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UTILIZATION OF ANTENATAL SERVICES AMONG TEENAGERS IN GHANA

BY

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DECLARATION

I confirm that this Project, which has been appropriately referenced, submitted to the Department of Community Health at Ensign Global College of Public Health, Kpong, is the outcome of my independent research and has not been previously presented for an academic qualification elsewhere.

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DEDICATION

To God Almighty, my husband Mr. Kenneth Paa Kwesi Otabil, and my Children for being the main pillars of strength.

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I thank God for the gift of life and grace to carry on with this project work.

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LIST OF ABBREVIATIONS

ANC - Antenatal Care

CHPS - Community-based Health Planning and Services

GDHS - Ghana Demographic and Health Survey

GHIMS - Ghana Health Service Information Management System

GHS - Ghana Health Service

GMICS - Ghana Multiple Indicator Cluster Survey

GSS - Ghana Statistical Service

HBM Health Belief Model

HIV - Human Immune Deficiency Virus

ICF - Inner City Fund

JICA - Japan International Cooperation Agency

KOICA - Korea International Cooperation Agency

LMIC - Low- and Middle-Income Countries

MICS - Multiple Indicator Cluster Survey

NGO - Non-Governmental Organization

NHIS - National Health Insurance Scheme

PPP Public-Private Partnership

UNDP United Nations Development Programme

UNFPA - United Nations Population Fund

UNICEF - United Nations International Children's Emergency Fund

USAID - United States Agency for International Development

WHO - World Health Organisation

ABSTRACT

Antenatal care services provide pregnant women with skilled health workers to help detect danger signs early before they become a problem during pregnancy. In Ghana, teenage pregnancies continue to be prevalent. The main aim of the study was to examine the proportion of teenagers who utilise antenatal services in Ghana, determine the socio-cultural factors related to the current pregnancy of adolescents and identify the factors influencing pregnant teenagers' use of antenatal services in Ghana. The study population was pregnant teenagers who participated in the Multiple Indicator Cluster Survey (MICS) 2017/18 in Ghana. The sample comprised 354 teenagers between the ages of 13 and 19 years who are participants in the Multiple Indicator Cluster Survey in Ghana. Data was extracted from the Multiple Indicator Cluster Survey and subsequently analysed using STATA and Microsoft Excel. The analysis involved descriptive statistics such as mean, standard deviation, percentages, and frequencies, as well as chi-squared and logistic regression. The study found that (215) 78% of teenagers had four or more recommended antenatal care visits with a midwife. Furthermore, the study found that the socio-demographic factors related to adolescents' current pregnancies include age distribution, educational background, family structure and caretakers, economic background, marital status and desire for a last child. Additionally, the study revealed that age factors, education, living situation, economic status, marital status, desire for a last child ,and timing of Antenatal Care visits are the factors affecting Antenatal Care service utilisation among pregnant teenagers in Ghana. Therefore, the study recommended that healthcare providers, schools and community members should collaborate to organise seminars and workshops to inform teenagers about the essence of Antenatal Care services and answer any misunderstanding they might have.

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

Antenatal care is explained as the care provided for pregnant women by skilled healthcare professionals throughout the pregnancy period (McNellan *et al.*, 2019). The process involves screening, risk identification, health education, health promotion and the prevention and management of pregnancy-related diseases (McNellan *et al.*, 2019). Antenatal care (ANC) services are an effective initiative to help reduce the rate of maternal mortality in Ghana. Antenatal services help to identify complications such as hypertensive disorder and manage proactively to prevent its impact on pregnancy (Anaba, Alor and Badzi, 2022a). Antenatal care services provide pregnant women with skilled health workers to help detect danger signs early before they become a problem during pregnancy. Another benefit of antenatal care service is that it allows expectant mothers to learn about possible complications during pregnancy and the relevance of accessing skilled delivery services (McNellan *et al.*, 2019). This helps to decrease the number of illnesses and deaths among newborns and during the perinatal period..

The prevalence of pregnancy among teenagers remains high in Ghana (United Nations Population Fund (UNFPA), 2022). There is a higher risk factor of maternal mortality associated with teenage pregnancy, due to the risk of complications such as puerperal endometritis, eclampsia, systemic infections and death (UNFPA), 2022). According to the World Health Organisation (WHO), the leading cause of death globally among female adolescents aged 15 to 19 is complications during pregnancy (WHO, 2022). To control the complications that come with teenage pregnancy, mothers are required to attend antenatal clinics for monitoring of the health of both the mother and foetus towards a safe delivery. Various health organisations such as the World Health Organisation (WHO) and the Ghana Health Service (GHS) envision a

world where pregnant women and newborns receive quality care from pregnancy through childbirth to postnatal.

Studies have shown a diverse level of use of antenatal care services by pregnant teenagers around the world (McNellan et al., 2019; Anaba et al., 2022; Hackett et al., 2019). These studies assessed the use of antenatal care services among adolescent pregnant women in India (McNellan et al., 2019; Anaba, Alor and Badzi, 2022b; Hackett et al., 2019). The study found that pregnant teenagers used antenatal care services more frequently than pregnant adults. Also (Micheal *et al.*, 2022) examined the use of antenatal care services among unmarried adolescents in Nigeria. Results from the study indicated that most unmarried adolescents seek antenatal care from faith-based and traditional care attendants. The findings showed that there was a low utilization of certified medical antenatal care. In Ghana, Anaba, Alor and Badzi, (2022) conducted a study on the use of antenatal care among adolescents and young mothers. Results from the study indicated that adolescents had a lower likelihood of using antenatal care services in the Upper East region of Ghana. Reports have shown that two out of ten girls in Ghana become pregnant before they reach 18 years old (Amoadu *et al.*, 2022). As adolescent pregnancy is an important health concern, it is equally necessary to assess the use of antenatal services by teenage pregnant mothers considering the cultural, religious and social perceptions of teenage pregnancy in Ghana. The study examines antenatal care utilization among teenage mothers in Ghana.

1.2 Problem Statement

Adolescent pregnancy is a public health issue that has clear health, social, economic, emotional, and mental repercussions for those who experience it, their families, their communities, and society as a whole (Amoadu *et al.*, 2022). Ghana has experienced a high record of teenage pregnancy over the years. Ghana's District Health Information Management Health System

(DHIMS) reports that between 2016 and 2020, there were 13,444 pregnancies among young adolescents aged 10 to 14 and 542,131 pregnancies among adolescent girls aged 15 to 19(UNFPA, 2022). The pregnancy and delivery of adolescents are highly associated with risk factors such as haemorrhage, sepsis, hypertensive conditions etc. as compared to older women (Anaba *et al.*, 2022).

Adolescent pregnancies can have intergenerational consequences. Children born to teenage mothers are more likely to experience adverse health, educational, and social outcomes throughout their lives (Moshi *et al*., 2023). They may have a higher risk of developmental delays, poor academic performance, and behavioural issues. Children of teenage mothers are also more likely to become parents themselves as teenagers, continuing a cycle of disadvantage (Moshi *et al*., 2023).

In Ghana, there are varied religious and cultural perceptions about teenage pregnancy which mostly influence the stigmatisation of pregnant teenagers (Amoadu *et al.*, 2022). Thus, the stigma that comes with teenage pregnancy as well as cultural, social and religious influences, may influence the rate of use of antenatal care services among pregnant teenagers. The cost of seeking general medical care, especially ANC services is higher cost in Ghana despite the introduction of NHIS and free ANC care services, Individuals with NHIS are charged for some if not the most important services needed for early identification of complications related to pregnancy and childbirth when utilising ANC services (Siakwa *et al.*, 2022).In addition to this, the culture and religious lifestyle of most societies in Ghana, frown at teenage pregnancy and as such most teenagers who get pregnant are stigmatised making them refuse to use ANC services. Considering the works of past research (Amoadu et al., 2022; Asare *et al*., 2019), much has not been done to critically analyse and generalise opinions on the factors that influence the use of antenatal care services by pregnant teenagers. Thus, the current study makes use of secondary data to collect and analyse already existing empirical data to make a

generalised conclusion of findings for a better representation of opinion on the topic. The use of secondary data to analyze the research problem will provide generalized results from various perspectives regarding the utilization of antenatal care services by adolescent females. For this reason, the current study examines the adequate utilisation of the ANC facility before the end of the pregnancy trimesters by teenagers in Ghana.

1.3 The Rationale of the Study

The main aim of the study is to explore the utilisation of antenatal care services by teenagers in Ghana. The study will be useful to various government agencies as well as policymakers in the health sector in terms of gaining data on the state of antenatal usage among teenagers in Ghana. This will help agencies concerned with antenatal service management to develop structures that will make antenatal services more accessible and also encourage their use among teenagers. The result from the current study will also help address low ANC usage among adolescents by drawing the attention of various stakeholders to support the advocacy of encouraging the usage of antenatal usage by pregnant teenagers. This will encourage the collective effort to eradicate problems such as stigma, cost, location and other related factors that prevent the use of ANC by pregnant adolescents. Academically, the study will benefit students and researchers as the study serves as a source of data for teaching and learning and also for future research purposes. The study also provides an opportunity to bridge gaps from existing studies conducted about the study topic. For instance, existing studies have not often used secondary data to analyse the use of antenatal services by teenagers in Ghana, and this will be handled by the current study topic through a systematic literature review.

1.4 Conceptual Framework on the Utilisation of Antenatal Care Services

The conceptual framework was adapted from the Anderson and Newman Model. The Andersen Behavioral Model of Health Services Use was proposed in 1968 as a theoretical framework to explain the factors that affect a person's use of health services (Solanke *et al*., 2023). This conceptual framework was modified to incorporate variables relevant to the current study. The model posits that health service use is influenced by three sets of factors: predisposing, enabling, and need.

Figure 1.1 In the modified framework, the utilization of antenatal care (ANC) services is influenced by various independent variables; socio-demographic factors, economic factors, obstetric factors and socio-cultural factors. Socio-demographic factors, such as age, level of education, and marital status, can shape an individual's decision to seek ANC. Socio-cultural factors, including unplanned pregnancy, knowledge deficit, and the influence of traditional birth attendants (TBAs), can impact the perception and understanding of ANC services. Obstetrics factors, such as parity and gravida, also play a role in influencing ANC utilization patterns. Economic factors, such as poverty and the availability of high-quality ANC services, can affect access to care. Additionally, facility aspects like the accessibility of the medical facility and the standard of care can either hinder or facilitate the use of ANC. By considering these independent variables in conjunction with the dependent variable of ANC utilization, a comprehensive understanding of the factors influencing ANC utilization can be achieved.

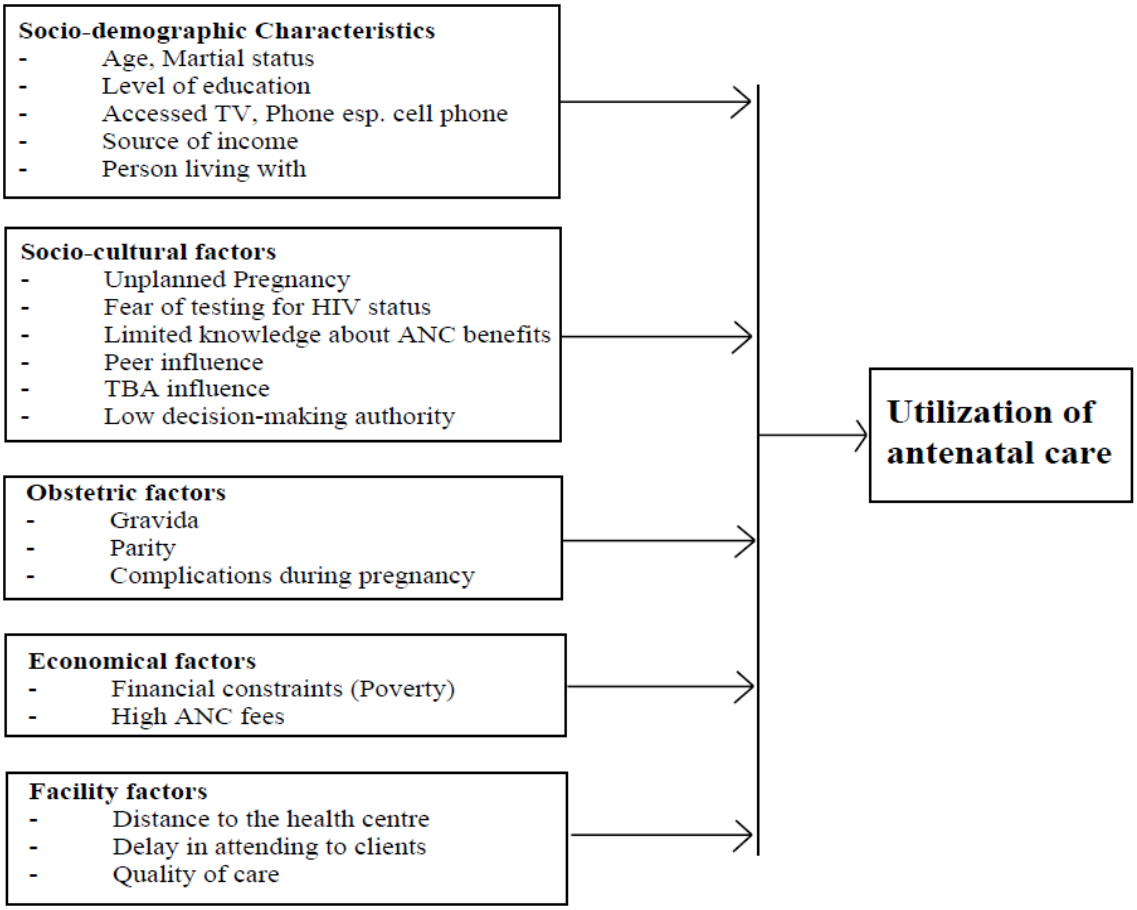

Figure 1.2: Conceptual framework on the utilisation of antenatal care services

1.5 Research Questions

1. What is the proportion of teenagers that utilise antenatal services in Ghana?
2. What are the socio-cultural factors related to the current pregnancy of adolescents?
3. What are the factors that influence the utilisation of antenatal services by pregnant teenagers in Ghana?

1.6 General objective

The main aim of the study is to examine the utilisation of antenatal services by teenagers in Ghana.

1.6.1 Specific Objectives

The specific objectives of the study include the following:

1. Identify the proportion of teenagers who utilise antenatal services and the number of visits in Ghana.
2. Determine the socio-demographic factors related to the current pregnancy of adolescents.
3. Examine the factors that influence the utilisation of antenatal services by pregnant teenagers in Ghana.

1.7 Scope of Study

The scope of this study was to examine the utilisation of antenatal services among teenagers in Ghana and identify the factors that influence their utilisation of these services. The study utilised data from the Multiple Indicator Cluster Survey (MICS) 2017/18, which includes a sample of pregnant teenagers in Ghana. By analyzing this dataset, the study aimed to shed light on the proportion of teenagers who utilise antenatal services in the country and understand the factors that significantly impact their utilisation. The study considered various factors that may influence the utilisation of antenatal services among pregnant teenagers in Ghana. These factors encompass socio-demographic, socio-cultural, and economic variables. Socio-demographic factors such as age, level of education, and marital status were examined to determine their influence on antenatal service utilisation. Additionally, socio-cultural factors like unplanned pregnancies, and knowledge deficits regarding antenatal care are considered. Furthermore, the study explored economic factors such as financial constraints (poverty) and their influence on the utilisation of antenatal services among teenage mothers was analysed.

1.8 Profile of Study Area

Since Ghana's transition to multi-party democracy, the country has earned a reputation as one of West Africa's most stable nations (BBC News Services, 2023). The land area of the country is around 238,535 sq km, with a total population of 32.1 million. Common languages spoken in Ghana include English, Dagbani, Dangme, Ga, Ewe, Dagaare, Twi, Bono, Fante, Nzema, Gonja and Frafra. The Ghana Health Service (GHS) is a public health body that was established under Act 5252 of 1996 under the 1992 constitution of Ghana (Ghana Health Service, 2022). The GHS is an autonomous executive agency and is responsible for implementing national health policies of the country under the control of the Ministry for Health. The prevalence of pregnancy among teenagers remains high in Ghana (United Nations Population Fund (UNFPA), 2022). Due to the increased possibility of complications like puerperal endometritis, eclampsia, systemic infections, hemorrhage, and even death, teenage pregnancy carries a higher risk of maternal mortality (Anaba *et al.*, 2022).

1.9 Organisation of Report

Chapter one introduces the study, presenting background information on the topic of the utilisation of antenatal services among teenagers in Ghana. The problem statement is identified, highlighting the importance of addressing complications during pregnancy and childbirth among pregnant adolescents. The rationale for conducting the study is explained, emphasising the need to understand the factors influencing the utilisation of antenatal services by teenage mothers. A conceptual framework is presented, outlining the relationships between the variables under investigation. Research questions are formulated to guide the study. The general and specific objectives of the study are outlined, along with a profile of the study area and the scope of the research. The chapter concludes by describing the organisation of the report.

Chapter two is dedicated to the literature review. It begins with a conceptual review, defining antenatal care and discussing its importance for maternal and child health. The implications of teenage pregnancy are examined, followed by an overview of the healthcare system in Ghana. The chapter includes a theoretical review, highlighting relevant theories and frameworks, and an empirical review, summarising previous research on the topic. The study's theoretical and empirical ramifications are discussed after the study's main findings from the literature review are summarized. Limitations and gaps in the literature are listed in the chapter's conclusion.

Chapter 3 of the book discusses the research methodology. Along with the tools and techniques used for data, the research methods and design are described. The study population and variables of interest are defined. The sampling procedure is detailed, including considerations for pre-testing. The chapter discusses data handling, analysis techniques, ethical considerations, limitations, and assumptions.

Chapter four presents the results and discussion of the study findings. Background information is summarised in a table, and the key study variables are analysed and presented. A thorough explanation of the results is again provided in the chapter. The research questions, objectives, key variables, literature review, and results are linked and discussed, with appropriate references cited to support the analysis.

Chapter five presents the conclusions and recommendations of the study. Key findings are summarised, and recommendations are segmented and targeted towards stakeholders and interested parties. The chapter concludes the report, providing a concise and actionable overview of the study's outcomes and implications.

The overall organisation of the report ensures a logical progression of information, from the introduction and literature review to the methodology, results, discussion, and concluding

remarks, providing a thorough understanding of the factors influencing the use of antenatal care among teenagers in Ghana.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The utilisation of antenatal services is crucial for ensuring positive pregnancy outcomes and improving maternal and child health. Teenagers, as a vulnerable population, face unique challenges in accessing and utilising these services (Asare *et al*., 2019). In Ghana, a country with a high rate of teenage pregnancies, understanding the factors that contribute to the utilisation of antenatal services among this population is essential for developing effective interventions and policies (Amoadu *et al*., 2022). This literature review aims to explore the current state of knowledge regarding antenatal care utilisation among teenagers in Ghana, identify the factors influencing their access and use of these services, and highlight potential strategies to improve their health outcomes. The literature review will draw on a range of sources, including online articles, academic journals, and books, to provide a comprehensive understanding of the topic. Relevant keywords and search terms are employed to identify pertinent studies and publications, such as "antenatal care", "teenage pregnancy", "Ghana", "utilisation", "access", "barriers", and "factors influencing".

The literature review will begin with a conceptual review, providing an overview of antenatal care and its significance, as well as a brief description of the healthcare system in Ghana. This will be followed by a theoretical review, which will discuss two relevant theories and their application to antenatal care utilisation among teenagers. The empirical review section will delve into the patterns, trends, and factors influencing antenatal care utilisation among teenagers in Ghana, and the existing interventions and strategies aimed at improving their access to these services. Finally, the conclusion will summarise the key findings, identify gaps in the literature, and provide recommendations for future research.

2.2 Conceptual Review

This section of chapter two presents a detailed understanding of the various concepts that form the current study topic.

2.2.1 Definition and Components of antenatal care

Antenatal care, also known as prenatal care, is a vital component of healthcare that focuses on providing medical and health support to pregnant women from conception until the onset of labour (World Health Organisation (WHO), 2018). Keeping track of the pregnancy, spotting potential problems, and promoting a healthy lifestyle are vital for the health of both the mother and unborn child (McCauley *et al*., 2021).

The components of antenatal care encompass various aspects. Medical assessment and monitoring involve regular check-ups with healthcare professionals to track the progress of the pregnancy, including measurements of weight gain, blood pressure, and fetal growth through ultrasound scans (WHO, 2018). Laboratory tests and screenings are conducted to detect potential health issues or complications, such as blood tests for anaemia, HIV, syphilis, and hepatitis B, as well as screenings for gestational diabetes, hypertension and other pregnancy-related conditions (McCauley *et al*., 2021).

Health promotion and education form an essential part of antenatal care, providing guidance and information on maintaining a healthy lifestyle during pregnancy, including discussions on nutrition, physical activity, substance avoidance, and stress management (Ssetaala *et al*., 2020). Additionally, counselling and psychological support are offered to address concerns, alleviate anxiety, and prepare for childbirth and parenthood (Doudu *et al*., 2022). Immunizations may also be given to protect the mother and the unborn child from specific diseases, such as flu shots and tetanus toxoids (WHO, 2018).

Furthermore, antenatal care focuses on the identification and management of pregnancy complications, such as preeclampsia, gestational diabetes, or placenta previa, to reduce the risk of adverse outcomes for both mother and baby (Massenga *et al*., 2023). Antenatal care plays a critical role in maternal and child health, particularly for vulnerable populations like teenage mothers, who may face unique challenges during their pregnancies. By providing comprehensive antenatal care, healthcare professionals contribute to the prevention of adverse pregnancy outcomes, including premature birth, low birth weight, and maternal and neonatal morbidity and mortality (WHO, 2018).

2.2.2 Importance of antenatal care for maternal and child health

The promotion of the mother's and the unborn child's health and wellbeing during pregnancy is greatly aided by antenatal care (Tessema *et al*., 2023). It enables medical professionals to recognize and handle potential risks, avoid complications, and guarantee pregnant patients receive the best care possible. Medical professionals can identify and manage potential risks, prevent complications, and ensure safe pregnancies. Regular antenatal check-ups help identify potential health issues or complications in both the mother and the unborn child (WHO, 2018). Early detection allows for prompt management and intervention, which lowers the risk of unfavorable outcomes like preterm birth, low birth weight, and maternal and neonatal mortality (WHO, 2018). Additionally, antenatal care provides pregnant women with essential information and guidance about maintaining a healthy lifestyle during pregnancy. Healthcare providers offer advice on nutrition, exercise, and other aspects of self-care to promote the well-being of the mother and her developing fetus. This education can help expectant mothers make informed decisions and adopt healthy behaviours contributing to positive pregnancy outcomes (Ssetaala *et al*., 2020). Another important aspect of antenatal care is the provision of counselling and psychological support. Pregnancy can be an emotionally challenging period

for many women, particularly teenagers, who may face unique challenges and stressors (Tessema *et al*., 2023). Through counselling and support, healthcare providers can help address concerns, alleviate anxiety, and prepare pregnant women for childbirth and parenthood.

Furthermore, antenatal care includes immunisations for pregnant women, which protect both the mother and the unborn child from specific diseases. Vaccinations, such as the flu shot and tetanus toxoid, can help prevent illnesses that could pose a risk to the mother or her baby during pregnancy or after birth (WHO, 2018). In summary, antenatal care is crucial for ensuring the health and well-being of both the mother and her unborn child. It contributes to the early detection and management of complications, promotes healthy behaviours, provides emotional support, and helps prevent illnesses through vaccinations. By offering comprehensive antenatal care, healthcare providers can reduce the risk of adverse pregnancy outcomes and improve overall maternal and child health, especially for vulnerable populations like teenagers (McCauley *et al*., 2021).

2.2.3 Teenage Pregnancy and its Implications

Teenage pregnancy refers to pregnancies that occur among young women under the age of 20 (Asare *et al*., 2019). Teenagers who become pregnant often face a unique set of challenges and risks compared to older pregnant women. Understanding these challenges and their implications is vital for developing appropriate interventions and policies aimed at improving the health outcomes for both teenage mothers and their children.

One of the key implications of teenage pregnancy is the increased health risks faced by teenage mothers. They are at a higher risk of experiencing certain pregnancy-related complications, such as preterm birth, low birth weight, and preeclampsia (Moshi *et al*., 2023). These complications can have long-lasting effects on the health of both the mother and her child. Additionally, teenagers may be more likely to engage in risky behaviours during pregnancy,

such as poor nutrition, substance use, or inadequate prenatal care, further exacerbating the potential health risks (Asare *et al*., 2019).

Teenage pregnancy also has significant educational and economic consequences. Teenage mothers often face difficulties in continuing their education, as they may need to balance the demands of school with those of motherhood. This can result in lower educational attainment, reduced future earning potential, and an increased likelihood of experiencing poverty (Diabelkova *et al*., 2023). The economic consequences not only affect the teenage mother but also have a lasting impact on the well-being of her child.

Another implication of teenage pregnancy is the potential for social stigma and isolation. Teenage mothers may face negative societal attitudes, judgment, or discrimination, which can lead to feelings of shame, low self-esteem, and depression (Amoadu *et al*., 2022). This social isolation can make it more challenging for young mothers to access social support networks and healthcare services, further complicating their situation.

Lastly, the consequences that come with teenage pregnancies are intergenerational. The most important concern here is the children born to teenage mothers who are more likely to experience adverse health, educational, and social outcomes throughout their lives (Moshi *et al*., 2023). These children may have a higher risk of developmental delays, poor academic performance, and behavioural issues. Also, children of teenage mothers are at an increased risk of becoming teenage parents themselves, perpetuating a cycle of disadvantage (Moshi *et al*., 2023).

In summary, teenage pregnancy has significant implications for the health, education, and social well-being of both the young mother and her child. These challenges highlight the importance of addressing the factors that contribute to teenage pregnancy and ensuring that pregnant teenagers have access to comprehensive antenatal care and support services.

2.2.4 Overview of the healthcare system in Ghana

The Ghana healthcare system involves a mixture of public and private healthcare providers with the Ministry of Health being responsible for the overall policy and planning of the healthcare system in Ghana (Amoah *et al*., 2021). The government of Ghana is committed to providing wider public healthcare coverage, and as such, there are several initiatives aimed at increasing access to healthcare services for all citizens, especially the poor and vulnerable. To ensure access to primary healthcare services, a network of community-based health planning and services (CHPS) compounds, health centres, and clinics are spread across all areas of the country (Kumbeni *et al*., 2023). These facilities provide basic health services such as immunisation, family planning, antenatal and postnatal care, and treatment of common illnesses with no charges to pregnant women, children under five years, and the elderly.

Also, the government of Ghana through the Ghana Health Service (GHS) has provided secondary healthcare services through regional and district hospitals, which offer more specialised services such as surgery, obstetrics and gynaecology, and laboratory services (Kumbeni *et al*., 2023). Teaching hospitals located in major cities provide specialized and advanced tertiary healthcare services as part of the wider public healthcare system initiative (Asumah *et al*., 2023). In In addition to the public healthcare system, there are also private healthcare providers, including private hospitals, clinics, and pharmacies. (Singh *et al*., 2023). The private sector plays a significant role in the healthcare system, especially in urban areas

In 2007, the government of Ghana under President Agyekum Kuffour established the National Health Insurance Scheme (NHIS) (Opoku *et al*., 2021). The National Health Insurance Scheme (NHIS) is a government-run program providing financial protection against healthcare costs to Ghanaians (Opoku *et al*., 2021). The National Health Insurance Scheme in Ghana offers coverage for both public and private healthcare services, and it is available to all citizens. The National Health Insurance Scheme (NHIS) is financed by contributions from individuals,

employers, and the government. The NHIS has played a significant role in increasing the utilization of antenatal care services by pregnant teenagers. With the NHIS card, pregnant teenagers can access high-quality antenatal care services at little or no cost.

Despite efforts to improve healthcare in Ghana, challenges persist, including inadequate funding, healthcare worker shortages, infrastructure gaps, and limited rural access to care (Amoah *et al*., 2021). For instance, in most hospitals in Ghana, there is a lack of tools and equipment to efficiently and effectively manage maternal situations. Some areas do not even have access to maternal healthcare and this makes pregnant women resort to traditional maternal care which comes with various complications.

2.2.5 Global Trends in antenatal care utilisation

Antenatal care (ANC) is a critical component of maternal and child health. It provides women with preventive and curative services during pregnancy, ensuring the best possible health outcomes for both mother and baby. The use of antenatal care services has been increasing gradually globally over the past few decades, but there are still significant disparities in access and quality of care among different populations (Duodo *et al*., 2022). According to the World Health Organization (WHO), pregnant women should have at least eight antenatal care (ANC) visits, with the first one to be scheduled during the first trimester (World Health Organisation, 2018). Global estimates suggest that only 64% of pregnant women attend at least four antenatal care (ANC) visits, with only 48% receiving their first ANC visit during the first trimester (Ahmed, 2021).

In low- and middle-income countries, ANC use by teens varies widely with some countries reporting as low as 20% attendance (Rwabilimbo *et al*., 2020). However, overall, the utilisation of ANC services has been increasing in LMICs, with a significant increase in the percentage of women attending at least one ANC visit in the past few decades (Rwabilimbo *et al*., 2020).

In high-income countries (HICs), the utilisation of ANC services is generally higher, with most women attending at least four ANC visits (WHO, 2018). However, there are still disparities in access and quality of care among different populations, with marginalised groups often experiencing barriers to accessing ANC services.

Although the global trend in ANC utilization is positive, it is important to acknowledge that there is still a considerable way to go in ensuring that every pregnant woman has access to high-quality ANC services. This is crucial for reducing maternal and neonatal mortality and morbidity, and achieving the maternal and child health-related Sustainable Development Goals.

2.2.6 Antenatal Care Utilisation among Teenagers in Ghana

Teenage pregnancy is a significant issue in Ghana. An estimated 14% of adolescent girls aged 15-19 years have started childbearing, and only around 40% of them receive antenatal care (WHO, 2018). The utilisation of antenatal care services among pregnant teenagers in Ghana is lower than among adult women, with various barriers contributing to this situation (Duodo *et al*., 2022). There are several barriers that prevent pregnant teenagers from attending the recommended number of ANC visits during their pregnancy. These barriers include a lack of knowledge about the importance of ANC, cultural beliefs and norms, stigma, inadequate access to health facilities, and financial constraints. According to a study conducted by Opoku et al. (2021) in 2017, only 47% of pregnant teenagers attended at least four ANC visits during their pregnancy, which is lower than the number recommended by the World Health Organisation (WHO). The study also found that the majority of pregnant teenagers who did attend ANC had their first visit late, with only 25% receiving their first visit in the first trimester. In addition, teenage mothers in Ghana are more likely to experience complications during pregnancy and

childbirth than adult mothers. The risk of maternal mortality is higher among teenage mothers, emphasizing the need to improve access to and quality of antenatal care.

Based on the Demographic and Health Survey, a child's survival after birth is partially dependent on the mother's young age (Ghana Statistical Service (GSS), Ghana Health Service & ICF International, 2015). Thus, there is a greater chance of children dying in infancy when they are born to mothers who are below 18 years. Antenatal care is crucial for teenagers who are pregnant, and it is a matter of concern for all stakeholders. According to the 2014 Ghana Demographic and Health Survey (GDHS), 97.8% of mothers below the age of 20 received antenatal care from skilled personnel. The study also revealed that in 2014, 87% of young pregnant women in Ghana had four or more antenatal care visits. This indicates an increase in awareness among teenagers in Ghana regarding the importance of antenatal care. The percentage of pregnant women in Ghana who made use of antenatal services has increased from 78% in 2008. In addition, 64% of young women (6 out of 10) made their first antenatal visit before the fourth month of pregnancy, which is an improvement from 55% in 2008. (Source: Ghana Statistical Service (GSS), Ghana Health Service & ICF International, 2015). This shows the gradual improvement of antenatal usage in Ghana, indicating positive results from all efforts and initiatives to improve antenatal care usage in Ghana.

2.2.7 Interventions and Strategies to Improve Antenatal Services Utilisation among Teenagers in Ghana

1. Government policies and programs

The government of Ghana has implemented policies to improve antenatal care utilization among teenagers. Some of the interventions that have been implemented to improve maternal and adolescent health in Ghana include a free maternal healthcare policy, adolescent-friendly health services, the National Health Insurance Scheme (NHIS), education programs, and Community Based Health Planning Service (CHPS) (Anaba et al., 2022). These interventions

have contributed significantly to increasing access to quality ANC services among teenagers in Ghana. According to Blanchet et al. (2012), the use of outpatient visits increased sharply in 2005 when the NHIS operations began. It has been reported that the use of ANC services by pregnant women increased after the introduction of the NHIS (Blanchet et al., 2012). However, there are still socio-economic factors that prevent pregnant teenagers from accessing these services, which need to be addressed.

2. Community-based interventions

Community-based interventions in Ghana can help to improve antenatal service utilisation among teenagers. For instance, education campaigns at the community level can be conducted through schools, churches, community centres, and mosques to educate teenagers on the importance of antenatal care (Habib *et al*., 2020). Relevant topics that can be included in the campaign can be the benefits of antenatal care, pregnancy complications, family planning, and child health. Another major intervention to improve the use of ANC services by teenagers is through mobile health clinics (Habib *et al*., 2020). Here, mobile health clinics can be set up in rural areas to bring antenatal care services closer to teenage mothers. These clinics provide various services including prenatal care, HIV testing, and family planning. This can be achieved through the services of community health workers who provide home-based antenatal care services, including check-ups, health education, and support for teenage mothers (Ayelepuni *et al*., 2022). They can also refer pregnant teenagers to health facilities for specialised care when necessary.

3. Role of non-governmental organisations

Non-governmental organisations play a critical role in improving antenatal service utilisation among teenagers (Misago *et al*., 2023). These organisations develop policies that specifically target teenage pregnancy and antenatal care. Other relevant initiatives that are put up by the non-governmental organisation to improve the use of ANC services by teenagers include

investment in health infrastructure, training and recruitment of health workers, financial support to the health system and research and evaluation (Anaba *et al*., 2023). Organisations such as FHI360 support maternal health utilisation by engaging with government, communities and health service providers to design and implement integrated approaches to the most pressing challenges facing maternal health care (FHI360, 2023). JICA also supported maternal and child healthcare through food and security in Africa (Carimo, 2021). These policies can address issues such as education, health services, and support for teenage mothers. Non-governmental organisations can also ensure that these policies and interventions are effectively implemented and monitored.

4. Public-Private partnerships

Public-private partnerships (PPPs) can play a significant role in improving antenatal service utilisation among teenagers. Teenagers can make better use of ANC services through PPPs that combine public and private sector resources and expertise (Habib *et al*., 2020). This means that PPPs can help ensure that teenagers have access to high-quality services that are both affordable and accessible. Effective initiatives that can be adopted through PPPs to improve the use of ANC services among teenagers include access to healthcare, education and awareness, improved quality of care, technology and innovation and affordable care.

5. Use of technology and media

Technology and media can play an important role in improving antenatal service utilisation among teenagers. In recent times, there has been high use of Telemedicine to promote effective healthcare delivery in most countries (Misago *et al*., 2023). Telemedicine allows healthcare providers to remotely diagnose, treat, and monitor patients. Thus, the use of technological applications like telemedicine can be particularly useful for teenagers who live in remote or underserved areas. Other means technology and media can be used to improve the utilisation

of ANC by teenagers include mobile health, education through social media, text messaging and video-based education (Anaba *et al*., 2022).

Efforts to improve antenatal care utilisation among teenagers in Ghana include increasing awareness of the importance of ANC through education campaigns, providing adolescent-friendly health services, and reducing financial barriers to accessing health care (Owusu, 2021). The Ghanaian government has implemented several policies, such as the Free Senior High School (SHS) policy and the National Health Insurance Scheme, aimed at improving access to education and healthcare for teenagers (Owusu, 2021). However, there is still a need for further action to ensure that all pregnant teenagers in Ghana have access to high-quality antenatal care services.

2.5 Theoretical Review

This section of chapter two presents a review of theories related to the current study. The section has to provide contributing ideas from the study topic for further analysis and hypothesis development.

2.5.1 Health Belief Model

The Health Belief Model (HBM) is a theoretical framework used to predict health-related behaviors by assessing individuals' beliefs and attitudes regarding their health and illnesses (Sheng *et al*., 2023). The theory suggests that people will take actions to improve their health if they feel that they are at risk of a specific health issue, believe that the issue is serious, and believe that a particular action will reduce the risk of the problem. The Health Belief Model (HBM) proposes that individuals are more likely to take steps to enhance their well-being if they perceive themselves to be at risk for a particular health condition, view the condition as potentially serious, and believe that taking a specific action will reduce the likelihood of contracting it. The HBM is made up of several components (Sheng *et al*., 2023). Perceived

susceptibility refers to an individual's belief that they are at risk of a particular health problem (Ma *et al*., 2023). Perceived severity refers to the individual's belief about the seriousness of the problem (Ma *et al*., 2023). Perceived benefits refer to the belief that taking a particular action will reduce the risk of the problem (Sheng *et al*., 2023) Perceived barriers refer to the perceived costs or negative consequences associated with taking a particular action (Limbu *et al*., 2023). Cues to action are external factors that motivate individuals to take action (Zhang et al., 2022), while self-efficacy refers to an individual's belief in their ability to successfully perform the desired behavior (Limbu et al., 2023).

The Health Belief Model (HBM) has been used to investigate the factors that affect the utilization of antenatal care, especially among vulnerable groups like teenage mothers in Sheng. Studies have demonstrated that the perceived susceptibility and perceived severity are crucial determinants of the utilization of antenatal care among pregnant teenagers (Tungaraza *et al*., 2022). Pregnant teenagers who perceive themselves to be at a higher risk of pregnancy-related complications and view those complications as severe are more likely to seek antenatal care.

Perceived benefits and perceived barriers are also relevant to understanding antenatal care utilisation (Tungaraza *et al*., 2022). Teenage mothers who perceive the benefits of antenatal care, such as improved health outcomes for themselves and their babies, are more likely to utilise these services. However, perceived barriers, such as transportation issues or lack of social support, can hinder access to antenatal care and reduce utilisation rates.

Cues to action, such as advice from a healthcare provider or social support from family and friends, can motivate pregnant teenagers to seek antenatal care. Finally, self-efficacy plays a role in antenatal care utilisation, with pregnant teenagers who have greater confidence in their

ability to navigate the healthcare system and manage their health needs more likely to seek antenatal care (Nigusie *et al*., 2022).

The HBM provides a useful framework for understanding the factors that influence antenatal care utilisation among pregnant teenagers (Nigusie *et al*., 2022). Its focus on individual beliefs and attitudes towards health-related behaviours can inform the development of interventions and policies aimed at improving antenatal care utilisation.

However, the HBM has been criticized for its narrow focus on individual-level factors and its failure to account for broader social and structural factors that can impact health-related behaviours (Sheng et al., 2023). For instance, factors such as poverty, lack of social support, and inadequate healthcare infrastructure may hinder antenatal care utilisation among pregnant teenagers, regardless of their individual beliefs or attitudes. Therefore, it is essential to consider both individual and contextual factors when applying the HBM to understand antenatal care utilisation among pregnant teenagers in Ghana.

2.5.2 Andersen's Behavioral Model of Health Services Use

Andersen's Behavioral Model of Health Services Use was proposed in 1968 as a theoretical framework to explain the factors that influence an individual's utilization of health services (Solanke et al., 2023). Andersen's Behavioral Model of Health Services Use is a theoretical framework that seeks to explain the factors that influence an individual's utilisation of health services. Andersen's Behavioral Model of Health Services Use is a theoretical framework that seeks to explain the factors that influence an individual's utilisation of health services.. The model posits that health service use is influenced by three sets of factors: predisposing, enabling, and need.

Predisposing factors refer to an individual's attributes and beliefs, including age, gender, education level, and health beliefs (Solanke et al., 2023). Enabling factors are the resources that allow individuals to access healthcare services, including transportation, income, and health insurance (Travers et al., 2020). Need factors refer to an individual's perceived or actual need for health services, based on their health status and healthcare needs (Travers *et al*., 2020)?

Andersen's Behavioral Model has been applied to understand the factors that influence antenatal care utilisation among pregnant teenagers in Ghana. For example, predisposing factors such as age and education level are significant predictors of antenatal care utilisation among teenage mothers. Pregnant teenagers who are younger or have lower levels of education may be less likely to seek antenatal care (Tolera *et al*., 2020). Enabling factors such as income and transportation have also been found to influence antenatal care utilisation among pregnant teenagers (Thakkar *et al*., 2023). Limited financial resources or lack of access to reliable transportation may hinder pregnant teenagers' ability to access antenatal care services.

Need factors, such as perceived health status and healthcare needs, are also relevant to understanding antenatal care utilisation (Gayatri *et al*., 2023). Pregnant teenagers who perceive themselves to be in good health and have lower healthcare needs may be less likely to seek antenatal care, while those with high healthcare needs may be more likely to seek care.

Andersen's Behavioral Model provides a useful framework for understanding the factors that influence antenatal care utilisation among pregnant teenagers. Its focus on predisposing, enabling, and need factors can help identify potential barriers and facilitators to care (Gayatri *et al*., 2023). However, the model has been criticized for emphasizing individual-level factors and failing to account for broader social and structural factors that can impact health service utilization (Tolera et al., 2020). For instance, cultural beliefs, social norms, and healthcare system factors may play an important role in shaping antenatal care utilisation among pregnant

teenagers. It is crucial to consider individual and contextual factors when applying Andersen's behavioural model to understand antenatal care utilization among pregnant teenagers in Ghana.

2.9 Theoretical and Empirical Implications of the Study

The review of theories and studies that relate to the current study topic helps to critically analyse the research problem with supporting ideas while identifying gaps for further analysis. Given this, the current study reviews the Health Belief Model and Andersen's Behavioral Model. The HBM provides a useful framework for understanding the factors that influence antenatal care utilisation among pregnant teenagers. Thus, the HBM helps to understand the factors that influence antenatal care utilisation, particularly among vulnerable populations such as teenagers. For example, research has shown that perceived susceptibility and perceived severity are significant predictors of antenatal care utilisation among pregnant teenagers. However, it is essential to consider both individual and contextual factors when applying the HBM to better understand antenatal care utilisation among pregnant teenagers in Ghana. Andersen's Behavioral Model on the other hand provides a useful framework for understanding the factors that influence antenatal care utilisation among pregnant teenagers. Its focus is on predisposing, enabling, and needing factors that can help identify potential barriers and facilitators to care.

The review of existing literature allows for assessing the current study's objectives using various methodological approaches in other jurisdictions. This helps to identify gaps in existing studies as related to the specific objectives of the current study. The empirical review is also useful for the development of questionnaires as well as new hypotheses for further analysis. Further, results from existing studies are relevant for a better discussion of the current study results.

2.6. Empirical Review

The second chapter of the study provides an empirical review of relevant literature pertaining to the research objectives.

2.6.1 The proportion of teenagers who utilise antenatal services

In recent times, attention has been drawn to the relevance of introducing pregnant women to antenatal healthcare to prevent pregnancy and delivery-related issues that affect the mother and the baby (Amoadu et al., 2022). In recent times, there has been an improvement in the utilization of antenatal services among young and adolescent mothers. However, poor usage of antenatal services by teenagers in some areas is still prevalent. A study conducted by Duodu et al. in 2022 assessed the trends in antenatal care visits and their associated factors in Ghana. The study analyzed the datasets of 7,795 teenagers aged 15 to 49 years who participated in the Ghana Multiple Indicator Cluster Survey (GMICS) from 2006 to 2018.The study found a consistent increase in the proportion of antenatal attendance among women with an increase from 49.3% in 2006 to 49.98% in 2011 to 58.61% in 2017 and 2018. According to a study, teenagers tend to use antenatal services less than adults who have higher education, health insurance coverage, and increasing household wealth. The study also revealed that in two rural districts of the Upper West Region in Ghana, 71.3% of expectant mothers enrolled late or in the eighth week for ANC visits. According to a study by Owolabi et al. (2017), which analyzed the utilization of antenatal care in thirteen West African countries, only 35% of adolescents started receiving ANC during the first trimester. However, 62% of adolescents attended more than four ANC visits. Another study conducted by Anaba et al. (2022) examined the use of antenatal care among adolescent and young mothers in Ghana between 2017 and 2018. The study relied on secondary data gathered from the Ghana Multiple Indicator Cluster Survey. The study found that the use of antenatal services by teenagers is 80% higher for 4 or more

ANC visits. This was highly associated with teenagers with junior high school education, exposed to the internet or in the second wealth quintile. Results obtained from the studies conducted in Ghana were also seen in other areas around the world where location, culture, lifestyle, economic structure and political systems differ from that of Ghana. In Uganda for instance, (Kayemba *et al*., 2022) assessed the timing and quality of antenatal care among adolescent mothers. The study found that a total of 82% of the adolescents from the study attended ANC for their recent pregnancy. Results from the study also revealed that a significantly higher proportion of teenage pregnant mothers 83.9 per cent registered their pregnancy to ANC on time as compared to adult pregnant women of 78.6% (Fulpagare *et al*., 2019).

Moreover, (Fulpagare *et al*., 2019) examined antenatal care service utilisation among adolescent women in India. Results from the study revealed that a significantly higher proportion of teenage pregnant mothers 83.9 per cent registered their pregnancy to ANC as compared to adult pregnant women 78.6% while 63% of pregnant adolescents registered their pregnancy in the first trimester and 55.4% of adolescent pregnant women received counselling from a health worker indicating the awareness of early ANC visits initiation. The similarity in findings from studies across different areas around the world indicates a higher level of usage of ANC service in most areas around the world. This may be a result of the positive outcome of various global initiatives such as public education, stakeholder involvement and policy development put up to encourage the use of ANC services by teenagers. Again, research conducted by Ziblim et al. (2018) in Ghana on antenatal care utilisation among adolescent mothers revealed that 98.3% of pregnant teenagers had initiated ANC attendance.

Overall, most areas around the world have seen improvement in the use of antenatal care services among teenage mothers. Various policymakers must consider putting in more results for an increasing positive outcome.

2.6.2 The sociodemographic factors related to the current pregnancy of adolescents

Teenage pregnancy is a public concern in most countries around the world as the effort put up to mitigate the problem of teenage pregnancy has not fully met its purpose. The problem of teenage pregnancy comes up as a result of various socio-cultural practices that affect adolescents in various ways. This is proven by various existing studies conducted about the factors that contribute to teenage pregnancy.

For instance, a study conducted by Asare *et al*., (2019) examined the factors associated with adolescent pregnancy in the Sunyani municipality of Ghana. Results from the study revealed that place of residence, occupation and economic status were associated with adolescent pregnancy. Likewise, Chung *et al.* (2018) conducted a study on a comprehensive understanding of risk and protective factors related to adolescent pregnancy in low and middle-income countries. The information was gathered through a systematic review method and analyzed. The findings suggest that behaviors such as smoking and drinking alcohol could be linked to adolescent pregnancy. Additionally, a study by Barbi et al. (2020) in Ghana examined the socio-cultural factors influencing women's decision-making about seeking care during pregnancy and delivery. A qualitative research approach via interviews and focus group discussions with pregnant women and analysed using the thematic approach. The study found that coverage of health insurance is a socio-cultural factor related to the pregnancy of adolescents.

Another study conducted by Diabelkova *et al*., (2023) assessed the outcomes of adolescent pregnancy and their risk factors in Košice. Results from the study indicated that teenagers who were unmarried and had basic or no education were more likely to become pregnant. Thus, educating adolescents was a strategic means of reducing teenage pregnancy. Again, the study found that high-risk activities such as the use of tobacco products, smoking, drug use, drinking alcohol and risky sexual behaviour are factors related to adolescent pregnancy outcomes. This

is different in other areas and other socio-economic factors have been identified to influence pregnancy rate among adolescents.

In Tanzania, (Moshi *et al*., 2023) examined the associated factors of teenage pregnancy among teenagers. According to a study, urban residence, low education status, poor knowledge of sexual and reproductive health, low family economic status, peer groups, sexual abuse, and early marriage are among the factors responsible for teenage pregnancy. Additionally, Amoadu et al. (2022) evaluated the sociocultural factors that affect adolescent pregnancy in Ghana. The study found that socio-cultural factors such as lack of communication, poverty, lack of sex education, early marriage, misconception, coerced sex, non-usage of contraceptives and decline in cultural values such as puberty rites. In Nepal, Thappa et al. (2021) study on teenage pregnancy and the socio-demographic attributes as a major contributor revealed that 85.1% of teenage mothers were less than 20 years of age indicating age as a significant socio-demographic factor to current pregnancy. Also, in Guyana, Cummings (2021) conducted a study on sociodemographic factors, socioeconomic factors and teenage pregnancy outcomes and found that the educational attainment of mothers is a socio-demographic factor in current teenage pregnancies.

Again, MezMur et al. (2021) study on teenage pregnancy and its associated factors in Ethiopia found that teenagers between the ages of 16 to 17 years and lack of education are the socio-demographic factors to the current pregnancy of adolescents. Furthermore, Alukagberie et al. (2023) study on factors associated with adolescent pregnancy in Nigeria indicated that family is a socio-demographic factor in the current pregnancy of adolescents in that some parents prioritise economic benefits at the expense of providing guidance and communication about sexual health issues for their teenagers. In the same way, Amoadu et al. (2022) conducted a study on the socio-cultural factors influencing adolescent pregnancy in Ghana and revealed that economic status is a socio-demographic factor related to the current pregnancy of

adolescents. Finally, a study conducted by Senkyire et al. (2022) on socio-economic factors associated with adolescent pregnancy in Ghana found that marital status was significantly associated with current adolescent pregnancies.

In conclusion, it can be concluded that teenage pregnancy is influenced by various socio-cultural practices such as place of residence, occupation, economic status, marital status, educational attainment, and awareness about sexual and reproductive health. Other contributing factors include urbanization, poverty, peer influence, sexual abuse, early marriage, lack of communication, misconceptions about sexual health, coerced sex, and non-usage of contraceptives. Furthermore, the impact of these factors on teenage pregnancy may vary depending on the location and cultural context.

2.6.3 The factors that influence the utilisation of antenatal services by pregnant teenagers.

Socioeconomic factors play a significant role in the use of antenatal care services among teenagers in Ghana. Some of the key socioeconomic factors that influence ANC utilisation among teenagers in Ghana include income, occupation, cost and the attitude of teenagers (Worku *et al*., 2016; Rwabilimbo *et al*., 2020; Owusu, 2021). In low-income countries, the level of income and occupation of the families of teenagers also plays a crucial role in the utilisation of ANC services among teenage mothers in Ghana (Rwabilimbo *et al*., 2020). Thus, teenagers from low-income households are less likely to attend ANC visits because of financial constraints. Also, the cost involved in seeking ANC care services plays a relevant

The marital status of the teenager serves as a significant factor that influences the utilisation of ANC services among teenage mothers in Ghana. Married teenagers are more likely to attend ANC visits than unmarried teenagers because they have the support of their partners, families, religious leaders and the general society (Nxiweni *et al*., 2022). The location of teenage mothers also influences the utilisation of ANC services in Ghana. Teenagers living in rural

areas are less likely to attend ANC visits due to inadequate healthcare facilities, long distances to healthcare centres, and transportation challenges (Micheal *et al*., 2023). Education is a significant factor that influences the utilisation of ANC services among teenage mothers in Ghana. Studies have shown that teenage mothers with lower levels of education are less likely to attend ANC visits (Worku *et al*., 2016; Owusu, 2021). This is because education is associated with increased knowledge about the importance of ANC and better access to health care services.

Accessing quality antenatal care before, during and after childbirth remains one of the effective means of reducing maternal and neonatal mortality. For this reason, various studies have examined the factors that influence the use of antenatal care among teenagers. A case in point is the study conducted by (Nxiweni *et al*., 2020) which examined the factors that influence the use of antenatal services among their childbearing age in South Africa. The study was conducted using secondary data from the South African Demographic Health Survey (DHS) from the period 1998 to 2016. The study found that factors that influence adolescents' use of antenatal care services include media exposure, high level of education, marriage or cohabiting, residents in urban areas, employment and higher wealth index. Also, (Alibhai *et al*., 2022) conducted a study on the factors that impact antenatal care utilisation. The study was conducted based on a systematic review of literature from various authors whose work was related to the study topic. Results from the study revealed that factors that influence adolescent use of antenatal care services include socioeconomic status education and quality of antenatal service. Moreover, (Worku *et al*., 2016) assess the factors that influence teenage antenatal care utilisation in South Africa. The study was conducted using a cross-sectional health facility-based study. The data for the study was gathered using a structured questionnaire. Results from the study indicated that factors that influence the use of antenatal care services by teenagers include distance to the nearest facility and service satisfaction.

Also, a Ziblim *et al.* (2018) study in Ghana revealed that respondents who were 18 years or older were more likely to utilise antenatal services compared to adolescent mothers who were below 18 years of age. Again, Lange et al. (2023) conducted a study on antenatal care and health behaviour of pregnant women in Pomerania and revealed that health-damaging behaviours such as drinking or smoking were found to be associated with the utilisation of antenatal service. Finally, Annaba et al. (2022) examined the use of antenatal care among adolescents and young mothers in Ghana from 2017 to 2018. The study was conducted by gathering secondary data from the Ghana Multiple Indicator Cluster Survey. The findings showed that fear of stigma and socio-cultural norms are factors that influence the use of antenatal care services by teenagers.

2.10 Limitations and Gaps in the Literature

A review of the literature on the utilisation of antenatal services by teenagers has provided valuable insights, however, there are still limitations and gaps for further research analysis. Many studies on antenatal services and teenagers suffer from sample bias. Often, the samples used in these studies (Kayemba *et al*., 2022; Fulpagare *et al*., 2019: Asare *et al*., 2019; Diabelkova *et al*., 2023) are drawn from specific populations, such as urban areas or specific socioeconomic backgrounds, which may not be representative of the overall teenage population. This limits the generalisability of the findings and may not capture the experiences of teenagers from diverse backgrounds.

Also, some studies rely on retrospective data (Fulpagare *et al*., 2019; Amadou *et al*., 2022; Nxiweni *et al*., 2020; Alibhai et al., 2022). This approach can introduce recall bias, as participants may not accurately remember or report their antenatal care experiences. Additionally, medical records may lack comprehensive information or have inconsistencies, leading to incomplete or inaccurate data. Again, many studies (Duodu *et al*., 2022; Anaba *et*

al., 2022; Moshi *et al*., 2023; Nxiweni *et al*., 2020; Worku *et al*., 2016) focus on cross-sectional data, providing a snapshot of antenatal service utilisation at a specific point in time. Longitudinal studies that follow teenage mothers throughout their pregnancy and beyond are relatively scarce. Such studies would provide a better understanding of the factors influencing antenatal service use and the outcomes associated with different patterns of utilisation.

In addition, some studies (Nxiweni *et al*., 2020; Alibhai *et al*., 2022) may lack appropriate comparison groups to examine the differences in antenatal service use between teenage mothers and older women. Comparing teenage mothers to adult counterparts could help identify unique challenges faced by teenagers and inform targeted interventions. Moreover, the majority of studies (Kayemba *et al*., 2022; Fulpagare *et al*., 2019: Asare *et al*., 2019; Diabelkova *et al*., 2023) on antenatal service use by teenagers have focused on specific regions or countries, limiting the generalisability of findings to different cultural, social, and healthcare system contexts. More research is needed to understand the variations in antenatal care utilisation among teenagers across different settings and cultural backgrounds.

Addressing these limitations and filling the existing gaps in the literature would provide a more comprehensive understanding of the factors influencing antenatal service use by teenagers and inform the development of effective interventions and policies to improve their reproductive health outcomes.

2.7 Conclusion

The literature review provides valuable insights into the utilisation of antenatal care services among teenagers in Ghana. The findings highlight the importance of addressing the factors that contribute to low utilisation and the need for effective interventions to improve access to and uptake of antenatal care services.

Regarding the proportion of antenatal care utilisation by teenagers, studies indicate a gradual increase in usage globally, including in Ghana. Several studies (Duodu *et al*., 2022; Anaba *et al*., 2022; Kayemba *et al*., 2022; Fulpagare *et al*., 2019) have reported an increased percentage of antenatal care utilisation by teenagers.

Factors contributing to teenage pregnancy in Ghana are multifaceted and include socioeconomic factors, lack of sexual and reproductive health knowledge, peer influence, early marriage, poverty, and cultural values (Asare *et al*., 2019; Diabelkova *et al*., 2023; Moshi et al., 2023; Amoadu *et al*., 2022). Understanding these factors is essential for developing targeted interventions to address teenage pregnancy and improve antenatal care utilisation.

Factors influencing the utilisation of antenatal care services by teenagers encompass socioeconomic, cultural, accessibility, and knowledge-related factors. Effective interventions should consider these factors and may involve government policies, community-based initiatives, NGO support, public-private partnerships, and the use of technology and media.

The theoretical implications of the study are supported by the Health Belief Model (HBM) and Andersen's Behavioural Model. The HBM provides insights into the factors that influence antenatal care utilisation, particularly among vulnerable populations like teenagers. Perceived susceptibility and severity are significant predictors of antenatal care utilisation. Andersen's Behavioural Model emphasises predisposing, enabling, and needing factors, helping identify barriers and facilitators to care.

The empirical implications of the study demonstrate the need for further research in the Ghanaian context. Existing studies provide valuable insights into antenatal care utilisation among pregnant teenagers, serving as a foundation for the current study's objectives and methodology. The results from existing studies will contribute to the discussion and interpretation of the current study's findings.

To sum up, the literature review underscores the importance of addressing the low utilisation of antenatal care services among teenagers in Ghana. By understanding the contributing factors and employing effective interventions, such as improved education and awareness, enhanced access to services, and technological innovations, it is possible to increase antenatal care utilisation and improve maternal and child health outcomes among teenage mothers in Ghana.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter provides the method employed by the study to collect and analyse data for the study. The chapter consisted of the study methods and design, source of data, inclusion and exclusion criteria, study variables, sampling, pre-test, data handling, data analysis, ethical issues and limitations of the study.

3.2 Study Methods and Design

The focus of this study was on teenagers' use of antenatal care services, it was an analytical cross-sectional using secondary data from MICS 2017/2018. The study aims to explain why pregnant teenagers use or do not use antenatal care services. To achieve that, a quantitative research design was adopted. A quantitative method involves gathering and analysing numerical data, which helps to identify patterns that explain pregnant adolescents' use of antenatal care services.

3.3 Source of Data

The study collected data from the Ghana Multiple Indicator Cluster Survey (MICS) 2017/18, which was conducted by the Ghana Statistical Service in partnership with various government ministries like the Ministry of Health, Ministry of Education, Ministry of Sanitation and Water Resources, Ministry of Gender, Children and Social Protection, Ghana Health Service and the Ghana Education Service. The survey was part of the Global MICS Programme and received technical and financial support from organizations like the United Nations Children's Fund (UNICEF), KOICA, UNDP, USAID and the World Bank through the Statistics for Results

Facility – Catalytic Fund (SRF-CF). The MICS 6 survey was conducted between 2017 and 2018.

The Global MICS Programme was developed by UNICEF in the 1990s to collect internationally comparable data on a wide range of indicators related to children and women, using a multi-purpose household survey. MICS surveys measure key indicators that allow countries to generate data for use in policies, programmes, and national development plans. They also help in monitoring progress towards the Sustainable Development Goals (SDGs) and other internationally agreed-upon commitments. The programme aims to identify vulnerable groups and disparities that inform social inclusion and poverty reduction policies and interventions.

3.4 Study Population

The study population were pregnant teenage mothers who were participants in the Multiple Indicator Cluster Survey (MICS) in Ghana. To get the target population, the study included pregnant teenagers between the ages of 15 and 19 years and excluded 235 individuals who did not have one year and month of birth. Also, 11,400 women were dropped from the study because their ages were above 20. Among those aged 15-19, 2,607 more were dropped since they have never given birth. After the entire process, a total of 354 sizes of data were used for the study.

3.5 Study Variables

The variables of this study were divided into dependent and independent variables. The dependent variable for the study was the utilisation of ANC services by teenagers. The independent variables of interest to the study were: socio-demographic factors (age, level of education, marital status, financial constraints (poverty), high ANC services etc.).

Dependent variables

On the side of the dependent variables, the Utilisation of ANC services is a binary measure indicating whether a teenager availed of ANC services or not, serving as a primary reflection of the penetration and adoption of ANC services among the teenage cohort. The choice of prenatal care provider is categorised to list potential care providers, shedding light on the preferences of healthcare professionals such as Doctors, Midwives, or Community Health Nurses (CHN). The antenatal care visits, categorised to differentiate between teenagers based on their visit patterns, capture segments like those who never opted for a visit, initiated visits early, or began visits later in their pregnancy. This evaluates the timing and consistency of ANC service engagement among teenagers.

Table 3.1: Variables influencing utilisation of ANC services

Variables	Operational explanation	Scale of measurement
Independent variable		
Age	Ages between 15-19	Continuous
Level of education	Teenager's highest level of education	Categorical
Living situation of teenagers who have given birth	Living condition	Categorical
The wealth index quintile of teenagers who have ever given birth	Ever given birth and number of children	Categorical
Marital status of teenagers who have ever given birth	Marital status	Categorical
Wanted last-child	Binary (Yes/No)	Categorical
Dependent variable		
Utilisation of ANC services	Utilisation of ANC services by Teenagers	Binary (Yes/No)

choice of prenatal care provider	Doctor & Midwife, Doctor, Midwife, CHN, Midwife & CHN	Categorical
antenatal care visits	Never visit, Early visit, Late visit	Categorical

Table 3.1 delineates the variables that are considered to influence the utilisation of Antenatal Care (ANC) services among teenagers. The age variable is captured on a continuous scale that spans ages from 15 to 19, aiming to discern any age-specific tendencies or variations in ANC utilisation among teenagers. The Level of Education represented as a categorical variable, signifies the teenager's highest achieved education level. This seeks to investigate how different education levels might impact the use of ANC services, possibly indicating a correlation between education and health awareness. The variable concerning the living situation of teenagers who have ever given birth, classified categorically, outlines the living conditions of the teenager, aiming to understand whether living arrangements, such as staying with parents, guardians, or independently, influence the propensity to use ANC services.

The Wealth Index quintile of teenagers who have ever given birth delves into the socio-economic standing of teenagers who have previously given birth, exploring a potential connection between wealth status, prior childbirth experience, and ANC service uptake. Marital status, represented as a categorical variable, notes the marital condition of the teenager and aims to capture the possible influences of marital dynamics on the decision or capacity to use ANC services. The variable "Wanted last-child" differentiates between teenagers who had planned their most recent pregnancy from those who hadn't, ascertaining if the intentionality behind pregnancies impacts the approach towards and prioritisation of ANC services.

3.6 Pre-testing

Pre-testing is done to assess feasibility, test data tools, and adjust as necessary. To determine the validity, a pre-test study was conducted using a sample of 30 participants from the Ghana Multiple Indicator Cluster Survey (MICS) using the data collection sheet. This was to ensure that the data collection sheets were valid to obtain the right data for the study.

3.7 Data Analysis

The data was processed using STATA. Initially, the dataset was refined to focus on the target demographic, filtering out participants aged 20 and above, resulting in the exclusion of 11,400 women. Additionally, the study concentrated solely on teenagers who had previously given birth, leading to the removal of 2,607 women who had never given birth and 13 with specific missing data on their most recent birth. For a comprehensive assessment, several new variables were generated, including the participant's living situation and the nature of their prenatal care provider. The living situation was categorized into distinct groups such as living with parents, in-laws, or other relatives. For prenatal care, participants were classified based on whether they received care from doctors, midwives, community health nurses (CHN), or combinations thereof. Furthermore, antenatal care (ANC) visits were coded into two distinct variables, indicating the number of visits ("1-3 visits" or "4+ visits") and the timing of these visits ("Never visit", "Early visit", or "Late visit").

Descriptive statistics were generated to understand the distribution of each variable individually. Subsequent bivariate analyses, using cross-tabulations and chi-squared tests, were conducted to explore relationships between pairs of variables. This bivariate exploration aimed to decipher potential correlations, for instance, between the type of prenatal care provider and the number of ANC visits or the association of ANC visits with other factors like marital status, age, and education level.

3.8 Ethical Issues

Verbal assent was obtained from each respondent for the MICS data, and children aged 13-17 years were individually interviewed after obtaining prior adult consent from their parents or caretakers. All respondents were informed that participation was voluntary and that their information would remain confidential and anonymous. They were also informed of their right to refuse to answer any or all questions, as well as to stop participating at any time.

To maintain data security, the study ensured that the data sets were stored in secure locations with password-protected computers and that only authorised personnel could access the data. Confidentiality requires the identity of the participants and their personal information. The study ensured that the data sets did not contain any identifying information such as names, addresses, phone numbers, or social security numbers.

3.9 Limitations of the Study

The study suffered from sampling bias due to the extensive exclusions. The remaining 354 participants were not representative of the broader population of pregnant teenagers. This affected the validity and reliability of the study's conclusion. Also, excluding a significant number of participants reduced the amount of available data, potentially leading to a loss of statistical power and limiting the ability to detect meaningful associations. Furthermore, teenagers provided responses they believed were socially desirable, which affected the accuracy of the reported antenatal service utilisation and other related behaviours.

CHAPTER FOUR

RESULTS

4.1 Introduction

In this chapter, the study's findings and discussions are presented, starting with the demographic profile of the respondents. Subsequently, the results of the specific objectives of the research are discussed.

4.2 Characteristics of Respondent

This section presents a detailed demographic profile of teenage respondents. Specifically, it sheds light on their age distribution, educational attainment, living arrangements, economic status as indicated by the wealth index quintile, marital status, and their sentiments regarding their last child. By delving into these dimensions, the section offers a comprehensive understanding of the characteristics and circumstances surrounding teenagers who have previously given birth.

Table 4.2: Socio-demographic profile of teenagers who have ever given birth

Variable	Frequency	Percentage (%)
Age of woman (yrs)		
15	7	2
16	28	8
17	63	18
19	141	40
Level of education		
Pre-primary or none	29	8
Primary	100	28
JSS/JHS/Middle	202	57

SSS/SHS/Secondary	23	7
Living situation of teenagers who have given birth		
Self	16	5
Husband	114	32
Parents	116	33
Inlaws	60	17
Grandparents	30	8
Other relatives	18	5
The wealth index quintile of teenagers who have ever given birth		
Poorest	118	33
Second	84	24
Middle	82	23
Fourth	50	14
Richest	20	6
Marital status		
Currently married	155	44
Formerly married	26	7
Never married	173	49
Wanted last-child		
Yes	57	21
No	223	79
	394	100

Source: MICS, 2017/2018

Table 4.2 sheds light on the demographic and socio-economic characteristics of teenagers who have ever given birth, offering insights into their age, educational level, living situation, wealth distribution, marital status, and desire for the last child. Starting with the age distribution, the majority of teenagers who have ever given birth are concentrated in the 19 years age group,

representing 141 (40%) of the total. This suggests that a significant proportion of adolescents who become mothers are nearing the end of their teenage years. However, it's notable that even at the age of 15, 7 (2%) have already experienced childbirth, emphasising the early onset of motherhood for some.

In terms of educational attainment, a considerable 202 (57%) of the teenagers had reached the JSS/JHS/Middle school level. In contrast, only 23 (7%) had advanced to the SSS/SHS/Secondary level. When examining the living situation of these teenage mothers, the data shows a diverse living arrangement pattern. Parents emerge as the primary caregivers, with 116 (33%) of teenagers living with them, closely followed by husbands at 114 (32%). Regarding economic status, as reflected by the wealth index quintile, the majority, 118 (33%), are situated in the 'poorest' category. However, it's noteworthy that there are teenagers spanning all economic backgrounds who have given birth, though the representation significantly dwindles in the 'richest' category at 20 (6%).

The marital status offers another dimension to the context. A sizable 173 (49%) of teenage mothers have never been married. This predominance of unmarried teenage mothers indicates that a significant portion of teenage pregnancies occur outside the institution of marriage. Lastly, regarding the desire for the last child, an overwhelming majority, 223 (79%), did not want their last child when they did. This figure hints at a considerable gap in family planning and reproductive health education among teenagers.

4.3 Displays the proportion of teenagers who utilise antenatal services and the number of visits in Ghana

This section delves into the patterns of antenatal service utilisation among teenagers in Ghana. By analysing the timing of antenatal care visits and the types of healthcare providers accessed, this section offers insights into the extent to which teenagers engage with these vital health

services during pregnancy. The table, denoted as Table 4.3 presents the frequency and corresponding percentage of teenagers based on when they initiated their antenatal visits, the professionals who provided them with care, and the adequacy of their antenatal visits, gauged by the number of visits they made. This exploration aims to determine the proportion of teenagers in Ghana who harness antenatal services and the intensity of their engagement, thereby providing a nuanced understanding of their healthcare-seeking behaviours during pregnancy.

Table 4.3: The proportion of teenagers that utilise antenatal services

Antenatal story	**Frequency**	**%**
Time ANC visits started by teenagers who have given birth		
Never visit	79	22
Early visit	146	41
Late visit	129	36
Type of prenatal care providers rendering services		
Doctor & Midwife	37	13
Doctor	9	3
Midwife	215	78
CHN	9	3
Midwife & CHN	6	2
Adequate ANC services visit		
1 - 3 visits	59	22
4+ visits	215	78

Source: Field Data, 2023

Table 4.3 provides a detailed overview of the antenatal care (ANC) services utilisation patterns among teenagers who have ever given birth. Several teenagers begin their antenatal check-ups early in their pregnancies. Specifically, 146 (41%) of teenagers started their ANC visits early

that is within 1 to 3 months. However, there are notable disparities in ANC utilisation. Alarmingly, 79 (22%) of the teenagers never visited an ANC clinic during their pregnancy. On the other hand, 129 (36%) of the teenagers started their ANC visits late. This delayed engagement with healthcare services can be concerning, as early and consistent prenatal care is paramount for identifying and managing potential pregnancy and childbirth complications.

When we consider the types of prenatal care providers rendering services to these teenagers, the role of midwives stands out prominent. A majority, 215 (78%), received their prenatal care from a midwife, emphasising the central role that midwives play in maternal healthcare, especially for teenagers. Doctors and community health nurses (CHN) have lesser involvement, with only 9 (3%) being attended to by a doctor and another 9 (3%) by a CHN. Combined services, where both doctors and midwives or midwives and CHNs collaborate, represent a small fraction of the care providers, at 13% and 2% respectively. This might hint at the accessibility and trust placed in midwives as primary prenatal care providers in the region.

Lastly, regarding the adequacy of ANC service visits, the majority, and 215 (78%), had four or more visits. This is an encouraging statistic as it signifies adherence to recommended ANC visits, ensuring thorough monitoring throughout the pregnancy. However, there is still a segment, 59 (22%), who had limited interactions, with only 1 to 3 visits. This lower frequency might not be optimal for comprehensive prenatal care and monitoring.

4.4 Factors that influence the utilisation of antenatal services by pregnant teenagers in Ghana

This section delves into the factors that influence the utilisation of antenatal services by pregnant teenagers in Ghana.

Table 4.4: The chi-squared table on the factors that influence Antenatal Care (ANC) services attendance among teenagers.

Variable	1 - 3 visits n (%)	4+ visits	p-value
Age of woman			0.029
15	3(50)	3(50)	
16	11(42)	15(58)	
17	11(18)	47(81)	
18	15(18)	68(820	
19	19(19)	82(81)	
level of education who have ever given birth			0.19
Pre-primary or none	4(16)	21(84)	
Primary	23(30)	54(70)	
JSS/JHS/Middle	29(19)	122(81)	
SSS/SHS/Secondary	3(14)	18(86)	
Living situation of teenagers who have given birth			0.212
Self	1(10)	9(90)	
Husband	15(18)	70(82)	
Parents	16(18)	75(82)	
Inlaws	15(31)	34(69)	
Grandparents	6(27)	16(73)	
Other relatives	6(35)	11(65)	
The wealth index quintile of teenagers who have ever given birth			0.017
Poorest	30(32)	64(68	
Second	10(14)	59(86)	
Middle	14(23)	47(77)	
Fourth	4(11)	33(89)	

Richest	1(8)	12(92)	
Marital status of teenagers who have ever given birth			0.733
Currently married	26(21)	96(79)	
Formerly married	3(15)	17(85)	
Never married	59(21)	215(78)	
Wanted last-child			0.921
Yes	12(20)	45(21)	
No	47(80)	170(79)	

Source: **Field Data, 2023**

According to Table 4.8, the factors influencing Antenatal Care (ANC) service attendance among teenagers are examined across different variables. Considering the age of the woman, the distribution among teenagers aged 15 indicates that 3 (50%) attended 1-3 visits and an equal number of 3 (50%) attended 4 or more visits. For those aged 16, 11 (42%) attended 1-3 visits, while 15 (58%) opted for 4 or more visits. A shift is observed in teenagers aged 17, where 11 (18%) attended 1-3 visits and a much larger 47 (81%) attended 4 or more visits. This trend of higher attendance for 4+ visits remains consistent for teenagers aged 18 and 19. The p-value of 0.029 indicates a significant association between the age of the teenager and ANC service attendance, as it falls below the 0.05 significance level.

When examining the level of education among teenagers who have ever given birth, those with pre-primary or no education, 4 (16%) attended 1-3 visits compared to 21 (84%) who attended 4+ visits. Among those with primary education, 23 (30%) attended 1-3 visits, whereas 54 (70%) attended 4 or more visits. The trend of higher attendance for 4+ visits also persists across other education levels, with the JSS/JHS/Middle and SSS/SHS/Secondary education groups also showing higher frequencies for 4+ visits. However, the p-value of 0.19 suggests there is no

significant association between the education level and ANC service attendance, as it exceeds the 0.05 significance level.

Considering the living situation of teenagers, whether living by themselves, with their husbands, parents, in-laws, grandparents, or other relatives, the trend remains consistent with a higher number of teenagers opting for 4+ visits in every category. The p-value of 0.212, however, indicates that the living situation does not significantly affect the number of ANC visits.

When analysing the wealth index quintile of teenagers who have ever given birth, all categories show a larger frequency of teenagers attending 4+ visits, with the richest quintile showing the most pronounced difference. The p-value of 0.017 indicates a significant relationship between the wealth index quintile and ANC attendance, falling below the 0.05 significance level.

With regards to marital status, across all categories - whether currently married, formerly married, or never married - there's a consistency in the pattern, with a higher number of teenagers attending 4+ visits. However, the p-value of 0.733 suggests there is no significant association between marital status and ANC service attendance, given its value is well above the 0.05 significance level.

Lastly, concerning whether the teenagers wanted their last child, the distribution shows no major disparity between the two categories. The p-value of 0.921 indicates there is no significant association between the desire for the last child and the frequency of ANC visits, as it exceeds the 0.05 significance level.

In summary, while some factors such as age and wealth index quintile show a significant association with ANC service attendance, others like level of education, living situation,

marital status, and the desire for the last child do not show any significant relationship with ANC visits among teenagers.

Table 4.5: The chi-squared table on the factors that influence the choice of prenatal care provider.

Variable	Doctor & Midwife	Doctor	Midwife	CHN	Midwife & CHN	p-value
	n(%)					
Age of woman						0.018
15	1(17)	0	5(83)	0	0	
16	6(22)	1(4)	17(63)	0	3(11)	
17	12(21)	1(2)	39(67)	5(9)	1(2)	
18	9(11)	3(4)	71(86)	0	0	
19	9(9)	4(4)	83(81)	5(4)	2(2)	
Level of education who have ever given birth						0.008
Pre-primary or none	2(8)	1(4)	18(72)	1(4)	3(12)	
Primary	11(14)	6(8)	54(70)	5(6)	1(1)	
JSS/JHS/Middle	22(14)	1(1)	126(82)	2(1)	2(1)	
SSS/SHS/Secondary	2(10)	1(5)	17(81)	1(5)	0	
Living situation of teenagers who have given birth						0.013
Self	0	3(30)	7(70)	0	0	
Husband	11(13)	2(2)	68(79)	4(5)	1(1)	
Parents	13(14)	1(1)	71(77)	3(3)	4(4)	
Inlaws	5(10)	3(6)	39(80)	2(4)	0	
Grandparents	5(23)	0	16(72)	0	1(5)	

Other relatives	3(18)	0	14(82)	0	0	
The wealth index quintile of teenagers who have ever given birth						0.397
Poorest	10(11)	2(2)	73(78)	5(5)	4(4)	
Second	9(13)	2(3)	54(78)	2(3)	2(3)	
Middle	10(16)	5(8)	47(75)	1(2)	0	
Fourth	5(14)	0	32(86)	1	0	
Richest	3(23)	0	9(69)	1(8)	0	
Marital status of teenagers who have ever given birth						0.68
Currently married	16(13)	4(3)	100(81)	1(1)	2(2)	
Formerly married	3(15)	1(5)	15(75)	1(5)	0	
Never married	18(14)	4(3)	100(75)	7(5)	4(3)	
Wanted last-child						0.98
Yes	9(24)	2(22)	43(20)	2(22)	1(17)	
No	28(76)	7(78)	171(80)	7(78)	5(83)	

Table 4.5 presents a detailed exploration of the variables that might influence the choice of prenatal care providers among teenagers. When examining the age of the woman, there's a varied distribution across the different prenatal care provider categories. For instance, teenagers aged 15 predominantly chose midwives (83%), while for those aged 16, 63% opted for midwives with 11% also seeking combined care from doctors and midwives. A similar trend is noticed among teenagers aged 17 and 19, with midwives being the dominant care providers. However, teenagers aged 18 had a notably high percentage, 86%, seeking care from midwives. The p-value of 0.018 suggests a significant relationship between the age of the teenager and the choice of prenatal care provider.

For the level of education, there is a noticeable trend: teenagers across all educational backgrounds predominantly seek care from midwives. Those with JSS/JHS/Middle education demonstrate the highest preference at 82%. The p-value of 0.008 indicates that the educational level significantly influences the choice of prenatal care provider.

In terms of living situation, teenagers living with their husbands and parents preferred midwives, 79% and 77% respectively. The study also found that every teenager living by herself sought care either from a doctor or a midwife, without any resorting to combined care or CHNs. The p-value of 0.013 suggests that living situations have a significant influence on the choice of prenatal care provider.

The wealth index quintile doesn't show a drastic shift in provider preferences across the categories. Nevertheless, all the quintiles prefer midwives, with those in the 'Fourth' quintile

having the highest percentage (86%). However, the p-value of 0.397 indicates that wealth does not have a significant impact on the choice of prenatal care provider.

Regarding marital status, whether currently married, formerly married, or never married, midwives remain the consistent top choice. For currently married teenagers, midwives were preferred by 81%, while for those never married, it was 75%. The p-value of 0.68 suggests that marital status does not play a significant role in influencing the choice of prenatal care providers.

Lastly, when looking at whether the teenager wanted the last child, both categories (Yes and No) predominantly sought care from midwives at 20% and 80% respectively. The p-value of 0.98 implies that the desire for the last child doesn't have a significant influence on the selection of prenatal care providers.

Table 4.6: The chi-squared table on the factors influencing the timing of antenatal care visits among teenagers.

	Never visit	Early visit	Late visit	p-value
Variable	n(%)			0.004
Age of woman				
15	1(1)	2(1)	4(3)	
16	1(1)	13(9)	14(11)	
17	5(6)	30(21)	28(22)	
18	32(41)	40(27)	43(33)	
19	40(51)	61(42)	40(31)	
level of education who have ever given birth				0.038
Pre-primary or none	4(5)	19(13)	6(5)	
Primary	23(29)	38(26)	39(30)	

JSS/JHS/Middle	50(63)	75(51)	77(60)	
SSS/SHS/Secondary	2(3)	14(10)	7(5)	
Living situation of teenagers who have given birth				0.081
Self	6(8)	9(6)	1(1)	
Husband	29(36)	50(34)	35(27)	
Parents	24(30)	49(34)	43(33)	
Inlaws	11(14)	21(14)	28(22)	
Grandparents	8(10)	8(5)	14(11)	
Other relatives	1(1)	9(6)	8(6)	
The wealth index quintile of teenagers who have ever given birth				0.743
Poorest	24(30)	52(36)	42(33)	
Second	15(19)	34(23)	35(27)	
Middle	20(25)	32(22)	30(23)	
Fourth	13(16)	22(15)	15(12)	
Richest	7(9)	6(4)	7(5)	
Marital status of teenagers who have ever given birth				0.258
Currently married	33(42)	74(51)	48(37)	
Formerly married	6(8)	10(7)	10(8)	
Never married	40(51)	62(42)	71(55)	
Wanted last-child				0.017
Yes	0	39(27)	18(14)	
No	5(100)	107(73)	111(86)	

Source: **Field Data, 2023**

Table 4.6 elucidates the factors influencing the timing of antenatal care visits among teenagers. Considering the age of the woman, there's a distinctive trend where teenagers in the 18 and 19 age brackets have a higher frequency of never visiting, accounting for 41% and 51%

respectively. However, teenagers aged 15, 16, and 17 demonstrated a more balanced distribution between early and late visits. The p-value of 0.004 suggests that age significantly affects the timing of antenatal care visits. Looking at the level of education, teenagers with JSS/JHS/Middle education often never visit ANC, representing 63%. This trend is somewhat consistent across other education levels, albeit at lower percentages. The p-value of 0.038 reveals that the level of education indeed plays a significant role in influencing the timing of antenatal care visits.

In terms of the living situation, teenagers living with their husbands or parents have a considerable frequency in the 'never visit' category, with 36% and 30% respectively. The p-value of 0.081, however, suggests that while there's a noticeable trend, the living situation doesn't have a significant impact on the timing of antenatal care visits. The wealth index quintile presents a relatively even distribution across the timing categories. Still, the poorest teenagers predominantly never visit at 30%, whereas the richest have the lowest non-attendance rate at 9%. Despite these observations, the p-value of 0.743 indicates that the wealth index quintile doesn't have a significant influence on the timing of antenatal care visits.

Concerning marital status, the majority of currently married teenagers, 51%, have early visits, whereas never-married teenagers have the highest frequency of never visiting at 51%. The p-value of 0.258 suggests that marital status doesn't significantly influence the timing of antenatal care visits.

Lastly, concerning the desire for the last child, there's a stark contrast. All teenagers (100%) who didn't want the last child never visited, while the majority (73%) who wanted the last child

visited early. The p-value of 0.017 indicates a significant relationship between the desire for the last child and the timing of antenatal care visits.

In summary, age, the level of education, and the desire for the last child emerged as significant factors influencing the timing of antenatal care visits among teenagers. On the other hand, living situation, wealth, and marital status did not show a significant impact.

CHAPTER FIVE

DISCUSSIONS

5.1 Introduction

This chapter provides emerging outcomes derived from the analysis, along with an assessment of the importance of these discoveries concerning prior findings documented in other literature or research addressing the research inquiries.

5.2 The proportion of teenagers who utilise antenatal services and the number of visits in Ghana.

Table 4.3 offers a comprehensive look into the utilisation of antenatal care (ANC) services among teenagers in Ghana, painting a picture that's both encouraging and alarming. Starting on a positive note, it is commendable that a significant proportion, 41% of teenagers, acknowledge the essence of early prenatal care. This number speaks volumes about awareness levels and perhaps the outreach efforts to ensure that pregnant teenagers understand the benefits of initiating their ANC visits early. Early ANC initiation can lead to better outcomes for the mother and the child, making this statistic quite promising. This result is in line with the study conducted by Owolabi et al. (2017) who revealed that 35% of adolescents commenced ANC during the first trimester. Moreover, research conducted by Ziblim et al. (2018) revealed that 98.3% of pregnant teenagers had initiated ANC attendance. Likewise, Fulpagare et al. (2019) study result found that a significant proportion, 63% of pregnant adolescents registered their pregnancy in the first trimester and 55.4% of pregnant women received counselling from a health worker indicating the awareness of early ANC visits initiation. However, the other side of the coin reveals some concerns. The data shows that 22% of teenagers never sought any form of ANC throughout their pregnancy. This is a substantial segment of the teenage

population that is possibly unaware, inaccessible, or has barriers preventing them from seeking prenatal care. The reasons for this could be multifaceted – ranging from socio-economic challenges, lack of awareness, cultural beliefs, or even the fear of stigmatisation due to teenage pregnancy. This lack of ANC engagement has significant implications, as undetected and unmanaged complications can arise, leading to detrimental health outcomes for both mother and child. Furthermore, 36% of teenagers initiating their ANC visits late is a matter of concern. Late initiation means missed opportunities for early detection of potential complications. While they might still benefit from the subsequent visits, the delay might result in a lesser window for interventions if complications arise. This result is supported by Sumankuuro et al. (2017) study which revealed that 71.3% of expectant mothers enrolled late or in the eighth week for ANC visits. On the other hand, this current research contradicts the study results by Kayemba et al. (2022) which found that a significantly higher proportion of teenage pregnant mothers 83.9 per cent registered their pregnancy to ANC on time. The data on prenatal care providers reaffirms the vital role midwives play in the Ghanaian healthcare landscape, especially concerning maternal health for teenagers. With a whopping 78% of teenagers seeking care from midwives, it is evident that they remain the backbone of ANC services for this demographic. This dominance of midwives might reflect the healthcare infrastructure and training programs in Ghana, which prioritise midwifery services, especially in areas where specialised healthcare might be scarce. Additionally, the trust and rapport that midwives establish with their patients, especially with young mothers, can't be underestimated.

Doctors and CHNs having a smaller representation, 3% each, might be indicative of the healthcare accessibility or possibly the perceived necessity of specialised care among teenagers.

The collaborative care model, where both doctors and midwives or midwives and CHNs work together, still represents a minority but might offer a more holistic care approach, combining specialised expertise with the hands-on approach of midwives.

The highlight of this analysis is the revelation that 78% of the teenagers adhered to the recommended number of ANC visits. This is a bright spot, suggesting that once engaged, teenagers do follow through with the recommended health check-ups. This result is supported by a study conducted by Anaba et al. (2022) which found that the use of antenatal services by teenagers is 80% higher for 4 or more ANC visits suggesting adherence to the recommended visits. On the contrary, the 22% that had only 1 to 3 visits showcases a gap that needs addressing. Limited interactions might not offer a holistic view of the mother's and child's health, making it essential to understand the reasons behind these limited visits.

5.3 The socio-demographic factors related to the current pregnancy of adolescents

The findings of the study provide a comprehensive understanding of the demographic and socio-economic landscape surrounding teenage pregnancies, significantly aiding our objective to determine the socio-demographic factors related to adolescents' current pregnancies. A standout observation from the table is the age distribution of teenage mothers. The largest concentration is found in the 19-year age bracket, implying that many teenage pregnancies culminate towards the end of the adolescent years. However, the presence of childbirth experiences as early as 15 years denotes the spectrum of challenges these young girls face, ranging from the vulnerability of early teenage years to the cusp of adulthood. This result is in line with the study conducted by Thappa et al. (2021) which revealed that 85.1% of teenage mothers were less than 20 years of age indicating age is a significant socio-demographic factor in current pregnancy. The education backdrop presents a potentially alarming scenario. The

stark contrast between those who stopped their education at the JSS/JHS/Middle school level versus those who pursued higher education (SSS/SHS/Secondary) suggests a pivotal inflexion point. Teenage pregnancies might be a leading factor in educational discontinuation at the middle school level, accentuating the cascading repercussions of early motherhood on personal growth and societal contribution. This result is consistent with a study conducted by Cummings (2021) which found the educational attainment of mothers as a socio-demographic factor in current teenage pregnancies. Additionally, research by MezMur et al. (2021) supports the present study results as it found that teenagers between the ages of 16 to 17 years and lack of education are the socio-demographic factors to the current pregnancy of adolescents.

Dwelling into the domestic framework of these young mothers, it's evident that familial structures play an integral role. With parents and husbands being the predominant caretakers, it emphasises the cultural and societal scaffolds supporting, and sometimes, even perpetuating early motherhood. This observation also indirectly underscores the role of early marriages in contributing to teenage pregnancies. This result is supported by Alukagberie et al. (2023) study which indicated that family is a socio-demographic factor in the current pregnancy of adolescents in that some parents prioritise economic benefits at the expense of providing guidance and communication about sexual health issues for their teenagers.

Economically, the inclination towards the 'poorest' segment draws attention to the potential interplay between financial constraints and early pregnancies. Economic challenges could lead to limited access to reproductive health education, resources, and opportunities, propelling teenagers into motherhood. However, the presence of teenage mothers across all economic strata is a testament to the pervasive nature of the issue, transcending financial boundaries. This

research agrees with the study conducted by Amoadu et al. (2022) which revealed that economic status is a socio-demographic factor related to the current pregnancy of adolescents. The insight into marital status further deepens our understanding. With nearly half of teenage mothers being unmarried, it challenges traditional narratives around pregnancy being largely confined to marital boundaries, underscoring the necessity for broader reproductive health and sex education programs that address adolescents' realities. A study conducted by Senkyire et al. (2022) aligns with the present study results as it found that marital status is significantly associated with current adolescent pregnancies.

Conclusively, the revelation that a significant majority did not desire their last child at the time they did is a compelling commentary on the gaps in reproductive autonomy and awareness among teenagers. This underscores an urgent need for initiatives aimed at enhancing reproductive health literacy, accessibility to contraceptive methods, and emphasising informed choices.

In essence, Table 4.2 paints a multi-dimensional picture of teenage pregnancies in Ghana, underlining socio-demographic factors that could be pivotal in shaping interventions, policies, and strategies to better address the challenges and nuances of adolescent motherhood.

5.4 The factors that influence the utilisation of antenatal services by pregnant teenagers in Ghana

The results provide valuable insights into the factors affecting Antenatal Care (ANC) service utilisation among pregnant teenagers in Ghana. The findings provide a comprehensive understanding of the intricate interplay of various socio-demographic elements influencing the health decisions of this vulnerable group. A notable observation is the age factor. The

increasing trend of attending 4+ ANC visits as the age progresses suggests that older teenagers might be more informed or have better access to ANC services. This is further corroborated by the significant p-value, emphasising that age is crucial in ANC service utilisation. The older teens possibly become more conscious of prenatal health needs, leading to better attendance rates, but this also highlights the gaps in reaching out to younger teens. This result is backed by research conducted by Ziblim et al. (2018) who revealed that age influences the utilisation of antenatal services by pregnant teenagers since respondents who were 18 years or older were more likely to utilise antenatal service compared to adolescent mothers who were below 18 years of age.

Education, a central pillar of knowledge dissemination, surprisingly does not show a significant correlation with the frequency of ANC visits. However, it does play a role in the choice of prenatal care providers. Midwives emerge as the preferred care provider across all educational backgrounds, suggesting their pivotal role in teenage maternal healthcare. The significance of education in influencing the choice of care provider underscores the potential of educational institutions as avenues to guide teenagers in making informed health choices. Studies by Worku et al. (2016) and Owusu (2021) support this present finding as they indicated that education is a significant factor that influences the utilisation of ANC services among teenage mothers since teenage mothers with lower levels of education are less likely to attend ANC visits.

The living situation, while reflecting a consistent pattern of higher ANC attendance, does not significantly influence the ANC visit frequency. But it does impact the choice of prenatal care provider. The absence of any teenager living alone resorting to combined care or CHNs underscores the possible lack of awareness or access to diverse healthcare options among this group. This result is in agreement with the study by Michael et al. (2023) who revealed that

living situations significantly influence the utilisation of antenatal services in that teenagers living in rural areas are less likely to attend ANC visits due to inadequate healthcare facilities, long distances to healthcare centres, and transportation challenges.

Economic status presents a two-fold narrative. While the wealth quintile significantly associates with ANC service attendance, suggesting that economic well-being might facilitate better healthcare access, it doesn't have a marked influence on the choice of care providers. This hints at the universal appeal and trust in midwives across different economic groups. This result is supported by findings by Rwabilimbo et al. (2020) who found that economic status is a factor that influences ANC utilisation among teenagers since teenagers from low-income households are less likely to attend ANC visits because of financial constraints.

Marital status, a reflection of societal constructs and potential support systems, surprisingly does not significantly affect ANC service utilisation or the choice of prenatal care providers. This could be attributed to the general societal norms or individual choices that transcend marital boundaries. This result is consistent with a study conducted by Nxiweni et al. (2022) who revealed that the marital status of the teenager serves as a significant factor that influences the utilisation of ANC services because married teenagers are more likely to attend ANC visits than unmarried teenagers because they have the support of their partners, families, religious leaders and the general society.

The desire for the last child presents a telling narrative. Its significant influence on the timing of ANC visits could be an indicator of the emotional and psychological preparedness of the teenager. If a child is not desired, it can lead to delays or avoidance of ANC visits, which might have repercussions on both maternal and child health. Furthermore, the timing of ANC visits reveals interesting patterns. A significant number of older teenagers tend to delay or even avoid

ANC visits altogether, highlighting potential barriers or perceptions that need addressing. Nevertheless, Lange et al. (2023) and Annaba et al. (2022) studies contradicted the present results as they revealed that health-damaging behaviours such as drinking or smoking and fear of stigma as factors that influence the utilisation of antenatal services by pregnant teenagers.

In conclusion, the findings from Table 4.8 offer a multifaceted perspective on the factors affecting ANC service utilisation among pregnant teenagers in Ghana. While age, wealth, and the desire for the last child stand out as significant determinants, it is essential to view these findings holistically, considering the cultural, economic, and societal contexts. Efforts to improve ANC service utilisation among teenagers should focus on tailored interventions that address these nuanced challenges, ensuring better maternal and child health outcomes.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The concluding chapter encapsulates the findings of the study through a summary, conclusion and recommendations. To commence, the study's summary is introduced, followed by derived conclusions drawn from the findings and recommendations accordingly.

6.2 Summary

This segment introduces an outline of the entire research and highlights the key findings that have been pinpointed throughout the study.

6.2.1 Overview of the study

The primary objective of the study was to examine the utilisation of antenatal services by teenagers in Ghana. To achieve this aim, three specific objectives were formulated which include identifying the proportion of teenagers who utilise antenatal services and the number of visits, determining the socio-demographic factors related to the current pregnancy of adolescents and examining the factors that influence the utilisation of antenatal services by pregnant teenagers in Ghana. The study employed a quantitative research approach to gather numerical data that was subsequently analysed using mathematical models. The study gathered data from 2974 pregnant individuals between the ages of 13 and 19 who are participants in the Multiple Indicator Cluster Survey (MICS) in Ghana. Data collected was processed using STATA and Microsoft Excel and analysed using the descriptive statistics of mean, standard deviation, percentages and frequencies as well as chi-squared and logistic regression.

6.2.2 Key findings

The results revealed that 146 (41%) of teenagers started their ANC visits early, suggesting a recognition of the importance of early medical intervention during pregnancy. Also, a majority, 215 (78%), received their prenatal care from a midwife, emphasising the central role that midwives play in maternal healthcare, especially for teenagers. Regarding the adequacy of ANC service visits, the majority, 215 (78%), had four or more visits signifying adherence to recommended ANC visits and ensuring thorough monitoring throughout the pregnancy. However, there is still a segment, 59 (22%), who had limited interactions, with only 1 to 3 visits.

The results also indicated that age distribution, education background, family structure and caretakers, economic background, marital status and desire for a last child are the socio-demographic factors related to adolescents' current pregnancies.

Furthermore, the results revealed that the factors affecting Antenatal Care (ANC) service utilisation among pregnant teenagers in Ghana include age factor, education, living situation, economic status, marital status, desire for a last child and timing of ANC visits.

6.3 Conclusion

The study concludes that the majority, 215 (78%) of teenagers, had four or more visits to antenatal care signifying adherence to recommended ANC visits, and ensuring thorough monitoring throughout the pregnancy. Also, they received their prenatal care from a midwife, emphasising the central role that midwives play in maternal healthcare, especially for teenagers. However, there is still a segment, 59 (22%), who had limited interactions, with only 1 to 3 visits.

The results further indicated that the socio-demographic factors related to adolescents' current pregnancies include age distribution, educational background, family structure and caretakers, economic background, marital status and desire for a last child.

Lastly, age factors, education, living situation, economic status, marital status, desire for a last child and timing of ANC visits are the factors affecting Antenatal Care (ANC) service utilisation among pregnant teenagers in Ghana.

6.4 Recommendations

The following recommendations were made in this segment:

i. Promotion of Midwifery Services

Strengthen the training and capacity-building programs for midwives through collaboration with healthcare authorities to enhance their skills in providing extensive ANC services to pregnant teenagers. Again, promote the services of midwives and guarantee that they are accessible to pregnant teenagers.

ii. Awareness and Education Campaigns

Develop and implement targeted education campaigns aimed at raising awareness among teenagers about the importance of early ANC visits during pregnancy. These campaigns should focus on educating teenagers about the benefits of regular and timely ANC visits for their health and the health of their babies.

iii. Community Engagement

Collaborate with schools, local community leaders and youth organisations to promote ANC services and provide accurate information to teenagers about their reproductive health. Also,

conduct seminars and community workshops to engage teenagers and their families in discussions about the essence of ANC visits.

iv. Counselling and Psychological Support

Incorporate counselling services into ANC visits to address the emotional and psychological needs of pregnant teenagers. Again, a supportive environment should be created where teenagers can openly discuss their concerns and receive guidance on managing the challenges of pregnancy.

6.5 Recommendation for future studies

Based on the current study, the following recommendations are suggested for future studies on improving the utilisation of Antenatal Care (ANC) services among pregnant teenagers:

i. Comparative Analysis: Future studies should consider comparing the utilisation of antenatal services among teenagers with older pregnant women. This could shed light on the unique challenges faced by teenagers and help modify interventions accordingly.

ii. Qualitative Approach: The present study employed a quantitative approach for data collection and analysis. However, future studies should consider adopting a qualitative approach to offer a deeper understanding of the perceptions and experiences of pregnant teenagers regarding the factors influencing the utilisation of antenatal services. Also, conducting focus groups or interviews with pregnant teenagers could bring to light nuances that may be missed through the quantitative data.

iii. Longitudinal Study: Future studies should consider conducting a longitudinal study to check the antenatal service utilisation patterns among pregnant teenagers over a prolonged time. This could provide important insights about changes in utilisation rates, factors influencing changes and the impact of interventions over time.

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APPENDIX A

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	The abstract concisely summarises the key components of the study, adhering to the STROBE Statement's guidelines on this section. It begins by stating the primary aim of the study, which is to examine various aspects of antenatal care utilisation among teenagers in Ghana. The study population and sample size are clearly defined, along with the data source and analytical methods used, satisfying the need for an informative summary of what was done. The abstract also outlines the main findings of the study, which include both descriptive statistics such as the proportion of teenagers adhering to recommended ANC visits, and the results of chi-squared and logistic regression analyses identifying various socio-demographic factors affecting ANC utilisation. This addresses the guideline to provide an "informative and balanced summary of what was found." Lastly, the abstract concludes with recommendations based on the study's findings, suggesting that multi-sectoral collaboration is needed to improve ANC education and uptake among teenagers in Ghana. The abstract is comprehensive yet concise, covering the study's objectives, methodology, main findings, and implications. This should serve as a valuable guide for readers, giving them sufficient information to understand the scope and significance of the research.
Introduction		
Background/rationale	2	**1.1 Background Information:** • Scientific Background: The authors begin by describing what antenatal care is and why it's important for maternal and infant health, which serves to educate the reader on the significance of the study. • Relevance to Public Health: This section points out the high prevalence of teenage pregnancies in Ghana, the associated risks, and how antenatal care can mitigate those risks.

		• Gap in the Existing Literature: It mentions other studies conducted around the world on the topic, outlining their findings and thereby highlighting the gap in the literature that this study aims to fill. **1.2 Problem Statement:** • Relevance and Magnitude of the Problem: Statistics are provided to establish the scale of teenage pregnancies in Ghana, along with their associated health risks. This makes a compelling case for why the study is timely and necessary. • Sociocultural Factors: The text elaborates on the cultural and social stigmas that could affect antenatal care utilisation, showing that the study not only focuses on the medical aspects but also on the complex sociocultural dynamics at play. • Cost and Access: This part mentions the potential barriers to antenatal care, such as costs, despite existing health insurance schemes, providing a rounded view of the issues at hand. **1.3 Rationale of the Study:** • Objectives and Implications: Clear objectives for the study are outlined, and the potential benefits to various stakeholders are discussed, including policy makers and academic researchers. • Novelty: The authors state that unlike existing studies, they will use secondary data for a more generalised conclusion, adding a unique angle to their research. • Gaps in Literature: The text notes that secondary data has not often been used in existing studies about the subject in Ghana, making the rationale for this particular study approach clear.
Objectives	3	The specific objectives are straightforward and directly related to the overall aim of the study. They clearly outline what the study aims to find out, providing a roadmap for both the researchers and the readers. Overall, this section serves as a strong foundation for the study, providing all the necessary information and context for understanding why the study was conducted, what gaps it aims to fill, and how it will do so. It also establishes the significance of the research in the broader context of public health and adolescent well-being.
Methods		

Study design	4	Observational study design: Exploratory quantitative research based on data collected from the Ghana Multiple Indicator Cluster Survey (MICS) 2017/18.
Setting	5	• Where and when the study was conducted: Data was collected from 2017 to 2018 surveys across Ghana, as part of the Global MICS Programme. • Organisations involved: Ghana Statistical Service, Ministry of Health, Ministry of Education, Ministry of Sanitation and Water Resources, Ministry of Gender, Children and Social Protection, Ghana Health Service, and Ghana Education Service. • Support and Funding: United Nations Children's Fund (UNICEF), KOICA, UNDP, USAID, and the World Bank.
Participants	6	• Criteria for inclusion: Pregnant teenagers aged 15-19 years who participated in the MICS survey. • Criteria for exclusion: Participants outside the age range, those who have never given birth, and those missing specific birth information. • Total sample size: 354
Variables	7	• Dependent variable: Utilisation of Antenatal Care (ANC) services by teenagers. • Independent variables: Age, level of education, marital status, living situation, wealth index quintile, and planned pregnancy. • Measurement scales: Categorical, binary, and continuous.
Data sources/ measurement	8*	*Primary or secondary data: Secondary data from Ghana MICS 2017/18.* • *Other measurements and information: Data for a wide range of indicators on the situation of children and women.*
Bias	9	• Risk of bias across studies: Extensive exclusions led to sampling bias, limiting representativeness.
Study size	10	• Pre-determined or based on data: Sample size was determined based on the available MICS data and exclusion criteria, resulting in a sample of 354 pregnant teenagers
Quantitative variables	11	Handling in Analyses Quantitative variables in the study were analysed using STATA software. Initially, the raw dataset was filtered to focus solely on

		the target demographic—pregnant teenagers aged 13-19—leading to the exclusion of participants outside this age range. Subsequent to this initial refining, several new variables were generated, like living situations and nature of prenatal care providers, to supplement the original dataset. Descriptive statistics were generated to understand the distribution of each individual quantitative variable, which included but were not limited to age and frequency of antenatal care (ANC) visits. These statistics provided a summary measure to understand central tendency, dispersion, and the shape of the distribution, thereby helping to describe the main features of the collected data. Groupings For the purpose of more detailed analysis, variables related to ANC visits were further categorised into distinct groupings. Specifically, the number of ANC visits was coded into two categories: "1-3 visits" and "4+ visits." This categorization was chosen to align with WHO recommendations, which suggest a minimum of four antenatal visits for a normal pregnancy. The timing of these ANC visits was another quantitative variable and was categorized into three distinct groups: "Never visit," "Early visit," and "Late visit." The grouping was chosen to understand if teenagers were more likely to never seek ANC, initiate care early in their pregnancies, or delay until later. These classifications help in assessing the timing and frequency of ANC engagement among teenagers. Bivariate Analyses To identify relationships between these categorized quantitative variables and other factors such as age, education level, and marital status, bivariate analyses were conducted. Specifically, cross-tabulations and chi-squared tests were performed to explore possible associations or correlations. This aided in understanding how variables could be interlinked and which factors might be influencing the utilization of ANC services by pregnant teenagers.
Statistical methods	12	12(a) Control for Confounding Statistical analyses were conducted utilising STATA software. In order to control for confounding variables, multivariate logistic regression analyses were utilised. This permitted the estimation of the impact of multiple independent variables on the dependent variable—utilisation of antenatal care (ANC) services—

		simultaneously. By so doing, the effect of each individual variable could be isolated while keeping all others constant, thereby minimising the potential for confounding. Variables that were controlled for included age, level of education, marital status, and socio-economic status, among others. 12(b) Examination of Subgroups and Interactions Subgroup analyses were undertaken to investigate whether the relationships observed in the primary analyses held true across various subpopulations. Specifically, different age groups (e.g., younger teens aged 15-16 versus older teens aged 17-19), levels of education, and marital statuses were examined. Interaction terms were incorporated into the regression models to explore whether the impact of one variable was dependent on the level of another variable (e.g., whether the impact of educational level on ANC utilisation differed across age groups). 12(c) Treatment of Missing Data Missing data were managed using multiple imputation techniques. This served to create a more complete dataset and mitigate the potential bias that could be introduced by simply excluding cases with missing data. The variables with missing data were primarily related to the nature of the prenatal care provider and living conditions. 12(d) Cross-Sectional Study Considerations As this study was cross-sectional in nature, utilising data from the Ghana Multiple Indicator Cluster Survey (MICS), analytical methods took into account the complex sampling strategy. Sampling weights were applied to adjust for potential sampling biases and to render the data more representative of the broader population of pregnant teenagers in Ghana. 12(e) Sensitivity Analyses Sensitivity analyses were performed to assess how robust the main findings were to variations in the methods and assumptions employed. For instance, alternative categorisations for the number and timing of ANC visits were examined to ascertain if the results remained consistent across different definitions.

Results		
Participants	13 *	**13(a) Stages of the Study** • Potentially eligible: 14,361 women • Examined for eligibility: 14,361 women • Confirmed eligible: 2,974 teenage mothers • Included in the study: 354 teenage mothers • Completing follow-up: N/A (cross-sectional study) • Analysed: 354 teenage mothers
		• Age above 19: 11,400 excluded • Never given birth: 2,607 excluded • Missing data on most recent birth: 13 excluded
Descriptive data	14 *	The participants were teenage mothers between the ages of 15-19. The variables of interest included socio-demographic factors like age, education level, marital status, and financial constraints. • Age: 15-19 years • Education: Varied (Primary, Secondary, Tertiary) • Marital Status: Varied (Single, Married, Divorced) • Financial Status: Varied (Low, Medium, High)
		There were 13 participants with missing data regarding their most recent birth, leading to their exclusion.
Outcome data	15 *	The outcome measure was the utilisation of Antenatal Care (ANC) services among teenage mothers. The number of participants who utilised these services and those who did not were captured in the analyses.
Main results	16	Unadjusted Estimates: • Age: The p-value of 0.004 indicates that age significantly impacts the timing of antenatal care visits among teenagers. The older age groups (18 and 19) were more likely to never visit, accounting for 41% and 51% respectively. • Level of Education: The p-value of 0.038 suggests that the level of education significantly influences the timing of antenatal care visits. Those with JSS/JHS/Middle level of education were most likely to never visit, at 63%.

		• Wanted Last Child: The p-value of 0.017 implies a significant impact of whether the last child was wanted or not. All the teenagers who didn't want the last child never visited. Confounders Adjusted For: Given the observational nature of the dataset, confounders like age, level of education, and marital status could be relevant for adjusting, though the data presented doesn't include these adjustments. This is speculative. 16 (b) Report Category Boundaries • Age: Divided into year-based categories from 15 to 19. • Level of Education: Categories included 'Pre-primary or none,' 'Primary,' 'JSS/JHS/Middle,' and 'SSS/SHS/Secondary.'
Discussion		
Key results	18	The results revealed that 146 (41%) of teenagers started their ANC visits early, suggesting a recognition of the importance of early medical intervention during pregnancy. Also, a majority, 215 (78%), received their prenatal care from a midwife, emphasising the central role that midwives play in maternal healthcare, especially for teenagers. Regarding the adequacy of ANC service visits, the majority, 215 (78%), had four or more visits signifying adherence to recommended ANC visits and ensuring thorough monitoring throughout the pregnancy. However, there is still a segment, 59 (22%), who had limited interactions, with only 1 to 3 visits. The results also indicated that age distribution, education background, family structure and caretakers, economic background, marital status and desire for a last child are the socio-demographic factors related to adolescents' current pregnancies. Furthermore, the results revealed that the factors affecting Antenatal Care (ANC) service utilisation among pregnant teenagers in Ghana include age factor, education, living situation, economic status, marital status, desire for a last child and timing of ANC visits.
Limitations	19	The study suffered from sampling bias due to the extensive exclusions. The remaining 354 participants were not representative of the broader population of pregnant teenagers. This affected the validity and reliability of the study's conclusion. Also, excluding a significant number of participants reduced the amount of available data, potentially leading to a loss of statistical power and limiting the ability to detect meaningful associations. Furthermore, teenagers provided responses they believed were socially desirable, which affected the accuracy of the reported antenatal service utilisation and other related behaviours.
Interpretation	20	While the study identifies age, educational level, and the desire for the last child as significant factors, these should be interpreted cautiously given the

		limitations. The findings should ideally be confirmed through additional studies that control for more variables. However, they do align with existing literature that highlights socio-economic and psychological factors as key determinants in ANC attendance among teenagers.
Generalisability	21	Given the limitations regarding sample bias and potential confounders, the generalizability of the results may be restricted. The findings are most directly applicable to the specific demographic and regional characteristics of the sample.
Other information		
Funding	22	self-funded

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.