIST OF APPENDICES xvi

CHAPTER ONE 1

1.0 INTRODUCTION 1

1.1 Background 1

1.2 Problem Statement 4

1.3 Rationale of the Study 5

1.4 Conceptual Framework 6

1.5 Research Questions 10

1.6 General Objective 10

1.7 Specific Objectives 10

1.8 Profile of Study Area 10

1.9 Scope of the Study 13

1.10 Organization of the Study 14

CHAPTER TWO 15

2.0 LITERATURE REVIEW 15

2.1 Introduction 15

2.2 Global Prevalence of HIV and Mother-to-Child Transmission 16

2.3 Global HIV Screening Initiatives 17

2.4 HIV Prevalence and Mother-to-Child Transmission in Ghana 18

2.5 Uptake of ANC-Based HIV Testing and Receipt of Results in Ghana 19

2.6 Women's Knowledge of HIV Transmission and Prevention in Ghana 20

2.7 Predictors of ANC-Based HIV Testing Uptake (Andersen's Behavioral Model) 21

2.8 HIV Policies and Intervention Strategies 22

2.9 Summary 23

CHAPTER THREE 25

3.0 METHODOLOGY 25

3.1 Introduction 25

3.2 Research Design and Source of Data 25

3.3 Data Collection Techniques and Tools 26

3.5 Study Variables 27

3.6 Operationalization of Variables 29

3.7 Data Handling 29

3.8 Data Analysis 30

3.9 Ethical Considerations 31

3.10 Limitations of the Study 31

3.11 Assumptions 32

CHAPTER FOUR 33

4.0 RESULTS 33

4.1 Demographic Characteristics 33

4.2 Women's Knowledge of HIV transmission and prevention 36

4.4 Bivariate Analysis of Sociodemographic Factors Influencing HIV Knowledge Among Women 38

4.5 Bivariate Analysis of Socio-Demographic Factors Influencing HIV Testing Uptake Table 42

4.6 Logistic Regression of Factors Influencing HIV Knowledge Among Women 46

4.7 Logistic Regression of Factors Influencing HIV Testing Uptake Among Women 50

CHAPTER FIVE 54

5.0 DISCUSSION 54

5.1 Introduction 54

5.2 Women's Knowledge of HIV and Its Prevention 54

5.3 Uptake of HIV Testing During Antenatal Care 56

5.4 Determinants of HIV Testing Uptake Among Women 57

5.5 Summary of Key Findings 58

CHAPTER SIX 60

6.0 CONCLUSIONS AND RECOMMENDATIONS 60

6.1 Conclusions 60

6.2 Recommendations 61

Empowering Women and Communities 61

Strengthening Health-Service Delivery 61

Health-System and Policy Support 62

Research and Continuous Learning 63

6.3 Summary 63

REFERENCES 64

APPENDIX I 72

APPENDIX II Ethical Clearance Form 74

LIST OF TABLES

Table 1: Demographic Characteristics 34

Table 2: Distribution of Women's Knowledge on HIV Transmission and Prevention Methods. 37

Table 3: Bivariate Analysis of Sociodemographic Factors Influencing HIV Knowledge Among 40

Table 4: Bivariate Analysis of Socio-Demographic Factors Influencing HIV Testing Uptake 43

Table 5: Logistic Regression of Factors Influencing HIV Knowledge Among Women..... 48

Table 6: Logistic Regression of Factors Influencing HIV Testing Uptake Among Women..... 51

LIST OF FIGURES

Figure 1: Conceptual framework of determinants of HIV testing and counselling for PMTCT 9

Figure 2: Map of Ghana Showing Administrative Regions 13

Figure 3: Comprehensive Knowledge on HIV Prevention and Treatment 38

LIST OF APPENDICES

APPENDIX I..... 72

APPENDIX II Ethical Clearance Form 74

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Global progress in reducing HIV infections and AIDS-related deaths has been significant over the past three decades. More people now have access to prevention, testing, and treatment services than ever before. Yet, HIV remains a major public health concern particularly in low- and middle income countries where weak health systems and resource constraints continue to impede progress (UNAIDS, 2024). In 2021, approximately 38.4 million people were living with HIV globally, with 1.5 million new infections and 650,000 AIDS-related deaths recorded that year (UNAIDS, 2022a). These figures underline the ongoing urgency of sustained global action.

Sub-Saharan Africa continues to bear the heaviest burden, accounting for nearly two-thirds of all people living with HIV and the vast majority of infected children (UNAIDS, 2022a). Persistent structural and social challenges including poverty, gender inequality, stigma, and weak health infrastructure limit prevention and treatment success (Kok *et al.*, 2017).

Mother-to-child transmission (MTCT) of HIV remains the principal source of paediatric infection. Transmission can occur during pregnancy, labour, delivery, or breastfeeding (WHO, 2023). Without intervention, the risk of vertical transmission ranges from 15 to 45 percent, but with early HIV testing, timely initiation of antiretroviral therapy (ART), safe delivery, and infant prophylaxis, the risk can fall below 5 percent (Obeagu *et al.*, 2025; FHI 360). Antenatal care (ANC) therefore serves as a critical entry point for HIV testing and prevention of MTCT.

In Ghana, HIV prevalence is moderate but continues to threaten maternal and child health. National estimates indicate that in 2022 adult prevalence was 1.7 percent equivalent to roughly 330,000 adults and 25,000 children living with the virus (Ghana AIDS Commission, 2023). Women shoulder a disproportionate share of this burden: among those aged 15–49 years, prevalence is higher than among men, due partly to biological susceptibility and to gender-based inequalities that limit women's control over sexual health and access to care (Ghana AIDS Commission, 2023).

The consequences of maternal HIV extend beyond infection risk. HIV-positive pregnant women face greater likelihood of adverse outcomes such as preterm birth, low birth weight, and intrauterine growth restriction (Yang *et al.*, 2020). When maternal infection remains undetected or untreated, the infant's chance of contracting HIV rises sharply.

Socio-demographic differences within Ghana compound the challenge. The 2022 Ghana Demographic and Health Survey (GDHS) reported high national coverage of antenatal HIV testing but revealed inequities across regions. Fewer women in underserved areas particularly North East, Savannah, and Oti received testing compared to those in Greater Accra or Ashanti (GSS, GHS & ICF, 2023).

Knowledge of how HIV is transmitted from mother to child and of the effectiveness of prevention interventions also varies widely. In many rural areas, awareness of transmission during delivery or breastfeeding remains limited. Research from northern Ghana shows that while most women have heard of HIV, far fewer understand specific transmission routes or the protective role of PMTCT (Mohammed *et al.*, 2024). Nationally, only about 69 percent of women of reproductive age correctly recognised that HIV can be transmitted during pregnancy, with substantial variation by region and education (Mohammed *et al.*, 2024). In the Upper East Region, although more than 85

percent of women had heard of HIV, less than half could identify all major transmission routes (Nyarko *et al.*, 2019). Qualitative studies from the north further reveal misconceptions that transmission to the child is inevitable even when treatment is available (Dako-Gyeke *et al.*, 2016).

Some pregnant women continue to rely on traditional or spiritual remedies instead of biomedical PMTCT services, widening the gap between awareness and evidence-based practice (Sutherland *et al.*, 2025). Similar gaps exist among health professionals. Midwives in mission hospitals, for instance, have demonstrated limited understanding of ART initiation protocols and infant-feeding guidelines, restricting their capacity to support mothers effectively (Donkor *et al.*, 2023). Cultural norms around breastfeeding and persistent stigma also deter some women from fully engaging in prevention services, even in urban areas such as Kumasi where ART availability is high (Sutherland *et al.*, 2025).

At the system level, challenges such as staff shortages, irregular training, stock-outs of essential commodities, and weak supervision undermine service quality (Osei *et al.*, 2023). These constraints reduce confidence in care and exacerbate community-level misinformation. Consequently, knowledge gaps are widespread affecting both women and healthcare providers and are reinforced by systemic weaknesses. Without adequate knowledge, even well-structured PMTCT programmes cannot achieve full effectiveness. Bridging these deficits is critical to achieving national and global goals for the elimination of MTCT in Ghana.

To address this, Ghana has implemented several policies to eliminate vertical transmission. HIV testing has been integrated into routine ANC, ART coverage expanded, and national PMTCT guidelines revised to improve implementation (National PMTCT Guideline, 2021). Yet disparities persist, driven by stigma, uneven distribution of skilled personnel, and lack of awareness in

underserved communities. Understanding the factors behind these inequalities is therefore vital for ensuring that all women regardless of location or socio-economic background have equitable access to HIV testing and prevention services during pregnancy.

1.2 Problem Statement

Ghana has made measurable gains in HIV control through the expansion of PMTCT programming and adoption of WHO's Option B+, which guarantees lifelong antiretroviral therapy for all HIVpositive pregnant and breastfeeding women. HIV testing has been embedded within antenatal care, and the National Health Insurance Scheme's free maternal care package reduces point-of-care financial barriers (Ghana AIDS Commission, 2023). The 2022 Ghana Demographic and Health

Survey (GDHS) indicates that more than nine in ten women who attended ANC were offered an HIV test, reflecting a strong national platform for prevention (GSS, GHS & ICF, 2023). Yet important gaps persist. Women of reproductive age continue to bear a disproportionate share of the national burden, representing nearly 68% of all people living with HIV, and this imbalance magnifies risks to maternal and child health (Ghana AIDS Commission, 2023). Regional inequities remain pronounced: while testing rates surpass 95% in some regions, they fall below 80% in others, a pattern that mirrors uneven health infrastructure, long travel distances, and socioeconomic constraints that limit consistent service use (GSS, GHS & ICF, 2023).

Knowledge deficits compound these structural barriers. Only about 69% of women of reproductive age correctly identify pregnancy as a route of HIV transmission, and misconceptions such as assuming that infant infection is inevitable continue to circulate in some communities (Mohammed *et al.*, 2024; Sutherland *et al.*, 2025). Stigma, concerns about confidentiality, and limited partner

support further reduce willingness to test or remain engaged with services after initial contact. At the operational level, missed opportunities also occur late in pregnancy. Evidence from Northern Ghana shows lapses in repeat testing for women who initially tested negative, driven by staffing pressures, long waiting times, and weak follow-up systems signals of persistent system stress that can blunt the impact of otherwise sound policy (Amoako *et al.*, 2025).

Taken together, Ghana's progress is real but uneven. Disparities in testing uptake, health literacy, and service accessibility continue to undermine national gains toward the elimination of paediatric infections. Addressing these gaps requires a clear understanding of the determinants of HIV testing among women of reproductive age. The present study therefore examines how socio-demographic, economic, and health-system factors shape testing behaviour. By generating evidence on these drivers, the study aims to inform public-health practice, guide equitable policy design, and support educational initiatives that accelerate progress toward eliminating mother-to-child transmission in Ghana.

1.3 Rationale of the Study

Eliminating paediatric HIV in Ghana depends on both high coverage and equitable uptake of testing among pregnant women. Although PMTCT services and ART availability have expanded, the expected decline in new infant infections has been slower than anticipated, pointing to persistent implementation bottlenecks and uneven adherence (Ghana AIDS Commission, 2023; Ghana News Agency, 2024). Socio-demographic disparities are central to this challenge. The 2022 GDHS demonstrates that urban women are more likely than rural women to undergo HIV testing during pregnancy, reflecting differences in proximity to facilities, transport costs, and the reliability of service delivery (GSS, GHS & ICF, 2023). Knowledge profiles also differ across populations.

While general awareness is high, comprehension of specific MTCT pathways and the preventive role of maternal ART and infant prophylaxis remains inconsistent, with women in deprived regions more likely to hold misconceptions or incomplete information (Mohammed *et al.*, 2024).

Health-system constraints amplify these inequalities. In Saboba District, for example, only about one-fifth of women who initially tested negative were retested at 34 weeks' gestation, a missed safeguard that reflects weak continuity mechanisms and limited staffing bandwidth (Amoako *et al.*, 2025). Long waiting times, stock management challenges, and the dampening effects of stigma and privacy concerns can further erode follow-through even when services are nominally available. These realities underscore the need for an analysis that goes beyond national averages to identify which women are being left behind and why.

The present study responds to that need by quantifying the prevalence of testing and receipt of results among women in Ghana and by modelling the determinants associated with uptake. Its contribution is practical as well as analytical: findings can help programme managers and frontline teams tailor demand-creation and service-delivery strategies to high-need settings; inform resource allocation and region-specific planning consistent with the UNAIDS 95-95-95 framework; highlight priorities for qualitative and longitudinal research on persistent barriers; and enrich midwifery, nursing, and public-health training with context-specific evidence on maternal HIV prevention. By linking empirical results to these domains, the study provides actionable insights for accelerating progress toward the elimination of mother-to-child transmission.

1.4 Conceptual Framework

This study applies Andersen's Behavioral Model of Health Service Use to explain variation in antenatal HIV testing among women in Ghana. The model proposes that utilisation arises from the

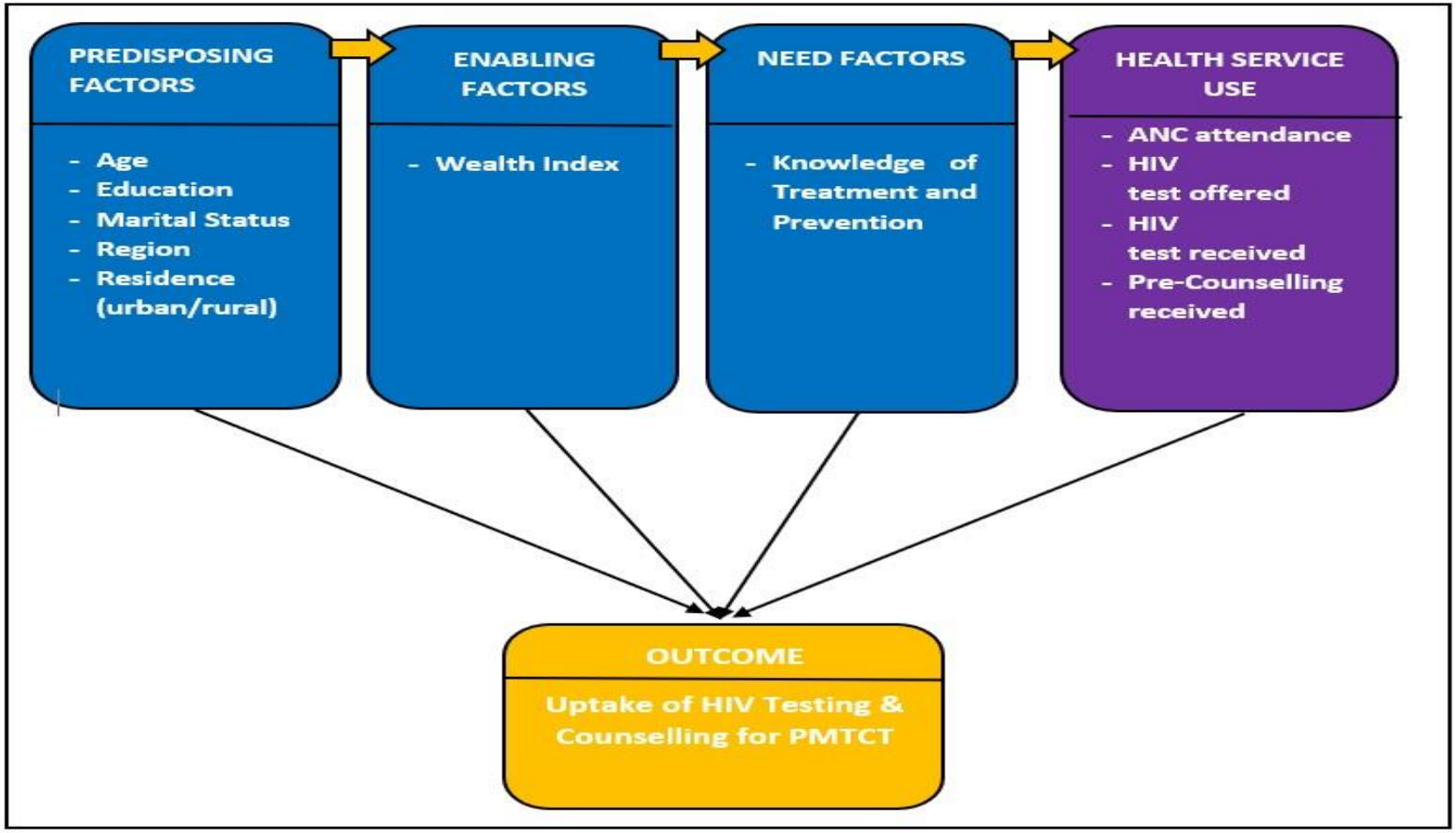
interplay of three domains: predisposing characteristics, enabling resources, and need (Andersen, 1995). In the Ghanaian context, predisposing factors include age, education, marital status, parity, and place of residence attributes that shape health beliefs and the propensity to seek testing. Younger, better-educated women, for instance, are more likely to recognise the value of testing, whereas women in rural settings may face informational deficits or social pressures that dampen uptake (Mohammed *et al.*, 2024).

Enabling factors capture the material and organisational conditions that make service use possible or difficult. Household wealth, physical distance to facilities, NHIS coverage, and exposure to credible health information influence whether a woman can convert intention into action. Women with greater economic resources or those living closer to functioning facilities encounter fewer obstacles, while those in deprived areas must navigate transport costs, household responsibilities, and irregular service availability (Essuman *et al.*, 2024). Need encompasses both perceived susceptibility and relevant knowledge of HIV transmission. Women who understand pregnancy, delivery, and breastfeeding as transmission windows and who appreciate the protective effect of maternal ART and infant prophylaxis are more likely to test and to act on results. Conversely, enduring misconceptions, such as the belief that infant infection is unavoidable, erode motivation to engage (Sutherland *et al.*, 2025).

Although Andersen's model emphasises individual and household determinants, service characteristics remain proximate levers that translate these factors into actual utilisation. Within ANC, whether a test is offered, accepted, and followed by communication of the result depends on the reliability, privacy, and efficiency of the encounter (Dadzie *et al.*, 2024). In this study, the model guides variable selection and hypothesis formulation, structures the review of determinants

in Chapter Two, and informs interpretation of findings in Chapter Five. Framing the analysis through this lens clarifies how socio-demographic attributes, enabling resources, perceived need, and service features interact to produce observed patterns of HIV testing among pregnant women in Ghana.

Figure 1: Conceptual framework of determinants of HIV testing and counselling for PMTCT



(**Source:** Adapted from Andersen, 1995)

1.5 Research Questions

1. What is the level of knowledge of HIV Transmission and Prevention among women in Ghana?
2. What are the patterns of uptake of HIV testing, pre-test counselling, and receiving HIV test results during antenatal care?
3. What factors predict HIV testing uptake among pregnant women in Ghana?

1.6 General Objective

This study aimed to assess the Prevalence and determinants of HIV testing and counselling for PMTCT among women in Ghana using the 2022 GDHS.

1.7 Specific Objectives

1. To examine women's knowledge of HIV and its prevention.
2. To assess the uptake of HIV testing and receiving HIV test results during antenatal care.
3. To identify predictors of HIV testing uptake among pregnant women.

1.8 Profile of Study Area

This study drew on nationally representative data from Ghana, a lower-middle-income country on the west coast of Africa bordered by Côte d'Ivoire to the west, Burkina Faso to the north, Togo to the east, and the Atlantic Ocean to the south. Ghana was divided into 16 administrative regions and had an estimated population of 30.8 million in 2021 (GSS 2021). Its geographical and cultural diversity significantly shaped access to healthcare services, including those directed at preventing mother-to-child transmission (PMTCT) of HIV.

The health system in Ghana was structured in tiers national, regional, district, and community levels under the stewardship of the Ministry of Health and implemented largely by the Ghana Health Service (GHS). Through this structure, maternal and child health services, including antenatal HIV testing and counselling, were delivered across the country (GHS 2021). Despite this framework, socio-demographics disparities persisted. Regions such as Greater Accra and Ashanti, with higher concentrations of facilities and personnel, reported relatively better coverage of antenatal services, while rural and underserved areas like Upper East, Savannah, and North East continued to face barriers such as distance to facilities, limited human resources, and inadequate supplies (GSS 2023).

The introduction of Ghana's National Health Insurance Scheme (NHIS) was a crucial intervention in reducing financial barriers to care. The scheme provided free coverage for antenatal services, including HIV testing, counselling, and treatment for enrolled women. This policy improved service uptake, but gaps remained in awareness and enrolment, particularly in rural and poorer communities where women often did not register for NHIS or faced challenges in renewing their membership (Wang et al. 2021). These inequities contributed to persistent inequalities in PMTCT access, even though services were theoretically free at the point of care.

Ghana was ethnically diverse, with the Akan, Mole-Dagbani, Ewe, and Ga-Dangme being the largest groups, and religiously plural with Christianity as the dominant faith, followed by Islam and traditional religions. These cultural and religious systems often shaped women's perceptions of health, pregnancy, and HIV. For example, stigma surrounding HIV remained an issue in some communities, discouraging women from seeking testing during pregnancy (UNAIDS, 2023).

Understanding how these cultural contexts intersected with health-seeking behavior was key to strengthening PMTCT programming.

The economy was largely informal, with many women engaged in agriculture, trading, and services. This reality affected women's capacity to pay for healthcare or take time away from work to attend antenatal appointments. While NHIS reduced out-of-pocket costs, indirect costs such as transport, time lost from work, and childcare responsibilities still limited-service uptake, especially for women in rural and economically deprived households (GSS, 2022).

As of 2022, Ghana's national HIV prevalence stood at 1.7%, with socio-demographic differences evident. Greater Accra and Eastern consistently recorded higher prevalence compared to the north (GAC, 2023). The Ghana AIDS Commission (GAC) coordinated the national HIV response, aligning government and partners in expanding prevention, testing, and treatment. Despite progress, the uneven distribution of services and persistent socio-economic barriers left many women without full access to PMTCT during antenatal care.

By situating this study in the Ghanaian context, the analysis highlighted how geographic, economic, cultural, and systemic differences influenced HIV testing and counselling during pregnancy. This was vital for understanding why gaps in PMTCT coverage remained and for informing strategies to achieve the national goal of eliminating mother-to-child transmission of HIV.

Figure 2: Map of Ghana Showing Administrative Regions

Source: *(Ghana Statistical Service, 2021)*.

1.9 Scope of the Study

This study examined the determinants of HIV testing and counselling for the prevention of motherto-child transmission (PMTCT) among women in Ghana, using secondary data from the

2022 Ghana Demographic and Health Survey (GDHS). The analysis was limited to women aged 15–49 years who had a live birth within the five years preceding the survey and who attended at least one antenatal care (ANC) visit during that pregnancy, since ANC served as the primary entry point for PMTCT services.

The study did not include men, adolescents who were not mothers, or women who did not access ANC during their most recent pregnancy. While the GDHS provided nationally representative data, the analysis considered both socio-demographic differences and broader predictors of HIV testing uptake, including socio-demographic characteristics, knowledge of HIV and PMTCT, and ANC service utilization. This scope ensured that the findings highlighted structural and individual factors shaping PMTCT service use, thereby informing strategies to strengthen maternal health and HIV prevention efforts in Ghana.

1.10 Organization of the Study

This dissertation was structured into five chapters. Chapter One provided the introduction, covering the background, problem statement, rationale, conceptual framework, research questions, objectives, scope, and the profile of the study area. Chapter Two reviewed relevant literature on HIV testing for PMTCT, with a focus on determinants and disparities in access and uptake. Chapter Three outlined the methodology, describing the study design, population, data sources, inclusion and exclusion criteria, variables, and statistical analysis plan. Chapter Four presented the results of the study, while Chapter Five discussed the ethical considerations and dissemination of findings. The dissertation concluded with appendices that included the study timeline, budget, and data extraction checklist.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Human Immunodeficiency Virus (HIV) testing within the framework of the Prevention of Motherto-Child Transmission (PMTCT) remains one of the most cost-effective strategies to reduce paediatric HIV infections and maternal mortality. Global commitments, notably the UNAIDS 9595-95 targets, highlight the importance of identifying 95 % of people living with HIV, enrolling 95 % of those diagnosed on treatment, and achieving viral suppression for 95 % of those on therapy by 2030 (UNAIDS, 2023). Sub-Saharan Africa bears a disproportionate burden, accounting for nearly two-thirds of global HIV infections and most paediatric cases (UNAIDS, 2024).

Ghana has made substantial progress in integrating PMTCT into routine antenatal care (ANC), yet service inequities and knowledge gaps persist. Women in urban and wealthier households exhibit higher HIV testing uptake than those in rural and low-income settings, where structural barriers such as limited health infrastructure, transport difficulties, and stigma constrain access (Dadzie *et al.*, 2024). Despite strong ANC attendance, persistent misconceptions for instance, beliefs that HIV spreads through mosquito bites or food sharing continue to affect informed decision-making (Mohammed *et al.*, 2024).

This review synthesizes international and national evidence on HIV testing and result receipt during pregnancy. It examines women's knowledge of HIV transmission and prevention, sociodemographic determinants, and systemic factors influencing service use. The chapter applies

Andersen's Behavioral Model of Health Service Use as the conceptual lens, grouping determinants into predisposing, enabling, and need-related factors that explain variations in ANC-based HIV testing uptake among Ghanaian women.

2.2 Global Prevalence of HIV and Mother-to-Child Transmission

Globally, HIV remains a leading public-health challenge despite four decades of intervention. At the end of 2022, approximately 38.4 million people were living with HIV, with 1.5 million new infections and 650,000 AIDS-related deaths recorded that year (UNAIDS, 2023). Sub-Saharan Africa carries the highest burden, home to about two-thirds of all people living with the virus and most children infected through vertical transmission (UNAIDS, 2024).

Mother-to-child transmission (MTCT) accounts for nearly all paediatric infections. Without intervention, the risk of transmission during pregnancy, labour, delivery or breastfeeding ranges from 15 % to 45 %. However, timely maternal testing, initiation of lifelong antiretroviral therapy (ART), safe delivery practices and appropriate infant prophylaxis can reduce this risk to below 5 % (De Cock *et al.*, 2010; Mofenson *et al.*, 2022). Between 2010 and 2022, global paediatric infections dropped from over 500,000 to around 130,000 cases (UNICEF, 2024), largely due to the rapid expansion of PMTCT programmes.

Nonetheless, progress remains uneven. Eastern and Southern Africa have achieved significant declines, whereas West and Central Africa still contribute nearly one-fifth of new paediatric infections (UNAIDS, 2023). Health-system limitations, inadequate human resources, stock-outs of test kits, and stigma continue to hinder the elimination agenda. Sustained progress depends on reliable ANC-based testing and strong linkage to lifelong treatment.

2.3 Global HIV Screening Initiatives

International frameworks have guided the expansion of HIV testing, particularly for pregnant women. The UNAIDS Global AIDS Strategy 2021–2026 and the 2021 UN High-Level Meeting on AIDS established 2025 milestones under the 95-95-95 targets, prioritizing people-centred and community-led testing (UNAIDS, 2022a). These commitments emphasise universal access to antenatal HIV testing as a cornerstone of elimination strategies.

WHO's successive guidelines operationalised these global goals. The 2016 guideline introduced HIV self-testing and assisted partner notification to reach first-time testers. The 2019 consolidated guideline expanded differentiated service delivery and clarified retesting protocols for individuals with ongoing exposure, including pregnant and breastfeeding women. The 2021 integrated guideline further unified prevention, testing, treatment, service delivery, and monitoring—reemphasising provider-initiated testing in ANC and rapid ART initiation following a positive result (WHO, 2021).

The Global Alliance to End AIDS in Children by 2030, launched by UNAIDS, WHO, and UNICEF in 2022, focuses on four pillars: (1) testing and treatment for pregnant and breastfeeding women; (2) early testing and treatment for infants and children; (3) closing adolescent treatment gaps; and (4) removing social barriers such as stigma (UNAIDS, 2022). Complementary initiatives, including WHO's Triple Elimination Agenda, promote integrated screening for HIV, syphilis, and hepatitis B within ANC, offering a validation framework for elimination (WHO, 2023).

Collectively, these global commitments have shifted emphasis from isolated testing to comprehensive, life-course approaches. Local Fast-Track city initiatives and multi-partner district

programmes further reinforce the norm of routine ANC testing and same-day result communication (IAPAC & UNAIDS, 2022).

2.4 HIV Prevalence and Mother-to-Child Transmission in Ghana

Ghana's HIV burden, though moderate, remains of public-health concern. In 2022, adult prevalence was estimated at 1.7 %, translating to roughly 330,000 adults and 25,000 children living with HIV (Ghana AIDS Commission, 2023). Women constitute about 70 % of infections, underscoring the relevance of maternal interventions. The country adopted Option B+ in 2012, guaranteeing lifelong ART for pregnant and breastfeeding women, and embedded HIV testing into routine ANC nationwide. By 2022, more than 90 % of ANC attendees reported being offered a test (GSS, GHS & ICF, 2023).

Although MTCT has declined, residual transmission persists due to missed opportunities for retesting late in pregnancy and during breastfeeding, late ANC initiation, and incomplete followup (Amoako *et al.*, 2025). Studies indicate that women who book late for ANC or attend few visits are less likely to be retested and more likely to miss early infant diagnosis appointments. Providerlevel inconsistencies such as divergent advice on infant feeding or prophylaxis—also compromise service quality (Donkor *et al.*, 2023).

Nevertheless, Ghana's integrated ANC-PMTCT framework demonstrates significant momentum. Sustained progress requires strengthening early ANC uptake, ensuring reliable supply chains, and addressing stigma and socio-economic inequities that still impede universal access (GSS, GHS & ICF, 2023; Ghana AIDS Commission, 2023).

2.5 Uptake of ANC-Based HIV Testing and Receipt of Results in Ghana

HIV testing has been a standard component of ANC in Ghana for more than a decade. National data show that most pregnant women attending ANC are offered and accept HIV testing, reflecting the success of provider-initiated testing and the Treat All policy (GSS, GHS & ICF, 2023; Ghana AIDS Commission, 2023). Uptake is highest among women who initiate ANC early and complete at least four visits, as these visits provide multiple testing opportunities (Aboagye *et al.*, 2024).

Where supplies and staff are adequate, rapid testing enables same-day results, facilitating immediate ART initiation for positive cases (WHO, 2021). However, periodic test-kit shortages, high client volumes, and staffing constraints reduce efficiency. Facilities that experience these challenges record lower testing rates and occasional delays in result delivery (GSS, GHS & ICF, 2023).

Persistent challenges include inadequate retesting during late pregnancy or breastfeeding for women with ongoing exposure, especially in northern Ghana (Dadzie *et al.*, 2024; Amoako *et al.*, 2025). Socio-economic factors compound service barriers: women with inconsistent NHIS coverage or long travel distances are less likely to attend repeat visits or receive results on time (Wang, Otoo & Dsane-Selby, 2021; Ghana Statistical Service, 2022). Media exposure and healthpromotion messaging are associated with improved awareness and demand for testing (Essuman

et al., 2024).

Overall, Ghana's ANC platform achieves wide coverage, but sustaining high performance requires system reliability, proactive follow-up for retesting, and streamlined result communication at every

visit.

2.6 Women's Knowledge of HIV Transmission and Prevention in Ghana

Women's understanding of HIV transmission and prevention strongly influences testing behaviour. While general awareness is near universal, comprehensive knowledge defined by the Demographic and Health Surveys (DHS) as correctly identifying two prevention methods, recognising that a healthy-looking person can have HIV, and rejecting two common misconceptions remains incomplete (GSS, GHS & ICF, 2023; Mohammed *et al.*, 2024).

Many Ghanaian women can name condoms and fidelity as preventive measures but remain uncertain about transmission pathways during pregnancy, delivery, or breastfeeding. Misconceptions such as attributing infection to mosquito bites, food sharing, or spiritual causes are more common among women with limited education or minimal media exposure (GSS, GHS & ICF, 2023; Nyarko *et al.*, 2019; Dako-Gyeke *et al.*, 2016). These beliefs reduce perceived susceptibility and hinder testing decisions.

Information exposure significantly improves knowledge. Radio and television health programmes, community durbars, and engagement with community health officers are associated with higher knowledge scores (Essuman *et al.*, 2024). Knowledge levels also differ by socio-demographic profile: younger, urban, educated and wealthier women tend to score higher than older or rural women (Mohammed *et al.*, 2024). In this study, comprehensive HIV knowledge is measured using the DHS five-item definition detailed in Chapter Three.

Overall, accurate knowledge functions as both a health-literacy indicator and a behavioural determinant. Strengthening information delivery through ANC, community outreach and mass media remains critical to improve informed decision-making and testing uptake.

2.7 Predictors of ANC-Based HIV Testing Uptake (Andersen's Behavioral Model)

Evidence across sub-Saharan Africa, including Ghana, confirms that individual, socio-economic and service-delivery factors jointly determine whether pregnant women accept HIV testing during ANC. Andersen's Behavioral Model of Health Service Use (1995) provides a conceptual framework that categorises these determinants as predisposing, enabling and need factors.

Predisposing factors

Age, education, marital status, and parity significantly influence testing decisions. Adolescents (15–19 years) and younger women are less likely to test compared to women aged 25–34 (Essuman *et al.*, 2024). Higher education increases uptake through better health literacy and confidence in engaging with providers (Dadzie *et al.*, 2024). Married or cohabiting women and those with previous pregnancies demonstrate higher acceptance rates due to familiarity with ANC processes (GSS, GHS & ICF, 2023).

Enabling factors

Wealth, residence, insurance status, and information access determine the ability to use services. Urban women and those in higher wealth quintiles exhibit greater uptake than rural and poorer counterparts, who face transportation barriers and indirect costs (GSS, GHS & ICF, 2023; Dadzie *et al.*, 2024). NHIS coverage under the Free Maternal Care policy reduces user fees and supports attendance, though renewal lapses persist in deprived areas (National Health Insurance Authority, 2008). Exposure to health information through media or community health programmes further enhances uptake (Essuman *et al.*, 2024).

Need factors

Perceived susceptibility, knowledge of MTCT and perceived benefits of testing influence acceptance. Women aware of pregnancy and breastfeeding transmission windows and confident in ART effectiveness are more likely to test (Mohammed *et al.*, 2024). Conversely, stigma, fear of disclosure, and doubts about confidentiality discourage participation particularly among adolescents and women without partner support (UNAIDS, 2023; Dako-Gyeke *et al.*, 2016).

In summary, Andersen's model explains why health-service use depends on the interaction of background characteristics (predisposing), available resources (enabling), and perceptions of need. In Ghana, education, wealth, residence, insurance, and accurate knowledge consistently predict HIV testing during ANC, confirming the model's applicability.

2.8 HIV Policies and Intervention Strategies

Policy frameworks at both global and national levels have shaped HIV testing in pregnancy. The UNAIDS Global AIDS Strategy 2021–2026 and the 2021 UN High-Level Meeting on AIDS reaffirmed universal testing, rapid ART initiation, and people-centred service delivery (United Nations, 2021; UNAIDS, 2021a). WHO guidelines (2016–2021) institutionalized self-testing, partner notification, and provider-initiated testing within ANC, with explicit directions for retesting during pregnancy and breastfeeding (WHO, 2021).

Ghana's policies mirror these frameworks. The National PMTCT Guidelines (revised 2021) mandate HIV testing at first ANC contact, specify retesting when indicated, and integrate partner services and early infant diagnosis (GHS, 2021; Ghana AIDS Commission, 2023). Adoption of

Option B+ in 2012 and the later Treat All approach ensured that all pregnant and breastfeeding women diagnosed with HIV commenced lifelong ART immediately.

Financial protection through the NHIS Free Maternal Care Policy (2008) removed user fees for ANC, delivery and postnatal care, including HIV testing and PMTCT services (National Health Insurance Authority, 2008). Implementation challenges persist, such as uneven NHIS coverage, commodity stock-outs and workforce shortages (WHO, 2023). National strategies now promote male involvement, stigma reduction, and community-led delivery to sustain progress and close equity gaps.

2.9 Summary

The literature demonstrates that mother-to-child transmission of HIV is largely preventable when ANC-based testing, prompt ART initiation, and appropriate infant prophylaxis are ensured (Mofenson *et al.*, 2022). Global and national policies, including the 95-95-95 targets, Option B+, Treat All and the Free Maternal Care policy, have expanded testing coverage and strengthened linkage to treatment (National Health Insurance Authority, 2008; Ghana AIDS Commission, 2023). Yet, disparities persist particularly delayed ANC booking, missed retesting during late pregnancy and breastfeeding, and uneven service quality in rural and resource-limited settings (Amoako *et al.*, 2025; GSS, GHS & ICF, 2023).

Women's HIV knowledge emerges as a critical determinant of testing behaviour: misconceptions reduce perceived risk and testing motivation, while education, media exposure and supportive provider communication enhance uptake (Nyarko *et al.*, 2019; Dako-Gyeke *et al.*, 2016;

Mohammed *et al.*, 2024). Using Andersen's Behavioral Model, the literature highlights how predisposing (age, education, marital status), enabling (wealth, residence, insurance, information access) and need (knowledge, perceived risk) factors jointly shape HIV testing behaviour.

Identified gaps include limited evidence on late-pregnancy retesting, inequities in rural service delivery, and variable quality of result communication. Addressing these gaps is essential to consolidate Ghana's progress toward eliminating paediatric HIV and achieving the global elimination targets

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter outlines the methodological procedures adopted to achieve the study's objectives. It describes the research design, data sources, study population, variable measurement, sampling, data handling, and analysis plan. The chapter also presents the ethical considerations, limitations, and analytic assumptions. The methodology was aligned with the framework and procedures of the 2022 Ghana Demographic and Health Survey (GDHS) to ensure national representativeness and policy relevance (GSS, GHS & ICF, 2023).

3.2 Research Design and Source of Data

The study employed an analytical cross-sectional design based on secondary analysis of the 2022 GDHS dataset. This design was appropriate for estimating the prevalence of HIV testing and result uptake during antenatal care (ANC) and identifying their determinants among women of reproductive age.

The analysis focused on the most recent live birth within the five years preceding the survey, as detailed ANC and PMTCT indicators were collected for that pregnancy (GSS, GHS & ICF, 2023).

The GDHS used a stratified two-stage cluster sampling design. In the first stage, census enumeration areas were selected across Ghana's 16 regions, stratified by urban and rural areas. In the second stage, households were systematically sampled within the selected clusters. All women aged 15–49 in sampled households were eligible for interview. Sampling weights were

applied to adjust for unequal probabilities of selection and non-response, producing nationally representative estimates (GSS, GHS & ICF, 2023).

The final analytic sample comprised 8,580 women aged 15–49 years who had a live birth in the five years preceding the survey and attended at least one ANC visit for that pregnancy. Women who did not attend ANC or had missing responses on key outcome variables were excluded. All analyses accounted for survey design features, including weights, strata, and primary sampling units, to ensure unbiased population estimates.

3.3 Data Collection Techniques and Tools

The study utilized secondary data collected through the 2022 GDHS. Trained fieldworkers administered the standard DHS Women's Questionnaire, which was adapted to Ghana's context and translated into major local languages. Data collection was conducted using computerassisted personal interviewing (CAPI) to enhance accuracy and reduce entry errors. Daily field supervision, automated consistency checks, and real-time data transmission ensured data quality. For this analysis, the Women's Recode (IR) file was used because it contained detailed variables on ANC, HIV testing, and PMTCT indicators (GSS, GHS & ICF, 2023).

3.4 Study Population

The study population included women aged 15–49 years who were residents of Ghana at the time of the survey. From the GDHS dataset, 8,580 women with complete data were analyzed. Eligible participants were those who had given birth in the five years preceding the survey and attended at least one ANC visit during that pregnancy. This subpopulation was selected because ANC serves as the primary entry point for PMTCT services.

Women who did not attend ANC for their most recent birth or had missing responses for any outcome variable were excluded. Weighting and complex survey corrections ensured that all estimates represented the national population of women of reproductive age in Ghana (GSS, GHS & ICF, 2023).

3.5 Study Variables

Primary Outcomes

- HIV testing during ANC: Respondent reported being tested for HIV during antenatal care (Yes/No).
- Receiving HIV test results: Among women tested for HIV during ANC, respondent reported receiving the test result (Yes/No).

Explanatory Variables

Variable selection was guided by Andersen's Behavioral Model of Health Service Use and previous empirical evidence (as reviewed in Chapter Two). All variables were recoded from standard DHS items.

Predisposing Factors

- Age group: 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49
- Highest education: none, primary, secondary, higher
- Marital status: never married, married, living together, separated, widowed, divorced
- Religion: Christianity, Islam, Traditional, Other/None
- Ethnicity: Akan, Mole-Dagbani, Ewe, Ga-Dangme, and pooled "other" groups to ensure

adequate sample sizes

Enabling Factors

- Place of residence: urban vs. rural
- Household wealth index: quintiles (poorest, poorer, middle, richer, richest)

Need and Service-Use Factors

- Comprehensive HIV knowledge (binary, DHS standard): Respondent correctly identified that consistent condom use and having one faithful, uninfected partner reduce HIV risk, recognized that a healthy-looking person can have HIV, and rejected two common misconceptions (mosquito bites and sharing food) (GSS, GHS & ICF, 2023).

Comprehensive HIV knowledge was derived from women's responses to five standard DHS indicators. Respondents were classified as having comprehensive knowledge if they:

1. Knew that consistent condom use can reduce the risk of HIV infection;
2. Knew that having one faithful, uninfected partner can reduce the risk of HIV infection;
3. Knew that a healthy-looking person can have HIV;
4. Rejected the misconception that HIV can be transmitted through mosquito bites; and
5. Rejected the misconception that HIV can be transmitted by sharing food with a person who has AIDS (GSS, GHS & ICF, 2023).

Women who answered all five items correctly were coded as having comprehensive HIV knowledge, while those who answered one or more incorrectly were categorized as

noncomprehensive. This binary measure aligns with DHS global methodology and facilitates cross country comparability of knowledge indicators.

3.6 Operationalization of Variables

All variables were coded according to DHS recode conventions. Binary outcomes such as HIV testing and receipt of results were coded as "1 = Yes" and "0 = No." Categorical variables such as age, education, and wealth quintile were maintained in standard DHS categories to allow comparability with national reports.

For comprehensive HIV knowledge, each correct response received a score of "1," while incorrect or "don't know" responses were scored as "0." The total score ranged from 0 to 5. Women who correctly answered all five questions were coded as having comprehensive knowledge ("1"), while those scoring below 5 were coded as non-comprehensive ("0"). This scoring method followed DHS guidelines for HIV knowledge measurement (GSS, GHS & ICF, 2023).

3.7 Data Handling

Permission was obtained from The DHS Program to access and use the 2022 GDHS women recode file. The dataset was downloaded and stored securely on a password-protected device.
Data cleaning involved verifying value ranges, harmonizing variable labels, and recoding "don't know" and missing responses according to DHS standards. Records with missing outcomes were excluded. Missingness on explanatory variables was minimal and handled through complete-case analysis. Only de-identified data were used, ensuring respondent confidentiality.

3.8 Data Analysis

All analyses accounted for the GDHS's complex survey design, incorporating sampling weights, primary sampling units, and stratification.

Descriptive Analysis

Weighted frequencies and percentages described sample characteristics and study variables at the national level. Key indicators were further disaggregated by socio-demographic characteristics (e.g., residence, education, wealth) consistent with DHS reporting standards.

Bivariate Analysis

Chi-square tests examined:

1. Associations between socio-demographic characteristics and comprehensive HIV knowledge; and
2. Associations between socio-demographic characteristics and HIV testing uptake and receipt of results.

Multivariable Analysis

A survey-weighted binary logistic regression model was used to identify determinants of HIV testing during ANC. Covariates were entered hierarchically based on Andersen's Behavioral Model: predisposing, enabling, and need/service-use factors. Variables such as age, education, residence, and wealth were retained regardless of significance to control for confounding. Results were presented as Adjusted Odds Ratios (AOR) with 95% Confidence Intervals (CI). Multicollinearity was assessed using Variance Inflation Factors (VIF), and model fit was

evaluated using survey-adjusted goodness-of-fit tests. Sensitivity checks included restricting the model to women who booked ANC in the first trimester and adding regional fixed effects to capture unmeasured spatial variation.

Significance and Software

All tests were two-sided with statistical significance set at $p < 0.05$. Analyses were performed using Stata version 19, with reproducibility possible in R (survey package).

3.9 Ethical Considerations

The 2022 GDHS obtained ethical approval from the Ghana Health Service Ethics Review Committee and the ICF Institutional Review Board. This secondary analysis utilized publicly available, de-identified data obtained under a formal data-use agreement with The DHS Program. No direct contact with participants occurred, and no identifying information was accessed. All analyses complied with ethical and data protection standards (GSS, GHS & ICF, 2023).

3.10 Limitations of the Study

The cross-sectional design precludes causal inference. Some responses were self-reported and subject to recall or social desirability bias, particularly regarding HIV testing and result disclosure. ANC indicators referred to the most recent birth within five years, which may have introduced recall decay for older events. The survey did not directly measure facility readiness or service quality; proxy indicators were used instead. Restricting the sample to live births may have excluded women with different ANC experiences. Despite these limitations, the large, nationally representative dataset ensures robust and generalizable findings.

3.11 Assumptions

The analysis assumed that women's self-reports accurately reflected their ANC experiences and HIV testing outcomes. Survey weighting, stratification, and clustering were correctly specified to yield unbiased estimates. "Receiving HIV test results" was assumed to represent standard rapid testing and result communication during ANC. Treating "don't know" responses as incorrect was assumed not to distort associations, supported by DHS practice. Low missingness justified the use of complete-case analysis.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic Characteristics

Table 4.1 summarized respondents' characteristics; only categories that showed independent associations with the study outcomes were highlighted. For age, women 20–24 years (17.7%) and 25–29 years (23.3%) had higher odds of comprehensive HIV knowledge than those 15–19 years, while those 40–44 years (8.5%) and 45–49 years (2.7%) had higher odds of HIV testing uptake. For education, primary (15.2%), secondary (52.2%), and higher (9.4%) levels were associated with greater HIV knowledge than no education, and secondary education (52.2%) was also associated with higher testing. For marital status, women living with a partner (21.0%) and those separated (4.2%) had lower odds of comprehensive knowledge than never in union, whereas widowed women (1.2%) had higher odds of testing. Regarding household wealth, the poorer (20.4%), middle (19.5%), richer (19.0%), and richest (17.4%) quintiles had progressively higher odds of comprehensive knowledge than the poorest; for testing, increases were evident from middle through richest. For ethnicity, only the Gurma (10.0%) group showed lower odds of comprehensive knowledge than Akan. Type of residence and religion did not show independent associations after adjustment and were not discussed further.

Overall, the socio-demographic profile indicates that most respondents were mature, married, moderately educated women spread across rural and urban Ghana, with a diverse mix of ethnic and religious backgrounds. These characteristics provide a strong basis for examining how demographic and socio-economic differences shape uptake of prevention of mother-to-child transmission (PMTCT) services.

Table 1: Demographic Characteristics

Variable / Response	Frequency	Percentage (%)
Age (Years)		
15 – 19	318	3.7
20 – 24	1,520	17.7
25 – 29	2,000	23.3
30 – 34	2,137	24.9
35 – 39	1,648	19.2
40 – 44	727	8.5
45 – 49	230	2.7
Type of Residence		
Urban	4,171	48.6
Rural	4,409	51.4
Educational Level		
No education	1,990	23.2
Primary	1,305	15.2
Secondary	4,480	52.2
Higher	805	9.4
Marital Status		
Never married	860	10.0
Married	5,355	62.4
Living with partner	1,804	21.0
Widowed	105	1.2

Divorced	96	1.1
Separated	360	4.2
Religion		
Catholic	651	7.6
Anglican	42	0.5
Methodist	326	3.8
Presbyterian	386	4.5
Pentecostal/Charismatic	3,347	39.0
Other Christian	1,280	14.9
Islam	2,059	24.0
Traditional	275	3.2
No religion	197	2.3
Other	17	0.2
Ethnicity		
Akan	3,387	39.5
Ga/Dangme	540	6.3
Ewe	875	10.2
Guan	281	3.3
Mole-Dagbani	1,930	22.5
Grusi	316	3.7
Gurma	856	10.0
Mande	318	3.7

Other	77	0.9
Wealth Index		
Poorest	2,033	23.7
Poorer	1,750	20.4
Middle	1,672	19.5
Richer	1,630	19.0
Richest	1,495	17.4
Total		

4.2 Women's Knowledge of HIV transmission and prevention

Table 2 presents findings on women's knowledge of HIV transmission and prevention. Overall, awareness of HIV prevention methods was generally high among respondents. The majority (78.5%) correctly recognized that condom use reduces the risk of HIV infection. Similarly, 86.1% of women acknowledged that having one faithful partner can reduce HIV transmission.

However, the persistence of knowledge gaps remains evident. Nearly 16.9% of respondents did not associate condom use with HIV prevention, while 11.3% were unaware that fidelity reduces risk.

In terms of misconceptions, a considerable proportion of women still held inaccurate beliefs about HIV transmission routes. About 31.4% believed that HIV could be transmitted through mosquito bites, while 26.9% thought it could be acquired by sharing food with a person living with HIV/AIDS. Encouragingly, a majority (61.7% and 69.6% respectively correctly rejected these false transmission routes, suggesting that continued health education has had some impact.

Regarding general awareness, 88.4% of women reported that they had received the results of their most recent HIV test. Despite relatively high levels of specific knowledge, only 36.3% of respondents demonstrated comprehensive knowledge of HIV transmission and prevention when all key indicators were combined, while 63.7% were classified as having non-comprehensive knowledge.

Table 2: Distribution of Women's Knowledge on HIV Transmission and Prevention Methods.

Variable	**n (Total = 8,580)**	**Yes (%)**	**n**	**No (%)**
Condom use reduces risk of HIV	6,933	78.5	1,647	16.9
One faithful partner reduces risk	7,499	86.1	1,081	11.3
Can get HIV from mosquito bites	2,990	31.4	5,590	61.7
Can get HIV by sharing food with a person with AIDS	2,458	26.9	6,122	69.6
Received result from last HIV test (proxy for awareness)	7,585	88.4	995	11.6

4.3 Overall Knowledge of HIV Among Women

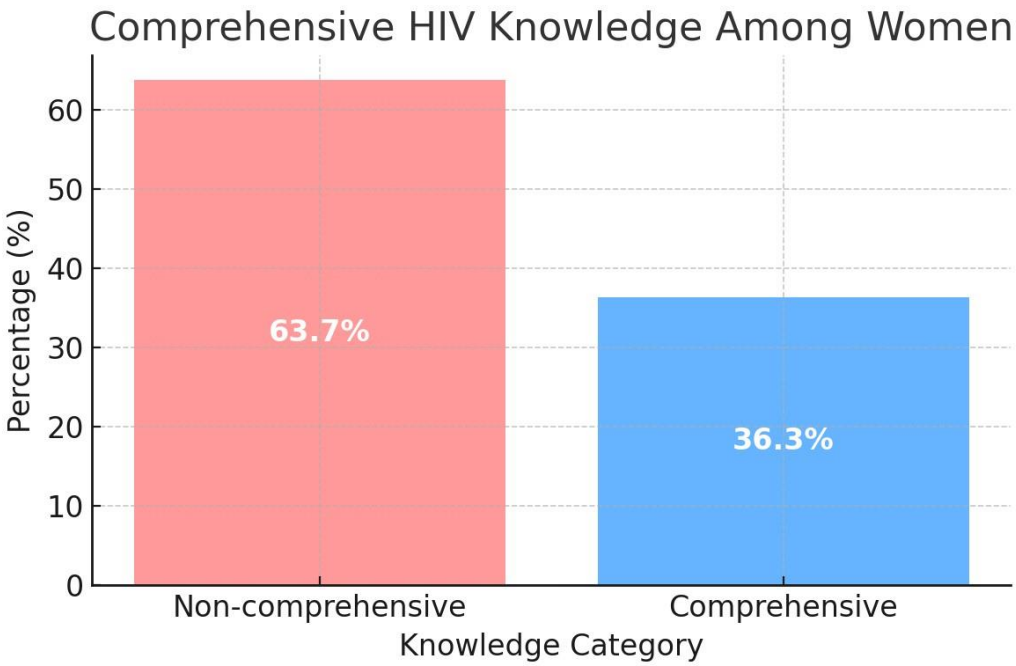


Figure 3: Comprehensive Knowledge on HIV Prevention and Treatment

The bar chart titled illustrates the distribution of respondents based on their overall understanding of HIV transmission and prevention. The results reveal that a majority of women (63.7%) possessed non-comprehensive knowledge, while only 36.3% demonstrated comprehensive knowledge of HIV prevention and transmission.

4.4 Bivariate Analysis of Sociodemographic Factors Influencing HIV Knowledge Among Women

Table 3 presents the association between socio-demographic characteristics and comprehensive HIV knowledge among women aged 15–49 years in Ghana. The results indicate statistically significant relationships between HIV knowledge and all the background characteristics examined ($p < 0.05$).

Comprehensive knowledge of HIV was significantly associated with age, education, marital status, and household wealth. Younger women aged 20–29 years were more likely to demonstrate comprehensive HIV knowledge than adolescents aged 15–19 years ($p < 0.001$). However, knowledge levels declined slightly among women aged 40 years and above.

Educational attainment showed a strong positive relationship with comprehensive HIV knowledge ($p < 0.001$). Women with secondary (42.8%) and higher education (70.8%) exhibited substantially greater knowledge compared to those with no education (16.5%). This pattern suggests that formal education enhances understanding of HIV transmission and prevention.

Marital status was also significantly associated with HIV knowledge ($p < 0.001$). Women who had never been in a union (42.9%) were more likely to have comprehensive knowledge than those living with a partner (27.4%) or married (34.4%), indicating that relationship dynamics and exposure to health information may influence awareness levels.

Household wealth had a similarly strong effect ($p < 0.001$). The proportion of women with comprehensive HIV knowledge increased steadily from 16.2% among those in the poorest quintile to 51.3% among those in the richest quintile. This gradient highlights the influence of socioeconomic status on access to information and health literacy.

Although place of residence (urban/rural) was significantly associated with HIV knowledge ($p < 0.001$), the urban advantage remained evident: 42.9% of urban women had comprehensive knowledge compared to 28.6% of rural women. These disparities underscore the role of infrastructural and informational access in shaping HIV awareness.

Overall, the bivariate analysis reveals that comprehensive HIV knowledge among Ghanaian women is closely linked to socio-demographic factors, particularly education and wealth status, with urban residence and younger age also conferring an advantage.

Table 3: Bivariate Analysis of Sociodemographic Factors Influencing HIV Knowledge Among Women

Variable	Category	Non-comprehensive n (%)	Comprehensive n (%)	p-value
Age group (years)	15–19	520 (65.1)	279 (34.9)	0.000*
	20–24	906 (59.6)	614 (40.4)	
	25–29	1,172 (58.6)	828 (41.4)	
	30–34	1,344 (62.9)	793 (37.1)	
	35–39	1,026 (62.3)	622 (37.7)	
	40–44	520 (71.5)	207 (28.5)	
	45–49	168 (72.4)	64 (27.6)	
Place of residence	Urban	2,382 (57.1)	1,789 (42.9)	0.000*
	Rural	2,324 (71.4)	932 (28.6)	
Educational level	No education	1,662 (83.5)	328 (16.5)	0.000*

	Primary	988 (75.7)	317 (24.3)	
Variable	**Category**	**Non-comprehensive n (%)**	**Comprehensive n (%)**	**p-value**
	Secondary	2,561 (57.2)	1,919 (42.8)	
	Higher	235 (29.2)	570 (70.8)	
Marital status	Never in union	493 (57.1)	367 (42.9)	0.000*
	Married	3,514 (65.6)	1,841 (34.4)	
	Living with partner	1,310 (72.6)	494 (27.4)	
	Widowed	71 (67.2)	34 (32.8)	
	Divorced	57 (59.4)	39 (40.6)	
	Separated	241 (66.9)	119 (33.1)	
Wealth index	Poorest	1,703 (83.8)	330 (16.2)	0.000*
	Poorer	1,270 (72.6)	480 (27.4)	
	Middle	1,110 (66.4)	562 (33.6)	
	Richer	908 (55.7)	722 (44.3)	
	Richest	728 (48.7)	767 (51.3)	

4.5 Bivariate Analysis of Socio-Demographic Factors Influencing HIV Testing Uptake Table 4 presents the association between socio-demographic characteristics and HIV testing uptake among women aged 15–49 years in Ghana. The analysis reveals statistically significant relationships between testing uptake and several background characteristics, including age, place of residence, education, wealth status, and ethnicity ($p < 0.05$). Marital status, however, did not show a significant association with HIV testing uptake ($p = 0.416$).

Age showed a clear pattern ($p = 0.0096$). Testing uptake increased with age, from 81.6 percent among adolescents (15–19 years) to over 90 percent among women aged 40 years and older. This suggests that older women are more likely to engage in antenatal services where HIV testing is routinely offered.

Place of residence was also significant ($p < 0.001$). Urban women were more likely to have tested for HIV (91.8 percent) compared with rural women (83.2 percent), reflecting better access to health facilities and testing services in urban areas.

Educational attainment exhibited a strong positive relationship with HIV testing ($p < 0.001$). Testing uptake rose from 80.7 percent among women with no formal education to 94.8 percent among those with higher education. This finding indicates that education enhances awareness and utilization of HIV testing during pregnancy.

Similarly, household wealth was a strong determinant ($p < 0.001$). Uptake increased steadily from 74.8 percent among the poorest quintile to 94.8 percent among the richest. This wealth gradient underscores the influence of economic resources on access to maternal health services.

Ethnicity was also associated with HIV testing ($p = 0.0004$). Testing uptake was highest among

Akan (89.8 percent) and Ewe (91.3 percent) women, while lower levels were observed among Gurma (73.3 percent) and Mole-Dagbani (83.5 percent) groups, suggesting that cultural or regional factors may influence service use.

Although marital status was not statistically significant ($p = 0.416$), a consistently high proportion of women across all marital categories had undergone testing, indicating widespread integration of HIV testing into antenatal care irrespective of marital status.

Overall, the bivariate analysis demonstrates that HIV testing uptake among Ghanaian women is strongly shaped by socio-economic and educational advantages as well as place of residence and cultural context. Improving equitable access in poorer, less-educated, and rural populations will be key to sustaining progress toward the elimination of mother-to-child transmission of HIV.

Table 4: Bivariate Analysis of Socio-Demographic Factors Influencing HIV Testing Uptake

Variable	Category	Did not test n (%)	Tested n (%)	p-value
Age group (years)	15–19	58 (18.4)	259 (81.6)	0.0096*
	20–24	225 (14.8)	1,294 (85.2)	

	25–29	215 (10.8)	1,783 (89.2)	
	30–34	224 (10.5)	1,912 (89.5)	
	35–39	187 (11.4)	1,462 (88.6)	
	40–44	70 (9.6)	659 (90.4)	
	45–49	19 (8.1)	213 (91.9)	
Place of residence	Urban	341 (8.2)	3,830 (91.8)	0.0000*
	Rural	741 (16.8)	3,668 (83.2)	

Highest educational level	No education	384 (19.3)	1,605 (80.7)	0.0000*
	Primary	187 (14.3)	1,117 (85.7)	
	Secondary	446 (10.0)	4,033 (90.0)	
	Higher	42 (5.2)	763 (94.8)	
Marital status	Never in union	97 (11.3)	761 (88.7)	0.4158
	Married	627 (11.7)	4,726 (88.3)	
	Living with partner	234 (13.0)	1,568 (87.0)	
	Widowed	4 (3.9)	99 (96.1)	
	Divorced	10 (10.3)	84 (89.7)	
	Separated	39 (10.9)	321 (89.1)	
Wealth index	Poorest	512 (25.2)	1,522 (74.8)	0.0000*
	Poorer	334 (19.0)	1,417 (81.0)	
	Middle	208 (12.4)	1,465 (87.6)	

	Richer	137 (8.4)	1,493 (91.6)	
	Richest	78 (5.2)	1,417 (94.8)	
Ethnicity	Akan	347 (10.2)	3,042 (89.8)	0.0004*
	Ga/Dangme	51 (9.4)	491 (90.6)	
	Ewe	76 (8.7)	801 (91.3)	
	Guan	49 (17.4)	234 (82.6)	
	Mole-Dagbani	319 (16.5)	1,613 (83.5)	
Variable	**Category**	**Did not test n (%)**	**Tested n (%)**	**p-value**
	Grusi	38 (12.0)	280 (88.0)	
	Gurma	229 (26.7)	629 (73.3)	
	Mande	56 (17.7)	262 (82.3)	
	Other	13 (16.8)	64 (83.2)	

4.6 Logistic Regression of Factors Influencing HIV Knowledge Among Women

Table 5 presents the adjusted odds ratios showing factors associated with women's comprehensive knowledge of HIV transmission and prevention. Women aged 20–24 years (AOR = 1.22, 95% CI: 1.03–1.46) and 25–29 years (AOR = 1.25, 95% CI: 1.00–1.56) were more likely to have comprehensive HIV knowledge compared to those aged 15–19 years.

Educational attainment showed a strong and consistent relationship with HIV knowledge. Compared to women with no education, those with primary education (AOR = 1.31, 95% CI: 1.05–1.64), secondary education (AOR = 2.41, 95% CI: 2.01–2.87), and higher education (AOR = 5.74, 95% CI: 4.34–7.61) were progressively more likely to possess comprehensive knowledge.

Household wealth also showed a strong positive association. Compared with women in the poorest quintile, those in the poor (AOR = 1.49, 95% CI: 1.19–1.87), middle (AOR = 1.70, 95% CI: 1.35–2.14), richer (AOR = 2.33, 95% CI: 1.76–3.09), and richest (AOR = 2.53, 95% CI: 1.85–3.45) categories were substantially more likely to have comprehensive knowledge of HIV.

Marital status demonstrated mixed associations. Women living with a partner (AOR = 0.60, 95% CI: 0.49–0.73) and those no longer living with a partner (AOR = 0.74, 95% CI: 0.56–0.97) were less likely to have comprehensive HIV knowledge compared with those who had never been in a union. Married women (AOR = 0.90, 95% CI: 0.74–1.11), widowed (AOR = 1.00), and divorced (AOR = 1.14) ** showed similar levels of knowledge to the reference group.

Ethnic differences were generally small, though women from the Gurma ethnic group (AOR = 0.44, 95% CI: 0.31–0.63) were less likely to have comprehensive knowledge compared to the Akan. Women belonging to the Ga/Dangme (AOR = 1.15), Ewe (AOR = 0.95), and Mole-Dagbani (AOR = 0.96) groups showed comparable levels to the Akan.

Table 5: Logistic Regression of Factors Influencing HIV Knowledge Among Women

Variable	AOR	95% CI	p-value
Age group			
(Ref: 15–19)			
20–24	1.22	1.03 – 1.46	0.022*
25–29	1.25	1.00 – 1.56	0.045*
30–34	1.19	0.94 – 1.51	0.152
35–39	1.27	0.99 – 1.62	0.055
40–44	0.93	0.67 – 1.30	0.683
45–49	0.90	0.66 – 1.24	0.527
Residence			
(Ref: Urban)			
Rural	1.06	0.85 – 1.33	0.589
Education			
(Ref: None)			
Primary	1.31	1.05 – 1.64	0.016*
Secondary	2.41	2.01 – 2.87	0.000***

Higher	5.74	4.34 – 7.61	0.000***
Marital status			
(Ref: Never in union)			
Married	0.90	0.74 – 1.11	0.329
Living with partner	0.60	0.49 – 0.73	0.000***
Widowed	1.00	0.69 – 1.44	0.996
Divorced	1.14	0.81 – 1.60	0.443
Separated	0.74	0.56 – 0.97	0.032*
Wealth index			
(Ref: Poorest)			
Poorer	1.49	1.19 – 1.87	0.001**
Middle	1.70	1.35 – 2.14	0.000***
Richer	2.33	1.76 – 3.09	0.000***
Richest	2.53	1.85 – 3.45	0.000***

Ethnicity			
(Ref: Akan)			
Ga/Dangme	1.15	0.89 – 1.48	0.276
Ewe	0.95	0.79 – 1.14	0.589
Guan	0.83	0.57 – 1.19	0.309
Mole-Dagbani	0.96	0.77 – 1.19	0.692
Grusi	1.14	0.83 – 1.58	0.414
Gurma	0.44	0.31 – 0.63	0.000***
Mande	0.62	0.36 – 1.05	0.077
Other	0.90	0.63 – 1.29	0.567

4.7 Logistic Regression of Factors Influencing HIV Testing Uptake Among Women

The results indicate that age, education level, marital status, and household wealth index are significant independent predictors of HIV testing uptake among women in Ghana. Older women were more likely to have tested for HIV compared to adolescents aged 15–19 years. Specifically, women aged 40–44 years had almost twice the odds of having been tested (AOR = 1.88, p = 0.039), while those aged 45–49 years were more than twice as likely (AOR = 2.22, p = 0.020).

Educational attainment showed a significant effect, with women who attained secondary education being more likely to have been tested compared to those with no education (AOR = 1.34, p =

0.046).

Marital status showed limited associations, except for widowed women, who had significantly higher odds of HIV testing compared to those who had never married (AOR = 2.79, p = 0.033).

Wealth index showed a strong and consistent relationship. Compared with women in the poorest households, the odds of HIV testing increased across all higher wealth quintiles, from the middle group (AOR = 1.91, p = 0.004) to the richest (AOR = 4.37, p < 0.001).

Neither place of residence (urban/rural) nor ethnicity was independently associated with HIV testing uptake after controlling for other variables.

Table 6: Logistic Regression of Factors Influencing HIV Testing Uptake Among Women

Variable	**Category**	**Adjusted Odds Ratio (AOR)**	**95% Confidence Interval**	**p-value**
Age group (Ref: 15–19)	20–24	1.19	0.72 – 1.97	0.499
	25–29	1.51	0.92 – 2.49	0.106
	30–34	1.57	0.93 – 2.66	0.094
	35–39	1.51	0.93 – 2.44	0.092
	40–44	1.88	1.03 – 3.41	0.038*
	45–49	2.22	1.13 – 4.33	0.019*

Variable	Category	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Place of residence (Ref: Urban)	Rural	0.93	0.63 – 1.37	0.713
Educational level (Ref: No education)	Primary	1.21	0.88 – 1.66	0.237
	Secondary	1.34	1.01 – 1.79	0.048*
	Higher	1.68	0.77 – 3.67	0.193
Marital status (Ref: Never in union)	Married	0.93	0.63 – 1.37	0.713
	Living with partner	0.94	0.63 – 1.42	0.769
	Widowed	2.79	1.09 – 7.18	0.033*
	Divorced	1.11	0.39 – 3.13	0.844
	Separated	0.91	0.50 – 1.65	0.756
Wealth index	Poorer	1.26	0.86 – 1.84	0.232

Variable	Category	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
(Ref: Poorest)				
	Middle	1.91	1.24 – 2.95	0.004**
	Richer	2.86	1.63 – 5.00	0.000***
	Richest	4.37	2.22 – 8.60	0.000***
Ethnicity				
(Ref: Akan)	Ga/Dangme	0.99	0.54 – 1.83	0.974
	Ewe	1.41	0.96 – 2.06	0.076
	Guan	0.60	0.30 – 1.22	0.158
	Mole-Dagbani	1.01	0.71 – 1.45	0.957
	Grusi	1.37	0.79 – 2.38	0.264
	Gurma	0.61	0.30 – 1.22	0.162
	Mande	0.84	0.25 – 2.88	0.782
	Other	0.58	0.30 – 1.11	0.100

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This chapter discusses the major findings of the study in relation to existing literature and relevant public health frameworks on HIV prevention and the prevention of mother-to-child transmission (PMTCT) in Ghana. The discussion interprets the results from the 2022 Ghana Demographic and Health Survey (GDHS) within the context of national efforts and global strategies particularly the UNAIDS 95–95–95 targets that aim to end the HIV epidemic by ensuring universal testing, treatment, and viral suppression (UNAIDS, 2023).

5.2 Women's Knowledge of HIV and Its Prevention

The study revealed that while awareness of HIV prevention methods was widespread, comprehensive understanding remained limited. Approximately 78.5% of women recognized condom use and 86.1% identified mutual fidelity as preventive measures, yet only 36.3% demonstrated comprehensive knowledge when all indicators were combined. This finding echoes the 2022 GDHS, which similarly reported high awareness but poor depth of understanding among Ghanaian women (GSS, GHS & ICF, 2023), as well as findings by Mohammed et al. (2024), who noted that fewer than four in ten women could identify all routes of mother-to-child transmission.

The persistence of misconceptions such as the belief that HIV can be transmitted through mosquito bites (31.4%) or food sharing (26.9%) illustrates a lingering gap between awareness and accurate understanding. These findings are consistent with earlier studies that linked misinformation to low literacy and inadequate access to credible health communication (Dako-Gyeke et al., 2016;

Sutherland et al., 2025).

Bivariate analysis (Table 3) showed significant associations between HIV knowledge and age, education, marital status, wealth, and place of residence ($p < 0.05$). Younger women, particularly those aged 25–29 years, were more likely to have comprehensive knowledge than adolescents (15–19 years), who often have less exposure to structured reproductive health education. Education emerged as the strongest predictor: women with secondary (42.8%) and higher education (70.8%) levels exhibited markedly better knowledge than those with no education (16.5%), corroborating studies that associate formal education with improved health literacy (Dadzie et al., 2024; Essuman et al., 2024).

Wealth and residence further influenced knowledge distribution. Women from richer and richest households, as well as those residing in urban areas, demonstrated higher comprehensive knowledge than their rural or poorer counterparts. This pattern reflects unequal access to media, health services, and formal schooling (GSS, GHS & ICF, 2023). Marital status also shaped awareness: women living with a partner were less informed than those never in union, possibly due to lower autonomy in health decision-making (Nyarko et al., 2019).

Overall, these findings reveal that accurate knowledge of HIV prevention remains unevenly distributed across Ghanaian women. Bridging these disparities requires enhanced communitybased health education through the Community-based Health Planning and Services (CHPS) strategy, integration of HIV education into school curricula, and targeted rural media outreach (Ghana Health Service, 2021). Strengthening these approaches can help dispel misconceptions and promote informed participation in PMTCT services (UNAIDS, 2023).

5.3 Uptake of HIV Testing During Antenatal Care

The study found that uptake of HIV testing during antenatal care (ANC) was high, with approximately 88% of women reporting that they had been tested and received their results. This demonstrates effective integration of HIV testing into routine maternal health services and aligns with national monitoring data showing significant coverage of provider-initiated testing across health facilities (Ghana AIDS Commission, 2022; GSS, GHS & ICF, 2023).

However, disparities were evident across demographic and socio-economic groups. Uptake increased steadily with age from 81.6% among women aged 15–19 years to over 90% among those aged 40 years and above. Younger women's lower uptake may relate to fear of stigma, lack of privacy, or limited autonomy in health decisions, a pattern also observed in Tanzanian and Kenyan studies (Mpondo et al., 2021; Mbuthia et al., 2020).

Education was a major determinant of testing: women with higher education had the highest uptake (94.8%), while those without formal education had the lowest (80.7%). This supports the argument that education enhances understanding of the importance of HIV testing and builds confidence to access health services (Mekonnen et al., 2020).

Household wealth similarly influenced testing, increasing from 74.8% among the poorest women to 94.8% among the richest. This gradient highlights how economic constraints such as transport costs and opportunity loss still affect service utilization (Dadzie et al., 2024).

Urban–rural disparities were also marked: urban women reported 91.8% testing uptake compared with 83.2% among rural women, consistent with national findings that urban areas benefit from more accessible, better-resourced ANC services (GSS, GHS & ICF, 2023). Ethnic differences were noted testing rates were highest among Akan and Ewe women (above 89%) and lowest among

Gurma (73.3%) and Mole-Dagbani (83.5%) groups suggesting that cultural factors may affect perceptions of HIV testing.

Although marital status did not show a significant association ($p = 0.416$), most women across all categories reported being tested, indicating that HIV testing has become a routine component of ANC in Ghana. Overall, while testing coverage is commendable, the persistence of inequalities by age, education, wealth, and residence underscores the need for targeted outreach and community sensitization, especially among younger and rural women.

5.4 Determinants of HIV Testing Uptake Among Women

Multivariate analysis showed that education, wealth, and residence were the most influential predictors of HIV testing among Ghanaian women. Those with secondary or higher education were significantly more likely to have tested than those without formal education, reaffirming the role of education in promoting health literacy and confidence to seek care (Adepoju et al., 2021; Mekonnen et al., 2020).

Similarly, household wealth positively predicted testing uptake, as women in wealthier households were more likely to attend ANC regularly and afford related costs such as transport or childcare (Dadzie et al., 2024). Urban residence also increased the likelihood of testing due to better access to health facilities, staff, and continuous testing supplies (GSS, GHS & ICF, 2023).

These results align with the Andersen Behavioral Model, which highlights that predisposing factors (age, education), enabling factors (income, residence), and need-based factors jointly influence health-seeking behavior. In this context, both socio-economic status and geographical accessibility enable women to participate in HIV testing for PMTCT (Ghana AIDS Commission, 2022).

Although marital status showed a weaker relationship, media exposure appeared to enhance testing uptake, supporting findings from East and Southern Africa where mass media campaigns improved HIV awareness and service utilization (Mbuthia et al., 2020). Overall, these determinants underscore the importance of integrating educational and socio-economic empowerment strategies into PMTCT programming to ensure equitable participation.

Taken together, the adjusted associations observed in this study strong effects of education and wealth, modest roles for marital status and age, and attenuation of residence after accounting for resources empirically affirm the explanatory utility of Andersen's Behavioral Model in the Ghanaian ANC setting, where predisposing and enabling factors, filtered through perceived need, shape whether women are tested and receive results during pregnancy (Andersen, 1995).

5.5 Summary of Key Findings

This study examined the prevalence and determinants of HIV testing for PMTCT among women in Ghana using the 2022 GDHS. Despite high awareness of HIV prevention, only 36.3% of women demonstrated comprehensive knowledge, indicating persistent informational gaps and misconceptions. Knowledge levels were significantly shaped by education, wealth, and residence, with urban and educated women showing the greatest understanding.

HIV testing uptake during ANC was encouragingly high at 88%, confirming successful implementation of provider-initiated testing. Nevertheless, disparities remained among adolescents, rural residents, and women from lower socio-economic backgrounds.

Education, wealth, and residence consistently emerged as the most significant predictors of both HIV knowledge and testing. These findings affirm that structural inequalities continue to shape PMTCT outcomes in Ghana. Strengthening community-based education, improving rural health

infrastructure, and promoting equity-focused interventions will be essential for sustaining progress toward the elimination of mother-to-child transmission of HIV and achieving the UNAIDS 95–95–95 targets.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study examined the prevalence and determinants of HIV testing for the prevention of motherto-child transmission (PMTCT) among women in Ghana using data from the 2022 Ghana Demographic and Health Survey (GDHS). Although awareness of specific prevention methods was high most women identified condom use and mutual fidelity as protective only 36.3% demonstrated comprehensive knowledge, and sizeable misconceptions persisted (e.g., beliefs about mosquito transmission and sharing food). HIV testing coverage was strong: 88.4% reported receiving their most recent test result, indicating effective integration of testing into routine maternal services.

Determinants analysis showed that comprehensive knowledge was higher among women aged 20–24 and 25–29 (vs. 15–19), those with primary, secondary, or higher education, women from poorer, middle, richer, and richest wealth quintiles (vs. poorest), and varied by ethnicity, with Gurma women showing lower odds (vs. Akan). Women living with a partner and those separated had lower odds of comprehensive knowledge (vs. never in union).

For HIV testing uptake, older age groups (40–44 and 45–49 vs. 15–19) and women with secondary education (vs. none) had higher odds. Widowed women also had higher odds than those never in union. Testing was higher among middle, richer, and richest wealth groups (vs. poorest). Place of residence and most ethnic groups were not independently associated with testing after adjustment.

In summary, Ghana appears to be progressing toward PMTCT goals through high testing coverage; however, knowledge gaps and socio-economic disparities remain. Closing these gaps requires targeted education that directly addresses misconceptions and equity-oriented service delivery for poorer and low-literacy populations.

6.2 Recommendations

Empowering Women and Communities

1. **Promote focused antenatal education:**

   Health workers should intensify one-on-one health education during focused ANC sessions rather than relying solely on group talks, since HIV remains a sensitive topic. Messages should emphasize the main transmission periods (pregnancy, delivery, and breastfeeding) and correct common myths such as mosquito or food-related transmission.

2. **Support peer and community initiatives:**

   Women who have successfully completed PMTCT programmes can act as peer educators within communities and ANC settings to share experiences and encourage early HIV testing and treatment adherence.

3. **Encourage male involvement:**

   Facilities should promote couple-based education and testing during ANC visits to improve partner support and reduce stigma associated with HIV testing.

Strengthening Health-Service Delivery

4. **Improve privacy and result communication:**

ANC facilities should ensure confidential HIV testing environments and guarantee that every woman receives her test results promptly to strengthen trust and follow-up.

5. **Provide periodic staff training:**

   Continuous professional development for midwives and related staff should emphasize respectful care, confidentiality, and effective communication to sustain quality service delivery.

6. **Ensure testing and supply readiness:**

   District health teams must maintain uninterrupted availability of HIV test kits, ART supplies, and educational materials to prevent service gaps.

Health-System and Policy Support

7. **Target underserved districts:**

   The Ghana Health Service should use DHIMS2 data to identify low-performing districts and intensify community outreach and follow-up in those areas.

8. **Reduce socio-economic barriers:**

   The Ministry of Health and NHIA should strengthen the Free Maternal Care Policy by prioritizing poor and rural women and supporting NHIS renewal or transport assistance where feasible.

9. **Integrate PMTCT within maternal-health programmes:**

   HIV testing and ART adherence should remain embedded within all ANC and postnatal services to ensure continuity of care.

Research and Continuous Learning

10. **Investigate persistent knowledge gaps:**

    Further research should examine why comprehensive HIV knowledge remains low despite high testing coverage and assess the effectiveness of community-based education and male-involvement strategies

6.3 Summary

This chapter has demonstrated that although HIV testing during pregnancy is high in Ghana, comprehensive knowledge of PMTCT remains inadequate, with misconceptions and inequities shaped by education, wealth and partner involvement. The refined recommendations focus on empowering women directly, strengthening facility-level service delivery, and improving systemwide supervision, education, and financial access. Prioritizing privacy, timely result delivery, community engagement, and targeted support for vulnerable women will ensure that Ghana's PMTCT programme achieves both high coverage and deeper understanding key steps toward eliminating mother-to-child transmission of HIV.

REFERENCES

Abanga, W.A., Klu, D., Dery, M., Fusheini, I., Dwomoh, S., Kubio, C. & Tagbor, H.K. (2025) 'Health services delivery factors affecting HIV retesting among pregnant women at 34 weeks' gestation in Saboba District, Northern Region, Ghana', *International Journal of STD & AIDS*, 36(3), pp. 212–222. https://doi.org/10.1177/09564624241303819. Available at: https://journals.sagepub.com/doi/10.1177/09564624241303819

Aboagye, R.G., Osborne, A., Salihu, T., Wongnaah, F.G. & Ahinkorah, B.O. (2024) 'Regional disparities and socio-demographic factors associated with eight or more antenatal care visits in Ghana', *Archives of Public Health*, 82(1), 192. https://doi.org/10.1186/s13690-024-01364-8. Available at: https://archpublichealth.biomedcentral.com/articles/10.1186/s13690-024-01364-8

Andersen, R.M. (1995) 'Revisiting the behavioral model and access to medical care: does it matter?', *Journal of Health and Social Behavior*, 36(1), pp. 1–10. https://doi.org/10.2307/2137284. Available at: https://www.jstor.org/stable/2137284

Dako-Gyeke, P., Dornoo, B., Ayisi-Addo, S., Atuahene, M., Addo, N.A. & Yawson, A.E. (2016) 'Towards elimination of mother-to-child transmission of HIV in Ghana: an analysis of national programme data', *International Journal for Equity in Health*, 15, 5. https://doi.org/10.1186/s12939-016-0300-5. Available at: https://equityhealthj.biomedcentral.com/articles/10.1186/s12939-016-0300-5. BioMed Central

Dadzie, L.K., Gebremedhin, A.F., Salihu, T., Ahinkorah, B.O. & Yaya, S. (2024) 'Socioeconomic inequalities in uptake of HIV testing during antenatal care: evidence from Sub-Saharan

Africa', *International Journal for Equity in Health*, 23, 4. https://doi.org/10.1186/s12939-023-02068-1.

Available at: https://equityhealthj.biomedcentral.com/articles/10.1186/s12939-023-02068-1

De Cock, K.M. *et al*. (2000) 'Prevention of mother-to-child HIV transmission in resource-poor countries: translating research into policy and practice', *JAMA*, 283(9), pp. 1175–1182. https://doi.org/10.1001/jama.283.9.1175.

Donkor, D.G. & Senoo-Dogbey, V.E. (2023) 'Prevention of mother-to-child transmission of Human Immunodeficiency Virus (HIV): what do Ghanaian midwives know?', *International*

Journal of Africa Nursing Sciences, 19, 100610. https://doi.org/10.1016/j.ijans.2023.100610. Available at: https://www.sciencedirect.com/science/article/pii/S2214139123000859

Essuman, M.A., Mohammed, H., Kebir, M.S., Obiribea, C. & Ahinkorah, B.O. (2024) 'Prevalence and factors associated with HIV testing among young women in Ghana', *BMC Infectious Diseases*,

24(1), 416. https://doi.org/10.1186/s12879-024-09068-8. Available at: https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-024-09068-8

FHI 360 (n.d.) *Prevention of Mother-to-Child Transmission of HIV: Policy and Program Brief*. Available at: https://www.fhi360.org/resource/prevention-mother-child-transmission-hiv-policyand-program-brief/

Ghana AIDS Commission (2023) *National and Sub-National HIV and AIDS Estimates and Projections 2023*. Accra: GAC.

Ghana Health Service (2021) *National Guideline for Prevention of Mother-to-Child Transmission of HIV, Syphilis and Hepatitis B Virus (PMTCT)*. Accra: GHS. Available at: Ghana PMTCT National Guideline 2021 pdf (PMTCT, Syphilis, HBV) prepwatch.org

Ghana Health Service (2022) *Consolidated Guidelines for HIV Care in Ghana: Test, Treat & Track*. Accra: GHS. Available at: https://www.differentiatedservicedelivery.org/wpcontent/uploads/Consolidated-Guidelines-For-Hiv-Care-In-Ghana.pdf Differentiated Service Delivery

Ghana Statistical Service (2021) *2021 Population and Housing Census: General Report Volume 3A — Demographic Characteristics*. Accra: GSS. Available at: https://statsghana.gov.gh/gssmain/fileUpload/pressrelease/2021%20PHC%20General%20Report%20Vol%203A_Population%20of%20Regions%20and%20Districts_181121.pdf statsghana.gov.gh+1

Ghana Statistical Service; Ghana Health Service & ICF (2023) *Ghana Demographic and Health Survey 2022: Key Indicators Report*. Accra and Rockville: GSS, GHS & ICF. Available at: https://dhsprogram.com/pubs/pdf/PR149/PR149.pdf

GSS; GHS & ICF (2024) *Ghana Demographic and Health Survey 2022: Final Report*. Rockville, MD: The DHS Program. Available at: https://www.dhsprogram.com/pubs/pdf/FR387/FR387.pdf

HIV.gov (2025) 'Global statistics'. Available at: https://www.hiv.gov/hiv-basics/overview/dataand-trends/global-statistics

IAPAC (2022) *Fast-Track Cities 2022 — Conference materials*. Available at: https://www.iapac.org/files/2022/10/Fast-Track-Cities-2022-Poster-Abstracts-Book-FINAL.pdf iapac.org

Kok, M.C., Broerse, J.E.W., Theobald, S., Ormel, H., Dieleman, M. & Taegtmeyer, M. (2017) 'Performance of community health workers: situating their intermediary position within complex adaptive health systems', *Human Resources for Health*, 15, 59. Available at: https://humanresources-health.biomedcentral.com/articles/10.1186/s12960-017-0234-z

Kwapong, G.D., Boateng, D., Agyei-Baffour, P. & Addy, E.A. (2014) 'Health service barriers to HIV testing and counselling among pregnant women attending antenatal clinic; a cross-sectional study', *BMC Health Services Research*, 14, 267. https://doi.org/10.1186/1472-6963-14-267. Available at: https://bmchealthservres.biomedcentral.com/articles/10.1186/1472-6963-14-267

Meisner, J., Hirschhorn, L.R. & Blackard, J.T. (2021)'Optimizing HIV retesting during pregnancy and postpartum to prevent mother-to-child transmission: a narrative review', *Journal of the International AIDS Society*, 24(3), e25650. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC8010369/

Mofenson, L.M., Ciaranello, A. & Cohn, J. (2022) 'Models of service delivery for optimizing a continuum of care for prevention of mother-to-child transmission of HIV', *PLOS Medicine*, 19(3), e1003944. Available at: https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001636

Mohammed, H., Kebir, M.S., Obiribea, C., Essuman, M.A. & Ahinkorah, B.O. (2024) 'Knowledge of HIV transmission during pregnancy among women of reproductive age in Ghana', *BMC Infectious Diseases*, 24(1), 507. https://doi.org/10.1186/s12879-024-09325-w.

Available at: https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-024-09325-w

Nyarko, V., Pencille, L., Akoku, D.A. & Tarkang, E.E. (2019) 'Knowledge, attitudes and practices regarding the prevention of mother-to-child transmission of HIV among pregnant women in the Bosome Freho District in the Ashanti region of Ghana: a descriptive cross-sectional design', *PAMJ Clinical Medicine*, 1, 69. https://doi.org/10.11604/pamj-cm.2019.1.69.20659. Available at: https://www.clinical-medicine.panafrican-med-journal.com/content/article/1/69/full clinicalmedicine.panafrican-med-journal.com

Sutherland, J.A., Calys-Tagoe, B.N.L. & Amoakoh-Coleman, M. (2025) 'Knowledge and perceptions about Human Immunodeficiency Virus (HIV) infection, mother-to-child transmission of HIV and HIV prevalence among antenatal attendees of a Ghanaian tertiary health institution: a

cross-sectional study', *BMC Public Health*, 25, Article number: 3143. https://doi.org/10.1186/s12889-025-3143-0. Available at: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-025-3143-0.

Tuke, V.J., Hoffman, H.J., Greenberg, L., Thabelo, R., Nchephe, M., Mots'oane, S., Masitha, M., Chabela, M., Mokone, M., Mofenson, L. & Guay, L. (2021) *Adverse pregnancy outcomes among HIV-positive women in the era of universal antiretroviral therapy remain elevated compared with*

HIV-negative women. AIDS Research and Therapy, 18, 58. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC8357042/

UNAIDS (2011) *Global Plan towards the elimination of new HIV infections among children by*

2015 and keeping their mothers alive. Geneva: UNAIDS. Available at: https://www.unaids.org/en/resources/documents/2011/20110609_JC2137_Global-Plan-Elimination-HIV-Children_en.pdf

UNAIDS (2021a) *Global AIDS Strategy 2021–2026: End Inequalities. End AIDS*. Geneva: UNAIDS. Available at: https://www.unaids.org/sites/default/files/media_asset/2021_start-freestay-free-aids-free-final-report-on-2020-targets_en.pdf unaids.org

UNAIDS (2024) 'Global HIV & AIDS statistics — Fact sheet'. Available at: https://www.unaids.org/en/resources/fact-sheet

UNAIDS; WHO; UNICEF (2022) 'Global Alliance to end AIDS in children by 2030'. Available at: https://www.unicef.org/press-releases/new-global-alliance-launched-end-aids-children-2030 and concept note:

https://www.unicef.org/childrenandaids/media/971/file/Global%20Alliance%20concept%20note%20(low-res).pdf

UNICEF (2024) *Children, HIV and AIDS: Global snapshot 2024*. New York: UNICEF. Available at: https://www.unicef.org/childrenandaids/documents/global-snapshot-hiv-and-aids-2024

UNICEF & UNAIDS (2020) *Start Free, Stay Free, AIDS Free — Final Report 2020*. New York/Geneva: UNICEF and UNAIDS. Available at: https://www.unaids.org/sites/default/files/media_asset/2021_start-free-stay-free-aids-free-finalreport-on-2020-targets_en.pdf unaids.org

United Nations (2021) *Political Declaration on HIV and AIDS: Ending Inequalities and Getting on Track to End AIDS by 2030 (A/RES/75/284)*. New York: UN. Available at: https://docs.un.org/en/A/RES/75/284

Wang, H., Otoo, N., Dsane-Selby, L. & Giedion, U. (2017) *Ghana National Health Insurance Scheme: Improving Financial Protection and Equity in Access to Health Services*. Washington, DC: World Bank. Available at: https://openknowledge.worldbank.org/entities/publication/9ce818c3-303b-5c94-a3eb-22b0aafb90c7

WHO (2016) *Guidelines on HIV self-testing and partner notification: Supplement to consolidated guidelines on HIV testing services*. Geneva: World Health Organization. Available at: https://apps.who.int/iris/handle/10665/251655

WHO (2019) *Consolidated guidelines on HIV testing services*. Geneva: World Health Organization. Available at: https://www.who.int/publications/i/item/978-92-4-155058-1

WHO (2021) *Consolidated guidelines on HIV prevention, testing, treatment, service delivery and monitoring: recommendations for a public health approach*. Geneva: World Health Organization. Available at: https://www.who.int/publications/i/item/9789240031593

WHO (2021) 'Mother-to-child transmission of HIV' (Fact sheet). Geneva: World Health Organization. Available at: https://www.who.int/teams/global-hiv-hepatitis-and-stisprogrammes/hiv/prevention/mother-to-child-transmission-of-hiv

WHO (2023) *Global guidance on criteria and processes for validation: elimination of mother-tochild transmission of HIV, syphilis and hepatitis B (Triple Elimination framework)*.

Geneva: World Health Organization. Available at: https://www.who.int/publications/i/item/9789240039360 who.int+1

APPENDIX I

Checklist

Item	Description	Check
SECTION A: SELECTION CRITERIA		
1	Women aged 15–49 years	☐
2	Had a live birth within the last five years preceding the survey	☐
3	Attended at least one antenatal care (ANC) visit for the most recent birth	☐
SECTION B: OUTCOME VARIABLES – PMTCT SERVICE UTILIZATION		
4	Pre-test counselling received during ANC	☐
5	HIV test received during ANC	☐
6	Received HIV test result after ANC testing	☐
SECTION C: INDEPENDENT VARIABLES (DETERMINANTS OF HIV TESTING AND COUNSELLING)		
7	Age group of respondents	☐
8	Marital status	☐
9	Level of education	☐
10	Religion	☐
11	Ethnicity	☐

12	Type of place of residence (urban/rural)	☐
13	Wealth index quintile	☐
14	Knowledge of HIV transmission and prevention (composite variable)	☐
SECTION D: ANALYTICAL COMPONENTS		
15	Weighted descriptive analysis performed	☐
16	Chi-square tests conducted to examine associations between socio-demographic factors and PMTCT service use	☐
17	Binary logistic regression conducted to identify determinants of HIV testing and counselling	☐

APPENDIX II Ethical Clearance Form

ENSIGN GLOBAL
UNIVERSITY

OUR REF: ENSIGN/IRB/EL/SN-298/03
YOUR REF:

August 4, 2025

INSTITUTIONAL REVIEW BOARD SECRETARIAT

Vanessa Operebea Addo-Djan
Ensign Global University
Kpong.

Dear Vanessa,

ETHICAL CLEARANCE TO UNDERTAKE POSTGRADUATE RESEARCH

At the General Research Proposals Review Meeting of the *INSTITUTIONAL REVIEW BOARD (IRB)* of Ensign Global University held on Friday, August 1, 2025, your research proposal entitled **"Regional Trends and Determinants of HIV Testing and Counselling for PMTCT Among Women in Ghana: Evidence from 2022 GDHS"** was considered.

You have been granted Ethical Clearance to collect data for the said research under academic supervision within the IRB's specified frameworks and guidelines.

We wish you all the best.

Sincerely,

Dr. (Mrs.) Rebecca Acquaah-Arhin
IRB Chairperson

22416504:VANESSA_OPAREBEA_ADDO-DJAN_1-6.pdf

ORIGINALITY REPORT

16%	12%	13%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Yusuf Olushola Kareem, Cyprian Issahaku Dorgbetor, Edward Kwabena Ameyaw, Zubaida Abubakar et al. "Assessment and associated factors of comprehensive HIV knowledge in an at-risk population: a crosssectional study from 19,286 young persons in Nigeria", Therapeutic Advances in Infectious Disease, 2023 Publication	1%
2	Charles Nzelu, Uche Nzelu, Amara Uche Ugwunze, Ngozi Azodoh. "Determinants of comprehensive knowledge of HIV transmission and prevention among women of reproductive age 15–49 years in Nigeria", PLOS Global Public Health, 2024 Publication	1%
3	mcd.org Internet Source	1%

4	somalia.unfpa.org Internet Source	<1%
5	Menen Tsegaw, Bezawit Mulat, Kegnie Shitu. "Determinants of Comprehensive HIV knowledge among reproductive-age women in Gambia: Further analysis of recent Gambia demographic and health survey", Research Square Platform LLC, 2022 Publication	<1%
6	Banjaw, Zelalem Demeke. "Factors Affectingthe Uptake of HIV Testing During Antenatal Care in Addis Ababa, Ethiopia", University of South Africa (South Africa) Publication	<1%
7	cbs.gov.np Internet Source	<1%
8	www.researchsquare.com Internet Source	<1%
9	Jenica Barnwal, Dilwar Hussain. "Factors influencing HIV knowledge among Indian men: A cross-sectional study", PLOS One, 2025 Publication	<1%

10	ugspace.ug.edu.gh Internet Source	<1%
11	link.springer.com Internet Source	<1%
12	doczz.net Internet Source	<1%
13	www.measureevaluation.org Internet Source	<1%
14	awe-inspiringplaces.com Internet Source	<1%
15	bmcpublichealth.biomedcentral.com Internet Source	<1%
16	Charles AS Karamagi, James K Tumwine, Thorkild Tylleskar, Kristian Heggenhougen. "Antenatal HIV testing in rural eastern Uganda in 2003: incomplete rollout of the prevention of mother-to-child transmission of HIV programme?", BMC International Health and Human Rights, 2006 Publication	<1%
17	pure.port.ac.uk	

	Internet Source	<1%
18	repository.uantwerpen.be Internet Source	<1%
19	Timothy Yao Akweh, Bright Atta Junior Boakye, Eunice Adoku, Felix Teyko, Elvis Enowbeyang Tarkang. "HIV testing uptake and its associated factors among Ghanaian men: insights from the 2022 Ghana demographic and health survey using the Anderson behavioral model", Discover Public Health, 2025 Publication	<1%
20	Submitted to University of Hull Student Paper	<1%
21	Opoku-Danso, Rita. "Strategies for Promoting the Prevention of Mother to Child Transmission of Human Immunodeficiency Virus among Antenatal Attendees in the Central Region of Ghana", University of South Africa (South Africa) Publication	<1%
22	www.science.gov Internet Source	<1%

23 Khawar, Laila. "New Methods to Track Progress Toward Elimination of Sexually Transmissible Infections and Blood-Borne Viruses in Australia.", University of New South Wales (Australia) <1%

Publication

24 Ya Yang, Joseph Adu. "Social Determinants ofAntenatal Care Utilization Among Reproductive Age Women: An Analysis of 2022 Ghana Demographic and Health <1%