ENSIGN GLOBAL COLLEGE

DEPARTMENT OF COMMUNITY HEALTH

ASSESSING THE PREVALENCE AND MAJOR DRIVERS OF LATE ANTENATAL CARE REGISTRATION AT THE NANUMBA SOUTH DISTRICT IN THE NORTHERN REGION OF GHANA

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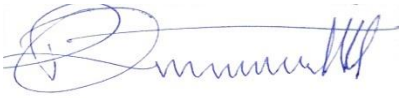
A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH, FACULTY OF PUBLIC HEALTH, ENSIGN GLOBAL COLLEGE IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

SEPTEMBER 2024

DECLARATION

I, Danikuu Nobini Robert, declare that this research on the topic "**Assessing the prevalence and major drivers of late antenatal care registration at the Nanumba south district in the northern region of Ghana**" is the result of my own original work produced under my supervisor. All ideas and information from other people's work, which are used in this project, have been duly acknowledged and cited.

SIGNATURE OF STUDENT DATE……24/09/2024



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Dr. STEPHEN MANORTEY..…… DATE……

(HEAD OF ACADEMIC PROGRAM)

DEDICATION

I dedicate this work to the Almighty God for his grace and mercy that has brought me thus far. I also dedicate it to my parents, siblings, and friends for their endless support.

ACKNOWLEDGEMENT

I am sincerely thankful to the Almighty God for according me the strength, wisdom, and knowledge throughout my studies. I am grateful to my project supervisor, Dr. Edward Kofi Sutherland for his patience, guidance, and support during the period of the study. He was always available to help and I appreciate his assistance.

I equally extend my felicitation to Mr Clinton Sekyere Frempong, Madam Owusu Gloria and Madam Inusah Amina who assisted in the data collection and analysis.

DEFINITION OF TERMS

Late antenatal care registration: When pregnant women visit a health facility due to pregnancy booking after twelve (12) weeks gestation.

Antenatal Care: Services offered to a pregnant woman by health care personnel purposely for preventing complications during pregnancy and delivery.

LIST OF ABBREVIATION

ANC: Antenatal care

CHPS: Community-Based Health Planning and Services

DHIMS2: District Health Information Management System

GIS: Geographic Information System

GSS: Ghana Statistical Service

MMDAs: Metropolitan, Municipal and District Assemblies

MMR: Maternal Mortality Ratio

SDG3: Sustainable Development Goal three

WHO: World Health Organization

AOR: Adjusted Odd Ratio

OR: Odd Ratio

CI: Confidence Interval

PI: Principal Investigator

UK: United Kingdom

VHT: Village Health Teams

GMHS: Ghana Maternal Health Survey

DRC: Democratic Republic of Congo

TBA: Traditional Birth Attendance

ABSTRACT

Introduction: Late antenatal care registration can be defined as a pregnant woman visiting a healthcare facility for assessment and booking after twelve weeks gestation. ANC provides both psychological and medical needs of pregnant women within the context of the health care delivery system. Late antenatal care registration mars the baseline health data of the pregnant woman and thereby affects the early detection of complications. This study assessed the prevalence and major drivers of late antenatal care registration in a rural district in Ghana.

Methods: A facility-based cross-sectional study was conducted among pregnant women attending antenatal care services in the Nanumba South District of Ghana. A structured questionnaire was administered to a random sample of 194 pregnant women. Data analysis was performed using Stata version 18. Descriptive statistics, including frequencies and confidence intervals, were used to summarize the data. In this study, participants' knowledge of ANC services was measured by asking ten (10) questions about ANC services. Each correct response was scored Yes (1) with an incorrect response scoring No (0). The overall score was computed for each participant and expressed as a percentage of the total possible score of 10. The participants' knowledge of ANC services was rated as adequate knowledge of ANC services (≥70% scores) and inadequate knowledge of ANC services. Inferential statistics, including chi-square and logistic regression, was used to identify associations and predictors of late antenatal care service utilization, with a significance level set at $p < 0.05$.

Results: One hundred and ninety-four pregnant women participated in the study. The majority of the women were young, with 42.3% aged 15-24 years and 44.3% aged 25-34 years. The study revealed both encouraging trends and areas of concern in antenatal booking practices. While 62.9% of women booked early for ANC within the first trimester, a significant 37.1% delayed booking

until later in pregnancy. Age emerged as a crucial predictor, with women aged 35-44 being significantly less likely to book early for ANC compared to those aged 15-24 [aOR = 0.28 (CI: 0.11-0.74), p=0.010]. Religion also played a significant role, with Christian women less likely to book early compared to those with no religious affiliation [aOR = 0.10 (CI: 0.01-0.80), p=0.031].

Conclusion: Overall, the study found that women in the Nanumba South District registered late (37.1%) for antenatal care services, even though they demonstrated a good level of knowledge (56.7%) on antenatal care services. Factors such as age and employment status were significant, with older women (34-44) and those unemployed showing differing patterns in antenatal care registration and knowledge.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

There is a target of the Sustainable Development Goal Three (SDG 3) to decrease global maternal death ratio to 70 per 100,000 live births by 2030 (United Nations, 2015). Achieving this goal can be accomplished through the provision of appropriate Antenatal care (ANC) to expectant mothers (Otundo Richard, 2019). Antenatal Care comprises education, screening, counseling, treatment, promoting, and monitoring and these are necessary and important steps to ensure both mother and child are safe throughout the pregnancy journey (AI Hamazi et al., 2017). It considers the holistic well-being of the pregnant woman factoring their culture, religion, and the settings within which healthcare is accessed (Jibril, 2017). It is recommended by the WHO that every expectant mother must utilize ANC services at least eight times during the gestational period, the first of which must be during the first trimester, that is 12 weeks of gestation) to facilitate early identification and management of any detected complications (WHO, 2016).

It may be noted that the number of women who attend ANC has increased worldwide majority go for only 4 visits juxtaposed to the standard 8 visits. Also, the increase in ANC attendance globally stands at just one visit. Alarmingly, lower rates are reported in sub-Saharan Africa and South Asia (UNICEF, 2018). The 2017 Ghana Maternal Health Survey (GMHS) reports that about 2% of pregnant women do not attend ANC, a figure that shows improvement over the years. Yet almost one-third of pregnant women still report late for ANC services, in the latter stage of second trimester or into their third trimester. This is a situation that calls for concern (Ghana Statistical Service, 2019). In the Nanumba South District, the district health information management system

(DHIMS2) data shows the district has records of pregnant women reporting late for antenatal care services. 2021 alone recorded about 65.1% of ANC registrants in the district beginning late after the first trimester, this figure diminished to about 58.8% in 2022 and 54.1% in 2023.

The purpose of antenatal care is to be ready for any unforeseen occurrences and be prepared for emergencies. As such, pregnant ladies who hesitate to make full use of ANC coverage fail to get all the care they need, which puts them and the baby they are expecting at risk for poor health outcomes (Appiah et al., 2020; Kuhnt & Vollmer, 2017; Shiferaw et al., 2021). According to Tumwizere et al., (2024), close to a 1000 women lose their lives from pregnancy-related preventable problems, a situation that is predominant in developing countries. Knowing that a significant portion of these deaths could have been avoided through timely and appropriate ANC services, which are instrumental in decreasing the deaths of pregnant women and are readily available in health facilities, even in rural areas yet not patronized by many makes the situation sad (Yeoh et al., 2016).

Several studies Kabunga et al., 2023; Kluckow et al., (2018); Musinguzi et al., (2022); Teshale & Tesema, (2020); Wolde et al., (2018) revealed several factors that contribute to this challenge. These factors include unplanned or unwanted pregnancy, location of health facilities which impacts travel time, waiting time at the facilities, availability of health workers at the facilities, food insecurity, limited family resources with more demands, and recommendations from village health teams (VHTs) for pregnant mothers to visit health centers to confirm pregnancies are factors contributing to delayed ANC attendance. However, it is important to note that these factors may vary across different locations due to unique circumstances and settings.

1.2 Problem Statement

Late antenatal-care registration is a major problem militating against the attainment of the SDG3, which seeks to reduce the Maternal Mortality Ratio worldwide. Although global maternal deaths have decreased from 451,000 in 2000 to 295,000 in 2017, more than 800 mothers still die every day worldwide (WHO, 2019). In sub-Saharan Africa, around 533 mothers die for every 100,000 live births, which makes up about 68% of maternal deaths in the world, totaling approximately 200,000 deaths each year. (WHO, 2019). Warri et al., (2020), indicated that the financial burden of healthcare services, including the cost of transportation, can deter timely ANC visits, long distances to health facilities, poor road networks, and lack of transportation are significant barriers to early ANC access and extended waiting time, and negative attitudes of healthcare providers can discourage women from seeking early ANC. ANC services are fully covered in the healthcare system, yet, there are still lots of pregnant women in sub-Saharan Africa who go to the health facilities late to seek ANC services for the first time since they got pregnant, mostly in their second and third trimesters (Gidey et al.,2017; Tola et al.,2021; Wolde et al.,2019). This increases their chance of experiencing pregnancy-related complications such vaginal bleeding, hypertensive problems, and fetal death
(Gidey et al.,2017; USAID,2018).

Maternal mortality is still high in Ghana, with 310 deaths per 100,000 live births reported in the 2017 National Maternal Health Survey (GHS/GSS/ICF, 2018). A lot of these fatalities might be avoided with prompt and proper ANC services.
(Blencowe et al., 2016). Regrettably, only 37.9% of pregnant women in the Nanumba South District attain 4+ visit, which is the standard for measuring the adequacy of ANC attendance by WHO.

Late registration for antenatal care services poses a significant threat to maternal and child health outcomes, particularly in resource-limited settings. Although there are well-established benefits of early and consistent antenatal care, a substantial proportion of pregnant women continue to initiate these services late, missing critical opportunities for timely intervention, health education, and birth preparedness. Addressing this issue requires a comprehensive understanding of the multifaceted factors that contribute to delayed antenatal care registration. By quantifying the prevalence and examining the socioeconomic, cultural, and health system drivers underlying late registration, this study will provide invaluable insights to inform targeted interventions and policies.

1.3 Rationale of the Study

This study is significant for several reasons. First, it aims to determine the prevalence of late ANC registration in the Nanumba South District of Ghana, providing essential data on how many pregnant women delay their initial ANC visits. This information is crucial for healthcare planning and resource allocation. Additionally, the study assesses the knowledge of pregnant women regarding ANC services in the district. Understanding the level of awareness and education about ANC can help identify gaps in information dissemination and guide the development of targeted educational programs.

Furthermore, the purpose of this research is to identify factors associated with delayed ANC registration in the Nanumba South District of the Northern Region. By pinpointing specific barriers that contribute to delayed ANC visits, the study will inform the creation of effective interventions and policies aimed at encouraging timely ANC registration. The combined results of these findings will play a crucial part in enhancing mother and child health prospects in the district. Furthermore,

they will significantly contribute to the overarching objective of decreasing maternal and infant mortality and morbidity rates in Ghana.

Based on this account, this study seeks to determine the prevalence and factors that contribute to late booking by pregnant women accessing ANC in the Nanumba South District of Ghana. Identification of these factors will help grasp the depth of the situation. This will help know what interventions will be appropriate to promote early booking of pregnant women in the district and potentially other parts of Ghana with similar demographics

1.4 Conceptual framework

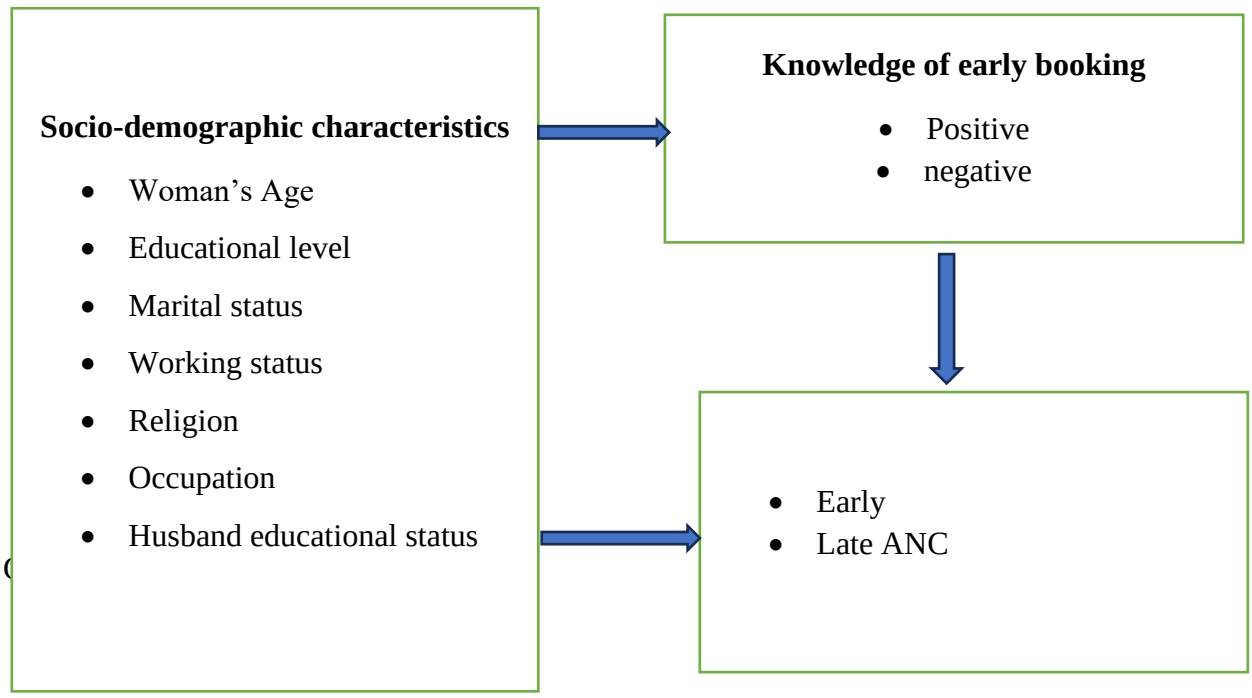


Figure 1: Conceptual Framework

I. Dependent Variable

- Prevalence of late antenatal-care registration

II. Independent Variable

- Knowledge level of pregnant women on ANC booking
- Socio-demographic characteristics

In this conceptual framework which was developed de novo by the researcher, the prevalence of late antenatal-care registration is the dependent variable, which is influenced by two main independent variables: pregnant women's knowledge of ANC booking and their socio-demographic characteristics. The knowledge level encompasses the pregnant women's awareness

and understanding of the need for early ANC visits, shaped by education, prior information, and community health initiatives. Socio-demographic characteristics include various personal and contextual factors such as age, education, income, marital status, employment, parity, access to healthcare, and cultural practices. These independent variables interact and collectively determine the likelihood of late ANC registration. By understanding these relationships, targeted interventions can be developed to address specific barriers and promote timely ANC attendance.

1.5 Research Questions

1. What is the prevalence of late antenatal-care registration in Nanumba South District of Northern Region?

2. What is the knowledge level of pregnant women on antenatal-care Services in Nanumba South District of Northern Region?

3. What factors are associated with late antenatal-care registration in Nanumba South District of the Northern Region?

1.6 General Objective

To assess the prevalence and major drivers of late antenatal-care registration at the Nanumba South District in the Northern Region of Ghana.

1.6.1 Specific Objectives

1. To ascertain the prevalence of delayed antenatal-care registration in the Nanumba South District of Ghana.

2. To assess knowledge of pregnant women on antenatal-care Services in the Nanumba South District of Ghana.

3. To determine the contributing factors of late registration for prenatal care in the Northern Region's Nanumba South District.

1.7 Profile of Study Area

Nanumba South District is one of the 261 Metropolitan, Municipal, and District Assemblies (MMDAs) in Ghana. It is also of the sixteen (16) Municipalities and Districts in the Northern Region. It was formerly part of the Nanumba District until it was detached and inaugurated on 27th August 2004. The district is in the eastern part of the Northern Region of Ghana. Its borders are shared by the Republic of Togo's Zabzugu District to the east, East Gonja Municipality to the west, Nanumba North Municipality to the north, Nkwanta-North District of the Oti Region to the southeast, and Kpandai District to the southwest with a land mass of about 1,789.2 km Square. (Ghana Statistical Service [GSS], 2021).

Map of Nanumba South District

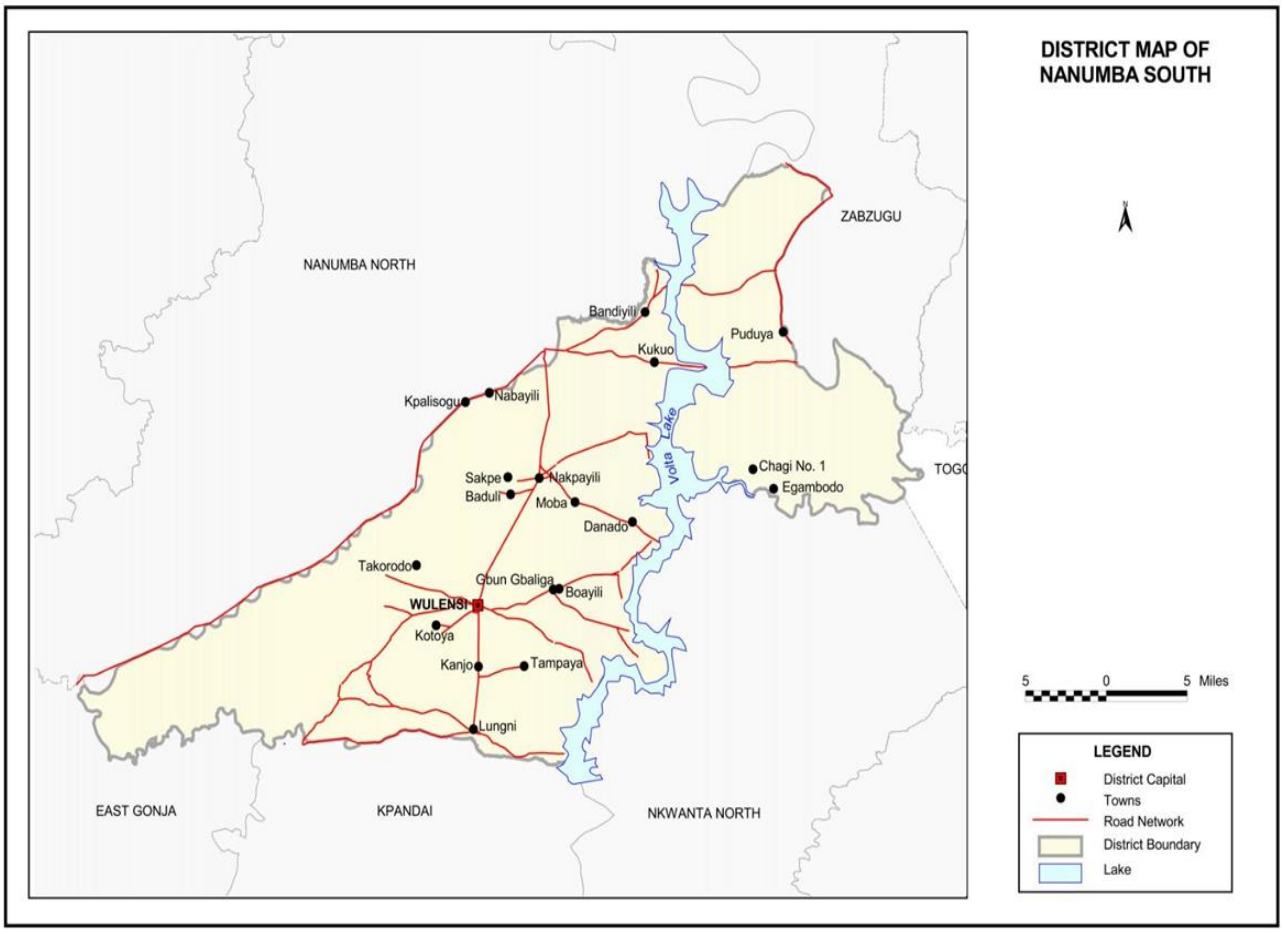


Figure 2: Nanumba South district map

Source: Ghana Statistical Service (2014)

1.8 Scope of Study

The research aimed to assess the prevalence and major drivers of late antenatal care registration in the Nanumba South District. The study was conducted between June 2024 and August 2024. It focused on pregnant women's socio-demographic characteristics, gestational age at registration and knowledge level of ANC. The study employed the use of standardized questionnaires in the determination of the prevalence and major drivers of late ANC registration.

1.9 Organization of Report

This report was presented in six (6) chapters focusing particularly on various aspects of the study which are: Introduction, Literature Review, Methodology, Results, Discussions, Conclusions, and Recommendations.

The study was introduced in Chapter One (1) with the following topics: the study's background, the problem statement, the study's rationale, the conceptual framework, the research questions, the general aim and specific objectives, the study area profile, and the study's scope.

The literature from other investigations on the subject was examined in Chapter Two (2). It considered the frequency of late ANC registration, the variables linked to late ANC registration, and pregnant women's awareness of ANC services.

Chapter Three (3) focused on the methodology used for the study comprising the research design, the process of data collection and analysis as well as limitations encountered during the study. Chapter Four (4) looked at presenting key findings based on study variables. Chapter Five (5) discussed the research findings by linking research questions, literature review, and results obtained from the study.

Finally, Chapter Six (6) made inferences from the study and targeted recommendations to key stakeholders on measures to improve early ANC registration in the Nanumba South District.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter discusses literature on the subject with regard to the objectives of the study. In addition, other published and grey literature that are not directly linked to the objectives of the study but are relevant were also reviewed in this chapter. Scholarly articles were retrieved from search engines such as Google Scholar, ScienceDirect, Science.gov, ResearchGate, and PubMed Central. This section is divided into three sub-sections: Prevalence of late antenatal-care registration, predictors of late antenatal-care registration, and Knowledge of pregnant women on antenatal-care Services.

2.2 Prevalence of late antenatal-care registration

A hospital centered cross-sectional study conducted by Aung et al. (2016), showed that the prevalence of delayed commencement of ANC among the study population was 56.2%. In South Africa, a study found that a significant proportion of women, 51% and 28% in rural and peri-urban areas respectively presented late for their first ANC visit (Ebonwu et al., 2018). Similarly, in Ethiopia, 71.2% in Ilu Ababor Zone of pregnant women went in late for their first ANC visit (Tola et al., 2021), and 59.4% in Northern Ethiopia (Wolde et al., 2018). Another study by Debelo and Danusa (2022), in Gedo General Hospital showed that of 330 women, about 58.5 % of them started attending ANC late, after 16 weeks of gestation. Some studies found a 73.6% prevalence of late ANC visit for the first time (Ndidi & Oseremen, 2010), Axum town (72.5%) (Gebresilassie et al., 2019), Kembata Tembaro Zone (68.6%) (Tekelab & Berhanu, 2014), Ilu Ababor (71.2%) (Tola et al., 2021), East Wollega 81.5% (Ejeta et al., 2017).

In Burkina Faso, 62.93% of women began their ANC visits after the first trimester (Somé, 2020). In Nigeria, a study at Rivers State University Teaching Hospital found that 84.8% of pregnant women delayed in registering for ANC (Eli et al., 2022). This ANC incidence is far lower than that of comparable developing nations like Cameroon (62.9%) and considerably below the suggested goal of 90% attendance (Saad-Haddad et al., 2016), Ghana (87%) (Ghana Statistical Service [GSS] et al., 2015), and Peru (94.4%) (Saad-Haddad et al., 2016).

2.3 Pregnant Women's Knowledge of antenatal-care Services

Health literacy is pivotal in determining the awareness levels of pregnant women about ANC. A study conducted by Guller et al., (2021), in Turkey found a significant health literacy dwindle amongst more than half of the participants, which correlated with lower levels of knowledge about antenatal care. In a study conducted in Eritrea, although many of the pregnant women had good knowledge and attitudes towards ANC, their actual practice was relatively low, indicating a gap between knowledge and application (Gebremariam et al., 2023). Once more in Rwanda, Kpienbaareh et al. (2022) found that women who knew little about pregnancy difficulties were less likely to reach the WHO-recommended number of visits (4+ visits) or use ANC services during the first trimester of their pregnancy. Also, more such women are often delivered away from the health facilities in the absence of skilled health attendants, juxtaposed to those who know pregnancy complications. Markos & Bogale (2014) and Tura et al., (2014), identified in their investigations that the lack of awareness is an impeding factor to accessing maternal health treatments.

The dearth of relevant and right knowledge on pregnancy complications makes it difficult to be ready for emergencies since the use of approved health centers for childbirth has been met with disapproval. (Tuyisenge et al., 2019). Lack of knowledge about the appropriate timing for ANC

and misconceptions about ANC services were frequently cited reasons for late registration. In Botswana, women with previous caesarean sections reported a lack of information and misconceptions about the appropriate booking time and venue (Ramotsababa & Setlhare, 2021; Ramotsababa & Setlhare, 2023). Similarly, poor understanding of the advantages and availability of ANC services was a significant factor in Ethiopia (Grum & Brhane, 2018; Tola et al., 2021).

2.4 Factors associated with late antenatal-care registration

Mlandu et al. (2022) found in the Democratic Republic of the Congo (DRC) and Kenya that, women living in rural settings have a higher probability to delay ANC. These women may encounter accessibility issues and probably unaware of health issues than women in urban areas (Tesfaye et al., 2017; Teshale & Tesema, 2020). Also, women in rural areas may face additional cultural barriers such as spouses' approval before accessing healthcare. This may hinder women from starting ANC early. (Clark et al., 2020).

A study conducted in Rwanda ona cohort of 10,231 pregnant women found that younger maternal age and higher parity were associated with delayed ANC initiation (Schmidt et al., 2021). Multiparity was another significant factor in these regions (Somé et al., 2020). Educational attainment also plays a crucial role; lower educational levels were linked to late ANC registration in both Rwanda and Ethiopia (Wolde et al., 2018; Scmidt et al., 2021). Systemic issues such as delayed referrals and lack of counseling also play a role. In Northern Ethiopia, not being advised to start ANC early was a significant determinant of late registration (Wolde et al., 2018). Women with lower socio-economic status and educational levels are more likely to register late for ANC. For instance, in Burkina Faso, no formal education and poor socio-economic status were significantly related with late ANC registration (Somé et al., 2020). Similarly, in Southeast Ethiopia, no formal education and low monthly income were linked to higher levels of late ANC

initiation (Wanamo et al., 2021). Economic barriers are another critical factor. Women with lower socioeconomic status, including those without health insurance or those facing high transportation costs, have a higher tendency to delay ANC visits (Ali et al., 2023). Employment status also influenced ANC timing, with employed women in rural South Africa more likely to present late for ANC (Ebonwu et al., 2018). Previous obstetric history, such as a history of stillbirth, influences the timing of ANC registration. In Southeast Ethiopia, women with no history of stillbirth were more likely to register late (Wanamo et al., 2021). Late ANC registration has been linked to severe neonatal outcomes, such as preterm birth and low birth weight. A study in the UK found that mothers who scheduled their initial ANC appointment after 20 weeks were significantly more likely to have preterm and low birth weight babies (Puthussery et al., 2022). This underscores the importance of timely ANC for improving neonatal health outcomes. The quality of ANC services and accessibility of health facilities are crucial determinants. Dissatisfaction with the standard of ANC services and the use of alternative ANC providers were significant factors in Botswana (Ramotsababa & Setlhare, 2021; Ramotsababa & Setlhare, 2023). In South Africa, barriers to accessing ANC services were more pronounced in rural areas, contributing to late registration (Ebonwu et al., 2018). Additionally, delayed referrals from local clinics were reported as a reason for late ANC registration in Botswana (Ramotsababa & Setlhare, 2021; Ramotsababa & Setlhare, 2023). Cultural beliefs and social support systems also impact ANC registration timing. Fear of disclosure, fear of the evil eye, and lack of husband support were significant factors in Egypt (Ali et al., 2023). In Ethiopia, advice from significant others and perceived timing of ANC were associated with timely ANC attendance as well (Gebresilassie et al., 2019).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

The chapter provides details on methods and procedures through which the study was carried out. The section included a description of the methods, location of the study, study population, exclusion and inclusion criteria, sample size, sampling method, data collection procedure, data analysis, data management, ethical concerns, budget and project outline and dissemination of findings. Each method to be used in achieving the objections for this study was appropriately justified with relevant literature

3.2 Study Design

A facility-based cross-sectional survey was undertaken to know the prevalence of delayed ANC booking among pregnant women and the variables that influence this at Lungni Health Centre, Nakpayili Health Centre and Kukuo CHPS in the Nanumba South District. A cross-sectional study allows a researcher to report prevalence and generalize it to the entire population while describing the strength of association between exposure and dependent variables (Wang & Cheng, 2020).

3.3 Study setting

Three health facilities in the Nanumba South District, namely, Lungni Health Centre, Nakpayili Health Centre and Kukuo CHPS were the selected sites for the data collection. These health facilities were selected purposively because they are actively engaged in regular ANC services in the district.

The 2023 yearly health performance report of the district documented about 4334 pregnant women were booked for ANC in the district in that year, and of these, 491, 332 and 210 pregnant women registered at Lungni Health Centre, Nakpayili Health Centre and Kukuo CHPS respectively. The total ANC attendance for the district in 2023 was 17906 with Lungni Health Centre, Nakpayili Health Centre and Kukuo CHPS recording 2001, 1441 and 210 attendances respectively. At Lungni Health Centre, ANC is conducted on Tuesdays and Fridays, while ANC is conducted at Nakpayili Health Centre and Kukuo CHPS on Wednesdays and Fridays.

3.4 Study population

Every pregnant woman coming for ANC services whether for their first visit or a subsequent scheduled visit, at Lungni health Centre, Nakpayili health Centre and Kukuo CHPS from 1 May 2024 to 31 May 2024.

3.5 Inclusion and Exclusion Criteria

3.5.1 Inclusion criteria

All pregnant women accessing ANC at Lungni Health Centre, Nakpayili Health Centre, and Kukuo CHPS during the study period were included. Minors (those below 18 years) were also eligible if accompanied by a guardian or family member and provided they gave informed consent to participate in the study.

3.5.2 Exclusion criteria

Pregnant women who do not frequently receive ANC services at the designated facilities but only visit for a one-time service were excluded from the study. Pregnant women who showed

signs of illness or discomfort at the time of sample were also not be included. Additionally, pregnant women who did not give informed consent to take part in the study were exempted

3.6 Sample size calculation and sampling procedure

3.6.1 Sample Size calculation

The sample size for this study is estimated using the Cochran formula

$$n_0 = \frac{Z^2 pq}{e^2}$$

where n_0= sample size

Z^2=Confidence level=1.96

P= prevalence of late ANC registration 86.8% (Damme, 2015)

q=0.132

e^2 =margin of error

no== $\frac{(1.96)^2\ (0.86)(0.132)}{(0.05)^2}$= 176.06

Non response rate =10% of 176.06 =18

Therefore, the total number of participants to be sampled for this study is 194.

3.6.2 Sampling Procedure

The multistage sampling approach was used. Three health facilities were purposively selected and a simple random sampling technique was used to collect the sample. A proportionate sampling

was used to allocate the required sample per facility. The sample size of this study was distributed among the 3 selected health facilities selected using the Average monthly ANC coverage given to each facility. thus, the generated formula below

$$\frac{\text{Average monthly ANC coverage}}{\text{Total average monthly ANC coverage}} x\ calculated\ sample\ size$$

Table 1: Average monthly ANC attendance and required sample sizes

Health facility	Average monthly ANC coverage	Proportional allocation of sample
Lungni Health Centre	280	$\frac{280}{528} \times 194 = 103$
Nakpayili Health Centre	184	$\frac{184}{528} \times 194 = 68$
Kukuo CHPS	64	$\frac{64}{528} \times 194 = 24$
		TOTAL=194

3.7 Data collection procedure

Data was gathered with the use of a structured questionnaire. The questionnaire was adopted from Oduro et al., (2018). Two midwives administered it to study participants in the local Likpakpa and Dagbani languages. The study site is predominantly a rural farming area, with just a few women who can read and understand the English language. A two-day training was

conducted for research assistants which emphasized on the data collection tool and procedure. They also engaged in translating the questionnaire from English to the local dialect. After the training, the questionnaire was pretested on 10 pregnant women in another health facility (Chando CHPS), also in the district. Required changes were made to the questionnaire before the data collection was done in the selected health facilities. The survey collected information on socio-demographic characteristics of the participants including age, occupation, education, partner's education, and marital status. It also asked about their knowledge of ANC services, such as when they booked ANC, the benefits of ANC, and how many times they had visited. Data regarding the gestational age at the initial ANC visit was obtained from the prenatal books of the subjects. For those attending ANC for the first time, their gestational age was confirmed using their scan report. In this study, late registration is when participants reported for their first ANC appointment in their second trimester.

3.8 Data handling

The principal investigator (PI) monitored and supervised the data collection process. At the end of each day, the PI double-check all gathered data to ensure accuracy, completeness, and consistency. The data was collected using Kobo Collect, which enabled daily synchronization and secure storage on a password-protected server accessible only to the PI. Upon completion of data collection, the PI performed final checks to ensure no missing data. The data was then downloaded from the web server in Excel format and exported to STATA version 18 for cleaning and analysis.

3.9 Statistical Analysis

For analysis, the Kobo Collect data was exported to STATA version 18. Tables, percentages, means, and standard deviations were used to display the data. The frequency of late ANC

booking was determined using percentages and confidence intervals. Using logistic regression and chi-square testing, the association between late ANC booking and the independent variables was investigated; a p-value of 0.05 was considered statistically significant at a 95% confidence interval. Logistic regression was used to determine the degree of association between the dependent and independent variables, which were expressed as odds ratios with corresponding confidence intervals. The questionnaire has ten questions in order to gauge ANC services. Each correct response was scored Yes (1) with an incorrect response scoring No (0). Each participant's overall score was calculated and given as a percentage of the maximum possible score of 10. The participants' scores on the knowledge of ANC services were divided into two categories: appropriate knowledge (≥70%) and inadequate knowledge for a score less than 70%.

3.10 Dissemination of Results

Results from the study will be shared with the Ghana Health Services through the Nanumba South District Health Directorate, facilities involve and the findings published in a peer reviewed journal.

3.11 Ethical Considerations

The researcher sought approval from the Institutional Review Board of the Ensign Global College and also permission from the District Health Directorate of Nanumba South. Respondents were duly informed about the purpose of the study and consent was sought before answering the questionnaire. Any information regarding the identity of the respondents was not required in order to ensure anonymity and confidentiality.

3.11.1 Risk/Benefit

The study posed no or minimal risk to participants. There were no material benefits to participants a side the verbal expression of gratitude.

3.11.2 Confidentiality

Information shared will not be disclosed to anyone outside the research team. No names were written on the questionnaire. Every information from this research will be accessible to the principal investigator only through a password and hard copies will be kept under key and lock. Hard copy data will be destroyed after five years.

3.11.3 Limitations of the study

The purposive selection of the three health facilities in the district affects our ability to generalize the study findings. Also, the use of the quantitative method of data collection limited the exploration of some of the predictive variables. However, the study produces useful data on the drivers of late ANC registration such as advanced maternal age and occupation.

3.11.4 Assumptions

The assumption of the study is that responses given by participants was done truthfully and honestly. Also, all conditions were satisfied to increase the internal validity of the results, and the prerequisites for the statistical models utilized in this study were met.

CHAPTER FOUR

RESULTS

4.0 Introduction

A detailed description of the results based on the objectives of the study are presented in this chapter in the form of tables and graphs. One hundred and ninety-four pregnant women were interviewed in three health facilities between June and July 2024. The findings below demonstrate the analysis of data from the 194 respondents.

4.1 Socio-demographic characteristics of respondents

The socio-demographic characteristics of respondents are presented in Table 4.1. The majority of the women were young, with 42.3% aged 15-24 years and 44.3% aged 25-34 years. A striking 92.8% were married, and educational attainment was notably low, with 59.8% having no formal education. The occupational landscape was dominated by informal sector employment at 74.7%, while 23.7% were unemployed. Further the majority (61.9%) of the respondents' partners worked in the informal sector with the majority (51.1%) having no formal education.

Table 4.1 Socio-demographic characteristics of respondents

Variable	Frequency (n=194)	Percentage (%)
Age		
15 - 24	82	42.3
25 - 34	86	44.3
35 - 44	26	13.4
Marital status		
Married	180	92.8
Single	14	7.2
Level of education		
Basic	50	25.8
No formal education	116	59.8
Secondary	28	14.4
Religion		
Christian	93	47.9
Islam	33	17.0
None	12	6.2
Traditional	56	28.9
Occupation		
Formal	3	1.6
Informal	145	74.7

Unemployed	46	23.7
Partner's occupation		
Formal	19	9.8
Informal	120	61.9
Unemployed	55	28.4
Partner's education		
Basic	28	14.4
No formal education	105	54.1
Secondary	37	19.1
Tertiary	24	12.4

4.2 Antenatal booking among study participants.

The study revealed both encouraging trends and areas of concern in antenatal booking practices. While 62.9% of women booked early for ANC in the initial 12 weeks of pregnancy, a significant 37.1% delayed booking until later in pregnancy. This late booking behavior could potentially compromise the effectiveness of ANC in managing pregnancy-related complications. A striking finding was the influence of partners on ANC booking decisions, with 93.3% of women reporting that their ANC booking time depended on the decision of their partners. This underscores the critical need to involve male partners in maternal health initiatives. Furthermore, 36.6% of participants preferred the services of traditional birth attendants over skilled health attendants.

Table 4.2: Antenatal booking among study participants.

Variable	Frequency (n=194)	Percentage (%)
Booking for current pregnancy		
Early booking (1 - 3 months)	122	62.9
Late booking (4 - 9 months)	72	37.1
Booking time depends on partner's decision		
No	13	6.7
Yes	181	93.3
Prefer traditional birth attendants to hospital health attendants		
No	123	63.4
Yes	71	36.6
Concerns about the hospital health system which affects your booking time		
No	180	92.8
Yes	14	7.2
If yes specify		
Drugs	2	14.3
Health insurance renewal	1	7.7
Money for payment	11	84.6

4.3 Prevalence of late antenatal-care registration among respondents

The graph below captures prevalence of late antenatal-care registration among respondents. 37.1% of the respondents registered for antenatal-care late.

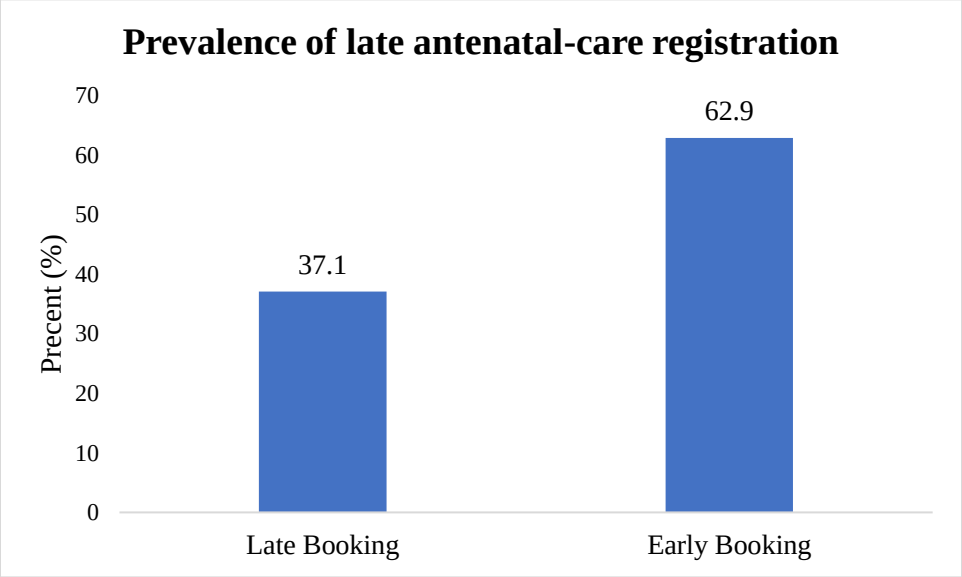


Figure 4. 1: Prevalence of late antenatal-care registration among respondents

4.4 Respondents' Knowledge on antenatal-care services

The knowledge on ANC services were also asked and the findings are presented in Table 4.3. An overwhelming 80.9% of women recognized the necessity of initiating ANC visits within the first trimester. Universal awareness (100%) was observed regarding ANC's role in detecting and treating pregnancy complications and preventing structural deformities. Nearly all participants (99.5%) understood the significance of fetal kick counting for monitoring fetal well-being. However, a notable misconception persisted, with 65.5% presuming sufficiency in four ANC visits during pregnancy. Also, the majority (91.2%) noted that intense frequent activities could be detrimental for the baby's development.

Table 4.3: Knowledge of respondents on antenatal-care services

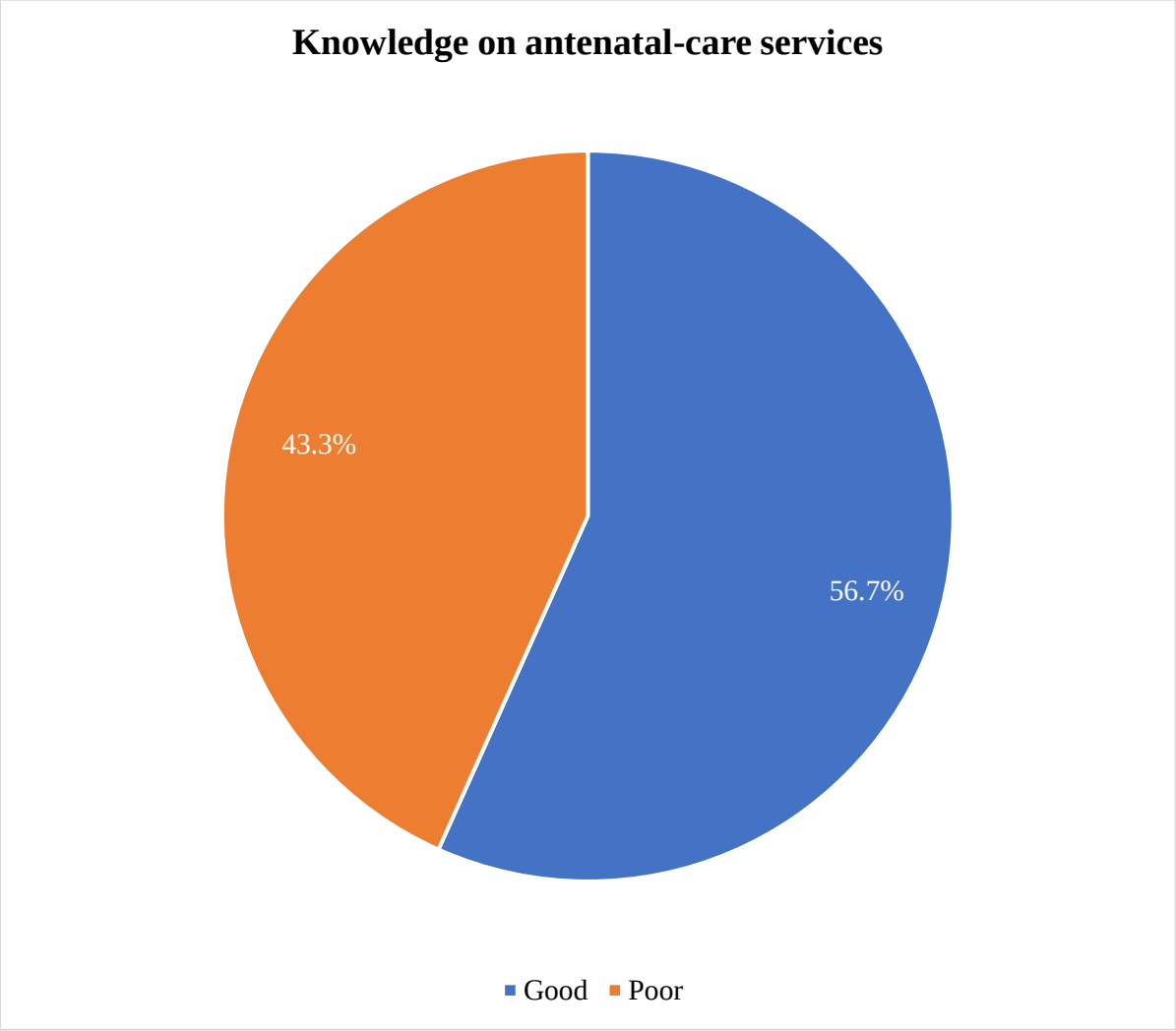
Variable	Frequency (n=194)	Percentage (%)
The first ANC must be within the 1st 3 months		
No	37	19.1
Yes	157	80.9
ANC helps to identify and treat pregnancy complications		
Yes	194	100.0
Structural deformities can be prevented during ANC		
Yes	194	100.0
Deficiencies of micronutrients can be found and improved during ANC		
Yes	194	100.0
No of times the fetus kicks is a sign of well-being		
No	1	0.5
Yes	193	99.5
Four ANC visits during pregnancy are enough		
No	67	34.5
Yes	127	65.5

Intensive frequent exercises may affect the baby		
No	17	8.8
Yes	177	91.2
Good outcome in pregnancy requires good diet		
No	3	1.6
Yes	191	98.5
Pregnant women should eat more food than non-pregnant women		
No	1	0.5
Yes	193	99.5
Mothers naturally learn the correct way to breastfeed their child.		
No	34	17.5
Yes	160	82.5

Overall knowledge on antenatal-care services among respondents

Figure 4.2 shows the overall knowledge on antenatal-care services among respondents. The majority (56.7%) of the respondents had knew about antenatal-care services.

Figure 4.2 shows the overall knowledge on antenatal-care services among respondents



4.4 Factors associated with antenatal care registration among participants

The variables linked to respondents' delayed prenatal care registration is displayed in Table 4.4. Participant's occupation (p=0.026), partner's occupation (0.044), and knowledge of participants on ANC were the only factors with significant association with late antenatal care registration

Table 4.4: Factors associated with late antenatal-care registration among respondents

Variable	Total, n=194 n(%)	Late booking n(%)	Early booking n(%)	p-values
Age				
15 - 24	82 (42.3)	26(36.1)	56(45.9)	0.055
25 - 34	86(44.3)	31(43.1)	55(45.1)	
35 - 44	26(13.4)	15(20.8)	11(9.0)	
Marital status				
Married	180(92.8)	68(94.4)	112(91.8)	0.492
Single	14(7.2)	4(5.6)	10(8.2)	
Level of education				
Basic	50(25.8)	18(24.7)	32(26.5)	0.485
No formal education	116(59.8)	46(63.8)	70(57.4)	
Secondary	28(14.4)	8(10.9)	20(16.5)	
Religion				
Christian	93(93.0)	41(34.5)	52(58.5)	0.080*
Islam	33(33.3)	11(12.2)	22(20.8)	
None	12(12.0)	1(4.5)	11(7.5)	

Traditional	56(56.0)	19(20.8)	37(35.2)	
Occupation				
Formal	3(3.0)	1(1.1)	2(1.9)	**0.026***
Informal	145(145.0)	61(53.8)	84(91.2)	
Unemployed	46(46.0)	10(17.1)	36(28.9)	
Partner's occupation				
Formal	19(9.8)	7(9.7)	12(9.8)	**0.044**
Informal	120(61.9)	52(72.2)	68(55.8)	
Unemployed	55(28.3)	13(18.1)	42(34.4)	
Partner's education				
Basic	28(14.4)	8(11.1)	20(16.4)	0.596
No formal education	105(54.1)	43(59.7)	62(50.8)	
Secondary	37(19.1)	12(16.7)	25(20.5)	
Tertiary	24(12.4)	9(12.5)	15(12.3)	
Knowledge on ANC services				
Good	110(56.7)	59(81.9)	51(41.8)	**<0.001**
Poor	84(43.3)	13(18.1)	71(58.2)	

*** Analysed with fisher's exact test**

4.5 Multivariate logistic regression analysis of the factors associated with late antenatal booking among study participants

The table below displays the factors that contribute to late antenatal care booking. The crude and adjusted regression analysis showed only knowledge of ANC services to be significant in

predicting late antenatal care registration with p-value of <0.001 in both models. Participants with poor knowledge on ANC services were 6 times more likely to book for ANC services late compared to participants with good knowledge (OR=6.31[CI:3.14-12.72], p<0.001). Final model analysis showed that the odds of participants with poor knowledge on ANC services booking late were 8 times more than counterparts with good knowledge (AOR=8.95[3.29-24.36], p<0.001).

Table 4.5: Multivariate logistic regression analysis of the factors associated with late antenatal booking among study participants

Variable	OR (95% CI)	p-value	AOR (95% CI)	p-value
Occupation				
Formal	1.00		1.00	
Informal	0.69 (0.06-7.77)	0.763	0.65 (0.04-11.13)	0.766
Unemployed	1.8(0.15-21.94)	0.645	0.63(0.03-11.70)	0.754
Partner's occupation				
Formal	1.00		1.00	
Informal	1.16(0.33-4.00)	0.596	0.76(0.28-2.07)	0.809
Unemployed	0.66(0.16-2.76)	0.268	1.88(0.61-5.78)	0.568
Knowledge on ANC services				
Good	1.00		1.00	
Poor	6.31(3.14-12.72)	**<0.001**	8.95(3.29-24.36)	**<0.001**

CHAPTER FIVE

DISCUSSIONS

5.0 Introduction

The chapter considers the results of the analysis and compares them with previous literature. It draws insights from the results, providing a better understanding of what the study sought to achieve. The main objective was to determine the prevalence of late antenatal care booking and the factors contributing to this in the Nanumba South District of Ghana.

5.1 Prevalence of late antenatal-care registration

Late registration for prenatal care has posed a significant challenge in achieving SDG3's target of reducing maternal mortality rates worldwide. This study evaluated the proportion of rural pregnant women who registered late for antenatal-care registration in the Nanumba South District. The findings revealed that approximately 37.1% of the women registered for antenatal care late. Although the percentage suggests a relatively low prevalence of late antenatal care registration among pregnant women in the Nanumba South District, it still raises significant concerns comparing this to the recommended number of visits by WH, (above 90%) of ANC booking for all pregnant women in the first trimester (WHO, 2015). Consistent with extant literature, this finding is lower when compared to the findings of studies conducted Southern Ethiopia (71.2%) (Tola *et al*., 2021), Northern Ethiopia (59.4%) (Wolde *et al*., 2018), Western Ethiopia (58.5%) (Debelo & Danusa, 2022), Axum town (72.5%) (Gebresilassie *et al*., 2019), Burkina Faso (62.93%) (Somé, 2020), Nigeria (84.8%) (Eli *et al*., 2022), Cameroon (62.9%) (Saad-Haddad *et al*., 2016) and Ghana (44.8%) (Oduro et al.,2022). The relatively lower prevalence of late antenatal care registration in the Nanumba South District compared to other regions may be attributed to the

reason that, there might be effective community outreach and education programs that emphasize the importance of early antenatal care, leading to increased awareness among pregnant women. Also, the accessibility and availability of healthcare facilities in the district could be better, making it easier for women to attend antenatal clinics early in their pregnancies. The observed differences could also be explained by the cultural practices and local norms in the Nanumba South District which might be more supportive of early antenatal care registration compared to other regions. This finding suggests the implementation of context-specific strategies to encourage timely antenatal care registration, ultimately contributing to better maternal health outcomes.

However, the current finding is higher in prevalence when compared to the findings of a hospital-based study conducted in South Africa, which found that slightly above 28% of peri-urban women went in for their first ANC visit (Ebonwu *et al*., 2018). The variation in what was found likely stems from the fact that the South African study (Ebonwu *et al*., 2018) focused on peri-urban women, whereas the current study involved women from a rural setting. Previous reports have indicated that pregnant women who live in rural areas are more inclined to initiate antenatal care later than their counterparts in urban areas (Ewunetie *et al.,* 2018). This suggests that targeted strategies are needed to address the specific barriers faced by rural women, such include difficult access to medical facilities, problems with transportation, and ignorance of the significance of early prenatal care. Public health programs should focus on improving healthcare infrastructure, enhancing community education, and providing support systems to encourage early registration for antenatal care.

The study also revealed a striking 36.6% of participants opted for traditional birth attendants (TBAs) for ANC services. These TBAs conduct birth services in addition to traditional prenatal care services including nutrition and cultural practices considered right for safe delivery (Adatara

et al., 2018). The public health concern for pregnant women choosing TBAs over health professionals stems from the negative outcomes TBA services have on maternal and child morbidity and mortality (Fronczak et al., 2007). This is because women who utilize the 'traditional ANC services may not have the opportunity to benefit from interventions to improve pregnancy and birth outcomes.

5.2 Knowledge of pregnant women on antenatal-care services

The study also assessed respondents' knowledge of antenatal-care services. The findings revealed that more than half (56.7%) of the respondents demonstrated a good understanding of antenatal care services. However, despite this knowledge, many still faced challenges in putting it into practice, as evidenced by their late antenatal-care registration (37.1%). This finding is however congruent with another cross-sectional study conducted in Ghana by Oduro *et al.*, (2022) which revealed almost 80% of their respondents were adequately knowledgeable on antenatal care services. Similarly, this finding corroborates the results of an Eritrean study which found that the most of the pregnant women in their study had good knowledge of accessing antenatal care services (Gebremariam *et al*., 2023). It is reasonable to argue that respondents who demonstrated a good understanding of antenatal care services may be well-educated or had previous pregnancies during which they attended antenatal care services and received education, hence their adequate knowledge.

Conversely, the finding from the current study contradicts previous studies conducted in Botswana (Ramotsababa & Setlhare, 2023) and Ethiopia (Grum & Brhane, 2018; Tola *et al*., 2021) which found that pregnant women had inadequate knowledge for accessing antenatal care services. Whereas, birth unpreparedness, comprising failure to seek and utilize ANC services in designated

health facilities during delivery has been found to complicate pregnancies (Tuyisenge et al., 2019). The possible explanation for this discrepancy could be the presence of other barriers such as logistical challenges, financial constraints, limited healthcare access, or cultural practices that hinder timely registration. The implication is that while education on antenatal care is crucial, it must be complemented with interventions that address these practical barriers. Enhancing healthcare accessibility, providing financial support, and engaging communities to shift cultural norms could help bridge the gap between knowledge and practice, ultimately improving maternal health outcomes.

5.3 Factors associated with late antenatal-care registration

It was found that both the participant's and partner's occupations are significantly associated with late ANC registration partially aligns with previous studies. Ebonwu *et al.* (2018) reported that women who worked or were employed in rural South Africa were more likely to present late for ANC. However, the current study provides a more nuanced perspective by also considering the partner's occupation. This inclusion of partner occupation is a valuable contribution to thealready available catalogue of knowledge, as it recognizes the potential influence of the partner's work situation on ANC timing. The significance of occupation in determining ANC timing may be due to various predictors such as schedule of work, workplace policies, and the economic pressures associated with different occupations. The significance of occupation suggests that workplace policies and support systems may play a crucial role in facilitating timely ANC. This implies a need for policies that support pregnant women in the workplace and allow for flexibility in attending ANC appointments. Advocate for workplace policies that support pregnant women in attending ANC appointments. This could include flexible working hours or paid time off for ANC visits.

The study also discovered a strong correlation between delayed ANC registration and inadequate understanding of ANC services. Participants with poor knowledge were found to be more than 5 times likely to register late for ANC services when juxtaposed to those with better knowledge. This is consistent with several studies in the literature. For instance, Wolde *et al.* (2018) found in Northern Ethiopia that not being advised to start ANC early was a significant determinant of late registration. Similarly, Gebresilassie *et al.* (2019) reported that advice from significant others and perceived timing of ANC were linked with timely ANC attendance in Ethiopia. The strength of this association in the current study (OR=6.31, AOR=8.95) underscores the crucial role that knowledge plays in determining ANC timing. The findings of the current research have many useful implications. The strong association between knowledge and timely ANC registration underscores the critical importance of health education and awareness campaigns. Implement comprehensive community education programs about the importance and timing of ANC. These programs should be designed to reach not only pregnant women but also their partners and the wider community. Investigate the quality and content of ANC knowledge in the community. Given the strong association between knowledge and timely ANC registration, it is crucial to understand what specific knowledge gaps exist and how best to address them.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Overall, the investigation found that women in the Nanumba South District registered late (37.1%) for antenatal care services, even though they demonstrated an acceptable depth of knowledge (56.7%) on antenatal care services. Factors such as age, poor knowledge and employment status were significant, with older women (20.8%) and those unemployed showing differing patterns in antenatal care registration and knowledge. These three predictive variables were further analyzed using the multivariate logistic regression analysis and only poor knowledge of pregnant women was statistically significant (AOR=8.95[3.29-24.36], $p<0.001$). The findings underscore the importance of addressing practical barriers to early antenatal care registration and suggest leveraging community-based and culturally tailored educational programs to improve maternal health outcomes.

6.2 Recommendations

In consideration of the study's findings, the researcher makes the following recommendations;

1. The Nanumba South District Health Directorate and community health workers should develop and implement targeted community outreach programs to increase awareness about the importance of early antenatal care registration, especially in remote settings.
2. Religious leaders, community-based organizations, and public health education agencies should partner to incorporate antenatal care education into religious and community programs, addressing culturally specific barriers.

3. The Nanumba South District Assembly through the Social services departments, employment agencies, and NGOs focused on socioeconomic support should create support programs that provide financial assistance to unemployed pregnant women to improve their access to antenatal care services.
4. Academic research institutions and policy-making bodies should conduct qualitative research to explore the specific barriers to early antenatal care registration among different demographic groups and tailor interventions accordingly.

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APPENDICES

Appendix V: Data Collection Instrument

TOPIC: ASSESSING THE PREVALENCE AND MAJOR DRIVERS OF LATE ANTENATAL-CARE REGISTRATION AT THE NANUMBA SOUTH DISTRICT IN THE NORTHERN REGION OF GHANA.

Hello Sir/Madam,

My name is DANIKUU NOBINI ROBERT and I am a student from Ensign Global College conducting a study titled, "Assessing the Prevalence and Major Drivers Of Late Antenatal-Care Registration at the Nanumba South District in the Northern Region of Ghana". This questionnaire is designed to gather information on the above research topic in partial fulfillment of the requirements for the award of Master of Public Health Degree from Ensign Global College. Your participation is very important to the success of this research. Your responses are highly appreciated. They will be treated with confidentiality and used for academic purpose only.

I am sharing my research ethics statement for your perusal.

Participant ID: ……..

PART A: Socio Demographics.

1. Age (years)

[ ] 15- 24

[ ] 25-34

[ ] 35-44

[ ] ≥45

2. Marital status

[ ] Single

[ ] Married

[ ] Widowed

[ ] Divorced

[ ] Cohabiting

3. Level of education

[ ] No formal education

[ ] Basic

[ ] Secondary

[ ] Tertiary

4. Religion

[ ] None

[ ] Traditional

[ ] Christian

[ ] Islam

5. Occupation

[ ] Formal

[ ] Informal

[ ] Unemployed

6. Partner's occupation

[ ] Formal

[ ] Informal

[ ] Unemployed

7. Partner's education

[ ] No formal education

[ ] Basic

[ ] Secondary

[ ] Tertiary

PART B: Participants' knowledge of ANC services

8. The first ANC visit after a missed period must be within the 1st 3 months.

[ ] Yes

[ ] No

9. ANC is very important in detecting and treating pregnancy complications such anemia, diabetes and malaria.

[ ] Yes

[ ] No

10. Structural deformities can be prevented during ANC.

[ ] Yes

[ ] No

11. Micronutrients deficiency can be detected and improved during ANC.

[ ] Yes

[ ] No

12. Foetal kick count can be used to monitor the well-being of the Foetus.

[ ] Yes

[ ] No

13. Four ANC visits during pregnancy are enough.

[ ] Yes

[ ] No

14. Regular and strenuous exercises may be unsafe for the baby.

[ ] Yes

[ ] No

15. Micronutrient-rich diet is required for a good pregnancy outcome.

[ ] Yes

[ ] No

16. Pregnant women need to eat more food than non-pregnant women.

[ ] Yes

[ ] No

17. Knowledge of appropriate child breastfeeding is acquired naturally.

[ ] Yes

[ ] No

PART C: Antenatal booking among study participants.

18. Booking for current pregnancy;

[ ] Early booking(1-3 Months)

[ ] Late Booking(4-9 Months)

19. Booking time depend on partner's decision.

[ ] Yes

[ ] No

21. Prefer traditional birth attendants to hospital health attendants?

[ ] Yes

[ ] No

22. Concerns about the hospital health system which affects your booking time.

[ ] Yes

[ ] No

IF YES SPECIFY

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……

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