

**ENSIGN GLOBAL UNIVERSITY, KPONG
EASTERN REGION, GHANA**

**FACULTY OF PUBLIC HEALTH
DEPARTMENT OF COMMUNITY HEALTH**

**UTILIZATION AND QUALITY OF ANTENATAL CARE SERVICES AMONG
WOMEN IN GHANA
BY**

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MAY, 2026

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EASTERN REGION, GHANA**

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**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**

MAY, 2026

DECLARATION

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

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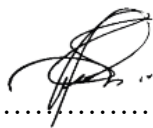
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24-04-26

PROF. STEPHEN MANORTEY

.....

(Head of Academic Program)

Signature

Date

DEDICATION

This study is dedicated to women of reproductive age in Ghana, especially those who face barriers in accessing adequate antenatal care. Your experiences continue to inspire efforts toward improving maternal health services.

ACKNOWLEDGEMENT

Firstly, I give thanks to the Almighty God for granting me the strength and guidance throughout this academic journey.

I would like to express my profound gratitude to my supervisor, Dr Sandra Boatemaa Kushitor, for her guidance and critical insights throughout the course of this research. Her expertise and encouragement were instrumental in shaping this study.

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DEFINITION OF TERMS

Antenatal Care (ANC): Care provided to pregnant women by skilled health professionals during pregnancy to ensure the best health conditions for both mother and baby.

ANC Utilization: The extent to which pregnant women make use of antenatal care services, typically measured by whether at least one ANC visit was attended.

Adequate ANC Utilization: Receiving antenatal care in line with recommended standards, defined in this study as at least 8 ANC visits, and initiation within the first trimester

Early Initiation of ANC: First antenatal care visit occurring within the first trimester (≤ 3 months) of pregnancy.

Late Initiation of ANC: First antenatal care visit occurring after the first trimester (> 3 months).

Women of Reproductive Age: Women aged 15–49 years, consistent with DHS classification.

Parity: The number of children a woman has given birth to.

Wealth Index: A composite measure of household socioeconomic status derived from asset ownership, categorized into quintiles:

DHS (Demographic and Health Survey): A nationally representative household survey that collects data on population, health, and nutrition indicators.

LIST OF ABBREVIATIONS

Abbreviation	Full Meaning
ANC	Antenatal Care
AIHW	Australian Institute of Health and Welfare
DHS	Demographic and Health Survey
EA	Enumeration Area
GDHS	Ghana Demographic and Health Survey
GHS	Ghana Health Service
GSS	Ghana Statistical Service
IR	Individual Recode
LMICs	Low- and Middle-Income Countries
MOH	Ministry of Health
NHIS	National Health Insurance Scheme
OECD	Organisation for Economic Co-operation and Development
PPS	Probability Proportional to Size
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
WHO	World Health Organization

ABSTRACT

Background: Despite progress in maternal healthcare, antenatal care (ANC) utilization and quality remain suboptimal in many low- and middle-income countries, including Ghana. The World Health Organization (WHO) updated its ANC guidelines in 2016 to recommend a minimum of eight contacts during pregnancy, aiming to improve maternal and neonatal health outcomes. However, data from the 2022 Ghana Demographic and Health Survey (GDHS) indicate that while most women attend at least one ANC visit, only about 38.4% meet the eight-contact benchmark. Persistent disparities exist, influenced by factors such as age, education, wealth, geographic location, and health system limitations. Understanding these dynamics is essential to achieving national and global maternal health targets.

Aim: This study aims to assess the utilization and quality of ANC services among women of reproductive age in Ghana, using data from the 2022 GDHS.

Method: A quantitative, cross-sectional design was employed using secondary data from the GDHS 2022. The study population included women aged 15–49 who had a live birth within five years prior to the survey. Descriptive statistics were used to summarize ANC utilization, while chi-square tests and logistic regression models identified key predictors of ANC adequacy and quality.

Results: The analysis included 5,036 women aged 15–49 years with recent births in Ghana. Antenatal care (ANC) utilization was near-universal (98%). While 88.58% of women achieved at least four ANC visits, only 38.75% met the updated WHO recommendation of eight or more visits. Early initiation of ANC was common, with 64.78% of women beginning care within the first trimester; however, 35.22% initiated care later than recommended. At the bivariate level, age, education, household wealth, place of residence, and parity were associated with achieving eight or more ANC visits. In adjusted analyses, age, wealth, and parity remained significant predictors of adequate ANC utilization.

Conclusion: Although antenatal care coverage in Ghana is high, achieving recommended standards of care remains uneven. Targeted efforts to improve early initiation and completion of adequate ANC visits, particularly among younger, poorer, and higher-parity women, are essential to promote equity and maternal health outcomes.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Maternal health refers to the overall well-being of women during pregnancy, childbirth, and the postpartum period. It encompasses their physical, mental, and social health throughout the maternal cycle, emphasizing that it is not merely the absence of disease or infirmity (WHO, 2025). It is a global priority, not only because it reflects the overall effectiveness of a country's health system but also due to its strong links with social and economic development (WHO, 2025). Among the key strategies to improve maternal and neonatal outcomes is antenatal care (ANC), which includes a series of scheduled medical visits, screenings, education, counseling, and interventions aimed at detecting and managing pregnancy-related complications, providing preventive services, and preparing women for childbirth and motherhood (WHO, 2016). In recognition of these benefits, the World Health Organization (WHO) revised its ANC guidelines in 2016, increasing the recommended minimum from four visits to eight contacts, with the first occurring within the first trimester. This update aimed to not only increase coverage but also improve the quality and timing of care to ensure better health outcomes for mothers and babies (WHO, 2016).

In high-income countries, antenatal care (ANC) utilization and quality are notably superior, contributing to significantly better maternal and neonatal health outcomes. For instance, Sweden has achieved nearly universal ANC coverage, with over 98% of pregnant women attending the recommended number of visits, resulting in one of the lowest maternal mortality ratios globally, at approximately 4 deaths per 100,000 live births (OECD, 2023). Similarly, Australia has maintained a well-structured and accessible ANC system, with 94% of pregnant women receiving timely and adequate care in accordance with national guidelines (AIHW, 2025).

Many countries in sub-Saharan Africa (SSA) on the other hand, still face major challenges when it comes to delivering adequate ANC. Recent analyses using data from multiple DHS surveys in SSA between 2018 and 2023 show that only 9% of pregnant women received eight or more ANC contacts during pregnancy (Demissie *et al.*, 2024). These low figures highlight persistent gaps in maternal health services across the region, often driven by limited access to healthcare facilities, financial constraints, cultural norms, and systemic health system weaknesses.

Ghana has made considerable progress in improving maternal healthcare through various policy interventions, particularly the Free Maternal Healthcare Policy introduced under the National Health Insurance Scheme (NHIS). This initiative has significantly reduced financial barriers to maternal health services and has led to increases in ANC attendance, skilled delivery, and postnatal care (Adawudu *et al.*, 2024). However, despite these efforts, maternal mortality in Ghana remains high. The most recent estimates put the country's maternal mortality ratio at around 310 deaths per 100,000 live births, well above the Sustainable Development Goal (SDG) target of 70 per 100,000 by 2030 (Abuosi *et al.*, 2024). These statistics suggest that increasing access alone may not be enough; the focus must also shift to ensuring that women receive timely, adequate, and high-quality ANC.

Looking at Ghana's latest Demographic and Health Survey conducted in 2022 (GDHS 2022), the data reveal that while a high percentage of women of reproductive age (15–49 years) had at least one ANC visit during their most recent pregnancy, only about 38.4% met the WHO recommendation of eight or more contacts (Aboagye *et al.*, 2024). This figure represents some improvement from previous years but still falls short of global targets. The World Health

Organization recommends that pregnant women receive a minimum of eight antenatal care contacts to improve maternal and neonatal outcomes and support progress toward Sustainable Development Goal (SDG) 3.1, which aims to reduce the global maternal mortality ratio to less than 70 deaths per 100,000 live births by 2030 (WHO, 2016; United Nations, 2015).

A growing body of evidence from Ghana and across SSA points to several factors that influence ANC use. Women's age and number of previous pregnancies often play a role, with younger and first-time mothers generally more likely to attend ANC regularly than older or multiparous women (Demissie *et al.*, 2024). Education level is another important factor; women with secondary or higher education are significantly more likely to begin ANC early and complete the recommended visits. Economic status also matters. Women from wealthier households consistently report higher rates of adequate ANC utilization compared to those from low-income households (Azaare *et al.*, 2024). These patterns are not only evident in Ghana's 2022 GDHS data but also reflected in multiple recent studies (Azaare *et al.*, 2024; Mare *et al.*, 2024; Tessema *et al.*, 2021).

Geographic location is another major determinant. Rural women, particularly those in the Northern, Savannah, and Oti regions, often face greater obstacles to accessing ANC than their urban counterparts in Greater Accra and the Ashanti Region (Dotse-Gborgbortsi *et al.*, 2022). These differences are often tied to infrastructure challenges, long travel distances to health facilities, and the uneven distribution of healthcare providers. Moreover, the availability and quality of services at health facilities vary considerably, contributing to differences in perceived and actual care quality (Dotse-Gborgbortsi *et al.*, 2023).

Quality, in fact, is one of the more overlooked aspects of ANC. A large multi-country study examining ANC services in 13 SSA countries, including Ghana, found that only about 54% of

women received care that could be considered high-quality, taking into account timeliness, provider skill, and comprehensiveness of services (Chilot *et al.*, 2023). In Ghana specifically, findings suggest that long waiting times, overworked staff, and inconsistent communication between providers and patients often lead to dissatisfaction and reduced trust in health services (Adawudu *et al.*, 2024). Even when services are technically available, the perception of poor quality may discourage some women from continuing care or returning for follow-up visits. Although several studies have examined antenatal care utilization in Ghana, much of the existing evidence focuses primarily on the number of ANC visits or is based on older datasets that predate the updated WHO recommendation of eight ANC contacts. There is limited recent nationally representative evidence that simultaneously examines both the utilization and quality of antenatal care services in Ghana using the most recent Demographic and Health Survey data.

Addressing this gap is important for understanding whether improvements in access to ANC services are translating into adequate and high-quality care for pregnant women. Therefore, this study assesses the utilization and quality of antenatal care services among women of reproductive age in Ghana using data from the 2022 Ghana Demographic and Health Survey, with the aim of informing policies and interventions to strengthen maternal healthcare services.

1.2 Problem Statement

Inadequate utilization and poor antenatal care (ANC) service quality remain significant challenges, particularly in low- and middle-income countries. Globally, the World Health Organization (WHO) recommends a minimum of eight ANC contacts during pregnancy to ensure optimal maternal and fetal health outcomes (WHO, 2016). Yet many countries struggle to meet this standard. For instance, in India, only 51% of women received four or more ANC visits (Kumar *et al.*, 2019), and in Pakistan, the figure is 37% (NIPS/Pakistan and ICF, 2019). In Bangladesh, approximately 47% of pregnant women had at least four ANC visits (Karar Z Ahsan *et al.*, 2019).

Similarly, in Nepal, 69% of women attended four or more ANC visits (MOH/Nepal, ERA/Nepal and ICF, 2017). These statistics highlight the global challenge of achieving adequate ANC coverage.

In sub-Saharan Africa, the situation is particularly concerning. A study analyzing Demographic and Health Survey data from 31 countries between 2010 and 2018 found that only 55.66% of pregnant women received at least four ANC visits (Chilot *et al.*, 2023)). In Ethiopia, only 22% of women received four or more ANC visits, and in Burkina Faso, the figure was as low as 32% (Bain *et al.*, 2022). In Uganda, while 96% of women had at least one ANC visit, only 47% completed four or more visits (Tessema *et al.*, 2021). In Nigeria, 57% of women received four or more ANC visits, but disparities exist between urban and rural areas (Ilesanmi *et al.*, 2023). These figures underscore the persistent challenges in ANC utilization across the continent.

Ghana has made strides in improving maternal health services, yet challenges remain. According to the 2014 Ghana Demographic and Health Survey, 87% of women had at least four ANC visits (GSS, GHS and International, 2015). However, disparities persist, with women in rural areas, those with lower education levels, and those in the lowest wealth quintiles less likely to receive adequate ANC (Seidu *et al.*, 2022). A study in the Sunyani Municipality found that 81% of women had four or more ANC visits, but factors such as distance to health facilities and lack of health insurance affected utilization (Owusu, 2021). Furthermore, a cluster analysis identified three patterns of care use: adequate, less adequate, and least adequate care. It found that nearly half of the women experienced inadequate maternal care, influenced by factors such as rural residence, lack of health insurance, and distance to health facilities (Ayanore, Pavlova, and Groot, 2016). These findings indicate that while overall ANC coverage is high, quality and equity issues persist.

The consequences of inadequate ANC are profound. Globally, approximately 303,000 women die each year due to pregnancy and childbirth-related complications, with 99% of these deaths occurring in low-resource countries (WHO, 2025b). In Ghana, the maternal mortality ratio was estimated at 310 deaths per 100,000 live births in 2017, reflecting the need for continued efforts to improve maternal health services (GSS, 2017). Improving ANC utilization and quality is essential to reduce maternal and neonatal mortality and achieve Sustainable Development Goal 3.1, which aims to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 (UN, 2025).

1.3 Rationale

Although there have been many efforts globally and regionally to improve maternal health, the use and quality of antenatal care (ANC) services are still not optimal, especially in low- and middleincome countries (Owusu, 2021).

While a substantial body of research exists on ANC in Ghana, much of it draws on data that predate recent shifts in healthcare delivery, including the effects of the COVID-19 pandemic on access to care. The 2022 GDHS therefore offers an important and timely evidence base, particularly in light of the updated WHO guidelines, which emphasize not only the number of ANC contacts but also their timing and quality. This study is relevant to policy, as its findings can inform Ghana Health Service strategies and resource allocation for maternal health; to practice, by highlighting service gaps that providers can address to improve ANC delivery; to research, by updating the evidence base with current, nationally representative data; and to education, by providing a reference point for training health workers on quality-focused antenatal care.

By analyzing the 2022 GDHS, this study will provide insights into the proportion of Ghanaian women who utilized ANC services during their most recent pregnancy, the adequacy of that

utilization in relation to global standards, and the socio-demographic and economic factors associated with uptake. These findings are essential to guide Ghana Health Service (GHS) strategies for improving maternal health outcomes and reducing preventable deaths, especially in underserved populations. In summary, analyzing the latest data on ANC use and quality will give a clearer understanding of where Ghana stands now, what progress has been made, and what still needs to be done to ensure all women receive the care they need during pregnancy.

1.4 Conceptual Framework

The conceptual framework for this study is grounded in Andersen's Behavioral Model of Health Services Use, which provides a comprehensive structure for understanding the factors influencing healthcare utilization, including antenatal care (ANC) services (Andersen, 1995). This model posits that the use of health services is determined by three broad categories of factors: predisposing characteristics, enabling resources, and need factors. These components interact to influence health-seeking behavior, including the initiation and adequacy of ANC utilization.

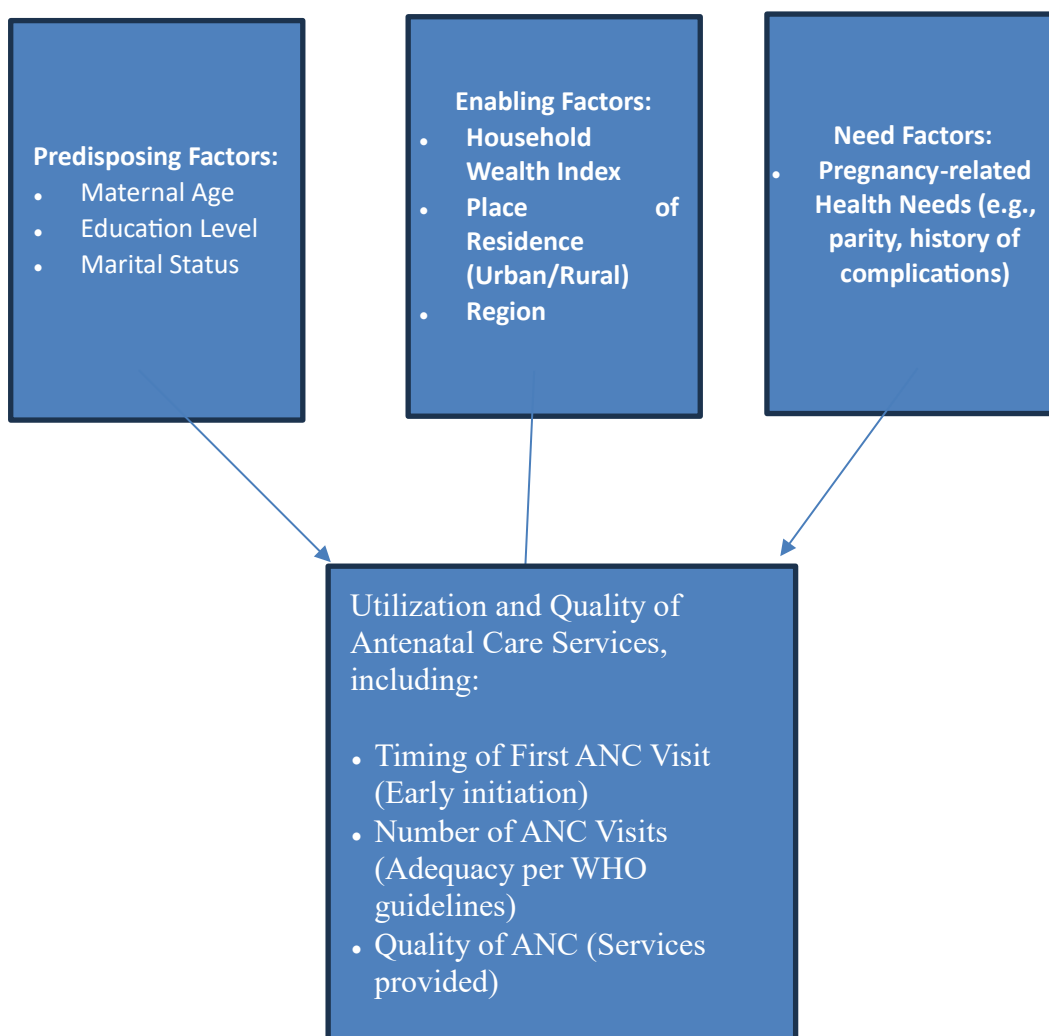


Figure 1 Conceptual Framework

Source: Adapted from Andersen's Behavioral Model of Health Services Use (Andersen, 1995).

Predisposing factors refer to the socio-demographic attributes that predispose individuals to use or not use healthcare services. In the context of ANC, these include maternal age, education level, marital status, and parity. Studies have consistently demonstrated that these factors influence ANC attendance. For example, younger women and those with higher education are more likely to initiate ANC early and attend the recommended number of visits (Tessema et al., 2021). Education enhances women's health literacy and empowerment, enabling them to better appreciate the benefits of ANC and navigate healthcare systems (Mare *et al.*, 2024).

Enabling factors involve the logistical and economic means that facilitate or hinder access to ANC services. These include household wealth, place of residence (urban versus rural), and geographic region. Financial capacity and physical access are critical for timely and adequate ANC use. Women from wealthier households are more likely to afford transport and service fees, attend more ANC visits, and receive higher quality care (Dotse-Gborgbortsi *et al.*, 2022). Urban residence often correlates with better access to health facilities and skilled providers compared to rural settings, where infrastructural challenges and distance may discourage ANC attendance (Tessema et al., 2021).

Need factors relate to the perceived and evaluated health needs that prompt service use. In pregnancy, this includes awareness of pregnancy status, recognition of complications, and prior obstetric history. Women who perceive higher risk or experience symptoms tend to seek ANC

earlier and more frequently (Kruk et al., 2018). Addressing need factors is essential for ensuring that ANC services are not only accessed but also appropriately matched to individual health risks. These three domains, predisposing, enabling, and need factors, are interrelated and jointly shape women's use of antenatal care services. Predisposing factors such as age, education, and marital status influence a woman's knowledge, attitudes, and perceived importance of ANC. For instance, women with higher education are more likely to appreciate the benefits of early and frequent ANC attendance (Tessema et al., 2021; Mare et al., 2024). However, this predisposition may not translate into utilization if enabling factors like financial means, proximity to health facilities, or urban residence are lacking. As Dotse-Gborgbortsi et al. (2022) note, geographic access and infrastructure are critical determinants of whether women can attend ANC visits, particularly in rural and underserved regions.

Furthermore, need factors such as previous pregnancy complications or perceived health risks often serve as the final motivator for care-seeking. Women with prior negative obstetric experiences or high-risk pregnancies are more likely to attend ANC earlier and more frequently (Kruk et al., 2018). Even in cases where predisposing and enabling conditions are favorable, a low perceived need can still result in delayed or inadequate ANC use. On the other hand, perceived vulnerability or past complications may override other barriers and compel women to seek care despite economic or geographic constraints (Chilot et al., 2023).

Addressing only one domain may not be sufficient; instead, interventions must be holistic and context-specific to improve ANC utilization and equity in maternal health services. These three categories of factors interact to shape women's utilization of antenatal care services. Predisposing factors influence a woman's likelihood or inclination to seek care by shaping her knowledge, beliefs, and attitudes toward maternal health services. Enabling factors determine whether the

necessary resources and access, such as financial capacity, geographic proximity to health facilities, and availability of services are present to allow utilization to occur. Need factors, which represent the perceived or actual health needs during pregnancy, often serve as the immediate trigger that prompts women to seek antenatal care. Together, these health-related factors interact to determine ANC utilization patterns in Ghana. By integrating these components, Andersen's model allows for a comprehensive understanding of how socio-demographic, economic, and health-related factors interact to determine ANC utilization patterns in Ghana.

1.5 Research Questions:

1. What proportion of women aged 15–49 in Ghana utilized antenatal care services during their most recent pregnancy?
2. How adequate is the utilization of ANC services among these women in terms of the timing of the first visit and the total number of visits compared to WHO guidelines?
3. What socio-demographic and economic factors influence the utilization of antenatal care services among women of reproductive age in Ghana?

1.6 General Objectives

To assess the utilization and quality of antenatal care services among women of reproductive age in Ghana, using evidence from the 2022 Ghana Demographic and Health Survey (GDHS).

1.7 Specific Objectives:

1. To determine the proportion of women aged 15–49 who utilized antenatal care services during their most recent pregnancy.
2. To assess the adequacy of ANC utilization based on the timing of the first visit and the total number of ANC visits, in line with WHO recommendations.

3. To examine the socio-demographic and economic factors (such as age, education level, household wealth, place of residence, and region) associated with ANC utilization among women of reproductive age in Ghana.

1.8 Profile of Study Area

This study was conducted within Ghana, a West African country with a diverse population and socio-economic landscape. According to the 2021 Population and Housing Census, Ghana's total population is approximately 34 million, with a population growth rate of about 2.15% per annum (GSS, 2021). The country has a youthful population structure, with about 38% of the population under the age of 15, indicating a high dependency ratio and significant future demands on health and social services (GSS, 2021). Life expectancy at birth is estimated at 64 years for males and 66 years for females (GSS, 2021).

The population is unevenly distributed across 16 administrative regions, with urban areas growing rapidly due to internal migration, particularly to Greater Accra and Ashanti regions. As of the 2021 Census, about 56% of the population lives in urban areas (GSS, 2021). Women aged 15–49 years constitute about 36% of Ghana's total population, representing the core demographic for maternal and reproductive health services (GSS, 2021). The total fertility rate (TFR) for Ghana is estimated at 3.9 children per woman, though this varies considerably by region and urban-rural status (GSS, 2021). Younger women aged 15–24 form a substantial portion of this group. Ghana's economy has been growing steadily, but 23.4% of the population still lives below the national poverty line, predominantly in rural areas (GSS, 2018). The health infrastructure includes over 4,000 facilities, but distribution is uneven, favouring urban centres. Rural women often face challenges related to distance, transportation, and the availability of skilled providers, affecting timely ANC attendance.

1.9 Organization of the Study

This thesis is organized into six chapters. Chapter One presents the introduction to the study, including the background, problem statement, rationale, conceptual framework, research questions, objectives, and profile of the study area. Chapter Two reviews relevant literature on antenatal care utilization and quality, drawing from global, regional, and Ghana-specific studies. Chapter Three describes the methodology used for the study, including the study design, data source, study population, variables of interest, and methods of data analysis. Chapter Four presents the results of the study, including descriptive statistics and regression analysis. Chapter Five discusses the findings in relation to existing literature and highlights their implications for maternal health policy and practice. Finally, Chapter Six provides the conclusions of the study and presents recommendations based on the findings.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter presents a critical review of existing literature on the utilization and quality of antenatal care (ANC) services among women of reproductive age, structured strictly around the objectives of the present study. The purpose of the review is to situate the study within the broader body of empirical evidence, synthesize what is currently known, and identify persisting gaps that justify the need for further investigation using recent national data from Ghana. Consistent with the study design, the literature is reviewed using a funnel approach, beginning with global evidence, narrowing to sub-Saharan Africa, and then focusing specifically on Ghana. Antenatal care is widely recognized as a cornerstone of maternal and neonatal health, providing opportunities for early detection of pregnancy-related complications, health promotion, and preparation for childbirth. In line with this, the World Health Organization updated its ANC guidelines in 2016, recommending a minimum of eight contacts during pregnancy, with emphasis not only on frequency but also on the timing and quality of care received (WHO, 2016). As a result, contemporary literature has increasingly moved beyond assessing simple attendance toward examining adequacy and content of care. The literature review is organized into three main substantive sections corresponding directly to the study objectives: utilization of antenatal care services; adequacy and quality of ANC; and socio-demographic and economic determinants influencing ANC utilization and quality. Each section synthesizes global, regional, and Ghana-specific evidence, critically compares findings across studies, and highlights methodological and contextual limitations in existing research.

2.2 Utilisation of Antenatal Care Services (Timing and Frequency)

Antenatal care (ANC) constitutes a critical entry point into the maternal and newborn health continuum, providing opportunities for early risk detection, preventive interventions, counselling,

and referral throughout pregnancy. Recognising limitations in the former four-visit model, the World Health Organization revised its ANC guidelines in 2016, recommending a minimum of eight contacts across pregnancy, with explicit emphasis on early initiation in the first trimester and continuity of care across subsequent trimesters (World Health Organization [WHO], 2016). This shift reflects growing evidence that maternal and neonatal outcomes are influenced not only by whether women attend ANC at least once, but also by when care begins and whether recommended contacts are completed.

Globally, evidence indicates that while at least one ANC contact is common, timely initiation and completion of eight or more contacts remain limited in many low- and middle-income countries (Arsenault et al., 2020; (Demissie et al., 2024). A large multi-country analysis of Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS) data from 54 Countdownto-2030 priority countries found that only 44.3% of women initiated ANC within the first trimester, while just 11.3% achieved eight or more ANC contacts (Arsenault et al., 2020). Importantly, the study demonstrated a strong association between early initiation and continuity: women who began ANC in the first trimester were substantially more likely to complete a higher number of contacts and receive a greater proportion of recommended ANC interventions compared to those who initiated care later (Arsenault et al., 2020). These findings suggest that late entry into care compresses the available window for follow-up visits and reduces exposure to essential services. In sub-Saharan Africa, the utilisation gap becomes more pronounced when assessed using the eight-contact benchmark. A recent multilevel analysis of DHS data from 14 sub-Saharan African countries found that approximately 91% of women did not meet the WHO-recommended minimum of 8 ANC visits, underscoring widespread noncompliance with the updated guideline across the region (Demissie et al., 2024). Regional monitoring data further highlight persistent challenges even under the less stringent four-visit standard. According to UNICEF, only about 57% of pregnant women in Western and Central Africa received at least four ANC visits as of 2023,

reflecting slow progress in ensuring continuity of care (UNICEF, 2023). Together, these findings indicate that ANC utilisation in sub-Saharan Africa is often characterised by partial attendance, with late initiation acting as a key barrier to completing recommended schedules.

In Ghana, national-level evidence paints a mixed picture: relatively high access but uneven continuity. Using data from the Ghana Maternal Health Survey, Abuosi et al. (2024) found that approximately 66% of women initiated ANC in the first trimester; however, only 44.4% achieved eight or more ANC visits. This indicates that although many women enter care early, a substantial proportion do not sustain attendance throughout pregnancy. Complementary evidence from the 2022 Ghana Demographic and Health Survey further confirms this pattern. A recent secondary analysis of the GDHS 2022 reported that only 38.4% of women attained eight or more ANC contacts, with marked regional disparities across the country (Aboagye et al., 2024). Southern and urbanised regions tended to record higher utilisation, while lower coverage persisted in several northern regions.

These Ghanaian findings mirror broader regional patterns, suggesting that the principal utilisation challenge has shifted from initial access to sustained engagement with ANC services. National surveys provide valuable estimates of coverage but are limited in their ability to explain why women who initiate ANC often early, fail to complete the recommended number of contacts within specific local contexts. The observed regional variation in Ghana further implies that district- and municipality-level factors, such as geographic accessibility, health system organisation, opportunity costs, and perceived value of services, may play a decisive role in determining continuity of care (Aboagye et al., 2024; Abuosi et al., 2024).

From a policy and planning perspective, these gaps underscore the importance of moving beyond national averages to examine local patterns of ANC utilisation. In settings such as Lower Manya Krobo Municipality, understanding barriers to timely initiation and sustained attendance is essential for designing interventions that address the specific conditions under which women discontinue or delay care. By focusing on both the timing and frequency of ANC contacts, the present study addresses identified gaps in the literature and aligns with contemporary global standards for assessing maternal healthcare utilisation.

2.3 Adequacy and Quality of Antenatal Care Services

Adequacy and quality of antenatal care (ANC) have become central concerns in contemporary maternal health discourse, particularly following the World Health Organization's revision of its ANC guidelines in 2016. Adequacy of ANC is no longer assessed solely by whether a woman attended care but by whether care was initiated early and sustained through enough contacts to allow effective prevention, detection, and management of pregnancy-related conditions. The WHO recommends a minimum of eight ANC contacts, beginning in the first trimester, emphasizing that more frequent and timely interactions improve maternal experience and clinical outcomes when combined with appropriate service content and continuity of care (WHO, 2016). Quality, in turn, reflects the extent to which essential evidence-based interventions—such as blood pressure monitoring, laboratory testing, iron supplementation, and counselling—are delivered during these contacts in a respectful and person-centred manner (WHO, 2016; WHO, 2018).

At the global level, growing evidence indicates that increases in ANC contact coverage have not consistently translated into improvements in effective care. Analyses across low- and middleincome countries show a persistent gap between service contact and service quality, with many women attending ANC but failing to receive the full package of recommended interventions. Arsenault et al. (2018), using data from 91 national household surveys, demonstrate that substantial

proportions of women who reported ANC attendance did not receive key components of care, highlighting inequities in quality both within and between countries. Similarly, Benova et al. (2018) emphasize that counting visits alone obscures deficiencies in care content, arguing that quality-adjusted coverage provides a more meaningful assessment of maternal health system performance than utilization metrics alone. These findings underscore that adequacy, and quality must be assessed jointly to understand whether ANC services are likely to deliver their intended health benefits.

Evidence from sub-Saharan Africa (SSA) reinforces these global patterns and reveals particularly low compliance with the WHO eight-contact recommendation. A recent multilevel analysis of DHS data across SSA found that only a minority of women achieved the recommended eight or more ANC contacts, with wide disparities by socioeconomic status and place of residence (Mare et al., 2024). This suggests that while earlier four-visit benchmarks masked important gaps, the eight-contact model exposes persistent structural barriers to continuity of care. Beyond contact frequency, quality assessments across SSA indicate that receipt of essential ANC components remains uneven. A pooled analysis of countries with high maternal mortality found that many women who attended ANC did not receive comprehensive care, reflecting systemic challenges such as workforce shortages, supply constraints, and facility-level variability in service delivery (Chilot et al., 2023). Together, these studies illustrate that inadequate ANC in SSA is not only about insufficient attendance but also about inconsistent care content.

Importantly, the SSA literature shows that adequacy and quality do not always move in tandem. In some contexts, women may achieve multiple contacts but still receive incomplete services due to health system limitations, while in others, women may receive relatively comprehensive care but fall short of adequacy benchmarks because ANC is initiated late or attendance is interrupted. Benova et al. (2018) highlight this divergence, noting that determinants of care content often differ

from determinants of attendance, implying that interventions focused solely on increasing contacts may fail to improve maternal outcomes unless accompanied by investments in service readiness and provider performance. This distinction is particularly relevant for policy design in resourceconstrained settings, where expanding access without strengthening quality may yield limited gains.

In Ghana, assessment of ANC adequacy and quality has gained renewed importance following the release of the 2022 Ghana Demographic and Health Survey (GDHS), which provides the most current nationally representative data aligned with post-2016 WHO recommendations. Evidence drawn from this dataset indicates that while ANC attendance is nearly universal, attainment of eight or more contacts remains suboptimal and varies substantially across regions (Aboagye et al., 2024). These findings suggest that national progress in maternal health service utilization may conceal important inequities in continuity of care. Moreover, analyses applying the eight-contact benchmark reveal sharper disparities than those observed under earlier four-visit standards, reinforcing concerns that improvements in coverage have not been evenly distributed.

Quality of ANC in Ghana similarly reflects mixed performance. While DHS-based indicators show that many women receive some essential components of care, not all women receive the full recommended package consistently across visits. Studies examining maternal healthcare quality in Ghana demonstrate that factors such as travel time, facility readiness, and regional infrastructure influence whether women receive timely and appropriate care when they attend (DotseGborgbortsi et al., 2023). These system-level constraints suggest that quality shortfalls are not solely attributable to individual behaviour but are embedded within broader health service delivery challenges. As a result, women may comply with ANC attendance recommendations without necessarily benefiting from comprehensive or effective care.

Despite these insights, gaps remain in the Ghanaian literature. Many studies focus primarily on either the number of ANC visits or selected quality indicators, without integrating adequacy and quality within a single analytical framework. Additionally, much of the existing evidence predates the 2022 GDHS or relies on older standards that do not fully reflect the WHO eight-contact model. There is therefore limited nationally representative evidence that simultaneously examines early initiation, continuity of care, and receipt of essential ANC components using the most recent data. Addressing this gap is critical for understanding whether ANC services in Ghana are not only accessed but are delivered in a manner consistent with global standards for effective and equitable maternal healthcare.

In summary, contemporary evidence shows that adequate and high-quality ANC remains uneven globally, across SSA, and within Ghana. The shift to the WHO eight-contact recommendation has revealed persistent gaps in continuity of care, while quality assessments highlight deficiencies in service content even among women who attend ANC. These patterns point to the need for integrated analyses that move beyond attendance to examine whether ANC services are delivered early, frequently, and with sufficient quality. The present study responds to this need by assessing both adequacy and quality of ANC among women of reproductive age in Ghana using the 2022 GDHS, thereby contributing timely evidence to inform maternal health policy and practice.

2.4 Socio-Demographic and Economic Determinants of Antenatal Care Utilization and Quality

Socio-demographic and economic characteristics play a central role in shaping both the utilization and quality of antenatal care (ANC), influencing whether women initiate care early, attend consistently, and receive appropriate services during pregnancy. Contemporary maternal health literature increasingly recognises that ANC outcomes are not determined solely by health system availability but are deeply embedded within broader social, economic, and geographic contexts.

As a result, disparities in ANC utilization and quality persist across and within countries, reflecting unequal distributions of resources, knowledge, and access.

At the global level, studies consistently identify maternal education, household wealth, age, and place of residence as key predictors of adequate ANC utilization. Women with higher levels of formal education are more likely to initiate ANC early and complete recommended contacts, partly because education enhances health literacy, autonomy, and the ability to navigate health systems (Benova et al., 2018). Economic status is similarly influential. Analyses using DHS data across low- and middle-income countries show that women from wealthier households are substantially more likely to receive both adequate and higher-quality ANC compared to those from poorer households, even in settings where services are nominally free at the point of use (Arsenault et al., 2018). These findings suggest that indirect costs such as transportation, opportunity costs, and informal payments continue to shape care-seeking behaviour.

Evidence from sub-Saharan Africa (SSA) mirrors these global patterns but reveals sharper gradients and more pronounced structural constraints. A recent multilevel analysis examining compliance with the WHO 2016 ANC recommendation across SSA found that maternal education and household wealth were among the strongest predictors of achieving eight or more ANC contacts, with women in the richest wealth quintiles significantly more likely to meet adequacy thresholds than those in the poorest quintiles (Mare et al., 2024). Place of residence also emerged as a critical determinant; rural women consistently exhibited lower odds of both early initiation and adequate ANC attendance. These disparities reflect long-standing infrastructural challenges, including distance to facilities, shortages of skilled providers, and weaker referral systems in rural and remote areas (Chilot et al., 2023).

Age and parity further interact with socio-economic factors to influence ANC utilization patterns. Younger women, particularly adolescents, often face barriers related to stigma, limited autonomy, and reduced financial independence, which can delay ANC initiation. Conversely, older and multiparous women may perceive themselves as experienced and therefore delay or reduce ANC attendance, especially when prior pregnancies were uncomplicated (Benova et al., 2018). The SSA literature suggests that these behavioural patterns are shaped not only by individual perceptions but also by community norms and prior interactions with the health system, underscoring the need to interpret utilization outcomes within their broader social context.

Beyond utilization, socio-economic characteristics also influence the quality of care women receive during ANC visits. Arsenault et al. (2018) demonstrate that inequalities in ANC quality persist even among women who attend care, with poorer and less educated women less likely to receive key components of ANC such as blood pressure measurement, laboratory testing, and counselling. This indicates that disparities are not limited to access alone but extend into service delivery processes, potentially reflecting differential treatment, facility-level resource constraints, or variations in provider practices. Benova et al. (2018) similarly show that women's socioeconomic position shapes the likelihood of receiving comprehensive care, reinforcing the argument that quality-adjusted coverage is socially patterned.

In Ghana, recent evidence confirms that socio-demographic and economic factors strongly influence both ANC utilization and adequacy. Using data from the 2022 Ghana Demographic and Health Survey, Aboagye et al. (2024) found that women with secondary or higher education, those from wealthier households, and those residing in urban areas had significantly higher odds of achieving eight or more ANC contacts. Marked regional disparities were also observed, suggesting that geographic inequalities persist despite national policies aimed at improving maternal health

access. These findings align with broader SSA evidence and indicate that the benefits of expanded ANC coverage in Ghana have not been evenly distributed.

Geographic and system-level factors further compound individual-level determinants in the Ghanaian context. Research examining maternal healthcare utilization and quality in Ghana highlights the role of travel time, facility distribution, and service readiness in shaping women's experiences of care. Dotse-Gborgbortsi et al. (2023) demonstrate that longer travel times and uneven facility quality influence maternal service utilization patterns, suggesting that women in geographically disadvantaged areas may face both reduced access and lower-quality care even when they attend services. These constraints disproportionately affect rural women and those in less resourced regions, reinforcing spatial inequities in maternal healthcare.

Despite the growing body of evidence, important gaps remain in the Ghanaian literature. Many studies focus primarily on utilization indicators such as number of ANC visits, without fully examining how socio-demographic and economic factors shape the quality of care received during those visits. Additionally, few analyses using the most recent GDHS data integrate utilization and quality outcomes within a single framework, limiting the ability to assess whether the same determinants operate similarly across these dimensions. Sub-national analyses, particularly at the district or municipal level, are also scarce, constraining the capacity to design targeted interventions for underserved populations.

Overall, existing evidence demonstrates that socio-demographic and economic determinants exert a powerful influence on ANC utilization and quality globally, across SSA, and within Ghana. Education, wealth, residence, age, and geographic location consistently shape women's engagement with ANC services and the care they receive. These persistent inequalities highlight

the need for analyses that go beyond national averages to examine how structural and social factors interact to influence both adequacy and quality of ANC. By examining these determinants using the 2022 GDHS, the present study contributes timely and policy-relevant evidence to inform efforts aimed at reducing inequities and improving maternal health outcomes in Ghana.

2.5 Summary of Literature and Identified Gaps

The reviewed literature demonstrates broad consensus that antenatal care (ANC) utilisation, adequacy, and quality are central to improving maternal and neonatal health outcomes. Evidence from global, sub-Saharan African, and Ghanaian contexts consistently shows that although ANC attendance has increased over time, significant challenges remain with respect to early initiation of care, continuity across pregnancy, and receipt of essential service components. The adoption of the WHO 2016 eight-contact recommendation has further revealed gaps that were less apparent under earlier four-visit standards, particularly among socio-economically disadvantaged populations.

Globally and within sub-Saharan Africa, studies indicate that many women who attend ANC do not achieve the recommended number of contacts or receive the full package of essential interventions, highlighting a persistent gap between service contact and effective coverage. While socio-demographic factors such as education, household wealth, and place of residence are well-established determinants of ANC utilisation, fewer studies integrate these factors with measures of adequacy and quality within a single analytical framework.

In Ghana, existing evidence confirms near-universal ANC attendance but points to uneven continuity and quality of care. Analyses based on the 2022 Ghana Demographic and Health Survey show that a substantial proportion of women do not attain eight or more ANC contacts and that marked regional disparities persist. However, much of the Ghanaian literature has focused either

on utilisation indicators or on selected quality components in isolation, limiting understanding of how timing, frequency, and content of care interact under contemporary WHO standards.

Consequently, important empirical gaps remain. First, there is limited nationally representative evidence in Ghana that simultaneously examines ANC utilisation, adequacy, and quality using the WHO 2016 framework and the most recent GDHS data. Second, although socio-demographic and economic determinants of ANC utilisation are well documented, fewer studies assess whether these same factors are associated with both adequacy and quality of care within a unified analytical approach. Addressing these gaps is necessary for generating evidence that reflects not only access to ANC services but also their effectiveness in meeting recommended standards of care.

2.6 Linkage Between the Literature Review and the Present Study

The literature reviewed in this chapter provides the empirical foundation for the focus, variables, and analytical approach of the present study. Evidence across global, regional, and Ghanaian contexts underscores the importance of assessing antenatal care beyond simple attendance by examining timing of initiation, continuity across pregnancy, and receipt of essential service components in line with the WHO 2016 recommendations. These insights directly inform the outcome measures adopted in this study, which assess ANC utilisation, adequacy, and quality concurrently.

Findings from prior studies also demonstrate the relevance of socio-demographic and economic factors in shaping ANC patterns. This evidence guides the selection of explanatory variables examined in the present analysis using data from the 2022 Ghana Demographic and Health Survey. By applying nationally representative data and contemporary standards, the study aligns its analytical framework with established approaches in the literature.

Overall, Chapter Two establishes a coherent basis for the present study by identifying key dimensions of ANC that warrant examination and by demonstrating how these dimensions have been operationalised in previous research. The linkage between the literature and the present study is reflected in the choice of indicators, determinants, and analytical focus, ensuring consistency between existing evidence and the methodological approach presented in Chapter Three.

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CHAPTER THREE

3.0 METHODOLOGY

This chapter describes the methodology used for the study. It outlines the research design, data source, study population, inclusion and exclusion criteria, sampling procedure, variables of interest, and the methods used for data analysis. The chapter also discusses ethical considerations and limitations associated with the study.

3.1 Study Design

This study adopted a quantitative, cross-sectional design using secondary data. The design was appropriate for examining population-level patterns of antenatal care (ANC) utilization and associated factors at a specific point in time using data from the 2022 Ghana Demographic and Health Survey (GDHS).

3.2 Study Site

This study utilized secondary data from the 2022 Ghana Demographic and Health Survey (GDHS), a nationally representative survey conducted across all sixteen administrative regions of Ghana, covering both urban and rural settings. As the GDHS is not facility- or community-specific, respondents were sampled from enumeration areas distributed nationwide, ensuring representation of Ghana's diverse population of women of reproductive age rather than a single geographic study site.

3.3 Study Population

The target population for this study was women aged 15–49 years who reported having had a live birth within five years preceding the survey.

3.4 Inclusion Criteria

Women were included in the analysis if they were aged 15–49 years, had a live birth within the five years preceding the 2022 GDHS, and had complete information on the antenatal care (ANC) variables of interest, including the number and timing of ANC visits and the ANC service components used to assess quality of care.

3.5 Exclusion Criteria

Women were excluded from the analysis if they had missing or incomplete data on key ANC variables, including timing of the first ANC visit, number of ANC visits, or the selected ANC service components used to assess quality of care.

3.6 Sample Size

The 2022 Ghana Demographic and Health Survey (GDHS) interviewed a total of 15,014 women aged 15–49 years using the women’s questionnaire. For this study, the analysis was restricted to women who had a live birth within the five years preceding the survey, since antenatal care (ANC) information in the DHS is collected with reference to the most recent birth within this period.

From the total sample, 5,138 women reported having had a live birth within the five years preceding the survey and were therefore eligible for inclusion in the study.

To ensure completeness and reliability of the analysis, the study further restricted the sample to women with available information on key antenatal care variables, including timing of the first ANC visit, number of ANC visits, and selected ANC service components used to assess quality of care. Women with missing or incomplete data on these variables were excluded from the analysis.

The final analytic sample consisted of 5,036 women who had complete antenatal care data, and this sample size was used for the main analyses in the study.

3.7 Sampling Procedure

This study adopted the sampling methodology used by the 2022 Ghana Demographic and Health Survey (GDHS), which employed a two-stage stratified cluster sampling design to ensure national and regional representativeness. The focus of this study was on women of reproductive age (15–

49 years) who participated in the GDHS 2022 and provided relevant information on antenatal care (ANC) utilization and quality.

In the first stage of sampling, enumeration areas (EAs) were selected across the country using probability proportional to size (PPS) from the sampling frame provided by the Ghana Statistical Service based on the 2021 Population and Housing Census. Each EA typically consisted of an average of 150–200 households. The selection ensured proportional representation of both urban and rural areas within each of Ghana’s administrative regions, including newly created ones.

In the second stage, a systematic random sampling approach was used to select households within each selected EA. Approximately 30 households were systematically selected per cluster to participate in the survey. All eligible women aged 15–49 years in the selected households were identified and interviewed using standardized DHS women's questionnaires.

3.8 Data Collection Methods and Instruments

The study utilized publicly available data from the 2022 Ghana Demographic and Health Survey (GDHS), which was a nationally representative survey conducted by the Ghana Statistical Service (GSS), in collaboration with ICF International. The GDHS collected information on health indicators, including maternal health service utilization, from women aged 15–49 years across all regions of Ghana. To retrieve the dataset, the researcher registered for access through the Demographic and Health Surveys (DHS) Program website. A request was submitted specifying the purpose of the study and the required dataset (the Individual Recode or IR file). Upon approval, the dataset was downloaded. The file was then imported into Stata version 18, where relevant variables were identified and extracted using a structured data extraction tool. This process ensured that the dataset was cleaned and restricted to eligible women who had a live birth within the last five years and had complete antenatal care information.

For the present study, data were extracted from the women's individual recode dataset (IR file) of the 2022 GDHS, focusing specifically on variables related to antenatal care, including the number and timing of ANC visits, provider type, components of care received, and sociodemographic characteristics. The analysis included all eligible women captured in the 2022 GDHS dataset who met the inclusion criteria.

The variables extracted for analysis, along with their operational definitions and scale of measurement, are presented in Table 3.1 below.

Variable Type	Variable	Operational Definition	Scale of Measurement
Dependent Variable	Utilization of ANC	Whether the woman attended any antenatal care visits during her most recent pregnancy	Binary (Yes/No)
	Adequacy of ANC	Adequate if ANC began in 1st trimester and total visits ≥ 8 (WHO criteria)	Binary (Adequate/Inadequate)
Independent Variable	Age of respondent	Respondent's age in completed years at time of last pregnancy	Continuous
	Education level	Highest level of formal education attained (e.g., none, primary, secondary, higher)	Categorical
	Wealth index	Economic status derived from household assets (quintiles: poorest to richest)	Categorical

	Residence	Place of residence of respondent: Urban or Rural	Binary
	Region	Administrative region where respondent resides	Categorical

Table 1 Variables of Interest

3.9 Pre-testing

As this study involved secondary analysis of the 2022 GDHS, the researcher did not conduct independent pre-testing of a data collection instrument. However, the GDHS women's questionnaire was pre-tested by the Ghana Statistical Service (GSS) and ICF International prior to the main survey to assess the clarity, cultural appropriateness, and reliability of the questions, including those on antenatal care service utilization.

3.10 Data Handling

After extraction, the dataset was cleaned in Stata version 18 to check for inconsistencies, out-of-range values, and missing entries. Key variables, including ANC visit timing and frequency, were recoded into analysis-ready categories (for example, adequate versus inadequate ANC utilization) based on WHO criteria. Cases with missing values on core ANC variables were excluded, as described in Section 3.5. Sampling weights, clustering, and stratification variables provided in the dataset were retained and applied during analysis to preserve the survey's representativeness.

3.11 Statistical Analysis

Data were analyzed using Stata version 18. Descriptive statistics summarized the proportion of women utilizing ANC services and meeting adequacy criteria. Chi-square tests examined associations between ANC utilization and sociodemographic variables. Multivariable logistic

regression models identified independent predictors of ANC utilization and adequacy, adjusting for potential confounders. To account for the complex sampling design of the GDHS, sampling weights, clustering, and stratification were applied in all analyses. The data was weighted in Stata using the survey (svy) command, which accounted for sampling weights, clustering, and stratification in the dataset. All analyses were conducted using the svy prefix to obtain weighted estimates and correct standard errors.

3.12 Ethical Considerations

This study involved secondary analysis of publicly available data from the 2022 Ghana Demographic and Health Survey (GDHS). Ethical approval for the GDHS was obtained by the survey implementers from relevant national and international ethical review boards prior to data collection. For this study, permission to access and use the dataset was obtained through the Demographic and Health Surveys (DHS) Program after submitting a formal request.

Several ethical principles were observed in this study. Confidentiality and anonymity were maintained because the DHS dataset is fully anonymized and contains no personal identifiers that could reveal the identity of respondents. The principle of data security was also upheld by storing the dataset securely and using it strictly for academic purposes. In addition, the principle of responsible data use was followed by ensuring that the data were used only for the approved research objectives and were not shared with unauthorized persons.

Ethical clearance for the conduct of this study was obtained from the Institutional Review Board (IRB) of Ensign Global University before the analysis was carried out.

3.13 Study Limitations

As a secondary analysis of the 2022 Ghana Demographic and Health Survey (GDHS), the research was limited to variables that were already collected; this restricted the ability to explore some

potentially relevant factors such as women's personal experiences, perceptions of care quality, or cultural beliefs affecting antenatal care utilization. Second, the cross-sectional nature of the GDHS limited the ability to establish causality; associations identified between variables should not be interpreted as causal relationships. Third, recall bias might have affected the accuracy of self-reported data, particularly with respect to the number and timing of ANC visits, especially for women who gave birth several years prior to the survey. To reduce this bias, the Ghana Statistical Service (GSS) encouraged interviewers to verify reported ANC visit dates against women's ANC/maternal health record booklets where these were available, rather than relying solely on unaided recall; however, not all respondents could produce their booklets at the time of interview, so residual recall bias cannot be fully ruled out. Fourth, the quality of ANC was assessed based on available indicators in the dataset, which might not have captured the full scope of service quality, such as provider competence or interpersonal care. Despite these limitations, the study provided valuable nationally representative evidence on antenatal care utilization and quality in Ghana, offering important insights for policy and intervention improvements in maternal health.

3.14 Assumptions

This study assumed that respondents provided honest and accurate responses to the GDHS questionnaire, particularly regarding antenatal care visits and their timing. It was also assumed that the data collection and quality-control procedures implemented by the Ghana Statistical Service (GSS) during the 2022 GDHS were rigorous enough to ensure the reliability and validity of the dataset used for this secondary analysis.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This chapter presents the results of the study on antenatal care utilization and quality among women in Ghana, based on data from the 2022 Ghana Demographic and Health Survey (GDHS). The analysis was restricted to 5,036 women aged 15–49 years with complete information on key antenatal care variables.

The chapter is organized into four main sections. The first section describes the socio-demographic characteristics of the respondents. The second section presents findings on the utilization of antenatal care services, including timing of the first visit and number of visits. The third section examines the adequacy and quality of antenatal care based on selected indicators. The final section presents the results of the bivariate and multivariable analyses, assessing the association between socio-demographic factors and antenatal care utilization and adequacy.

All percentages reported are weighted to account for the complex sampling design of the GDHS, while frequencies represent unweighted counts.

4.2 Socio-Demographic characteristics of participants

The study included 5,036 women aged 15–49 years with complete antenatal care data. The largest proportion of respondents were aged 25–29 years (24.14%), followed by those aged 30–34 years (23.80%) and 20–24 years (20.33%). Women aged 35–39 years accounted for 17.35% of the sample. Adolescents aged 15–19 years constituted 5.68%, while women aged 45–49 years represented the smallest proportion (1.85%).

More than half of the respondents had secondary education (53.78%), while 21.55% had no formal education. Those with primary education accounted for 15.24%, and 9.43% had higher education. Regarding household wealth, the distribution across quintiles was relatively even. The largest

proportion of respondents belonged to the poorest quintile (22.89%), followed by poorer (21.28%), middle (19.74%), richer (18.59%), and richest (17.49%) households.

Slightly more than half of the women resided in rural areas (52.03%), while 47.97% lived in urban areas.

Regionally, the highest proportion of respondents were from the Ashanti region (18.04%), followed by Greater Accra (11.92%) and the Northern region (11.16%). The smallest proportions were observed in Ahafo (2.26%), Western North (2.67%), Savannah (2.96%), Upper West (3.17%), and North East (3.20%) regions.

In terms of marital status, the majority of respondents were married (61.16%), while 21.91% were living with a partner and 11.81% had never been in union. Smaller proportions were separated (3.31%), widowed (1.03%), or divorced (0.78%).

With respect to parity, the largest proportion of women had 2–3 children (37.95%), followed by those with one child (26.99%) and 4–5 children (22.25%). Women with six or more children constituted 12.80% of the sample.

Table 4.1 Socio-Demographics

Variable	Category	Frequency (N)	Percentage (%)
Age Group (years)	15–19	293	5.68
	20–24	1,036	20.33
	25–29	1,246	24.14
	30–34	1,166	23.80
	35–39	848	17.35
	40–44	356	6.85
	45–49	91	1.85
Education Level	No education	1,460	21.55
	Primary	801	15.24
	Secondary	2,383	53.78
	Higher	392	9.43
Wealth Index	Poorest	1,583	22.89
	Poorer	1,258	21.28
	Middle	911	19.74
	Richer	726	18.59

	Richest	558	17.49
Place of Residence	Urban	2,092	47.97
	Rural	2,944	52.03
Region	Western	233	6.04
	Central	264	9.90
	Greater Accra	234	11.92
	Volta	209	3.86
	Eastern	226	7.22
	Ashanti	318	18.04
	Western North	231	2.67
	Ahafo	270	2.26
	Bono	231	3.37
	Bono East	364	5.46
	Oti	337	3.45
	Northern	519	11.16
	Savannah	427	2.96
	North East	470	3.20
	Upper East	359	5.33
	Upper West	344	3.17
Marital Status	Never in union	495	11.81
	Married	3,428	61.16
	Living with partner	904	21.91
	Widowed	48	1.03
	Divorced	29	0.78
	Separated	132	3.31
Parity (Children Ever Born)	1 child	1,313	27.00
	2–3 children	1,878	37.95
	4–5 children	1,158	22.25
	6+ children	687	12.80
Total		5036	100.0

4.2 Antenatal Care Utilization Among Women

Among women with recent births and valid antenatal care information, majority attended at least one antenatal care (ANC) visit during their most recent pregnancy. Specifically, 98.2% of women reported having at least one ANC visit, while 1.8% reported not attending any ANC visit.

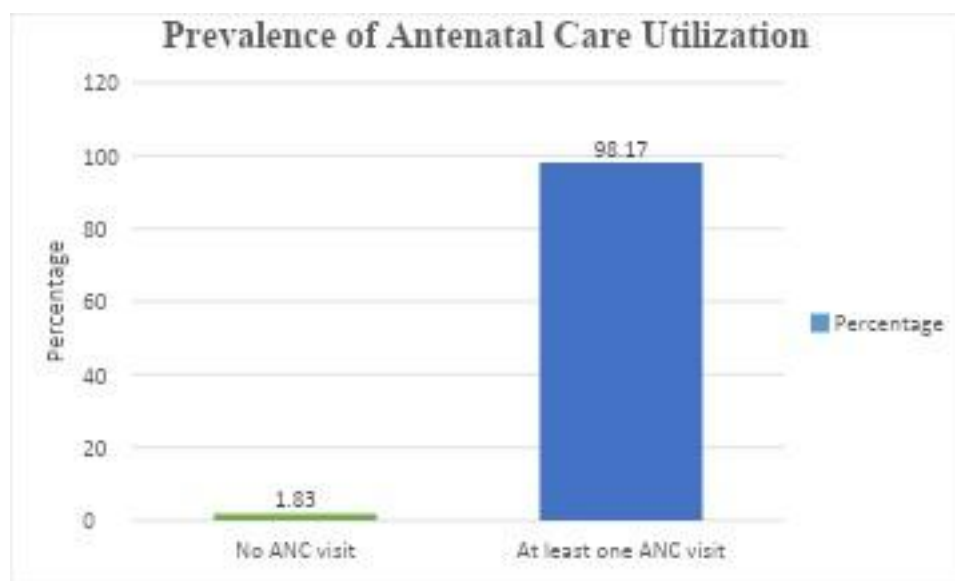


Figure 4.2 Antenatal Care Utilization

4.3 Adequacy of ANC utilization

Based on the WHO recommendation of at least four visits, 88.6% of women achieved four or more ANC visits, while 11.4% did not meet this threshold. According to the updated WHO 2016 recommendation of eight or more visits, only 38.8% of women met the recommendation, whereas 61.3% had fewer than eight visits.

With respect to timing of initiation ($n = 5,031$), 64.8% of women initiated ANC within the first trimester (≤ 3 months), while 35.2% initiated care after the first trimester.

Table 4.2 Adequacy of ANC Utilization

Indicator	Category	Frequency (n)	Weighted %
Any ANC visit	No ANC visit	102	1.83
	At least one ANC visit	5,036	98.17
ANC 4+ visits	Less than 4 visits	628	11.42
	4 or more visits	4,510	88.58

ANC 8+ visits	Less than 8 visits	3,341	61.25
	8 or more visits	1,797	38.75
Timing of first ANC	Late initiation (>3 months)	1,764	35.22
	Early initiation (≤ 3 months)	3,267	64.78

4.4 Factors associated with adequate ANC utilization among women of reproductive age in Ghana

At the bivariate level, age group ($F = 3.20$, $p = 0.0047$), education level ($F = 27.71$, $p < 0.001$), wealth index ($F = 37.64$, $p < 0.001$), place of residence ($F = 43.49$, $p < 0.001$), and parity group ($F = 7.13$, $p = 0.0001$) were all significantly associated with having eight or more ANC visits, while marital status was not significantly associated with adequate ANC utilization ($F = 1.53$, $p = 0.1778$).

Table 4.3 Factors associated with adequate ANC utilization among women of reproductive age in Ghana

Variables	8+ ANC visits – Yes n (%)	<8 ANC visits – No n (%)	F	P-value
Age group			3.20	0.0047
15–19	73 (24.50)	225 (75.50)		

20–24	327 (31.23)	720 (68.77)		
25–29	442 (35.79)	793 (64.21)		
30–34	476 (39.21)	738 (60.79)		
35–39	322 (36.18)	568 (63.82)		
40–44	121 (33.89)	236 (66.11)		
45–49	36 (37.11)	61 (62.89)		
Education level			27.71	<0.001
No education	283 (24.65)	865 (75.35)		
Primary	218 (27.25)	582 (72.75)		
Secondary	1,041 (38.17)	1,686 (61.83)		
Higher	255 (55.08)	208 (44.92)		
Wealth index			37.64	<0.001
Poorest	256 (20.70)	981 (79.30)		
Poorer	341 (31.14)	754 (68.86)		
Middle	318 (31.18)	702 (68.82)		
Richer	404 (43.30)	529 (56.70)		
Richest	478 (56.04)	375 (43.96)		
Residence			43.49	<0.001
Urban	1,029 (42.54)	1,390 (57.46)		
Rural	768 (28.25)	1,951 (71.75)		
Marital status			1.53	0.1778
Never in union	200 (33.00)	406 (67.00)		

Married	1,137 (36.26)	1,999 (63.74)		
Living with partner	389 (34.58)	736 (65.42)		
Widowed	18 (32.73)	37 (67.27)		
Divorced	13 (33.33)	26 (66.67)		
Separated	40 (22.60)	137 (77.40)		
Parity group			7.13	0.0001
1 child	504 (36.79)	866 (63.21)		
2–3 children	726 (37.66)	1,202 (62.34)		
4–5 children	398 (34.49)	756 (65.51)		
6+ children	169 (24.64)	517 (75.36)		

4.5 Factors Influencing ANC utilization among women of reproductive age in Ghana

After adjusting for socio-demographic and economic factors, age, wealth index, and parity remained significantly associated with achieving eight or more ANC visits.

Compared with adolescents aged 15–19 years, women aged 25–49 years had significantly higher odds of attending eight or more ANC visits. The adjusted odds increased progressively with age, ranging from 1.54 times higher among women aged 25–29 years (AOR = 1.54; 95 CI: 1.02–2.35; $p = 0.042$) to 3.14 times higher among women aged 45–49 years (AOR = 3.14; 95 CI: 1.55–6.35; $p = 0.001$).

Household wealth was also significantly associated with adequate ANC utilization. Compared with women in the poorest quintile, women in the poorer, middle, richer, and richest quintiles had progressively higher odds of achieving eight or more ANC visits. The adjusted odds ranged from

1.44 to 3.05, with women in the richest quintile having three times higher odds (AOR = 3.05; 95 CI: 2.05–4.54; $p < 0.001$).

Parity was inversely associated with achieving eight or more ANC visits. Compared with women with one child, those with four to five children had 29 lower odds (AOR = 0.71; 95 CI: 0.51–0.97; $p = 0.031$), while women with six or more children had 51 lower odds (AOR = 0.49; 95 CI: 0.34–0.72; $p < 0.001$) of attending eight or more ANC visits. Education level, place of residence, and marital status were not significantly associated with achieving eight or more ANC visits in the adjusted model.

Table 4.4 Factors Influencing ANC utilization among women of reproductive age in Ghana

Variable	Category	COR (95 CI)	p-value	AOR (95 CI)	p-value
Age group	Ref: 15–19				
	20–24	1.39 (0.98–1.98)	0.063	1.31 (0.90–1.90)	0.164
	25–29	1.71 (1.20–2.45)	0.003	1.54 (1.02–2.35)	0.042
	30–34	1.98 (1.39–2.83)	<0.001	1.92 (1.23–3.00)	0.004
	35–39	1.74 (1.19–2.55)	0.005	1.88 (1.15–3.06)	0.011
	40–44	1.57 (1.00–2.46)	0.048	2.14 (1.25–3.67)	0.006
	45–49	1.87 (0.99–3.55)	0.053	3.14 (1.55–6.35)	0.001
Education	Ref: No education				
	Primary	1.14 (0.85–1.54)	0.378	0.87 (0.66–1.15)	0.321
	Secondary	1.88 (1.47–2.41)	<0.001	1.11 (0.87–1.41)	0.385
	Higher	3.73 (2.68–5.20)	<0.001	1.23 (0.84–1.78)	0.285
Wealth index	Ref: Poorest				
	Poorer	1.73 (1.34–2.24)	<0.001	1.62 (1.26–2.09)	<0.001
	Middle	1.74 (1.33–2.27)	<0.001	1.44 (1.11–1.87)	0.007

	Richer	2.93 (2.24–3.83)	<0.001	2.06 (1.51–2.80)	<0.001
			40		
	Richest	4.88 (3.60–6.62)	<0.001	3.05 (2.05–4.54)	<0.001
Residence	Ref: Urban				
	Rural	0.53 (0.44–0.64)	<0.001	0.85 (0.68–1.07)	0.157
Parity	Ref: 1 child				
	2–3 children	1.04 (0.86–1.25)	0.710	0.81 (0.64–1.03)	0.090
	4–5 children	0.90 (0.72–1.14)	0.389	0.71 (0.51–0.97)	0.031
	6+ children	0.56 (0.42–0.76)	<0.001	0.49 (0.34–0.72)	<0.001
Marital status	Ref: Never in union				
	Married	1.16 (0.88–1.51)	0.291	1.17 (0.86–1.60)	0.314
	Living with partner	1.07 (0.81–1.42)	0.622	1.13 (0.83–1.52)	0.442
	Widowed	0.98 (0.42–2.29)	0.968	0.91 (0.39–2.11)	0.820
	Divorced	1.02 (0.39–2.70)	0.965	0.84 (0.27–2.59)	0.767
	Separated	0.60 (0.35–1.02)	0.059	0.62 (0.35–1.09)	0.096

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter discusses the key findings of the study on antenatal care (ANC) utilization and adequacy among women in Ghana, using data from the 2022 Ghana Demographic and Health Survey (GDHS). The findings are interpreted in relation to the study objectives and situated within existing empirical literature and the framework of Andersen's Behavioral Model of Health Services Use.

The implications of these findings for maternal health policy and practice are also highlighted, especially in relation to improving early initiation and sustained engagement with ANC services among vulnerable groups.

5.2 Antenatal Care Utilization in Ghana

The findings of this study show that antenatal care (ANC) utilization in Ghana is nearly universal. An overwhelming majority of women (98.2) attended at least one ANC visit during their most recent pregnancy, while only 1.8 reported no ANC attendance. This suggests that initial contact with maternal health services is no longer the primary challenge in Ghana; rather, the issue appears to lie beyond mere entry into care.

Several plausible factors may explain this exceptionally high coverage. First, Ghana's Free Maternal Healthcare Policy under the National Health Insurance Scheme (NHIS) has substantially reduced direct financial barriers to maternal services (Adawudu et al., 2024). Since its implementation, maternal services have been provided at no direct cost at the point of care, which likely encourages early contact with the health system (Adawudu et al., 2024). Beyond Ghana, studies across sub-Saharan Africa also report high levels of at least one ANC visit. Chilot et al.

(2023), in a multi-country analysis of high maternal mortality countries, observed that while initial ANC attendance is often high, continuity and adequacy remain problematic. Similarly, Demissie et al. (2024) found that although most women in SSA initiate ANC at least once, very few achieve eight or more contacts.

However, while Ghana's near-universal first-contact rate is encouraging, it should be interpreted cautiously. High initial utilization does not necessarily translate into adequate or high-quality care. As Benova et al. (2018) argue, focusing solely on "any ANC visit" can mask gaps in timing, frequency, and service content. In other words, the health system appears successful in bringing women into care at least once, but this metric alone does not guarantee optimal maternal outcomes.

Interestingly, Ghana's 98.2 coverage exceeds averages reported in several other sub-Saharan African countries post-2020. For example, Mare et al. (2024) note that although many SSA countries report high initial contact rates, very few approach the near-universal levels seen in Ghana.

This finding suggests that Ghana has largely overcome the barrier of first contact with antenatal services. The challenge now appears to shift from access to adequacy and quality. This distinction is important because maternal mortality reduction depends not only on whether women attend ANC at least once, but on whether care is timely, continuous, and comprehensive. The subsequent findings on adequacy and determinants, therefore, become critical in understanding whether Ghana's impressive initial coverage translates into meaningful maternal health protection.

5.3 Adequacy of Antenatal Care Utilization in Ghana

Although antenatal care attendance in Ghana was nearly universal, adequacy of care presents a more complex picture. While 88.6 of women achieved at least four ANC visits under the previous WHO recommendation, only 38.8 met the updated 2016 WHO standard of eight or more contacts.

In addition, although 64.8 initiated ANC within the first trimester, more than one-third (35.2) began care after three months of pregnancy.

The sharp contrast between four and eight visits suggests that Ghana's maternal health system was well aligned with the earlier four-visit model but is still adapting to the more intensive eight-visit framework. The four-visit model had been institutionalized for many years, and both providers and women were familiar with its expectations. Transitioning to eight contacts requires not only behavioural change among women but also greater health system capacity, appointment tracking, and provider workload management.

This pattern is not unique to Ghana. Across sub-Saharan Africa, compliance with the eight-contact recommendation remains low. Demissie et al. (2024), analysing DHS data from 14 SSA countries between 2018 and 2023, found that only about 9% of women achieved eight or more visits. Similarly, Mare et al. (2024) reported that compliance with the WHO 2016 recommendation remains substantially below optimal levels across the region, particularly among women facing economic and geographic barriers. Compared to these regional estimates, Ghana's 38.8% coverage appears relatively strong, suggesting better maternal health system performance than many SSA countries. However, it still indicates that the majority of women do not meet the global standard.

The relatively high proportion of women achieving four or more visits (88.6%) is consistent with earlier Ghanaian evidence under the previous WHO guideline. The 2014 GDHS reported high levels of four-visit attendance, reflecting long-standing improvements in maternal health access. However, as scholars such as Benova et al. (2018) argue, increasing the recommended number of contacts exposes previously hidden gaps in continuity of care. In practical terms, women who comfortably met four visits may struggle to complete eight visits due to indirect costs, time constraints, or reduced perceived need once the pregnancy progresses without complications.

The timing of initiation further reinforces this structural challenge. Although nearly two-thirds of women initiated ANC within the first trimester, the fact that 35.2 started late has important implications. Late initiation significantly reduces the available time window to complete eight visits. Even if a woman attends regularly after a delayed start, she may be mathematically unable to reach eight contacts before delivery. Studies across SSA have consistently shown that early initiation strongly predicts completion of recommended visits (Mare et al., 2024). In Ghana, Abuosi et al. (2024) also found that early initiation was associated with improved continuity of care. Late initiation may be influenced by several factors. Women may delay seeking care due to uncertainty about pregnancy status, cultural norms discouraging early disclosure, competing household responsibilities, or transportation barriers (Mare et al., 2024). Dotse-Gborgbortsi et al. (2022) highlight how geographic distance and travel time continue to shape maternal service utilization in Ghana, particularly in rural and underserved regions. Even where services are free, indirect costs such as transport and lost income may discourage early and repeated visits.

These findings suggest that Ghana has largely succeeded in promoting ANC access and sustaining attendance under the former four-visit model. However, achieving full compliance with the WHO 2016 eight-contact recommendation remains a challenge. The issue appears less about entry into care and more about sustaining consistent, guideline-aligned engagement throughout pregnancy.

This shift in focus from access to adequacy and continuity represents a critical transition in maternal health policy. Moving forward, strengthening follow-up systems, promoting early pregnancy detection, and addressing indirect access barriers may be essential to closing the gap between high initial attendance and full WHO-recommended compliance.

5.4 Factors Influencing ANC utilization among women of reproductive age in Ghana

The findings demonstrate that although several socio-demographic factors were associated with achieving eight or more antenatal care (ANC) visits at the bivariate level, only age, household wealth, and parity remained significant in the adjusted model. This pattern reflects the interconnected nature of determinants of health service use as conceptualised in Andersen's Behavioral Model, where predisposing characteristics, enabling resources, and perceived need interact to shape utilisation. The loss of significance of education and place of residence after adjustment suggests that their effects may operate indirectly through enabling factors such as wealth and access to resources. Similar patterns have been reported in multi-country analyses, where socioeconomic status is usually the dominant driver of adequate ANC utilisation despite differences in education and geography (Arsenault et al., 2020; Mare et al., 2024).

Age emerged as a strong predictor of adequate ANC attendance, with older women significantly more likely to achieve eight or more visits compared to adolescents. Within Andersen's framework, age functions as a predisposing factor, shaping health beliefs, autonomy, and capacity to mobilise resources. The lower likelihood of adequate attendance among adolescents may reflect the influence of stigma, limited decision-making power, and financial dependence, all of which constrain sustained engagement with maternal health services. Evidence from sub-Saharan Africa consistently shows that younger women are less likely to complete recommended ANC visits, partly due to social vulnerability and reduced access to supportive networks (Tessema et al., 2021; Bobo et al., 2020). In contrast, older women tend to have greater reproductive experience, social support, and confidence in navigating health systems, which enhances adherence to care schedules (Benova et al., 2018). These findings highlight the need for adolescent-sensitive maternal health interventions that address both social and structural barriers to care.

Household wealth and parity further illustrate the roles of enabling resources and perceived need in shaping ANC utilisation. Women in higher wealth quintiles were significantly more likely to achieve eight or more visits, indicating that financial capacity remains a critical enabler of sustained care, even in the presence of free maternal healthcare policies. Indirect costs such as transportation, opportunity costs, and informal expenses continue to disproportionately affect poorer women, reinforcing findings from both global and Ghana-specific studies (Arsenault et al., 2018; Azaare et al., 2024). Conversely, higher parity was associated with lower likelihood of adequate ANC attendance, suggesting that perceived need declines with increasing reproductive experience. Multiparous women may rely on prior pregnancy outcomes and therefore undervalue frequent monitoring, while also facing greater domestic and caregiving responsibilities that limit healthcare utilisation (Chilot et al., 2023; Bain et al., 2022). These results reinforce Andersen's proposition that utilisation is not solely determined by access, but by the dynamic interaction between resources, perceptions, and social context, indicating that policies aimed at improving ANC adequacy must address both economic constraints and behavioural drivers.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusions drawn from the study and outlines recommendations based on the key findings. The conclusions summarize the main results regarding antenatal care (ANC) utilization and adequacy among women in Ghana, while the recommendations propose practical measures to improve early initiation and completion of ANC visits, particularly among vulnerable groups.

6.2 Conclusion

This study assessed the utilization and adequacy of antenatal care (ANC) services among women of reproductive age in Ghana using data from the 2022 Ghana Demographic and Health Survey. The findings reveal that Ghana has made substantial progress in ensuring access to antenatal care, with nearly universal attendance of at least one ANC visit. However, while initial access is high, adequacy of care remains a significant concern. Although most women achieved four or more visits under the previous WHO guideline, less than 40 of women met the updated WHO 2016 recommendation of eight or more contacts. Furthermore, over one-third of women initiated ANC after the first trimester, limiting the likelihood of completing eight visits. These findings indicate that Ghana has largely succeeded in promoting entry into care but continues to face challenges in ensuring sustained and guideline-compliant maternal health engagement.

The study also demonstrated that socio-demographic and economic inequalities remain central determinants of adequate ANC utilization. Age, household wealth, and parity independently influenced compliance with the eight-contact model, while education and residence operated were associated factors. In summary, although Ghana's maternal health system has achieved impressive coverage in antenatal care, meaningful improvements in maternal and neonatal outcomes will

depend on sustained efforts to ensure early initiation, completion of the WHO-recommended eight contacts, and the reduction of socio-economic and geographic inequalities.

6.3 Recommendations

1. The Ghana Health Service should strengthen CHPS-level mechanisms to identify pregnant women early and ensure continuity of ANC attendance. Community health nurses should maintain simple pregnancy registers and conduct routine home follow-ups for women who miss scheduled visits. Attention should be given to adolescents and high-parity women, who were found to have lower odds of achieving adequate ANC visits.
2. Health promotion on the importance of completing at least eight ANC visits should be delivered through community-based platforms such as churches, mosques, market gatherings, and women's groups. Messaging should specifically address stigma and encourage early care
3. Health facilities and CHPS compounds should implement simple tracking and reminder systems (e.g., phone calls, SMS, or community health volunteer visits) to reduce missed ANC appointments. Given that adequate ANC requires repeated visits, such follow-up mechanisms are essential to support women to complete the recommended schedule.
4. The Ghana Health Service should strengthen provider–client interaction and service experience at ANC clinics to encourage women to return for subsequent visits. Long waiting times, poor communication, or unfriendly provider attitudes can discourage continued attendance. Improving respectful care, reducing waiting time, and ensuring consistent service delivery can enhance retention in ANC.

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APPENDICES

APPENDIX I: DATA EXTRACTION TOOL

Introduction to the Data Extraction Tool

This data extraction tool is designed to guide the systematic retrieval of relevant variables from the 2022 Ghana Demographic and Health Survey (GDHS) dataset for the study titled “Utilization and Quality of Antenatal Care Services Among Women of Reproductive Age in Ghana.” The tool focuses on variables related to antenatal care utilization, timing, frequency, and socio-demographic factors aligned with the study objectives.

As this study involves secondary analysis of publicly available, anonymized data, no new data was collected directly from individuals. The tool ensures accurate and consistent extraction of data for subsequent analysis while maintaining ethical standards and data confidentiality. **Objective 1: Proportion of Women Who Utilized ANC Services**

Variable	Description	
Parity	Women aged 15–49 who had a live birth in the last 5 years	
ANC Attendance	Number of ANC visits during last pregnancy	
ANC services	Whether ANC was received (Yes/No)	

Objective 2: Adequacy of ANC Utilization (Timing and Number of Visits)

Variable	Description	
Month of first ANC visit	The month of pregnancy (0–9) when the respondent first attended ANC.	
Total number of ANC visits	The total number of antenatal care visits made during the last pregnancy.	
Started ANC in 1st trimester	Categorical variable indicating whether ANC started within 0–3 months.	
Had 4+ ANC visits	Binary variable showing if the respondent attended at least four ANC visits.	
Had 8+ ANC visits	Binary variable indicating whether the respondent had eight or more ANC visits.	

Objective 3: Socio-Demographic and Economic Factors Associated with ANC Utilization

Variable	Description	
Age of respondent	Age of the woman at the time of the last pregnancy, in completed years.	

Education level	The highest level of formal education completed (e.g., none, primary, secondary).	
Wealth index	Economic status is derived from household assets (e.g., poorest to richest).	
Region of residence	Geographic region in Ghana where the respondent lives.	
Place of residence	Type of community: urban or rural.	
Marital status	Current marital status (e.g., single, married, cohabiting, divorced).	
Employment status	Whether the respondent is employed, unemployed, or engaged in informal work.	
Number of living children (parity)	The total number of living children the respondent has.	

APPENDIX II: APPROVAL LETTER FROM DHS



Sep 17, 2025

Francisca ~~Mawuse~~ Deh

Ensign Global University
Ghana

Request Date: 09/17/2025

Dear Francisca ~~Mawuse~~ Deh:

This is to confirm that you are approved to use the following Survey Datasets for your registered research paper titled:
"Utilization and Quality of Antenatal Care Services Among Women in Ghana"

To access the datasets, please login at: https://www.dhsprogram.com/data/dataset_admin/login_main.cfm. The user name is the registered email address, and the password is the one selected during registration.

The IRB-approved procedures for DHS public-use datasets do not in any way allow respondents, households, or sample communities to be identified. There are no names of individuals or household addresses in the data files. The geographic identifiers only go down to the regional level (where regions are typically very large geographical areas encompassing several states/provinces). Each enumeration area (Primary Sampling Unit) has a PSU number in the data file, but the PSU numbers do not have any labels to indicate their names or locations. In surveys that collect GIS coordinates in the field, the coordinates are only for the enumeration area (EA) as a whole, and not for individual households, and the measured coordinates are randomly displaced within a large geographic area so that specific enumeration areas cannot be identified.

The DHS Data may be used only for the purpose of statistical reporting and analysis, and only for your registered research. To use the data for another purpose, a new research project must be registered. All DHS data should be treated as confidential, and no effort should be made to identify any household or individual respondent interviewed in the survey. Also, be aware that re-distribution of any DHS micro-level data, either directly or within any tool/dashboard, is not permitted. Please reference the complete terms of use at: <https://dhsprogram.com/Data/terms-of-use.cfm>.

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APPENDIX III: ETHICAL CLEARANCE FROM ENSIGN GLOBAL UNIVERSITY



OUR REF: ENSIGN/IRB/EL/SN-335/02
YOUR REF:

December 4, 2025.

INSTITUTIONAL REVIEW BOARD SECRETARIAT

Francisca Mawuse Deh
Ensign Global University
Kpong.

Dear Francisca,

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 Wednesday, December 3, 2025, your research proposal entitled “Utilization and Quality of Antenatal Care Services Among Women of Reproductive Age in Ghana: Evidence from the 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,

A handwritten signature in black ink, appearing to read "Rebecca Acquah-Arhin", with a small flourish at the end.

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

OUR REF: ENSIGN/IRB/EL/SN-335/02
YOUR REF:

December 4, 2025.

INSTITUTIONAL REVIEW BOARD SECRETARIAT

Francisca Mawuse Deh
Ensign Global University
Kpong.

Dear Francisca,

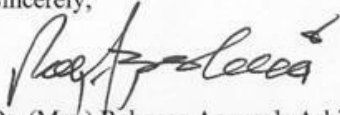
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You have been granted Ethical Clearance to collect data for the said research under academic supervision within the IRB's specified frameworks and guidelines.

We wish you all the best.

Sincerely,



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

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