

UNIVERSITY OF GHANA

REGIONAL INSTITUTE FOR POPULATION STUDIES

**DETERMINANTS OF ANTENATAL HEALTH CARE UTILISATION
AMONG YOUNG MOTHERS IN LIBERIA**

BY

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF
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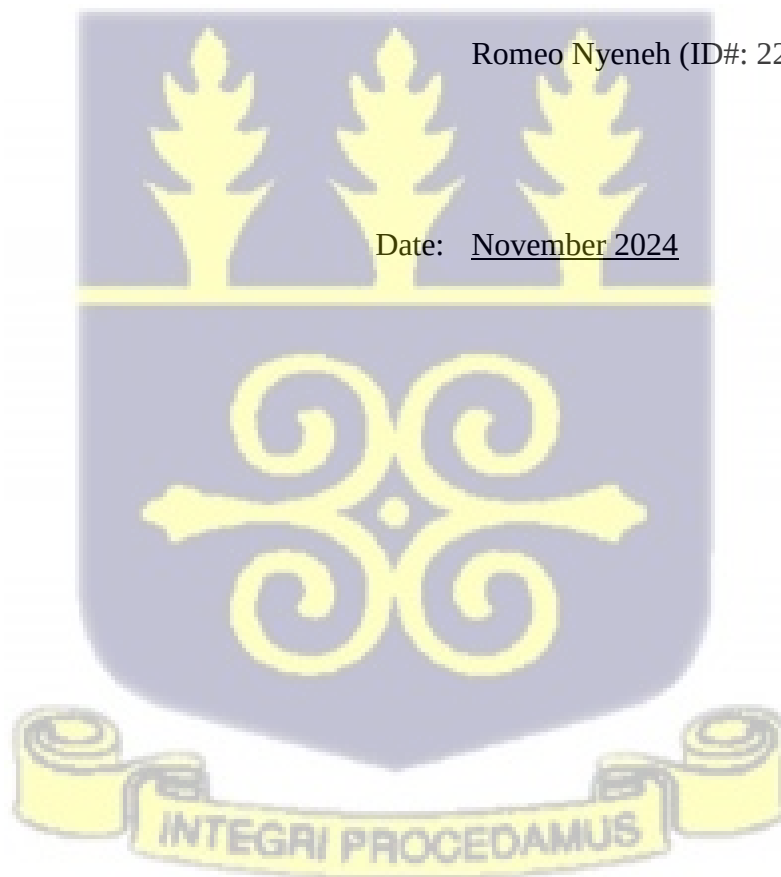
DECLARATION

I, **Romeo Nyeneh**, do hereby certify that, with the exception of references to other people's work that have been duly acknowledged, this work is the product of my own original research conducted under supervision at the Regional Institute for Population Studies, University of Ghana, and that neither a portion nor the entirety of it has been submitted elsewhere for the award of another degree.

Signed:  _____

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Date: November 2024



ACCEPTANCE

This dissertation has been accepted by the Regional Institute for Population Studies (RIPS), College of Humanities at the University of Ghana, Legon, in partial fulfilment of the requirements for the degree of Master of Arts (MA) in Population Studies.

Lilyk

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(Supervisor)

Date: November 2024



DEDICATION

Dedicated to the Almighty God for his divine favour and grace in my life.



ACKNOWLEDGEMENTS

I am grateful to everyone who contributed towards this journey in any way possible, whether spiritually, financially, morally and academically. Special thanks and appreciation to God Almighty for turning this dream into reality. My sincere gratitude goes to my supervisor, Dr. Lily N. A. Kpobi for the level of supervision and mentorship. To all my esteemed professors and lecturers of RIPS, I am grateful for the seed you planted in me. To my cousin Bill M. Quayeson and the entire IPS family, I am forever grateful for this golden opportunity. To our fellow graduate assistants Charles, Ceaser, David, Dr. Theo, Judith, and others, I appreciate your efforts. To my colleagues, I say thank you for the collaborations and team spirits. Lastly, to my parents, I say thank you plenty for everything. This journey would not have been possible without your prayers, impartation, and support. I am forever grateful!



ABSTRACT

Women who receive adequate antenatal care (ANC) are less likely to encounter pregnancy and delivery difficulties. Despite the advantages of ANC, many young women in Liberia continue to fall short of the WHO's recommended minimum of four visits.

This study seeks to determine the prevalence of antenatal health care utilisation among young mothers in Liberia, as well as the demographic and socio-economic characteristics that influence their ANC utilisation.

Cross-sectional data from the 2019-2020 Liberia Demographic and Health Survey were analysed in this study. A sample of 1,296 young mothers aged 15 to 24 who had previously given birth were selected for analysis. Descriptive statistics such as frequency tables, percentage distributions and charts were used to describe the background characteristics of respondents at the univariate level. Associations between demographic and socio-economic characteristics and ANC utilisation were analysed at the bivariate level using Pearson chi-square tests and cross-tabulations at a 95% confidence level. At the multivariate level, the relationships between demographic and socio-economic characteristics and ANC utilisation were analysed using binary logistic regression.

The findings of the study indicate that the prevalence of ANC utilisation by young mothers in Liberia was relatively high at 88.9%. The educational profile of the sample also showed that 50% of young mothers had secondary or higher education, while mothers who were not in union constituted nearly half (46.9%). 68.3% of the mothers initiated ANC during the first trimester, while 29% found the distance to a health facility to be a problem that limited their access. At the bivariate level, correlations were found between the number of ANC visits, the time of the first ANC visit, the region of residence, the distance to the health facility, and marital status. At the multivariate level, ANC usage was not significantly predicted by mothers' age, education level, wealth status, region and place of residence, marital status,

parity, health insurance, or religion, according to the results of the binary logistic regression analysis. However, the timing of the first ANC visit and the distance to the health facility were significant predictors of ANC utilisation among young mothers.

The study's findings inform the need for policy makers (government and partners) to expand access to ANC services by providing more ANC service centres that are closer to communities, in order to reduce the burden of distance to a health facility. They should also develop programs that encourage young women to seek early ANC and reduce stigma against pregnant young women.



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LIST OF ABBREVIATIONS

ANC	Antenatal care
WHO	World Health Organization
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa
MMR	Maternal mortality ratio
LMIC	Low-and middle-income countries



CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Worldwide, avoidable pregnancy and delivery-related problems continue to be a leading cause of death for women (UNICEF, 2023; WHO, 2023). According to estimates from the World Health Organization (WHO), almost 800 women died every day in 2020 from preventable causes related to pregnancy and childbirth (WHO, 2023). In the same year, sub-Saharan Africa and Southern Asia accounted for nearly 87 percent (253, 000) of the estimated global maternal deaths, with sub-Saharan Africa alone accounting for around 70 percent of maternal deaths (202, 000), while Southern Asia accounted for around 16 percent (47 000), (WHO, 2023). One of the critical approaches to mitigating these stark figures and reducing the risk of complications experienced by women during pregnancy and childbirth is through the proper utilization of antenatal care services.

Antenatal care (ANC) is defined by the World Health Organization as the care provided by skilled health-care professional to pregnant women in order to ensure the best health conditions for both mother and baby during pregnancy (WHO, 2016). Prior to 2016, the standard for the provision of effective ANC as required by the WHO was that all pregnant women undergo at least four ANC visits by or under the supervision of a skilled birth attendant (Luginaah et al., 2016; WHO, 2016). As part of new recommendations for a positive pregnancy experience, the WHO in 2016 recommended an additional four ANC visits, making a total of eight contacts that a pregnant woman should have with a health care provider throughout pregnancy. The rationale was that the four extra visits would enhance patient-provider contact and provide more opportunities to detect and manage complications (Tunçalp, et al., 2017; WHO, 2016).

Adherence to ANC regimens reduces the risk of obstetric complications experienced by women during pregnancy and childbirth (Luginaah et al., 2016; WHO, 2016). Regular ANC visits allow health care providers monitor the health of both the mother and the developing foetus (Anaba et al., 2022; Thangaratinam et al., 2012). This includes checking blood pressure, assessing foetal growth, and identifying any health conditions that may require intervention (Anaba et al., 2022; WHO, 2016).

Through the timely and proper application of evidence-based approaches, ANC helps save the lives of pregnant mothers and their unborn children (Luginaah et al., 2016; WHO, 2016). On the contrary, failure to attend ANC or inadequate utilization of ANC could lead to preventable complications, or worsen pre-existing conditions during pregnancy (Gross et al., 2012; Luginaah et al., 2016; WHO, 2016).

Irrespective of these benefits of ANC, many women still do not attend or meet the recommended four (4) minimum visits as prescribed by the WHO (WHO, 2016). Globally, only 70% of pregnant women worldwide in 2020 obtained the required minimum four antenatal care visits (UNICEF, 2024). In the same year (2020), about 57% of women reportedly received the minimum recommended four ANC visits in sub-Saharan Africa (Gebeyehu et al., 2022; UNICEF, 2024).

In Liberia, historical trends from previous surveys have highlighted some changes in the utilization of maternal health services over time. According to the 2007 Liberia Demographic and Health Survey (LDHS), approximately 55% of women aged 15–49 made four or more antenatal care (ANC) visits during their most recent pregnancy, while about 79% had at least one ANC contact with a skilled provider (LISGIS et al., 2008).

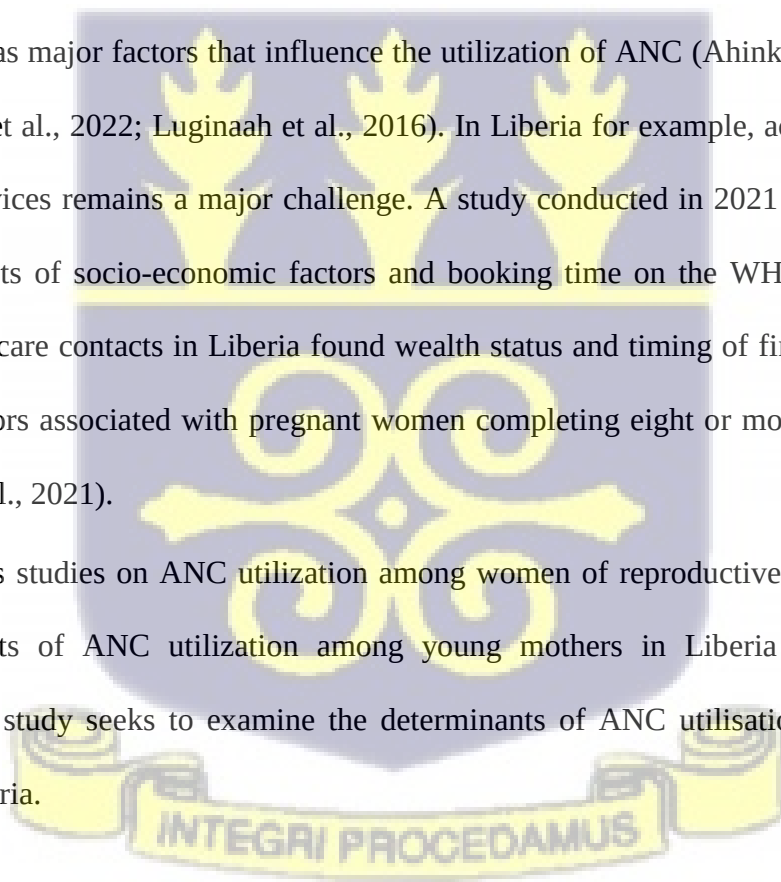
Later in 2013, the LDHS report showed a modest increase in ANC utilization— about 60% of women attended four or more visits, and 96% had at least one visit (LISGIS et al., 2014).

Accordingly, the 2019–2020 LDHS also revealed that 82% of women attended at least one ANC visit, while 56% completed four or more visits (LISGIS et al., 2021).

According to Ganle et al. (2014), Sumankuuro et al. (2018a) and Sumankuuro et al. (2018b), barriers associated with the utilisation of maternal health services (ANC) in low- and middle-income countries, especially within sub-Saharan Africa include: cultural norms, insufficient medical supplies and necessary medications, infrastructural challenges, inadequate qualified personnel, the high costs of necessary medications, and overall limited ability to deliver care (Ganle et al., 2014; Sumankuuro et al., 2018a; Sumankuuro et al., 2018b).

However, previous studies conducted particularly in SSA have found place of residence, wealth status, educational status, distance from a health facility, quality of health service, and cost of service as major factors that influence the utilization of ANC (Ahinkorah et al., 2021; Ekholuenetale et al., 2022; Luginaah et al., 2016). In Liberia for example, access to maternal health care services remains a major challenge. A study conducted in 2021 by Ahinkorah et al. on the effects of socio-economic factors and booking time on the WHO recommended eight antenatal care contacts in Liberia found wealth status and timing of first ANC visits as significant factors associated with pregnant women completing eight or more ANC contacts (Ahinkorah et al., 2021).

Unlike previous studies on ANC utilization among women of reproductive ages, studies on the determinants of ANC utilization among young mothers in Liberia remain limited. Therefore, this study seeks to examine the determinants of ANC utilisation among young mothers in Liberia.



1.1 Statement of the problem

Inadequate utilisation of ANC services has many consequences especially in young mothers (Banke-Thomas et al., 2017). Complications including pre-eclampsia and eclampsia, anemia, etc. can lead to disability such as obstetric fistula, increased morbidity and mortality in both mother and child (Apungu, 2023; Obura, 2018). Studies have shown that young mothers, particularly adolescent mothers (15-19 years), are three times less likely to utilize ANC compared to adult mothers (Mweteneni et al., 2021; WHO, 2014; Ziblim et al., 2018).

Young women are defined by the United Nations as women within the youthful ages of 15-24 years (Sorenson et al., 2004). Globally, young women (aged 15-24 years) constitute about 880 million of the world's population making up 12% of the world's population (UNAIDS, 2014).

In 2020, about 287,000 maternal deaths occurred worldwide during and following pregnancy and childbirth. Ninety-five percent of these deaths occurred in low- and middle-income countries where significantly high maternal mortality ratios have been recorded (Mwansa, M., 2016; UNFPA, 2023; WHO, 2019; WHO, 2023b).

To address the issue of high maternal mortality and other global challenges, the United Nations in 2015 established an agreed universal framework of 17 international development goals known as the Sustainable Development Goals (SDGs) with 169 targets for accomplishing these goals by 2030 (United Nations. 2015). Under goal 3, targets 3.1 and 3.8 focused on reducing maternal mortality ratio to less than 70 maternal deaths per 100,000 live births and achieving universal health coverage by 2030 (United Nations. 2015).

With the introduction of this global agenda, some progress has been made in reducing maternal mortality over the years. Global maternal mortality ratio (MMR) has declined by 34 percent from 339 deaths per 100,000 live births in 2000 to 223 deaths in 2020. This translates into an average annual rate of reduction of 2.1 percent (UNICEF, 2023). Despite this

progress, maternal mortality in low-and middle- income countries still remains high and unevenly distributed with sub-Saharan Africa experiencing the highest burden (UNICEF, 2023; WHO, 2023). In 2020, SSA recorded a MMR of 545 maternal deaths per 100,000 live births (UNICEF, 2023). In the same year, Liberia recorded a maternal mortality ratio of 652 deaths per 100,000 live births (WHO, 2023b).

The high rate of maternal mortality in Liberia was attributed to many factors including the high rate of teenage pregnancy and complications among young mothers (UNFPA, 2011; Yaya, et al., 2019). Data obtained from the 2019-2020 Demographic and Health Surveys conducted in Liberia showed that the incidence of teenage pregnancy in Liberia has increased from 32.8 percent in 2013 to 36.4 percent in 2019 (LISGIS et al., 2021; Kassa et al., 2018).

Moreover, the Liberia Demographic and Health Survey (LDHS) (2019-2020) reports also indicated that thirty percent of teenagers and young women were already mothers or were pregnant with their first child (LISGIS et al., 2021). Teenage childbearing in Liberia ranges from as low as 19 percent in Maryland county to 55 percent in Rivercess. Furthermore, almost half (47 percent) of young women with no education have begun childbearing, compared with 20 percent of those who attended senior high school (LISGIS et al., 2021). Such early childbearing also increases the risk of infant and child mortality (UNICEF, 2018, Yaya, et al., 2019).

Prevalence of antenatal care utilization among reproductive age women in sub-Saharan Africa remain a challenge with approximately 52% meeting the recommended minimum number of ANC visits (UNICEF, 2017). In the case of Liberia, there has been some improvement in the recommended number of ANC visits over the years. According to the LDHS 2019-2020 reports, 87 percent of reproductive age women who made at least four or more antenatal care visits as recommended by the WHO. This is an increase from 78 percent in 2013 (WHO, 2016; LISGIS, 2021).

At the same time, the LDHS 2019-2020 report also highlighted disparities by age, with younger women (15-24 years) less likely to make the recommended number of visits compared to older women. This suggests that, although access to ANC services has improved over time in Liberia, consistent and adequate utilization remains suboptimal, particularly among young mothers.

Meanwhile, a study done in 2019 by Yaya et al. on maternal health care service utilization in post-war Liberia also found region of residence, education, wealth status, place of residence, and religion as significant predictors of ANC utilization among women in Liberia. The odds of attending at least four ANC visits was low among women residing in rural area, but high among women with higher education and those who lived in high wealth index households (Yaya et al., 2019).

However, there is little known about the prevalence and factors influencing ANC use among young mothers (15–24 years) in Liberia, despite the country's high rates maternal deaths and pregnancies among young women. Therefore, this study seeks to examine the prevalence and determinants of ANC utilisation among young mothers in Liberia. Findings from this study could be used for research purposes and policy formulations

1.2 Research Questions

- 1) What is the prevalence of ANC utilisation among young mothers in Liberia?
- 2) What are the demographic and socio-economic determinants of ANC utilisation among young mothers in Liberia?

1.3 Research Objectives

1.3.1 General Objective

This study seeks to examine antenatal health care utilisation among young mothers in Liberia using data from the latest Demographic and Health Survey.

1.3.2 Specific Objectives

Specific objectives include:

- 1) To determine the prevalence of antenatal health care utilisation among young mothers in Liberia.
- 2) To examine the demographic and socio-economic characteristics that influence antenatal health care utilisation among young mothers in Liberia.

1.4 Rationale

Proper ANC utilisation has positive health outcomes for pregnant women and for childbearing, especially for young mothers (Roro et al., 2022; Tunçalp, et al., 2017; WHO, 2016). Adequate utilization of ANC during pregnancy is vital for reducing both maternal and child mortality rates. Through ANC, pregnant women and adolescents can gain awareness of micronutrient supplementation, nutrition, hygiene, counselling on family planning, breastfeeding, safe delivery practices, treatment for hypertension to prevent eclampsia, immunization against tetanus, as well as HIV testing and medications to prevent mother-to-child transmission (Anaba et al., 2022; UNICEF, 2024; WHO, 2016).

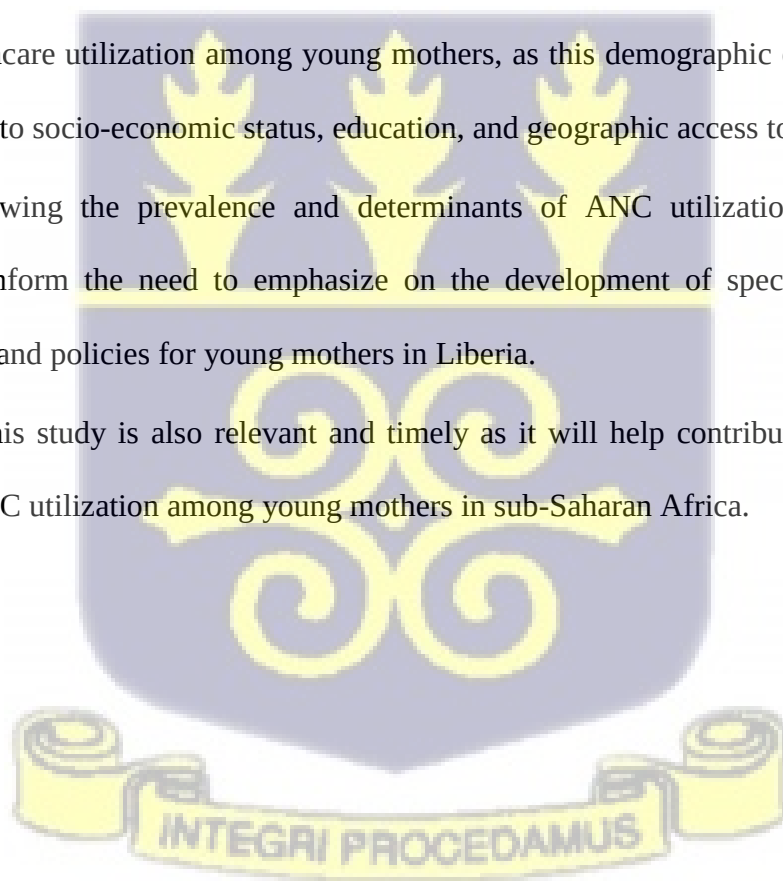
Furthermore, ANC empowers adolescents and young mothers by involving them in decision-making regarding their health and childbirth, including informed choices that lead to better health outcome (Anaba et al., 2022; WHO, 2016). Additionally, ANC also provides psychological support to mothers often faced with emotional and social challenges during

pregnancy by providing a supportive environment where they can discuss their concerns, fears, and emotional well-being (Adjiwanou et al., 2013; Anaba et al., 2022; WHO, 2016).

Although goal 3, targets 3.1 and 3.8 of the SDGs emphasized reducing maternal mortality ratio to less than 70 maternal deaths per 100,000 live births by 2030 and achieve universal health coverage, the attainment of this goal and targets are far from reality if attention is not given to the provision of adequate ANC services during pregnancy for young mothers within developing or low-and middle-income countries (United Nations, 2015).

Historical data suggest that, although access to ANC services has improved over time in Liberia, consistent and adequate utilization remains suboptimal, particularly among young mothers. This persistent gap underscores the relevance of examining the determinants of antenatal healthcare utilization among young mothers, as this demographic continues to face barriers related to socio-economic status, education, and geographic access to health services. Therefore, knowing the prevalence and determinants of ANC utilization among young mothers will inform the need to emphasize on the development of specific reproductive health services and policies for young mothers in Liberia.

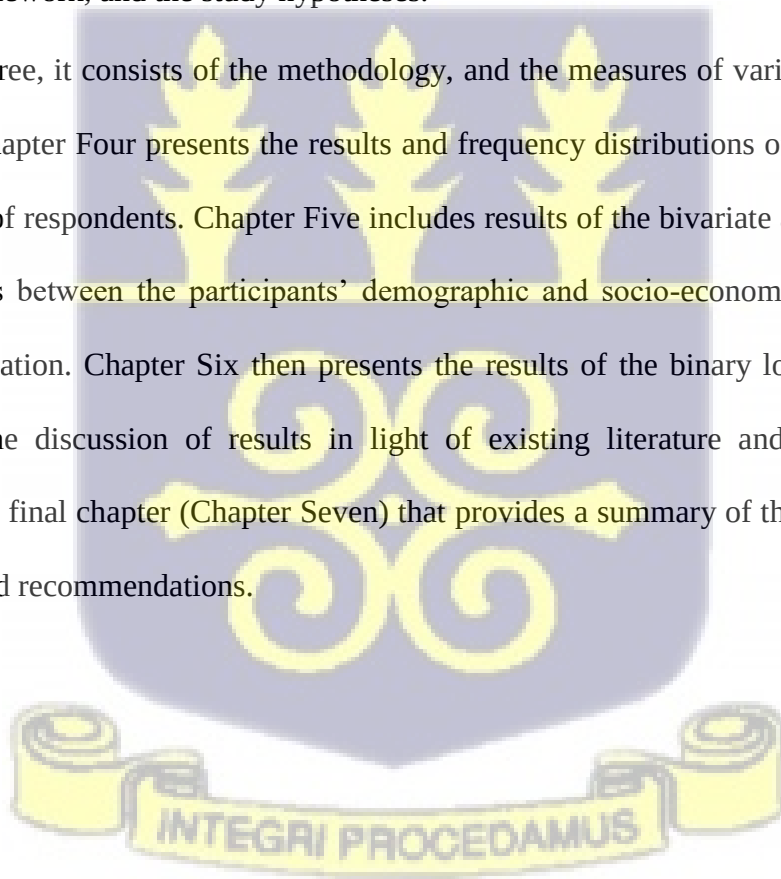
Furthermore, this study is also relevant and timely as it will help contribute to the field of research on ANC utilization among young mothers in sub-Saharan Africa.



1.5 Organization of the thesis

This thesis consists of seven chapters. Chapter One contains the background of the study, the problem statement, the rationale/ justification for the study, the research questions and study objectives. Chapter Two consists of the literature review, the theoretical framework, the conceptual framework, and the study hypotheses.

For Chapter Three, it consists of the methodology, and the measures of variables used in the study, while Chapter Four presents the results and frequency distributions of the background characteristics of respondents. Chapter Five includes results of the bivariate analysis showing the associations between the participants' demographic and socio-economic characteristics and ANC utilization. Chapter Six then presents the results of the binary logistic regression analysis and the discussion of results in light of existing literature and policy. This is followed by the final chapter (Chapter Seven) that provides a summary of the study findings, conclusions, and recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter examines relevant research on previous studies on the determinants of antenatal care (ANC) utilization. It begins with the concept of antenatal care and its requirements and goes further to examine a wide range of literature on various demographic and socio-economic variables which are perceived by previous researchers as potential determinants of antenatal healthcare utilization.

2.1 The Concept of Antenatal Care

The use of a structured model of ANC healthcare utilization was introduced in 2002 by the WHO to ensure the survival of women and adolescent girls from complications during pregnancy and childbirth, as part of their reproductive health rights (Lincetto et al., 2006; WHO, 2016). Initially, it was known as focused ANC (FANC) or basic ANC. The goal of the model was to deliver evidence-based interventions to be carried out at four critical times during pregnancy (Say et al., 2014; WHO, 2016). Between 2014-2017, global estimates showed that Just 64% of expectant mothers made the four minimum visits recommended by the WHO. This implies that additional efforts were required to promote ANC use and improve the quality of care (Lincetto et al., 2006; WHO, 2016).

As part of its recommendations for a positive pregnancy experience, the WHO in 2016 recommended an additional four ANC visits, making a total of eight contacts that a pregnant woman should have with a healthcare provider throughout pregnancy. The justification is that the four more visits would enhance patient-provider contact and provide more opportunities to identify and manage complications. (Tunçalp, et al., 2017; WHO, 2016).

Antenatal care provides many benefits to pregnant women and their unborn babies (WHO, 2016). During pregnancy, women should be evaluated and treated for any disorders that could affect their pregnancy, such as HIV/AIDS, anaemia, malaria, and sexually transmitted infections. At the same time, their unborn babies are also checked to make sure that they are growing well. They are also to receive information that will help them have healthy pregnancies and healthy babies. They are advised on various issues including the best foods to eat, preventive measures on HIV/AIDS and STDs, preparing for a safe delivery, preparing for the newborn and breastfeeding. In addition to other benefits, pregnant women also get two (2) tetanus immunizations to protect their unborn babies (WHO, 2016).

2.2 Challenges in utilising ANC services

There are many challenges associated with the provision and utilization of antenatal care services (AlDughaishi et al., 2023). These challenges, which affect both pregnant women and healthcare professionals, create major obstacles that prevent them from offering and receiving quality antenatal services. Some of these challenges include: limited healthcare infrastructures, lack of skilled birth attendants, limited education, poverty, distance to health facilities, access to transportation, health workers' attitudes toward pregnant women, and cultural norms (AlDughaishi et al., 2023).

According to a study by AlDughaishi et al. (2023) on the difficulties and methods of delivering effective antenatal education services in the public healthcare system in nine outpatient antenatal clinics in Oman, from January 2021 to March 2021, the main obstacles to receiving quality antenatal care were a lack of attention to pregnant women's needs, superficial antenatal education, overcrowding, a lack of educational facilities, the use of medical jargon, and unprofessional attitudes toward women. (AlDughaishi et al., 2023).

Numerous studies in sub-Saharan Africa have also emphasized the difficulties in using antenatal care (ANC) services (Abimbola et al., 2016; Nuamah et al., 2019). According to a 2016 study by Abimbola et al., which sought to evaluate how often women of reproductive age in the Afon community, Nigeria, used antenatal and delivery services, the prevalence of low ANC attendance was attributed to a number of factors, including a lack of funds, poor access to healthcare services, a long commute to the medical facility, lengthy waiting times, unfavourable attitudes of healthcare professionals, and a lack of consent from husbands. (Abimbola et al., 2016). In their study on maternal healthcare utilization and access in a rural district in Ghana, Nuamah et al. (2019) also discovered socioeconomic characteristics and access to healthcare as important factors that influenced pregnant women's use of maternal healthcare (Nuamah et al., 2019).

Additionally, the most significant obstacles to accessing maternal healthcare, according to Dahab et al.'s (2020) systematic review on barriers to accessing maternal care in low-income African countries, were lack of family support, poor quality of care, transportation barriers to health facilities, economic factors, and cultural beliefs. (Dahab et al., 2020).

Some young women, especially adolescents also faced stigma as a result of pregnancy that prevent them from seeking the care they require (Erasmus et al., 2020). Many tend to conceal their pregnancies for fear of reactions from members of their family, the community, school, and staffs within ANC facilities (Erasmus et al., 2020).

In the case of Liberia, a 2016 study by Luginaah et al. on the timing and use of antenatal care services reveals regional and county variations in ANC service use, with the South Eastern A region emerging as a comparatively vulnerable setting (Luginaah et al., 2016).

2.3 Determinants of ANC utilisation

2.3.1 Maternal age and ANC utilisation

Some studies have shown that the age of a woman could influence her utilization of ANC services. For example, results from Birmeta et al., (2013) study on the determinants of maternal health care utilization in Holeta town, Ethiopia discovered a significant association between age at birth and ANC attendance. ANC visits for women within the age group of 20-34 years was 1.2 times higher (OR=1.168) compared to those in the age group 15–19 women. (Birmeta et al., 2013).

Mudokwenyu-Rawdon et al. (2010) also found age as one of the major factors that affects a woman's decision to initiate ANC. According to Mudokwenyu-Rawdon et al. (2010), pregnant young women, especially adolescents, may tend to hide their pregnancies because they might be unmarried, attending school, afraid of prejudice against their health, or might simply be too young and ignorant to appreciate the value of ANC (Mudokwenyu-Rawdon et al., 2010). Moreover, some pregnant young women might avoid ANC services for fear of being labelled promiscuous. On the other hand, older adolescents who have had uneventful pregnancies and deliveries may see no reason to attend ANC for subsequent pregnancies (Mudokwenyu-Rawdon et al. 2010).

However, a study by Fulpagare et al., (2019) which assessed antenatal care services utilization among adolescent pregnant women in India revealed that young pregnant women performed better than adult pregnant women across all ANC service indicators. Some of the reasons for this according to the authors included: early registration of pregnancy, and social and economic supports received by young women compared to their adult counterparts, (Fulpagare et al., 2019). Additionally, Tesfaye et al. (2017)'s findings on delayed initiation of antenatal care and associated factors in Ethiopia also found that women aged between 15 and 30 were less likely to have delayed their first ANC booking compared to women aged 31 to

49. This may be due to fear of complications due to their inexperience of pregnancy (Tesfaye et al., 2017).

2.3.2 Education and ANC utilisation

When pregnant, educated women are more likely to insist on receiving quality ANC because they may be more aware of its advantages. (Ahmed et al., 2010; Duodu et al., 2022; Singh, 2016;). Furthermore, education empowers women and increases their confidence and negotiating abilities to request that ANC providers give them the essential treatments they require during each trimester. (Ahmed et al., 2010; Duodu et al., 2022; Singh, 2016).

Mothers' educational attainment has been found to be a significant predictor of appropriate ANC use in a number of studies, including Ali et al. (2018) and Addai (2000). According to Ali et al. (2018), women's educational attainment is a significant positive determinant of using recommended antenatal care services among adolescents and adult women in Bangladesh. Young women with higher and secondary education were 8.08 times (95% CI: 1.99-32.85; $P < .001$) and 3.56 times (95% CI: 1.81-7.03; $P < .001$) more likely to use recommended ANC services than young women without formal education, respectively. (Ali et al., 2018).

According to Addai's (2000) analysis of the factors influencing the utilization of maternal-child health services in rural Ghana, women who have completed secondary or higher education are more likely than those who have not to use these services. Furthermore, compared to women without any education, women with secondary or higher education had a comparatively high attendance rate (88.9%) at antenatal checkups. Women in rural areas who lack education are less likely to use contraception, seek prenatal care from a doctor, request an antenatal checkup, and give birth in a hospital (Addai, 2000).

Educational attainment and ANC utilization may also differ among sub-Saharan African countries. In 2024, Ameyaw et al. conducted a cross-sectional survey in thirteen (13) sub-Saharan African nations to examine the quality of antenatal care. The findings showed that at least eight out of ten Cameroonian women had gotten high-quality ANC (82.3%; CI = 80.6, 85.3). In Burundi, however, only roughly 10% of women received quality ANC (11.0%; CI = 10.0, 11.4), whereas among the thirteen nations, women with secondary or higher education had a better chance of receiving quality ANC than those without formal education (Ameyaw et al., 2024).

2.3.3 Wealth status and ANC utilisation

Wealth status could also have implications on young mother's use of ANC services. A cross-sectional survey on the determinants of ANC utilization among adolescent girls and young women in Indonesia indicated that young women from the richer wealth quintile were more likely to complete the minimum four (4) ANC visits compared to those in the poorer quintiles (Efendi et. al., 2016).

The significance of wealth status in the use of maternal healthcare services was also demonstrated by similar studies carried out in SSA. For instance, a multicounty analysis done in 2021 by Tessema et al., with the goal of identifying the utilization and determinants of attending at least four ANC visits in 12 East African countries. The findings revealed that women in medium- and wealthy households were more likely to complete the minimum of four ANC services than women with low household wealth index. This is due to the fact that women from middle-class and wealthy families were more likely to be able to cover the costs of care-seeking, including transportation, prescription drugs, and any related expenses. (Tessema et al., 2021).

These findings are supported by many studies including that of Saad-Haddad et al., (2016) and Hajizadeh et al., (2014). In their study on patterns and determinants of antenatal care utilization across seven countries: Bangladesh, Cambodia, Cameroon, Nepal, Peru, Senegal and Uganda, Saad-Haddad et al., in 2016, found that, once again, wealth status was one of the major determinants of completing four or more antenatal visits (Saad-Haddad et al., 2016). Similar findings were highlighted in a study conducted in 2014 in Bangladesh with the purpose of assessing social inequalities in the utilization of maternal care. Results from that study found that wealthier women were more likely to use ANC than poorer women. (Hajizadeh et al., 2014).

Pregnant women sometimes do not attend to antenatal services because of lack of transport fare to reach those health facilities (Bakari et al., 2022). In such cases, women attend ANC late or sporadically, resulting in inadequate utilization (Mrisho et al., 2009).

2.3.4 Marital status and ANC utilisation

Partner support could also play a major role in the utilization of ANC services. Being married often means that a pregnant woman has a partner who may help facilitate access to healthcare, whether through emotional support or financial means. This support can lead to increased awareness of the importance of ANC and reduce barriers to accessing these services.

Results from a study done by Njiku et al., (2017) on the prevalence and factors associated with late antenatal care visit among pregnant women in Lushoto, Tanzania indicated that married young mothers had significantly higher ANC attendance rates compared to unmarried mothers, and delay in booking ANC was mainly associated with not being married (Njiku et al., 2017). However, Nuamah et al., (2019) study on access and utilization of maternal healthcare in a rural district in the forest belt of Ghana revealed that odds of

attending ANC were higher among cohabiting mothers compared to those who were married (Nuamah et al., 2019).

On the other hand, Tesfaye et al., in their systematic review and meta-analysis done in 2017 on delayed initiation of antenatal care and associated factors in Ethiopia mentioned that partner's involvement was one of the main factors significantly associated with delayed initiation of ANC (Tesfaye et al., 2017).

2.3.5 Religion and ANC utilisation

Religion may also influence health-seeking behaviour, including ANC utilisation. Different religious groups may have varying beliefs about pregnancy and healthcare, which could either encourage or discourage the use of ANC services. Some religious communities may emphasize the importance of maternal health, leading to higher ANC attendance among their members. According to Addai's (2000) study on the factors influencing the utilization of maternal-child health services in rural Ghana, Catholic women were more likely than any other religious group to attend prenatal checkups (63.9%) (Addai, 2000).

Cultural practices and traditional beliefs that are common to the community may also contribute to how health services are used. Pregnant women in some places continue to believe in specific cultural customs and seek traditional healers during their pregnancy (Drigo et al., 2021). This may influence the utilization of ANC services. In their qualitative study of women's attitudes toward the use of antenatal care and its determinants in Myanmar, Tun et al. (2018) found that women's faith in traditional delivery attendants acted as a deterrent to the utilization of antenatal care. (Tun et al., 2018).

Furthermore, Yaya et al.'s 2019 cross-sectional household survey on the usage of maternal health care services in post-war Liberia also discovered a significant association between religious belief and antenatal care visits. The findings also showed that, in comparison to

Christian women, Islamic women were 1.90 as likely to have adequate ANC (OR=1.90; 95%CI=1.38–2.61). (Yaya et al., 2019).

2.3.6 Region of residence and ANC utilisation

Maternal mortality remains unevenly distributed globally with sub-Saharan Africa and Southern Asia accounting for most of the maternal death (nearly ninety percent) (WHO, 2011). Variation in maternal mortality globally is also significantly associated with variation in maternal healthcare across geographic regions (WHO, 2011).

In 2022, a study done by Gebeyehu et al. examines the mean number of ANC visits and related factors among reproductive aged women in Sub-Saharan Africa using the Demographic and Health Survey conducted from 2008 to 2019. According to its findings, regional differences in the number of ANC visits were attributed to both individual and community-level factors. Individual-level factors include being aged between 36–49 years, having secondary education or higher, having rich wealth status, media exposure, and grand multi-parity were significantly associated with the number of ANC visits. Furthermore, residing in rural areas, living in the western SSA region, and being from a middle-income country were community-level factors that were significantly associated with the number of ANC visits during pregnancy in sub-Saharan Africa (Gebeyehu et al., 2022)

Furthermore, another study done in 2024 by Belay et al. with aimed to examines the demographic and economic disparities in the utilisation of antenatal care (ANC) in four countries with high maternal mortality rates in Africa, namely: Nigeria, Chad, Liberia, and Sierra Leone, also found a varying level of disparities and inequalities in ANC utilization across these four regions. Disparities were prominent based on educational attainment and place of residence. Higher level of inequality was generally observed among individuals with higher education and those residing in urban areas. Inequality in ANC coverage was also

observed by economic status, subnational region, and other factors in Nigeria, Chad, Liberia, and Sierra Leone (Belay et al., 2024).

2.3.7 Type of place of residence and ANC utilisation

Another important factor that may influence ANC utilization is place of residence. According to a study conducted in 2010 by Titaley et al. on the factors associated with underutilization of antenatal care services in Indonesia, the results showed that pregnant women in rural areas were more likely to underutilize antenatal care services than those from urban areas (Titaley et al., 2010). In their study of young mothers' use of antenatal care in rural Ghana, Anaba et al. (2022) similarly found that urban women were less likely than their rural counterparts to have delayed ANC initiation (Anaba et al., 2022). Similar results were obtained by Dairo et al. (2018) regarding the use of antenatal and postnatal care services by young mothers in rural communities in southwestern Nigeria. They discovered that young mothers in rural areas used fewer antenatal and postnatal care services than their urban counterparts (Dairo et al., 2018).

In Liberia, a study conducted by Ekholuenetale et al. in 2022 on the effects of socioeconomic factors and booking time on the WHO recommended eight ANC contacts also found place of residence as significant predictors in making eight or more ANC contacts. Living in urban areas had a higher odd of obtaining eight or more ANC contacts than those in rural areas (Ekholuenetale et al., 2022).

2.3.8 Distance to health facility and ANC utilisation

Distance to a health facility remains a critical determinant of maternal health service uptake, particularly in low-resource and rural settings where infrastructure and transportation systems are often limited. According to Peters et al. (2008), physical accessibility—defined as the

availability and geographic distribution of health services relative to the population—significantly influences health-seeking behaviours and utilization, especially among rural and poor women.

Gabrysch et al. (2009) in their review on determinants of maternal health service use across developing countries found that long distances and lack of transport options reduce the likelihood of skilled care use. Similarly, Okwaraji et al. (2012) reported that women living more than 5 km from a health facility in sub-Saharan Africa are significantly less likely to utilize antenatal or delivery care.

In 2022, a cross-sectional study was done in Ghana by Dotse-Gborgbortsi et al., with the aims of comparing reported and modelled distance by socio-demographic characteristics and evaluate their relationship with the use of skilled birth attendants, and also assess the socio-demographic factors associated with self-reported distance problems in accessing maternal healthcare services. The results indicated that for all three maternal health services (ANC, SBA, PNC), there were significant associations with reported distance problems. Furthermore, the majority of rural women (70.2%) stated that one of the biggest obstacles to receiving maternal health services was the distance to the medical facility. (Dotse-Gborgbortsi et al., 2022).

Increase in distance to the nearest health facility could also lead to fewer antenatal visits as reported by Tanou et al. (2021) study on the effect of geographical accessibility to health facilities on antenatal care and delivery services utilization in Benin. The study findings revealed that a one-km increase in straight-line distance to the closest health center reduces the odds of a woman receiving at least one antenatal care by 0.042, delivering in facility by 0.092, and delivering her baby with assistance of skilled birth attendants by 0.118 (Tanou et al., 2021).

According to a thorough study conducted in 2011 by Steinbrook et al., which aims to investigate the geographic, demographic, and health-related factors contributing to loss to follow-up on antenatal care and safe childbirth in a migrant population on the Thailand-Myanmar border from 2007 to 2015, a strong predictor of loss to follow-up, miscarriage, malaria infections in pregnancy, and presentation for antenatal care was distance travelled to clinic. Additionally, the results showed that those who postponed antenatal treatment until the third trimester travelled 50% more than those who attended during the first trimester. (DR: 1.5; CI: 1.4 – 1.5). (Steinbrook et al., 2021)

Conversely, a 2015 study by Kyei et al. in rural Zambia on the impact of service quality and distance on ANC use discovered that neither the number of visits nor the timing of ANC were impacted by distance. Nonetheless, the quality of ANC received was significantly impacted by the distance to a facility as well as the quality of services offered at the nearest ANC facility (Kyei et al., 2015). Additionally, other results from Ali et al. (2020) study, which sought to ascertain the relationship between the road network distance from a health care facility and the use of ANC among Pakistani women of reproductive age, showed that women who lived less than 5 km away were 1.21 times more likely to utilise ANC services [Adjusted OR. 1.21; 95% CI (0.49–2.99)] (Ali et al., 2020).

In Liberia, findings from the Liberia Demographic and Health Survey (LDHS, 2019–2020) similarly indicate that women residing in rural counties or those located far from health facilities are less likely to attend the recommended number of ANC visits. The Liberia National Health Policy and Plan (2011–2021) also recognizes distance and transportation as major barriers to service delivery and outlines strategies to strengthen primary health care and expand community-based service delivery through initiatives such as the Essential Package of Health Services (EPHS).

2.3.9 Health insurance and ANC utilisation

Empirical evidence from a cross-sectional study conducted by Bintabara et al. (2018) on enhancing access to healthcare for women in Tanzania by addressing socioeconomic determinants and health insurance found a strong positive relationship between the provision of fee exemptions or health insurance coverage and the use of ANC and skilled attendance (Bintabara et al., 2018). Women who have health insurance can afford medical care, freely select the kind of care they want, and choose between medical facilities based on their requirements and expectations without worrying about the cost. (Bintabara et al., 2018).

Findings from Anaba et al., (2022) on the utilization of antenatal care among young mothers in Ghana also revealed that pregnant women with Free National Health Insurance Scheme (NHIS) coverage were more likely to access ANC than those without coverage (Anaba et al., 2022).

2.3.10 Parity and ANC utilisation

According to Were et al. (2013) qualitative studies on factors affecting ANC attendance in three sub-Saharan African countries (Ghana, Kenya, and Malawi), many young women, especially first-time mothers, are more likely to seek advice and assistance and initiate ANC earlier due to their inexperience of pregnancy, and its associated signs and symptoms (Were et al., 2013).

Evidence from Gross et al. (2012) on the timing of antenatal care for adolescent and adult pregnant women in south-eastern Tanzania also supported similar findings that first-time young mothers are more likely to seek ANC early in their pregnancies compared to adult pregnant women. Early attendance of antenatal care was linked to primiparity and prior experience with a miscarriage or stillbirth ($p < 0.05$) (Gross et al., 2012).

According to a study by Tumwizere et al. (2024) on the factors influencing late antenatal care attendance among high parity women in Uganda, the findings revealed that 73% of high parity women delayed seeking their first ANC visit. Late ANC attendance was associated with distance to the health facility, living with a partner, partner's education, delivery in a health facility, and desire for more children (Tumwizere et al., 2024).

Young mothers may also delay or fail to attend ANC due to fear of stigma or negative attitudes of health providers towards them (AlDughaishi et al., 2023; Nsemo et al., 2020). In 2020, a cross-sectional descriptive study conducted by Nsemo et al. on pregnant teenagers' perception and access to focused antenatal care services in a Ghanaian government hospital revealed stigmatization as a major reason for which many young mothers, especially teenagers stay away from attending antenatal care during pregnancy. According to the study results, 52% of the respondents linked stigmatization as the main reasons for not attending focused ANC, while 32% perceived healthcare providers attitude hindered them from attending focused ANC in their communities (Nsemo et al., 2020).

2.3.11 Timing of first ANC visit and ANC utilisation

The World Health Organization in 2016 recommends that pregnant women start their first ANC in the first trimester of pregnancy to ensure the best care and health outcomes for women and their fetuses (Anaba et al., 2022; WHO, 2016).

Many young mothers, especially adolescents tend to start their ANC late, which could adversely affect their health outcomes (Kayemba et al., 2023; WHO, 2016). If ANC is started later than planned, there may be lost chances for early detection and management of potential complications (WHO, 2016). A systematic review of the delayed initiation of ANC and associated factors in Ethiopia revealed the importance of timely antenatal care uptake as a key indicator for monitoring maternal health outcomes (Tesfaye et al., 2017).

Being a first-time mother was also said to have a positive association with first trimester ANC visits (Gross et al., 2012). In 2017, Musarandega and colleagues' study on prevention of mother-to-child transmission (PMTCT) service uptake of HIV services among adolescents and adult women attending ANC in selected health facilities in Zimbabwe revealed that young mothers in their first pregnancy were more likely to be present for ANC in the first trimester compared to older women (Musarandega et al., 2017).

2.4 Gaps in the Literature

Previous studies on determinants and utilization of ANC among young and adult women in other parts of the world, including sub-Saharan Africa, found many similarities in the determinants of ANC utilization among pregnant young and adult women (Anaba et al., 2022; Birmeta et al., 2013; Ekholuenetale et al., 2022; Luginaah et al., 2016). For their part, Birmeta et al., (2013) studied predictors of optimal antenatal care service utilization among adolescents and adult women in Bangladesh and found age, education, parity, place of residence, distance to health facility and region of residence as significant predictors of adequate ANC utilization (Birmeta et al., 2013).

In sub-Saharan Africa, a study by Anaba et al., (2022) on the utilization of antenatal care among young mothers in Ghana found that education, age, partner's education, place of residence, region of residence, health insurance, timing of ANC visits, distance to health facility and parity are all significantly associated with ANC utilization among women (Anaba et al., 2022). Similar results were also found in Ali et al., (2018) determinants of maternal health care utilization in Holeta town, Ethiopia. According to their findings, age, education, parity, place of residence, distance to health facility and region of residence were all predictors of adequate ANC utilization (Ali et al., 2018).

Moreover, studies by Erasmus et al., (2020) and AlDughaishi et al., (2023) also indicated barriers such as stigma and attitudes of community members and health care providers as some reasons for which many young women stay away from ANC services. In some cases, these barriers make many young women to delay the timing of their first ANC visit (AlDughaishi et al., 2023; Erasmus et al., 2020).

In the case of Liberia, a study done in 2016 by Luginaah et al. on the timing and utilization of ANC services in Liberia also found region and distance to a health facility as major predictors of ANC utilization among women of reproductive (Luginaah et al., 2016). In addition, Ekholuenetale et al., (2022) study on effects of socioeconomic factors and booking time on the WHO recommended eight antenatal care contacts in Liberia also found education, wealth status, place of residence, and timing of first ANC visit as significant predictor of ANC utilization (Ekholuenetale et al., 2022).

From the literature reviewed so far, a focus on the determinants of ANC utilization among young mothers is limited, especially in Liberia. Therefore, this study seeks to identify the determinants and prevalence of ANC utilization among young mothers aged 15-24 years and emphasize the need to develop specific reproductive health services and policies for young mothers in Liberia.

2.5 Theoretical framework

The theoretical foundation of this study is the Behavioural Model of Healthcare Utilization developed by Andersen (Andersen, 1995). Andersen's model of healthcare utilization focuses on the behaviours that influence how individuals access and use healthcare services. Initially created in the 1960s, it has undergone several revisions over the years. (Alkhawaldeh et al., 2023; Andersen, 1995).

According to Anderson (1995), three main factors influence a person's utilization of healthcare services: predisposing factors, enabling factors, and need factors (Andersen, 1995). Predisposing factors are basic social and demographic characteristics of individuals that exist prior to their existing healthcare state. This includes age, gender, education, marital status, occupation, ethnicity, social networks, and cultural attitudes, values, etc. These socio-demographic characteristics make people susceptible to seek health care services though they may not directly be responsible for their utilization of the healthcare services (Alkhawaldeh et al., 2023; Andersen, 1995).

Enabling factors are factors that assist people in the utilization of healthcare services. They include economic resources and logistical aspects of obtaining care such as: characteristics of the health care system, availability of health facilities, income, access to health facilities and services, health insurance, a regular source of care, extent and quality of social relationships with available health personnel, etc. (Alkhawaldeh et al., 2023; Andersen, 1995).

The Need factors are factors that motivate people to use various healthcare services. They are the most immediate cause of health service utilization. Examples of need factors include disease conditions, illness or complication during pregnancy, and physical conditions that will make a woman to seek antenatal care (Alkhawaldeh et al., 2023; Andersen, 1995).

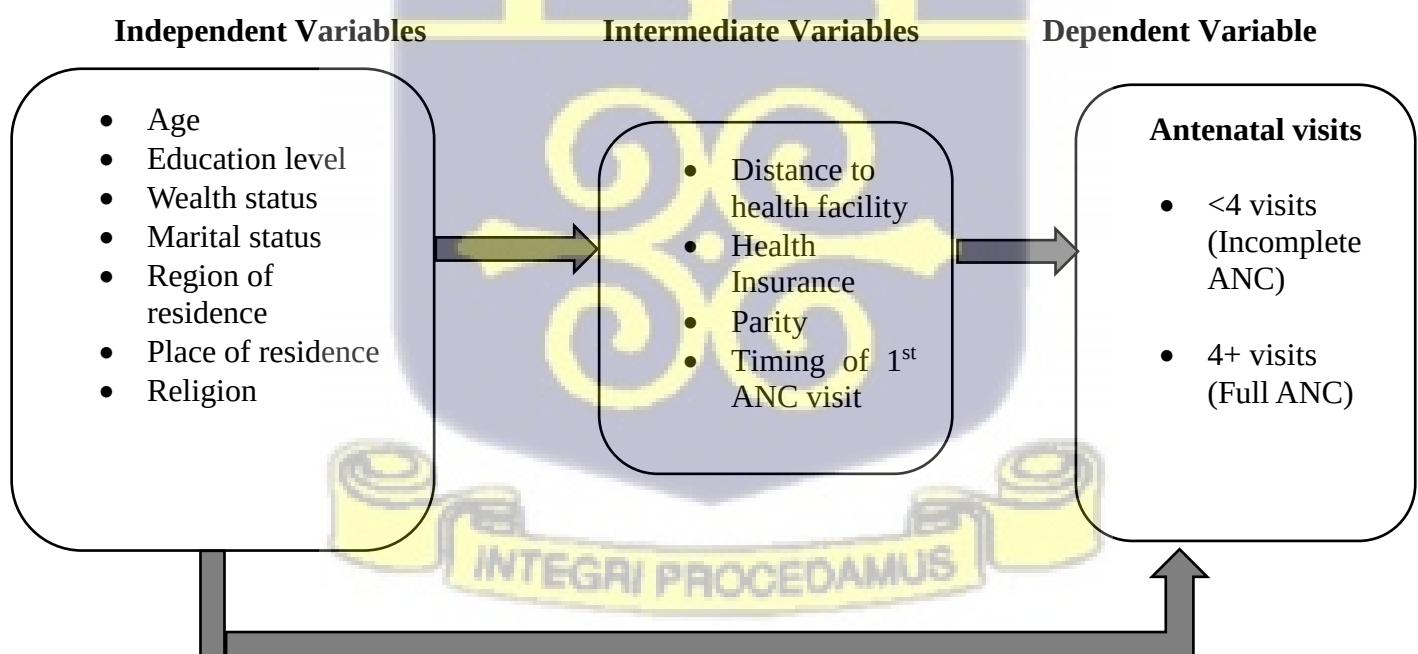
The Anderson's model of healthcare utilization is useful for this study because it helps in understanding the factors that will influence a woman's decision to use or not use the various ANC services during pregnancy (Alkhawaldeh et al., 2023). Predisposing factors such as education, religion, and cultural beliefs are key in understanding whether certain beliefs discourage the utilization of ANC services. For enabling factors, it helps in understanding the physical barriers that prevent a woman from accessing ANC services. The Need Factors help to understand the actual health conditions that influence ANC utilization.

2.6 Conceptual framework

The review of relevant theory and literature on antenatal healthcare utilization among young mothers shows that there exists a relationship between demographic and socio-economic characteristics and antenatal healthcare utilization. In this regard, the study accounts for independent, control, and intermediate variables that directly and indirectly influence antenatal healthcare utilization among adolescents and young mothers. Antenatal healthcare utilization is treated as the dependent variable in this study.

The conceptual framework below therefore shows that the independent variable, (the demographic and socio-economic characteristics) may have direct and indirect influence on the dependent variable (antenatal healthcare utilization).

Figure 2.1: Conceptual framework showing the relationship between demographic and socio-economic characteristics and ANC utilization among young mothers in Liberia

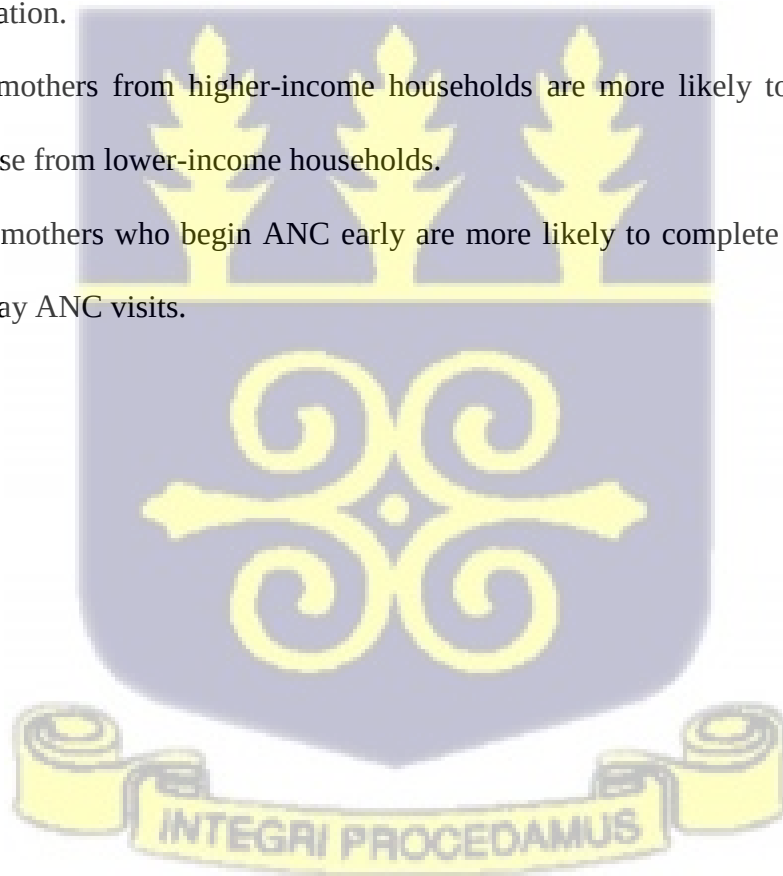


Source: Author's construct

2.7 Study Hypotheses

This study tested the following hypotheses:

- 1) Young mothers who are educated are more likely to complete ANC than those with no education.
- 2) Young mothers from higher-income households are more likely to complete ANC than those from lower-income households.
- 3) Young mothers who begin ANC early are more likely to complete ANC than those who delay ANC visits.



CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter describes the methodology used in the study, including the study area, sources of data, sample size, sampling and sample design, data collection procedures and measurement of variables. Also included in this chapter are methods and techniques used for data analysis and the study limitations.

3.1 Study Area

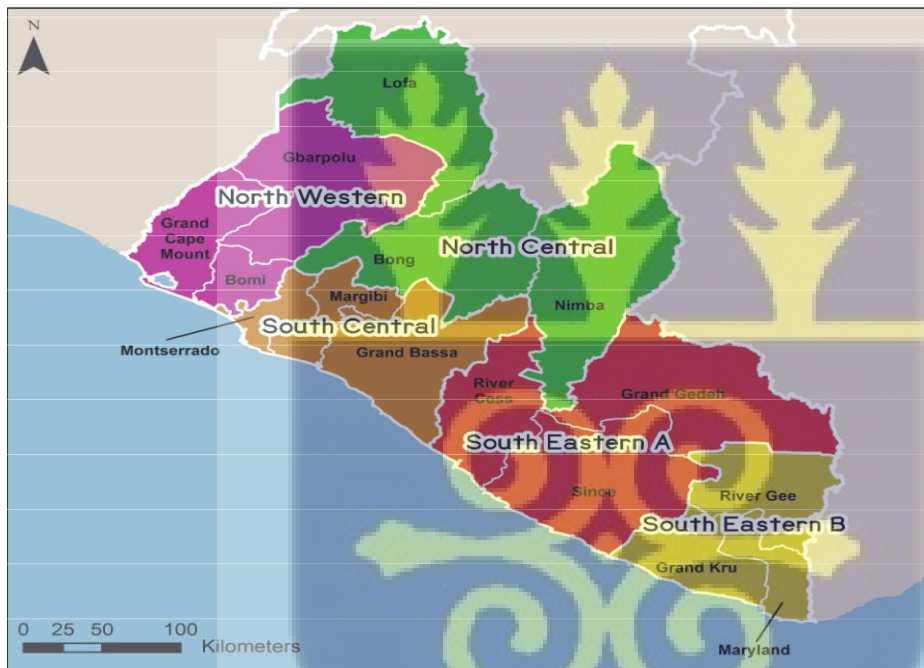
The research area for this study is Liberia. The Republic of Liberia is a country located along the coast of West Africa. It shares borders with three west African countries namely: Sierra Leone, Guinea, and the Ivory Coast. Its southwest corner is surrounded by the north Atlantic Ocean. Liberia is divided into five geographical regions namely: north-western, south-central, south-eastern A, southeastern B, and north-central regions. These five geographical regions are divided into fifteen political and administrative subdivisions/counties (LISGIS et al., 2021)

The population of Liberia is approximately 5.2 million. Compared to 2008, this is an increase from 3.5 million (LISGIS, 2023). In just 14 years, this is a 51% growth. Between 2008 and 2022, Liberia's population grew at an annual rate of 3.0. There are 101.5 men for every 100 females in the entire population. In comparison to 2008, the sex ratio trend is roughly the same (100.5). Male population proportion (50.4%) was about equal to female population proportion (49.6%). With the exception of Lofa and Montserrado, where there are more women than men, all of the counties have more men than women. 36.7 percent of the overall population reside within Montserrado, the largest among the counties. The county with the

lowest population River Gee (1.7%). It was estimated that 2,176,918, or 41.5 percent of the entire population, were children aged 0 to 17. Urban areas are home to more people (54.5%) than rural areas (45.5%) in Liberia. According to the 2022 Population and Housing Census, urbanization of the population was seen largely in Margibi (55.9), Maryland (61.5%) and Montserrado (91.7%). Montserrado has the largest percentage of working people (33.3%), with almost 28% of the population aged 5 and over being employed (LISGIS, 2023).

Figure 3.1: Map of the Study Area

Liberia



Source: Liberia Demographic and Health Survey (2019-2020) report

3.2 Source of Data

Secondary data from the Liberia Demographic and Health Survey (LDHS) 2019–2020 was used in this analysis (LISGIS et al., 2021). The 2019-2020 LDHS is the fifth Demographic and Health Survey to be conducted in Liberia. It was implemented by the Liberia Institute of

Statistics and Geo-Information Services (LISGIS) in partnership with the Ministry of Health (MOH). The 2019-2020 LDHS collected information between the period October 16, 2019, to February 12, 2020 from. The 2019–20 LDHS's main objective was to provide up-to-date estimates of key demographic and health indicators necessary for program managers, policymakers, and implementers the most recent estimates of important demographic and health indicators they need to track and assess the effects of current policies and programs and create new health policy initiatives in Liberia. The survey collected information on housing characteristics and household population, marriage and sexual activities, fertility levels, fertility preferences, family planning, infant and child mortality, maternal and child healthcare, nutrition, diseases (malaria, HIV/AIDs, etc.), adults and maternal mortality, women empowerment, and domestic violence, etc. (LISGIS et al., 2021).

This study uses information from the women's questionnaire. For the women's questionnaire, data were collected from women aged of 15-49 years. The questionnaire provides information on women's reproductive health and behaviour, their partners' characteristics, as well as other socio-demographic and socio-economic characteristics (LISGIS et al., 2021).

3.3 Sample Design and selection

The sampling frame for the 2019-2020 LDHS was created using data from the LISGIS's 2008 National Population and Housing Census (NPHC). The survey was conducted using a stratified two-stage cluster design. The first stage involved selecting sample points (clusters) consisting of EAs. A proportional probability was used to draw EAs to their size within each sampling stratum. 325 clusters were selected in total (LISGIS et al., 2021).

For the second stage, systematic sampling of households was carried out. In all clusters, there was household listing undertaken with an average of 129 households forming each cluster. An equal probability systematic selection process was used to select a fixed number of 30

households. Ultimately, there was a total sample size of 9,745 households. The sample results were a national representative of both urban and rural levels, including each of the five regions.

The classification of locales as urban or rural during the survey was standardized. The study area was divided into 5 regions, with each region comprising of 3 counties given a total of 15 counties. Each county contains districts and clans. Each clan was further divided into enumeration areas (EA) from the 2008 Liberia Population and Housing Census (LPHC), with an average of 100 households in each EA. There was a total of 7,012 EAs. Out of this number, the urban areas had 3,655 EAs while the rural areas had 3,357 EAs. The average EA had 96 households, with an average of 103 households in urban areas and 88 households in rural areas.

The census framework for 2008 was modified to account for the dispersion of urban and rural households across the fifteen counties. The results showed that 33.7% of all households in Liberia were in Montserrado. Urban areas accounted for more than half of all households, with percentage ranging from 3.5% in Rivercess to 93.6% in Montserrado (LISGIS et al., 2021).

The women's data file utilized in this study originally contains 8,065 females of reproductive age 15-49 years who were eligible for the survey (LISGIS et al., 2021). During the sample selection for this study, the original data containing 8,065 respondents were filtered out to obtain 3,124 young women within the reproductive ages of 15-24 years. Since the focus of the study is on antenatal care utilization among young mothers, the data were further filtered to obtain 1,523 young women aged 15-24 years who were already mothers during the survey. Subsequently, the data of 1,523 young mothers were weighted by applying a weight of $v005/1000000$ to the data to adjust for sampling biases and ensure that the sample accurately represents the population. Afterward, a nationally representative sample of 1,296 was

obtained. Responses of “don’t know” to a particular question were dropped during the analysis.

3.4 Methods of Data Analysis

The study used quantitative analytical tools and techniques to analyse data at several levels with the help of Stata 15 version software.

3.4.1 Univariate Analysis

Descriptive statistics were computed at the univariate level in describing the demographic and socio-economic characteristics of respondents. Data from the univariate analysis are presented in tables, graphs and charts using frequency distributions and percentages.

3.4.2 Bivariate Analysis

Associations between demographic and socio-economic characteristics and antenatal healthcare utilization of respondents were tested at the 95% confidence level using Pearson Chi-square test and cross tabulations.

3.4.3 Multivariate Analysis

For the multivariate analysis, binary logistic regressions were conducted to examine the determinants of ANC utilization among young mothers. This type of multivariate analysis was used because the dependent variable has two categories (dichotomous) (Incomplete ANC and Full ANC). ANC utilization was used as the dependent variable in the regression analysis, with 4+ visits indicating full ANC utilization and <4 visits indicating incomplete ANC utilization.

3.5 Measurement of variables used in the study

The variables used in this study as described in this section are grouped into three (3) categories namely: dependent, independent and intermediate variables.

3.5.1 Dependent Variable

ANC utilization is the dependent variable for this study. It is measured by the number of ANC visits a pregnant young woman made during pregnancy. This variable is measured at the binary level. Less than four (4) ANC visits made by young women during pregnancy were coded as “Incomplete ANC”, while four or more ANC visits made by young women were coded as “Full ANC”. This study chose to use the previously WHO-recommended four ANC visits rather than the currently recommended eight visits given the limitations in access to health services for many women in Liberia as reported in the literature (Ekholuenetale et al., 2022).

3.5.2 Independent Variables

Variables used as independent variables to predict ANC utilization are demographic and socio-economic characteristics of respondents are: mother’s age, education status, wealth status, marital status, region of residence, place of residence, and religion. Among the independent variables, marital status was recoded and grouped into three categories. Respondents who were never in union were recoded as “Never married”, those who were married or were living with partners were recoded as “Currently married”, and those who were divorced or were no longer living with their partner/separated were coded as “Formerly married”. For education status, it was also grouped into three categories namely: no education, primary education, and secondary and above, representing those with secondary and higher education.

3.5.3 Intermediate Variables

Intermediate variables used in the study are: distance to health facility, health insurance, parity, and timing of 1st ANC visit. For example, the number of living children which a young woman had was renamed as parity and recoded into three (3) categories namely: “1” representing primiparous young mothers (mothers with one child), “2” representing young mothers with two children, and “3+” representing young mothers with three or more children. For the timing of 1st ANC visit, young mothers that attended their first ANC visits in the first three (3) months were coded as “First trimester”, while those visiting in their 4-6 months were coded as “Second trimester”. For those who had their 1st ANC visit in their 7 months and above were coded as “Third trimester”.

Table 3.1: Measurement of Variables

Variables	Types of variables	Measures
Dependent variable		
Number of ANC visits	Categorical	< 4 visits (Incomplete ANC), 4+ visits (Full ANC)
Independent variables		
Age	Categorical	15-19, 20-24
Education level	Categorical	No education, primary, secondary and above
Wealth status	Categorical	Poorest, poorer, middle, richer, richest
Marital status	Categorical	Never married, currently married, formerly married
Region of residence	Categorical	North-western, South-central, South-eastern A, South-eastern B, and North central
Place of residence	Categorical	Urban, Rural

Religion	Categorical	Christian, Muslim, Traditional and no religion
Intermediate variables		
Distance to health facility	Categorical	Big problem, not a big problem
Health Insurance	Categorical	No, Yes
Parity	Continuous	1, 2, 3+
Timing of 1 st ANC visit	Categorical	First trimester (0-3 months), Second trimester (4-6 months), Third trimester (7+ months)

Source: Author's construct, 2024

3.6 Study Limitations

The data used in this study is secondary data from the LDHS 2019-2020 dataset. This has some important limitations which are important to note. The study cannot account for errors, missing data and biases that may have occurred during the data collection process. This may have a significant effect on the relevance, representativeness, quality and accuracy of the data which may affect the study's findings.

This study chose to use the previous WHO-recommended four ANC visits rather than the currently recommended eight visits given the limitations in access to health services for many women in Liberia as reported in the literature (Ekholuenetale et al., 2022).

Therefore, maintaining the four-visit threshold ensured methodological consistency with the dataset's structure, national monitoring standards, and comparable previous studies conducted in Liberia and other sub-Saharan African countries.

Furthermore, this study is limited to young mothers within the reproductive ages of 15-24 years at the time of the survey. The study does not account for young women who had their

first pregnancy during the survey as well as those without living children because the study is interested in understanding the factors that may influence the utilization of ANC services. Including mothers with current pregnancy or those without living children may affect the consistency of the data. This may have a significant effect on the size of the sample and the results of the study. Additionally, the study is limited to young mothers who reported some ANC visits during their pregnancy period. On preliminary analysis, only four young mothers reported having no ANC visits at all. These were therefore excluded from the analysis. However, it is recognized that an analysis which includes women who never attended ANC could provide additional nuance to the findings.



CHAPTER FOUR

BACKGROUND CHARACTERISTICS OF RESPONDENTS

4.0 Introduction

The background characteristics of the respondents are described in this chapter. The background characteristics include the demographic and socio-economic characteristics of the respondents. The information is displayed using tables and relative frequencies of the various categories or measures of variables used in the study.

4.1 Number of Antenatal visits (Dependent variable)

From the table below (Table 4.1), majority of the respondents (89%) reported having 4+ ANC visits during their most recent pregnancy. Those that reported less than four (4) ANC visits accounted for less than twelve (12) percent.

Table 4.1: Distribution of respondents by the Number of ANC visits made during pregnancy

Antenatal visits during pregnancy	Frequency	Percent
Less than 4 visits	143	11.02
4+ visits	1,153	88.98
Total	1,296	100.00

Source: Computed from LDHS (2019-2020) Data

4.2 Maternal Age

Respondent ages were grouped into two (2) categories: 15-19 years and 20-24 years respectively. From the total of 1,296 respondents, about seven (7) out of ten (10) respondents (70.9%) were within the age group of 20-24 years; while, those within the ages of 15-19 years accounted for 29.1 percent.

Table 4.2: Distribution of respondents by Current age

Respondent's current age	Frequency	Percent
15-19	377	29.12
20-24	919	70.88
Total	1,296	100.00

Source: Computed from LDHS (2019-2020) Data

4.3 Education

From the table below (Table 4.3), respondents with secondary and higher education constitutes about half of the total respondents (50.5%) interviewed during the survey, while those with no education constitute less than twenty percent (17.8%).

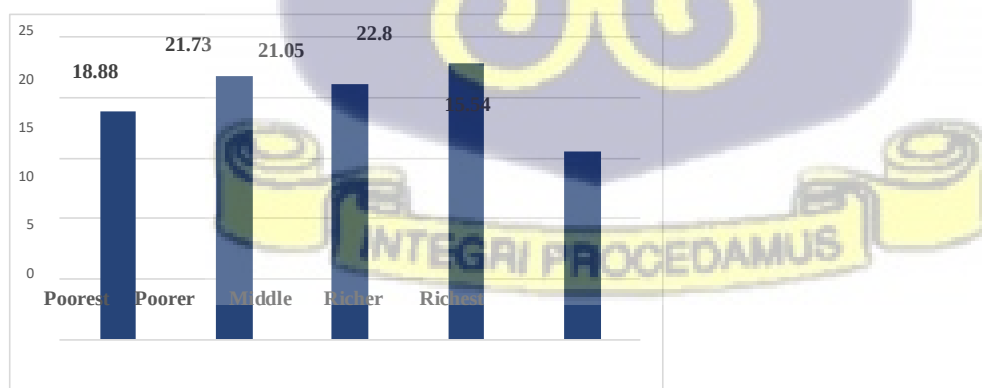
Table 1.3: Distribution of respondents by highest education level

Highest educational level	Frequency	Percent
No education	230	17.75
Primary	411	31.75
Secondary and above	655	50.5
Total	1,296	100.00

Source: Computed from LDHS (2019-2020) Data

4.4 Wealth Status

Figure 4.1 below grouped respondents into five (5) categories based on their current household wealth status. Respondents within the richer and richest wealth quintiles combined accounted for nearly two out of every five respondents (39%), similar to those within the poorer or poorest wealth quintiles combined accounted for two out of five respondents (40%).

Figure 4.1: Percentage distribution of respondents by wealth status

Source: Computed from LDHS (2019-2020) Data

4.5 Marital Status of Respondents

As indicated by the results in Table 4.4, respondents who were either never married or currently married accounted for almost equal proportion of the total respondents (46.9% and 46.6% respectively); while, those who were formerly married constituted less than seven (7) percent.

Table 4.4: Distribution of respondents by Current marital status

Current marital status	Frequency	Percent
Never Married	608	46.92
Currently married	605	46.65
Formerly married	83	6.43
Total	1,296	100.0

Source: Computed from LDHS (2019-2020) Data

4.6 Region of residence

As indicated in the table below (Table 4.5), nearly half (46%) of the total respondents in the study were from the South-central region. The fewest respondents came from the south eastern regions, with South eastern B accounted for less than six (6) percent of the total respondents.

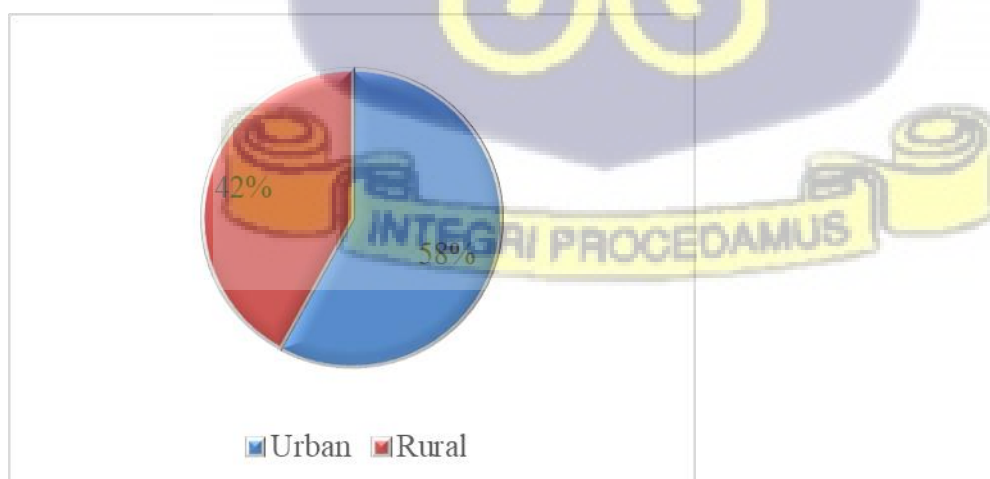
Table 4.5: Distribution of respondents by region of residence

Region	Frequency	Percent
North Western	99	7.66
South Central	597	46.09
South Eastern A	75	5.78
South Eastern B	70	5.37
North Central	455	35.10
Total	1,296	100.00

Source: Computed from LDHS (2019-2020) Data

4.7 Respondents by type of place of residence

Figure 4.2 categorized respondents by their type of place of residence. Nearly three (3) out of five respondents (58%) were from urban areas, while the remaining constituted those from rural areas (42%).

Figure 1.2: Percentage distribution of respondents by type of place of residence

Source: Computed from LDHS (2019-2020) Data

4.8 Religious affiliation

From the table below (Table 4.6), majority of the respondents (82.6%) interviewed during the survey were Christians. Traditional and no religion constituted less than three (3) percent (2.8%).

Table 4.6: Distribution of respondents by Religious affiliation

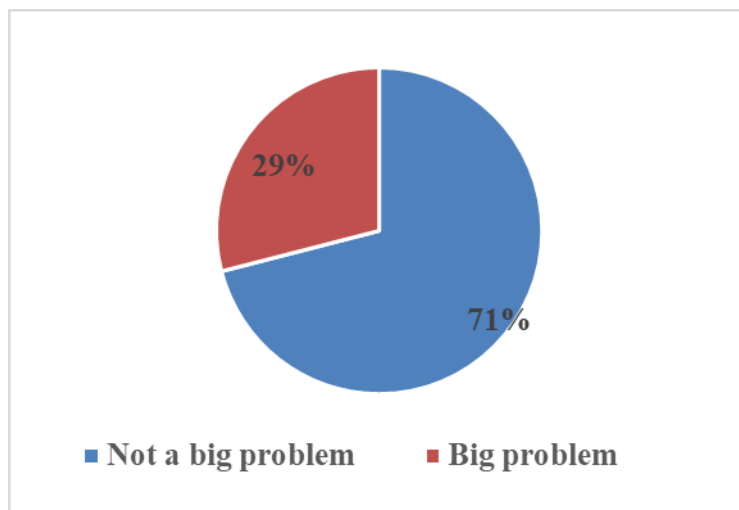
Religion	Frequency	Percent
Christian	1,071	82.66
Muslim	188	14.51
Traditional and no religion	37	2.82
Total	1,296	100.00

Source: Computed from LDHS (2019-2020) Data

4.9 Distance to health facility

As indicated by the results in figure 4.3, about 7 out of 10 respondents (71%) responded that distance to health facility was not a big problem in accessing medical help, while approximately three out of ten respondents (29%) responded that distance to health facility was a big problem in accessing medical help.

Figure 4.3: Percentage distribution of respondents by distance to health facility

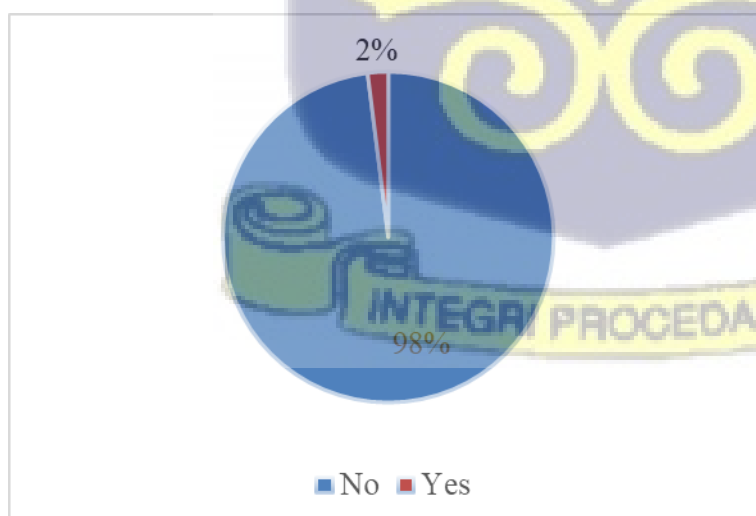


Source: Computed from LDHS (2019-2020) Data

4.10 Health Insurance

From figure 4.4 below, almost all of the respondents (98%) reported that they were not covered by any health insurance scheme. Only two (2) percent of the respondents reported that they were covered by health insurance.

Figure 4.4: Percentage distribution of respondents by health insurance

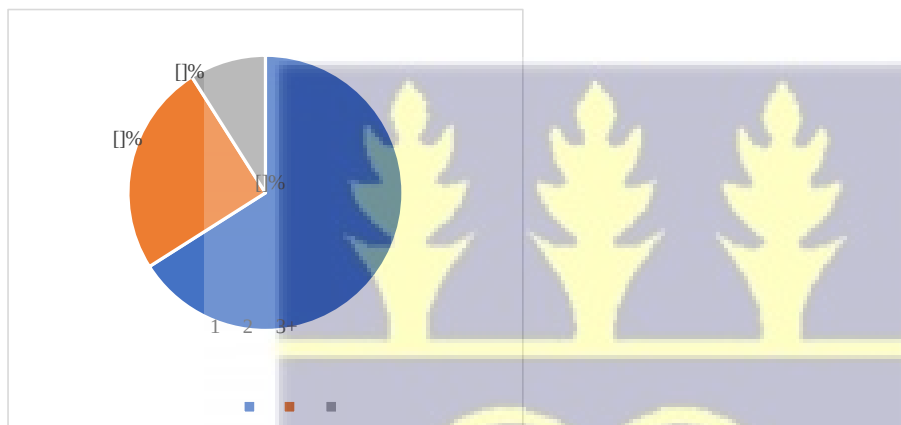


Source: Computed from LDHS (2019-2020) Data

4.11 Parity

The number of living children was one of the main inclusion criteria used during the survey. The number of living children a young mother has may influence her utilization of ANC. As shown by the results in the figure below (Figure 4.5), about two-thirds (66%) of the respondents reported that they were primiparous (had one child). Multiparous young mothers with three or more children constituted less than ten (10) percent of the respondents.

Figure 4.5: Percentage distribution of respondents by parity



Source: Computed from LDHS (2019-2020) Data

4.12 Timing of first ANC visit

Survey respondents were categorized based on timing of their first ANC visit. Out of the 1,296 respondents, two-third of the respondents (68%) reported having their first ANC visit in the first trimester (0-3 months). Those who reported having their first ANC visit in the third trimester (7+ months) accounted for approximately three (3) percent.

Table 4.7: Distribution of respondents by timing of first ANC visit

Timing of 1st antenatal check (months)	Frequency	Percent
First trimester	885	68.25
Second trimester	375	28.96
Third trimester	36	2.79
Total	1,296	100.00

Source: Computed from LDHS (2019-2020) Data

4.13 Chapter summary

In summary, the chapter looked at the description of background characteristics of young mothers and number of ANC visits. The results show that young women within the age group 20-24 had the highest proportion of women (70.8%) who had antenatal visits within the five years preceding the survey. Out of the 1296 young mothers, majority were Christians (82.6%), had secondary or higher education (50.5%), and were residence of urban areas (58%), especially within the south-central region (46%).

The next chapter presents the results of the bivariate analyses of associations between the variables.

CHAPTER FIVE

ASSOCIATIONS BETWEEN BACKGROUND CHARACTERISTICS AND ANTENATAL CARE VISITS

5.0 Introduction

This chapter examines the association between the demographic and socio-economic characteristics and antenatal care visits. Associations between demographic and socio-economic variables (independent variables) and ANC visits (dependent variable) were tested using Pearson's Chi-Square test at 95% significance level. Independent variables include: respondents' age, education, wealth status, marital status, religious affiliation, region of residence, type of place of residence, distance to health facility, health insurance, parity, and timing of 1st ANC visit.

5.1 Age of Respondents and ANC visits

The chi-square test of association found that there is no significant association between the age of respondents and ANC visits as indicated by the p-value (0.8618) in the table below (Table 5.1). The results also show that young women within the ages of 20-24 years have a higher proportion of completing 4+ ANC visits (89.1%) compared to those within the ages of 15-19 years (88.7%). Similar findings from Birmeta et al., (2013) which revealed that ANC visits for women within the age group of 20-34 years was 1.2 times higher compared to those in the age group 15-19 women. Moreover, attending less than four (4) ANC visits were slightly higher among young women within the ages of 15-19 years (11.3%) than those within the ages of 20-24 years (10.9%). From the total of 1,296 respondents, there were more young women within the ages of 20-24 years who attended ANC visits (919 respondents) compared to those within the ages of 15-19 years (377 respondents).

Table 5.1: Percentage distribution of respondents by age group and number of ANC visits

Age (in 5-year group)	Number of ANC visits		Total
	<4	4+	Number of women
	(%)	(%)	
15-19	11.3 (42)	88.7 (335)	377
20-24	10.9 (100)	89.1 (819)	919
Total			1,296

Chi-square = 0.0503

P-value = 0.8618

5.2 Education and ANC visits

From Table 5.2, the p-value of 0.7585 indicates that there was no association between education and ANC visits among young women. However, a higher proportion of respondents with no education (90.1%) completed 4+ ANC visits compared with those with some education, including primary (87.9%), secondary and higher education (89.2%). This is contrary to findings from (Addai, 2000) which found that level of attendance at antenatal check-ups is relatively high among women with secondary/higher education compared to women with no education. On the other hand, those with primary education had a higher proportion for attending less than four (4) ANC visits (12.1%) than those with no education (9.9%). There were more respondents with secondary and higher education who attended ANC visits (655 respondents) compared to those with no education (230 respondents).

Table 5.2: Percentage distribution of respondents by education level and number of ANC visits

Education level	Number of ANC visits		Total
	<4 (%)	4+ (%)	Number of women
No education	9.9 (23)	90.1 (207)	230
Primary	12.1 (49)	87.9 (362)	411
Secondary and above	10.8 (71)	89.2 (584)	655
Total			1,296
Chi-square = 0.8357		p-value = 0.7585	

5.3 Wealth status and ANC visits

Table 5.3 shows that there was no association between wealth status and ANC visits among young mothers (P-value: 0.7936). However, those within the middle and poorer wealth categories had higher proportions of completing 4+ ANC visits (91.1%) and (89.9%) respectively compared to those in the richest wealth category (87.0%). This is inconsistent with findings from Efendi et. al., (2016) which found that young women from the richer wealth quintile were more likely to make all the minimum four (4) ANC visits compared to those in the poorer quintiles. For less than four (4) ANC visits, the result also shows that those in the richest wealth category had a higher proportion (13.0%) compared to those in the middle wealth category (8.9%).

Table 5.3: Percentage distribution of respondents by wealth quintile and number of ANC visits

Wealth status	Number of ANC visits		Total
	<4 (%)	4+ (%)	Number of women
Poorest	12.9 (32)	87.1 (213)	245
Poorer	10.1 (29)	89.9 (253)	282
Middle	8.9 (24)	91.1 (249)	273
Richer	10.9 (32)	89.1 (263)	295
Richest	13.0 (26)	87.0 (175)	201
Total			1,296
Chi-square = 3.3022			p-value = 0.7936

5.4 Marital status and ANC visits

The result in Table 5.4 below shows a higher proportion of 4+ ANC visits made by those currently married (91.4%) compared to those never married (88.1%) and formerly married (78.2%). This is consistent with results from Njiku et al., (2017) which indicated that married young mothers had significantly higher ANC attendance rates compared to their unmarried counterparts. Additionally, the proportion of attending less than four ANC visits was higher for those who were formerly married (21.8%) compared to never married (11.9%) and currently married (8.6%). The p-value of 0.0232 shows that there was a statistically significant association between marital status and ANC visits.

Table 5.4: Percentage distribution of respondents by current marital status and number of ANC visits

Current marital status	Number of ANC visits		Total
	<4 (%)	4+ (%)	Number of women
Never married	11.9 (72)	88.1 (536)	608
Currently married	8.6 (52)	91.4 (553)	605
Formerly married	21.8 (18)	78.2 (65)	83
Total			1,296
Chi-square = 14.6078		p-value = 0.0232	

5.5 Religion and ANC visits

Table 5.5 shows a higher proportion of attending 4+ ANC visits among Muslims (94.1%) compared to Christians (88.0 %). On the other hand, there was a higher proportion of attending less than 4+ ANC visits among Christians (12.0%) compared to Muslims (5.9%). The distribution also indicates that the highest number of respondents attending ANC visits was recorded among Christians (1,071), while those from traditional and no religious background recorded the least number of respondents who attended ANC visits (37 respondents). As indicated by the p-value (0.0986), there is no association between religion and ANC visits.

Table 5.5: Percentage distribution of respondents by religion and number of ANC visits

Religion	Number of ANC visits		Total
	<4	4+	Number of women
	(%)	(%)	
Christian	12.0 (128)	88.0 (943)	1,071
Muslim	5.9 (11)	94.1 (177)	188
Traditional and no religion	9.0 (3)	91.0 (34)	37
Total			1,296

Chi-square = 6.6739

p-value = 0.0986

5.6 Region of residence and ANC visits

As indicated, the p-value (0.0254) in Table 5.6 shows that there is an association between region of residence and ANC visits. From the results in the table (Table 5.6), North-central region recorded the highest proportion of attending 4+ ANC (92.8%), followed by North-western region (90.7%). For the remaining three regions: South-eastern A, Southern B, and South-central, the proportion of attending 4+ ANC were 89.7 percent, 87.8 percent and 85.9 percent respectively. At the same time, attending less than 4 ANC shows a higher proportion in the South-central region (14.1%) compared to the other regions, with North-central recording the lowest proportion (7.2%). From the distribution, South-central region recorded the highest number of respondents who attended ANC visits (597 respondents); while, the lowest number of respondents attending ANC was reported in South-eastern B (70 respondents).

Table 5.6: Percentage distribution of respondents by region of residence and number of ANC visits

Region of residence	Number of ANC visits		Total
	<4	4+	Number of women
	(%)	(%)	
North-western	9.3 (9)	90.7 (90)	99
South-central	14.1 (84)	85.9 (513)	597
South-eastern A	10.3 (8)	89.7 (67)	75
South-eastern B	12.2 (9)	87.8 (61)	70
North-central	7.2 (33)	92.8 (422)	455
Total			1,296
Chi-square = 13.8089		p-value = 0.0254	

5.7 Type of place of residence and ANC visits

From the table below (Table 5.7), the p-value (0.8457) indicates that there is no significant association between place of residence and ANC visits. The proportion of 4+ ANC visits made by those residing in urban areas is higher at 89.2 percent compared to those in rural areas (88.7%). On the flip side, the proportion of those attending less than four ANC visits in rural areas is slightly higher at 11.3 percent compared to those in urban areas (10.8%). This is consistent with findings from Titaley et al., (2010) which found that pregnant women in rural areas are more likely to underutilize antenatal care services than those from urban areas. However, the distribution also revealed a higher number of those in urban areas attending ANC (750 respondents) compared to those in rural areas (546 respondents).

Table 5.7: Percentage distribution of respondents by type of place of residence and number of ANC visits

Typee of place of residence	Number of ANC visits		Total
	<4 (%)	4+ (%)	Number of women
Urban	10.8 (81)	89.2 (669)	750
Rural	11.3 (62)	88.7 (484)	546
Total			1,296

Chi-square = 0.0817

p-value = 0.8457

5.8 Distance to health facility and ANC visits

Results from Table 5.8 below indicates a higher proportion of those who attended 4+ ANC visits did not see distance to health facility as a problem (92.2%) compared to those who see distance to health facility as a problem in getting medical help (81.2%). This result is consistent with that of Kyei et al., (2015) which found that there was no effect of distance on timing of ANC or number of ANC visits made during pregnancy by pregnant women. On the other hand, a higher proportion of 18.8 percent of those who attended less than four ANC visits considered distance to health facility as a problem compared to 7.8 percent who did not considered distance to health facility as a problem in getting medical help. As indicated by the p-value (0.0002), there is an association between distance to health facility and number of ANC visits.

Table 5.8: Percentage distribution of respondents by distance to health facility and number of ANC visits

Distance to health facility	Number of ANC visits		Total
	<4 (%)	4+ (%)	Number of women
Big Problem	18.8 (71)	81.2 (307)	378
Not a big problem	7.8 (72)	92.2 (846)	918
Total			1,296

Chi-square = 34.9290

p-value = 0.0002

5.9 Health Insurance and ANC visits

Table 5.9 below shows that a higher proportion of respondents who completed 4+ ANC visits had no health insurance (89.0%) compared to those who had health insurance (87.6%). The finding is contrary to result from Anaba et al., (2022) which found that pregnant women who are covered by Free National Health Insurance Scheme (NHIS) were more likely to access ANC than those who were not covered. Meanwhile, those attending less than four (4) ANC visits reported a higher proportion (12.4%) among those with health insurance than those without health insurance (11.0%). Moreover, the distribution also shows that nearly all of the respondents that attended ANC visits had no health insurance (1266 respondents) compared to those with health insurance (30 respondents). As reported by the P-value (0.7885) in Table 5.4, there is no association between health insurance and ANC visits.

Table 5.9: Percentage distribution of respondents by health insurance and number of ANC visits

Covered by Health insurance	Number of ANC visits		Total
	<4 (%)	4+ (%)	Number of women
No	11.0 (139)	89.0 (1127)	1266
Yes	12.4 (4)	87.6 (26)	30
Total			1,296

Chi-square = 0.0616

p-value = 0.7885

5.10 Parity and ANC visits

Table 5.10 shows the percentage distribution of ANC visits by respondent parity level. As indicated by the results in the table (Table 5.10), there was no association between parity level and ANC visits (p-value: 0.5554). However, there was a higher proportion of completing 4+ ANC visits among respondents who were first time mothers (89.8%) compared to those with parity 3+ (87.0%). This is consistent with findings from Were et al., (2013) which revealed that first-time mothers are more likely to seek advice and assistance and initiate ANC earlier due to their inexperience of pregnancy, and its associated signs and symptoms. At the same time, for less than four ANC visits, there was a higher proportion among those with parity 3+ (13.0%) compared to those with one parity (10.2%). The distribution also shows a higher number of respondents with one parity attending ANC (853 respondents) compared to those with parity 3+ (117 respondents). In summary, the results from the table shows that as parity increases, the number of ANC visits decreases.

Table 5.10: Percentage distribution of respondents by parity and number of ANC visits

Parity	Number of ANC visits		Total
	<4 (%)	4+ (%)	Number of women
1	10.2 (87)	89.8 (766)	853
2	12.7 (41)	87.3 (285)	326
3+	13.0 (15)	87.0 (102)	117
Total			1,296

Chi-square = 2.0134

p-value = 0.5554

5.11 Timing of 1st ANC visit and number of ANC visits

Results from Table 5.11 show an association between the timing of 1st ANC visit and number of ANC (p-value = 0.0000). In addition, the proportion of attending 4+ ANC visits in the first trimester was higher (95.6%) compared to the third trimester (22.6%). This is consistent with findings from Gross et al. (2012), which found that being a first-time mother is mainly associated with attending 4+ ANC visits during the first trimester. Conversely, attending less than four (4) ANC visits saw a higher proportion in the third trimester (77.4%) compared to the first trimester (4.4%). From the total distribution, there were many respondents who attended ANC visits in the first trimester (885 respondents) compared to the third trimester (36 respondents).

Table 5.11: Percentage distribution of respondents by Timing of 1st ANC visit and number of ANC visits

Timing of 1 st ANC	Number of ANC visits		Total
	<4	4+	Number of women
	(%)	(%)	
First trimester	4.4 (39)	95.6 (846)	885
Second trimester	20.2 (76)	79.8 (299)	375
Third trimester	77.4 (28)	22.6 (8)	36
Total			1,296

Chi-square = 247.8823

p-value = 0.0000

5.12 Chapter summary

In summary, the chapter examines the association between the demographic and socio-economic characteristics and antenatal care visits. Among the variables, age, education status, wealth status, religious affiliation, place of residence, and health insurance were not associated with the number of ANC visits. Variables that were found to be associated with number of ANC visits made by young mothers during pregnancy are marital status, region of residence, distance to health facility, and timing of first ANC visit.



CHAPTER SIX

DETERMINANTS OF ANC UTILIZATION AMONG YOUNG MOTHERS

6.0 Introduction

This chapter focuses on determinants of antenatal healthcare utilization among young mothers. Binary logistic regression models were fitted to examine the relationship between demographic and socio-economic characteristics and ANC utilization. This method is best suited when the dependent variable is dichotomous as the case of this study. For each independent variable, one sub-category was selected as the reference category. The findings are represented in the odds ratios, expressing the magnitude of the determinants of ANC on young mothers. The resulting odds ratios (OR) indicate the nature of the net impact of independent variables on the probability of the outcome occurring. An increased chance of an outcome occurring is represented by an odd ratio greater than one, while a decreased chance of an outcome occurring is represented by an odds ratio less than one. An odds ratio of one implies lack or absence of the likelihood that the independent variable can predict the dependent variable, ANC utilization. The variables were tested at 95 percent confidence interval with a significance value (p-value) less than five (5) percent (0.05).

In the logistic regression, two models were used to examine the influence of demographic and socio-economic variables on ANC utilization among young women. The first model examines the independent effects of background characteristics such as mother's age, education, wealth status, marital status, religion, region of residence, and type of place of residence on ANC utilization. For the second model, the intermediate variables (distance to health facility, health insurance, parity and timing of 1st ANC visit) were included in the

model to determine the effect on the relationship between the socio-demographic variables and ANC utilization.

6.1 Relationship between Independent variables and ANC utilization among young mothers

The results in Table 6.1 below show the relationship between background characteristics (independent variables) and ANC utilization among young mothers. Among the independent variables (age, education status, wealth status, marital status, religious affiliation, region of residence, and place of residence), none of them show significant odds of predicting likelihood to complete ANC visits. This could be attributed to some data errors, missing data and biases that may have occurred during the data collection process. This may have a significant effect on the relevance, representativeness, quality and accuracy of the data. These could have accounted for the insignificance of the relationship between the independent variables and the dependent variable.

Table 6.1: Binary Logistic regression showing the relationship between Independent variables and ANC utilization among Young mothers

Model 1				
Characteristics	Odds Ratio	P-value	[95% Conf.	Interval]
Age				
15-19 (RC)				
20-24	0.99	0.976	0.562	1.749
Education Status				
No education (RC)				
Primary	0.88	0.667	0.498	1.564
Secondary and above	1.12	0.744	0.571	2.192
Wealth Status				
Poorest (RC)				
Poorer	1.27	0.357	0.761	2.129
Middle	1.51	0.224	0.777	2.928
Richer	1.39	0.413	0.633	3.031

Richest	1.19	0.742	0.421	3.367
Marital Status				
Never Married (RC)				
Currently Married	1.33	0.237	0.827	2.153
Formerly Married	0.54	0.136	0.241	1.214
Religious affiliation				
Christian (RC)				
Muslim	1.98	0.141	0.797	4.901
Traditional and No Religion	1.15	0.799	0.396	3.331
Region of residence				
North western (RC)				
South central	0.65	0.199	0.333	1.259
South eastern a	1.09	0.832	0.486	2.453
South eastern b	0.93	0.864	0.427	2.043
North central	1.46	0.300	0.713	2.982
Type of place of residence				
Urban (RC)				
Rural	0.91	0.751	0.499	1.650
_cons	6.38	0.000	2.467	16.515

OR=Odd Ratios RC= Reference category *p-value<0.05= significant

6.2 Relationship between independent variables, intermediate variables and dependent variable (ANC utilization)

The results in Table 6.2 below show the relationship between independent variables, intermediate variables and ANC utilization among young mothers. The intermediate variables were added to the model to see how these variables influence ANC utilization. When the intermediate variables were included in the model, distance to health facility and timing of 1st ANC visits were found to be significant predictors of ANC utilization among young mothers. Young mothers who said that distance to health facility was not a big problem in accessing medical help were 1.74 times (OR=2.74, p-value=0.000) more likely to complete ANC compared to those who said that distance to health facility was a big problem in accessing medical help. At the same time, young mothers who had their 1st ANC visit in the second

trimester (4-6 months) and third trimester (7+ months) were 0.83 (OR=0.17, $p=0.000$) and 0.99 (OR=0.01, $p=0.000$) times less likely to complete ANC than those who had their 1st ANC visit in the first trimester (0-3 months). All other variables did not show significant odds of predicting likelihood to complete ANC visits.

Table 6.2: Binary Logistic regression showing the relationship between Independent variables, Intermediate variables and ANC utilization among Young mothers

Model 2

Antenatal visits	Odds Ratio	P-value	[95% Conf. Interval]	
Age				
15-19 (RC)				
20-24	1.12	0.771	0.523	2.394
Education Status				
No education (RC)				
Primary	0.73	0.337	0.377	1.399
Secondary and above	0.96	0.901	0.457	1.993
Wealth Status				
Poorest (RC)				
Poorer	1.35	0.353	0.715	2.553
Middle	1.42	0.356	0.674	2.982
Richer	1.93	0.197	0.709	5.251
Richest	0.98	0.967	0.319	2.995
Marital status				
Never Married (RC)				
Currently Married	1.24	0.471	0.693	2.211
Formerly Married	0.69	0.348	0.319	1.497
Religion				
Christian (RC)				
Muslim	1.81	0.223	0.696	4.714
Traditional and No Religion	0.92	0.893	0.247	3.384
Region of residence				
North western (RC)				
South central	0.53	0.091	0.256	1.106
South eastern a	0.98	0.956	0.435	2.196
South eastern b	0.88	0.750	0.411	1.899
North central	1.57	0.234	0.747	3.296

Type of place of Residence

Urban (RC)				
Rural	0.92	0.828	0.447	1.905

Distance to health facility

Big problem (RC)				
Not a big problem	2.74	0.000	1.621	4.639

Health Insurance

No (RC)				
Yes	0.99	0.983	0.289	3.364

Parity

1 (RC)				
2	0.72	0.313	0.378	1.368
3+	0.88	0.797	0.320	2.401

Timing_1st_visit

First trimester (RC)				
Second trimester	0.17	0.000	0.091	0.299
third trimester	0.01	0.000	0.005	0.034
_cons	12.09	0.000	3.911	37.429

OR=Odd Ratios RC= Reference category *p-value<0.05= significant

6.3 Discussion of Findings

The main objective of the study is to examine the determinants of antenatal healthcare utilization among young mothers. Specific objectives include: to determine the prevalence of antenatal healthcare utilization among young mothers and to identify the demographic and socio-economic characteristics that influence antenatal healthcare utilization among young mothers in Liberia.

6.3.1 Predictors of ANC

From the binary logistics regression, the results found that distance to health facility and timing of first ANC visit were statistically significant predictors of ANC utilization among young women.

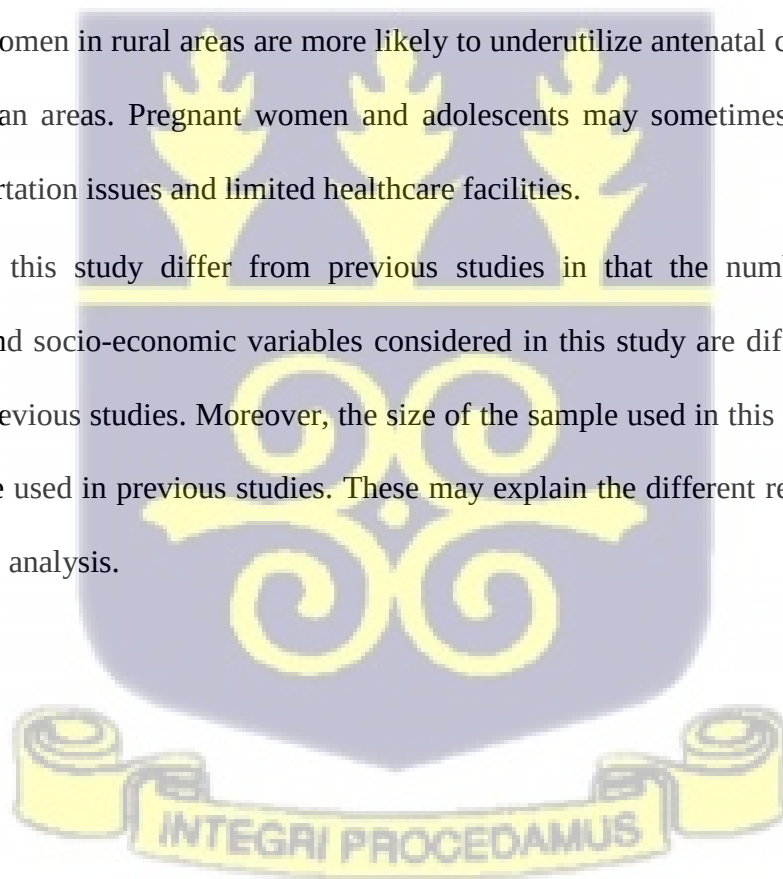
For distance to health facility, there was a statistically significant association between those who do not see distance to health facility as a problem in accessing medical help and meeting the recommended number ANC visits. This result is contrary to a previous study by Tanou et al., (2021) which found a negative effect of distance to health facilities on ANC utilization. With this, future research needs to explore further on the effects of distance to health facility on ANC utilization among young mothers.

For timing of first ANC visit, it was also significantly associated with ANC with women who delayed their first ANC showing lower odds of completing the required number of visits. This result is consistent with findings from Gross et al., (2012) which found that first-time young mothers are more likely to seek ANC early in their pregnancies than their adult counterparts. Early initiation of ANC by first-time young mothers are possibly due to their inexperience of pregnancy, and its associated signs and symptoms (Were et al., 2013).

However, results from the logistic regression also found variables such as mother's education, age, wealth status, health insurance, marital status, place of residence, and region of residence to not be significant predictors of ANC utilization among young mothers aged 15-24. This is inconsistent with results from previous studies (Ali et al., 2018; Birmeta et al., 2013; Efendi et. al., 2016; Anaba et al., 2022; Njiku et al., 2017; Titaley & JD, 2010; Duodu et al., 2022) which found mother's education, age, wealth status, health insurance, marital status, place of residence, and region of residence as significant predictors of ANC among young women. According to Ali et al., (2018), higher and secondary educated young women were 8.08 times (95% CI: 1.99-32.85; $P < .001$) and 3.56 times (95% CI: 1.81-7.03; $P < .001$) more likely to utilize recommended ANC services than young women without formal education. Educated women, when pregnant, may be more knowledgeable about the benefits ANC and are more likely to insist and ensure that they receive quality ANC (Duodu et al., 2022). For their part, Birmeta et al., (2013) found that ANC visits for women within the age

group of 20-34 years was 1.2 times higher compared to those in the age group 15–19 years. In terms of wealth status, study by Efendi et. al., (2016) also found that young women from the richer wealth quintile were more likely to make all the minimum four (4) ANC visits compared to those in the poorer quintiles. For health insurance, Anaba et al., (2022) also found that pregnant women who are covered by Free National Health Insurance Scheme (NHIS) were more likely to access ANC than those who were not covered. However, the results of the analysis of this sample did not find these variables significant. Also, contrary to the current study results, Njiku et al., (2017) revealed that married young mothers had significantly higher ANC attendance rates compared to unmarried young, and delay in booking ANC was mainly associated with not being married. Titaley et al. (2010) also found that pregnant women in rural areas are more likely to underutilize antenatal care services than those from urban areas. Pregnant women and adolescents may sometimes face challenges such as transportation issues and limited healthcare facilities.

The results of this study differ from previous studies in that the number and type of demographic and socio-economic variables considered in this study are different from what were used in previous studies. Moreover, the size of the sample used in this study is different from what were used in previous studies. These may explain the different results obtained in the multivariate analysis.



CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.0 Introduction

This chapter provides a comprehensive summary of the study including the study objectives, method of data analyses, results and findings. It is then followed by a conclusion and recommendations based on key findings.

7.1 Summary

The main objective of the study was to identify the determinants of antenatal healthcare utilization among young mothers. Specific objectives include: to determine the prevalence of antenatal healthcare utilization among young mothers, and identify the demographic and socio-economic determinants that influence antenatal healthcare utilization among young mothers.

Background characteristics examined in the study were education status, wealth status, health Insurance, age of mothers, parity, distance to health facility, marital status, place of residence, region of residence, religion, partner's education and timing of 1st ANC visits.

The relationship between ANC visits and other background characteristics of the study was examined at univariate, bivariate and multivariate levels of analyses. In terms of prevalence, 89% of the respondents attended at least four (4) ANC visits as required by the recommended minimum visit by the WHO (WHO, 2016). This suggests that prevalence of ANC visits among young women who had their most recent birth preceding the survey was high. The analysis also revealed that the majority (71%) of the respondents were within the age group of 20-29 years, while the remaining (29%) were within the age group 15-19 years. A highest proportion (46%) of the respondents were from the south-central region. At the same time,

majority of the respondents (58%) resided in urban areas. As per their educational levels, there were more respondents with secondary education and higher education (50.5%).

For the bivariate analysis, cross tabulations and Pearson Chi-square tests were employed to test for the association between background characteristics and number of ANC visits at 95% confidence level. Among the background characteristics, variables that were associated with ANC utilization among young mothers included marital status, distance to health facility, region of residence, and the timing of 1st ANC visit. The results of the bivariate analysis show a higher proportion of young women (89%) attended at least four (4) ANC visits, while the lowest proportion (11%) attended less than four (4) ANC visits. Completing 4+ ANC visits were more common among young women with no education (90.1%) than those with secondary and higher education (89.2%). The proportion of primiparous young women completing 4+ ANC visits was higher (89.8%) compared to those with parity 3+ (87.0%). There was also a higher proportion of completing 4+ ANC visits made by those currently married (91.4%) compared to those never married (88.1%) and formerly married (78.2%). ANC attendance is more prevalent among Christians and higher in the south and north-central regions compared to the other regions.

At the multivariate level, the binary logistics regression analysis was used to establish the relationship between the background characteristics and ANC utilization. The results show that only two variables were significant predictors of ANC utilization among young women aged 15-24 years, namely distance to health facility and timing of 1st ANC visit.

Considering the study results, education and wealth status were not statistically significant determinants of ANC utilization among young women. These findings are inconsistent with the hypotheses of the study. Therefore, hypotheses 1 and 2 were rejected.

7.2 Conclusion

The study examined the determinants of antenatal health care utilisation among young mothers in Liberia using data from the 2019–2020 Liberia Demographic and Health Survey (LDHS). The study found distance to health facility and timing of first ANC visit as important predictors of young mothers completing four or more antenatal care visits. This has important implications for the development of ANC interventions to promote maternal and child health outcomes for young mothers.

These findings suggest that young women who are living in areas very far from health facilities may not be able to complete the recommended four minimum ANC visits. This may also prevent them from attending ANC early which may also affect the number of visits they are required to make during pregnancy.

Beyond meeting the study's objectives, these findings carry important policy and programmatic implications. At a broader level, improving antenatal care utilization among young mothers contributes directly to achieving national and global health priorities, including the Sustainable Development Goals (SDG 3: Good Health and Well-being and SDG 5: Gender Equality).

7.3 Recommendations

Based on the study findings, there is a need for policy makers and other health stakeholders to create and implement policies that will see the establishment of more ANC service centers, encourage early ANC visits, address stigma and cultural barriers, and improve accessibility. To do this, government (National Legislature, Ministries of Finance, Health and Public Works) and partners (INGO's and NGO's) should invest more resources in building new health facilities or upgrading existing ones to provide comprehensive ANC services, with special priority given to areas with limited access to healthcare; as well as train and deploy

community health workers to offer basic ANC services, monitor pregnancies, and refer women to healthcare facilities when needed.

Moreover, governmental agencies (including Ministries of Finance, Public Works, Health and Internal Affairs) along with partners can also provide geographic access through better road networks, decentralization of health services, and community health outreach programs—as envisioned in the National Community Health Assistant Program (NCHAP). This is essential to address spatial inequalities in ANC utilisation in Liberia. Strengthening these frameworks aligns with the WHO Global Strategy on Integrated People-Centered Health Services (2016), which emphasizes bringing services closer to communities to reduce inequities in maternal and child health outcomes.

Government through the Ministries of Information, Education, Health and Internal Affairs, in collaboration with local partners can also encourage early ANC by creating public awareness campaigns through the use of various media platforms such as radio, television, social media, and community events to reach a broad audience highlighting the importance of early ANC visits.

Additionally, policy makers and health stakeholders (including the Ministries of Health, Education, Internal Affairs) and partners can develop and implement educational programs in schools, community centres, and health facilities to inform young women about the benefits of early ANC and pregnancy care, and also engage community leaders, elders, and religious leaders to address cultural norms and practices that may discourage young women from seeking ANC.

Although the proportion of young mothers with fewer than four antenatal care (ANC) visits was relatively small, this finding still offers valuable insights for maternal health research and policy in Liberia. Therefore, further research could also include other variables like employment status, autonomy in health care decision-making, exposure to media, partner's

education etc. and analytical technique like sensitivity analysis that are not included in this study to further explore other determinants of ANC utilization among young women.

Lastly, the study recognizes the significance of the revised WHO guideline and recommends that future studies and subsequent LDHS rounds or similar national surveys integrate the eight-contact definition because it provides a more comprehensive and up-to-date measure of antenatal care coverage and quality.



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