

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

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

**ORAL HEALTH KNOWLEDGE, ATTITUDES AND PRACTICES AMONG
PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT SOUTH TONGU
MUNICIPAL HOSPITAL IN THE VOLTA REGION OF GHANA**

BY

BLESSING UCHE

257100322

MAY, 2026

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

MAY, 2026

DECLARATION

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

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Date

DEDICATION

This work is dedicated to all pregnant women whose experiences and participation made this study possible, and to my family for their unwavering support and encouragement throughout my academic journey.

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First and foremost, I give thanks to the Almighty God for granting me life, strength, wisdom, and guidance throughout this academic journey. Without His grace and direction, the successful completion of this work would not have been possible.

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I am also deeply grateful to all the pregnant women who participated in this study. Your willingness to share your experiences and provide valuable information made this research possible.

Finally, I extend my heartfelt appreciation to my family, friends, and colleagues who provided encouragement, motivation, and support throughout this journey. Your support has been invaluable in helping me successfully complete this work.

DEFINITION OF TERMS

Oral Health: A state of the mouth, teeth, and orofacial structures that enables individuals to perform essential functions such as eating, speaking, and breathing, while also contributing to psychosocial well-being and the ability to live without pain, discomfort, or embarrassment.

Dental Caries: A bacterial-driven process that results in the demineralization and destruction of tooth structure, commonly referred to as tooth decay.

Periodontal Disease: An inflammatory condition affecting the supporting structures of the teeth, including the gums, periodontal ligament, and alveolar bone, which can lead to tooth mobility and eventual tooth loss if untreated.

Gingivitis: A mild and reversible form of periodontal disease characterized by inflammation of the gums, often presenting with redness, swelling, and bleeding during brushing or probing.

Antenatal Care (ANC): The routine healthcare services provided to pregnant women during pregnancy to monitor maternal and fetal health and to provide preventive and health promotion interventions.

Oral Health Knowledge: The level of awareness and understanding individuals have regarding oral health conditions, preventive measures, and the relationship between oral health and overall health outcomes.

Oral Health Attitudes: The beliefs, perceptions, and feelings individuals hold regarding the importance of oral health and the safety or necessity of seeking oral healthcare services.

Oral Health Practices: The behaviors and actions individuals undertake to maintain oral hygiene and prevent oral diseases, such as tooth brushing, use of fluoride toothpaste, dental visits, and dietary practices.

Community Periodontal Index of Treatment Needs (CPITN): A standardized clinical index used to assess periodontal health and determine the type of periodontal treatment required.

Pregnancy-related Oral Conditions: Oral health conditions that occur or worsen during pregnancy due to hormonal, physiological, and behavioral changes, including gingivitis, periodontal disease, and enamel erosion.

LIST OF ABBREVIATIONS

Abbreviation	Meaning
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
BOP	Bleeding on Probing
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
CHPS	Community-based Health Planning and Services
CPITN	Community Periodontal Index of Treatment Needs
FDI	FDI World Dental Federation
GSS	Ghana Statistical Service
IRB	Institutional Review Board
KAP	Knowledge, Attitudes, and Practices
LMICs	Low- and Middle-Income Countries
SSA	Sub Saharan Africa
STATA	Statistical Software for Data Analysis
UAE	United Arab Emirates
USA	United States of America
WHO	World Health Organization

ABSTRACT

Background: Maternal oral health is an important component of overall maternal and child health, yet it remains poorly integrated into routine antenatal care in many low- and middle-income countries. Physiological and hormonal changes during pregnancy increase the risk of oral conditions such as gingivitis and periodontal disease, which have been associated with adverse pregnancy outcomes including preterm birth and low birth weight. Despite these risks, knowledge, attitudes, and preventive oral health practices among pregnant women remain inadequate in many settings.

Aim: This study aimed to assess the oral health knowledge, attitudes, and practices among pregnant women attending antenatal clinic at South Tongu Municipal Hospital in the Volta Region of Ghana.

Method: Method: A facility-based quantitative cross-sectional study was conducted among pregnant women attending antenatal care at South Tongu Municipal Hospital. A consecutive sampling technique was used to recruit eligible pregnant women during the data collection period. Data were collected using a structured questionnaire administered through KoboCollect. A total of 406 pregnant women were targeted, and 334 respondents provided complete data for analysis, representing a response rate of approximately 82%. Data were analyzed using STATA. Descriptive statistics were used to summarize variables, while Chi-square tests and logistic regression analysis were used to examine associations between selected variables. Statistical significance was set at $p < 0.05$.

Results: The findings revealed generally low levels of oral health knowledge among respondents, with 57.78% demonstrating poor knowledge of oral health during pregnancy. However, 58.38% of respondents exhibited positive attitudes toward oral healthcare during pregnancy. Oral health practices were generally good, with 87.43% reporting good oral hygiene practices such as brushing twice daily and using fluoride toothpaste. Despite these positive practices, utilization of professional dental services during pregnancy was very low, with only 7.51% reporting visiting a dentist during pregnancy. Statistical analysis showed no significant association between oral health knowledge and oral health practices ($\chi^2 = 3.666$, $p = 0.056$) and no significant association between attitudes and oral health practices ($\chi^2 = 1.36$, $p > 0.05$).

Conclusion: Although most pregnant women demonstrated good oral hygiene practices and relatively positive attitudes toward oral health, knowledge regarding oral health during pregnancy was generally inadequate, and utilization of professional dental services was extremely low. These findings highlight the need to strengthen oral health education and integrate dental screening and referral into routine antenatal care services to improve maternal oral health awareness and preventive care.

Keywords: Oral health, pregnancy, knowledge, attitudes, practices, antenatal care, Ghana.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Oral health is a vital component of overall health and well-being. The World Health Organization (WHO) defines it as a state of the mouth, teeth, and orofacial structures that enable individuals to perform essential functions such as eating, breathing and speaking, and encompasses psychosocial dimensions such as self-confidence, well-being and the ability to socialize and work without pain, discomfort and embarrassment (WHO, 2025). The FDI World Dental Federation further describes oral health as a condition influenced by biological, behavioral, social, and environmental factors (FDI, 2025).

The significance of oral health extends well beyond the mouth. Increasing evidence highlights a strong link between oral diseases and systemic conditions such as cardiovascular disease, diabetes mellitus, respiratory infections, and adverse pregnancy outcomes (Oberoi *et al.*, 2016; Le *et al.*, 2021). For example, periodontal inflammation and the oral microbiome can serve as entry points for pathogenic bacteria into the bloodstream, potentially triggering systemic inflammation. Additionally, oral pain, tooth loss, or disfigurement can negatively affect nutrition, speech, self-esteem, and productivity, particularly among vulnerable groups (Peng, 2022; CDC, 2024).

Globally, oral diseases remain among the most prevalent health conditions. Dental caries, a bacterial-driven demineralization of tooth structure, affects more than 2 billion people worldwide, particularly children and individuals in low-income settings (Kassebaum *et al.*, 2017). Periodontal disease, marked by inflammation and infection of supporting tooth structures is also widespread and can lead to tooth mobility and eventual loss if untreated (Takedachi *et al.*, 2022). Oral

infections such as candidiasis or herpetic lesions may occur secondary to immunosuppression, poor hygiene, or systemic illness (Rieger *et al.*, 2024). These challenges are often most severe in disadvantaged populations, where access to preventive and curative dental care is limited. Although oral diseases are largely preventable, they continue to be underprioritized in many low- and middle-income countries (LMICs), making them a persistent public health concern (Ghods *et al.*, 2022; Rieger *et al.*, 2024).

Pregnancy is a distinct physiological state characterized by complex hormonal, metabolic, and immunologic changes that affect virtually every system in the body, including the oral cavity. Elevated levels of estrogen and progesterone can amplify the body's inflammatory response to dental plaque, making the gingival tissues particularly susceptible to disease (Sachelarie *et al.*, 2024). Estrogen increases vascular permeability, while progesterone can impair collagen production and modulate immune responses (Palanisamy, 2025). Additionally, the immunosuppressive state during pregnancy can foster the rapid proliferation of pathogenic oral bacteria, increasing the risk of oral infections such as gingivitis and candidiasis (Rieger *et al.*, 2024). Frequent episodes of vomiting, common in the first trimester, expose the teeth to hydrochloric acid with a low pH. This acid erodes the enamel, weakening the protective outer layer of the teeth and making them more prone to cavitation and decay (Boggess *et al.*, 2016).

As a result, several oral health conditions are frequently observed during pregnancy. The most common among these are gingivitis and periodontal disease. A comprehensive systematic review and meta-analysis published in 2022 analyzed data from 20 studies worldwide to assess the prevalence of periodontal disease among pregnant women. The findings revealed that approximately 67% of pregnant women experienced bleeding on probing (BOP), a key indicator of gingivitis. Additionally, the prevalence of periodontitis was estimated at 40%, with probing

depth and clinical attachment loss rates of 42% and 24%, respectively (Chen, Hong and Yu, 2022). Similarly, a study conducted at the Lagos State University Teaching Hospital reported that the prevalence of gingivitis among pregnant women ranged from 30% to 100% (Onigbinde *et al.*, 2015). In Senegal, a 2022 multicenter cross-sectional study among nulliparous found that 88% of these women had gingivitis, with 15% classified as moderate and 73% as severe (Gare *et al.*, 2023). Similarly, a study conducted in the Greater Accra Region found that 84.8% of adults presented with gingivitis. While this study included both pregnant and non-pregnant individuals, the high prevalence shows the burden of gingival inflammation in the region (Hewlett *et al.*, 2022).

Beyond localized oral issues, there is a growing body of evidence linking maternal periodontal disease to adverse pregnancy outcomes such as preterm birth, low birth weight, and pre-eclampsia (Manrique-Corredor *et al.*, 2019; Le *et al.*, 2022). Despite this established risk, research consistently shows that globally, many pregnant women possess limited knowledge about the oral-systemic health link and often underestimate the importance of oral hygiene during pregnancy (Onigbinde *et al.*, 2015; Chen, Hong and Yu, 2022; Hewlett *et al.*, 2022). For instance, a study conducted in government hospitals in the United Arab Emirates (UAE) revealed that only 15% of participants believed pregnancy increased the likelihood of gum disease, and a significant 66% reported that their gynecologists did not advise dental visits during pregnancy (Raeesi *et al.*, 2023).

Similarly, a study conducted by Hebbal *et al.* (2025) in Saudi Arabia found that a significant proportion had poor oral health practices, with many never utilizing dental services during pregnancy. A study conducted in Ghana by (Goka *et al.*, 2022), revealed that 72% of the pregnant women surveyed had never visited a dentist. It was also revealed that approximately 76.2% of participants had a Community Periodontal Index of Treatment Needs (CPITN) score of 2 or higher, indicating the presence of calculus and the need for oral hygiene instructions and scaling

(professional cleaning). Furthermore, cultural misconceptions such as fears that dental treatment could harm the fetus worsen the problem (Gupta *et al.*, 2019).

In Ghana, these challenges are amplified by structural barriers. A study exploring health system factors in Ghana identified that, beyond financial constraints, challenges such as limited and unequal distribution of skilled maternity care services, cultural insensitivity, and long waiting times hinder women's access to and use of skilled maternal and newborn healthcare services (Aboagye *et al.*, 2024).

Another study exploring dental care misconceptions and barriers in pregnancy revealed that most participants did not obtain dental care and did not recall receiving dental information during prenatal visits. Barriers to dental care included lack of insurance, difficulty in finding a dentist, low priority given to dental care, misconceptions about the safety and appropriateness of dental care during pregnancy, and sporadic anticipatory guidance during prenatal care (Detman, Cottrell and Denis-Luque, 2016).

Assessing the knowledge, attitudes, and practices of pregnant women regarding oral health provides an evidence-based foundation for designing effective interventions to address these gaps. knowledge, attitudes, and practice assessments offer insight into awareness levels, misconceptions, and behavioral trends essential for developing context-specific strategies that promote oral health as part of antenatal care. Integrating targeted oral health education into Antenatal care (ANC) services can enhance knowledge, shift attitudes, correct misinformation, and promote preventive practices that protect both maternal and fetal health (Manrique-Corredor *et al.*, 2019; Raeesi *et al.*, 2023; Hebbal *et al.*, 2025).

1.2 Problem Statement

Emerging evidence demonstrates that poor maternal oral health is not merely a localized dental concern but a significant public health issue with implications for pregnancy outcomes. Periodontal infections during pregnancy have been associated with adverse outcomes including preterm birth, low birth weight, preeclampsia, sepsis, and miscarriages. A meta-analysis of 30 studies by Le *et al.* (2022) found that pregnant women with periodontitis had a 3.18-fold increased risk of preeclampsia, with stronger associations observed in lower-middle-income countries. Evidence from Africa further reinforces this concern: women with periodontitis were twice as likely to experience preterm birth in Sudan (Shaggag, Alhabardi and Adam, 2022), while studies in Tanzania reported increased odds of preeclampsia (AOR = 4.12), low birth weight (AOR = 2.41), and preterm birth (AOR = 2.32) among women with periodontal disease (Gesase *et al.*, 2018). In Uganda, gingivitis was significantly associated with low birth weight (Muwazi *et al.*, 2014).

Despite this strong evidence linking maternal oral disease to adverse pregnancy outcomes, oral health remains poorly integrated into routine antenatal care globally. Even in high-resource settings, integration gaps persist. A United States-based survey revealed that although over 80% of prenatal care providers recognized the importance of oral health during pregnancy, less than 10% routinely incorporated dental history taking or screening into antenatal services due to time constraints and weak referral systems (Sarah B, Sarah and Assad, 2019). In many African contexts, these system-level gaps are compounded by low maternal knowledge, negative attitudes, and poor oral health practices. In Nigeria, only 16.7% of pregnant women had ever visited a dentist, largely for curative rather than preventive reasons (Buhari *et al.*, 2024). Similarly, in Ethiopia, only 34.1% of pregnant women demonstrated good oral health knowledge, with financial barriers, fear of

treatment, and limited access to professionals identified as key constraints (Wassihun, Ayinallem and Beyene, 2022).

In Ghana, while maternal health has received considerable policy attention, oral health remains marginal within antenatal care services. Regional disparities in antenatal care utilization and service coordination have been documented, with the Volta Region among areas experiencing inconsistencies in care quality (Aboagye *et al.*, 2024). Clinical evidence from Accra indicates a substantial burden of periodontal disease among pregnant women, with 76.2% presenting with a Community Periodontal Index of Treatment Needs score of 2 or higher, indicating the need for scaling and oral hygiene instruction (Goka *et al.*, 2022).

However, despite these concerning national and regional indicators, there is a critical lack of municipality-level evidence on oral health knowledge, attitudes, and practices among pregnant women in the Volta Region, particularly in South Tongu. Without localized data, health planners and policymakers are unable to design context-specific interventions or effectively integrate oral health promotion into antenatal services at the district level. This absence of evidence represents a significant gap in maternal health programming. Therefore, this study seeks to assess oral health knowledge, attitudes, and practices among pregnant women attending antenatal care in South Tongu Municipality to generate context-specific evidence that can inform targeted interventions and strengthen integration of oral health into maternal healthcare services.

1.3 Rationale for the Study

Oral health is a critical, yet frequently neglected, component of maternal well-being, especially in low-income communities. During pregnancy, physiological and hormonal changes increase a woman's vulnerability to oral conditions such as gingivitis, dental caries, and periodontal disease.

If these issues are not addressed, they can lead to serious complications, including preterm birth, low birth weight, and preeclampsia (Gesase *et al.*, 2018; Shaggag, Alhabardi and Adam, 2022). However, knowledge, attitudes, and practices (KAP) concerning oral health among pregnant women in Ghana, specifically the Volta region, remains under explored and poorly documented.

In the Ghanaian context, maternal health has received substantial public health attention in recent decades, yet oral health remains marginal within antenatal care (ANC) protocols. Existing studies from other parts of the country highlight substantial gaps in awareness of oral health risks, low rates of dental visits during pregnancy, and persistent misconceptions that deter pregnant women from seeking care (Goka *et al.*, 2022; Hewlett *et al.*, 2022; Aboagye *et al.*, 2024).

However, no comprehensive study has examined oral health patterns among pregnant women in the South Tongu Municipal area of the Volta Region. Considering that most oral diseases are preventable through proper hygiene, timely education, and regular dental check-ups, understanding the KAP landscape within this population is crucial (Muwazi *et al.*, 2014; Shaggag, Alhabardi and Adam, 2022).

This study aims to fill this gap by assessing the oral health knowledge, attitudes, and practices of pregnant women attending Antenatal Care in South Tongu. The findings are expected to contribute meaningfully to maternal and child health by providing empirical evidence to support the integration of oral health into antenatal care services. By identifying specific knowledge gaps, attitudinal barriers, and behavioral patterns, the study will inform the design of locally relevant oral health promotion strategies. Furthermore, the insights gained will serve as a foundation for policy advocacy, encouraging the inclusion of oral health within national antenatal care guidelines. Finally, the research will highlight the need for strengthened collaboration between dental and maternal healthcare providers, ultimately improving health outcomes for mothers and their babies.

1.4 Conceptual Framework

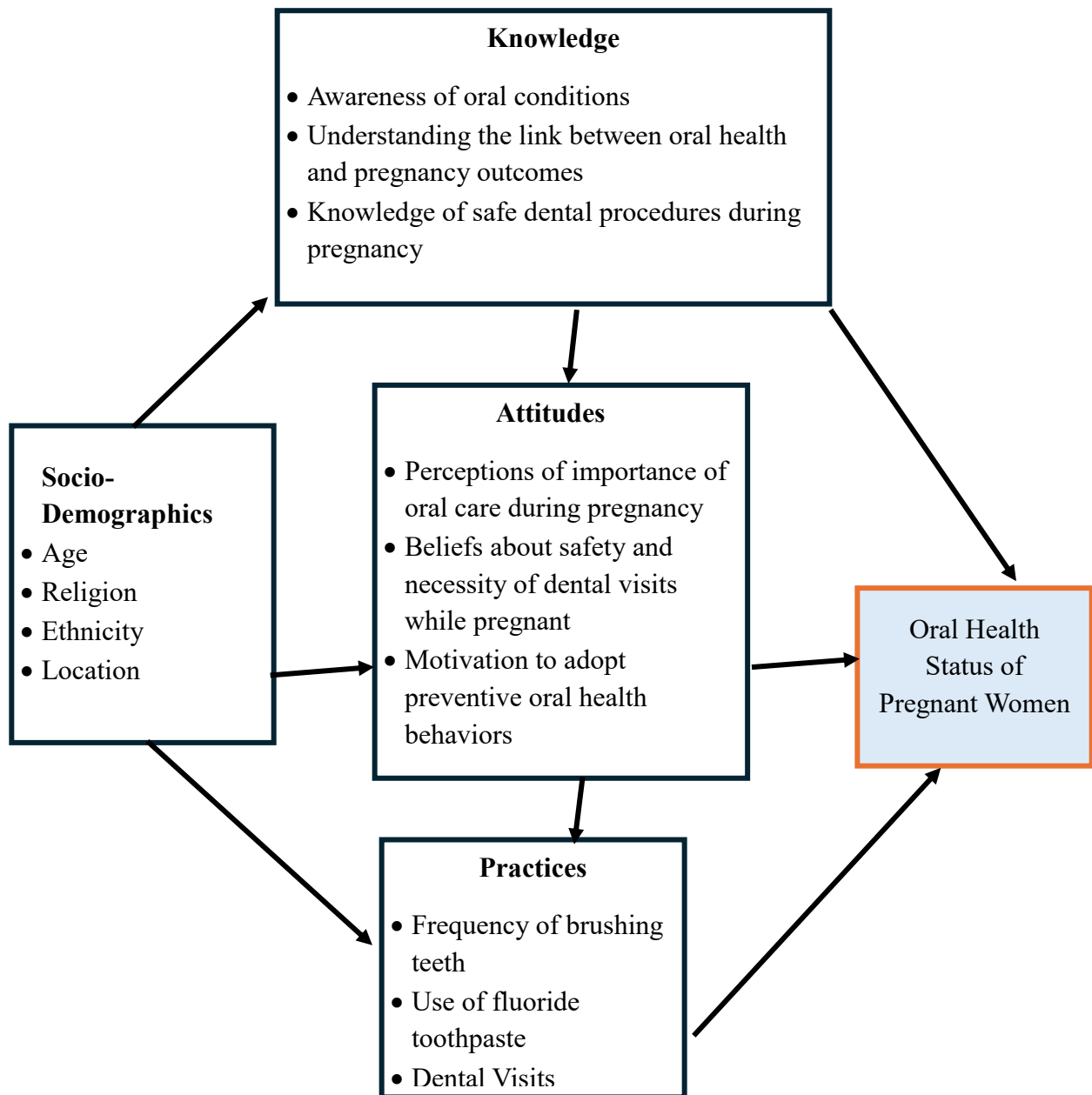


Figure 1.0 Conceptual Framework Adapted from the KAP model

The conceptual framework for this study is guided by the understanding that pregnant women's oral health outcomes are closely linked to their knowledge, attitudes, and practices (KAP) regarding oral health during pregnancy. Knowledge refers to the awareness and understanding of oral health issues common in pregnancy, such as gum disease, the safety of dental treatment, and

the importance of maintaining oral hygiene. Attitudes represent the beliefs, perceptions, and levels of concern that women have about their oral health and the necessity of seeking professional dental care while pregnant. Practices involve the actual behaviors adopted by the women to maintain oral hygiene, including brushing frequency, use of fluoride toothpaste, dietary choices, and dental visits.

This framework posits that knowledge, attitudes, and practices are interrelated and together contribute to shaping the overall oral health status of pregnant women. A key assumption within the framework is the link between knowledge and practices, suggesting that increased knowledge about oral health may lead to more positive health behaviors and better hygiene practices. This is supported by several studies that link high oral health knowledge to better practices, and poorer knowledge to negative practices and poor oral health outcomes (Wassihun, Ayinalem and Beyene, 2022; Buhari *et al.*, 2024; Wendkouni *et al.*, 2024).

1.5 Research Questions

1. What is the level of knowledge of pregnant women regarding oral health during pregnancy?
2. What are the attitudes of pregnant women towards oral healthcare during pregnancy?
3. What oral health practices are adopted by pregnant women during pregnancy?
4. Is there an association between oral health knowledge and oral health practices among pregnant women attending antenatal care?

1.6 General Objective

To assess the oral health knowledge, attitudes, and practices (KAP) among pregnant women attending antenatal clinic at South Tongu Municipal Hospital in the Volta Region of Ghana.

1.6.1 Specific Objectives

1. To assess the level of knowledge of pregnant women regarding oral health during pregnancy.
2. To examine the attitudes of pregnant women towards oral healthcare during pregnancy.
3. To evaluate the oral health practices adopted by pregnant women during pregnancy.
4. To determine the association between oral health knowledge and oral health practices among pregnant women attending antenatal care.

1.7 Profile of the Study Area: South Tongu Municipality

The South Tongu Municipality is one of the eighteen administrative districts in the Volta Region of Ghana. It was carved out of the then-larger Tongu District to enhance administrative efficiency and promote localized development. The municipal capital is Sogakope, which also serves as a key administrative, commercial, and service hub for the district (Ghana Districts, 2025).



Figure 1.1. Map of Ghana showing the location of the South Tongu District

Geographically, South Tongu is bordered to the north by Central Tongu District, to the south by Keta and Anloga Districts, to the east by the Akatsi South District, and to the west by the Volta River. The total land area is approximately 623.5 square kilometers (Ghana Districts, 2025). According to the 2021 Population and Housing Census, the South Tongu Municipality has a population of approximately 113,114, with females making up slightly more than half of the population (GSS, 2021). The population distribution is predominantly rural, with agriculture

(especially crop farming and fishing) serving as the core of the local economy. Livelihoods are also supported by petty trading, craftsmanship, and public sector employment (GSS, 2021).

In the municipality, healthcare delivery operates through a combination of public and private institutions. Public healthcare is mainly coordinated through a structured network of facilities, which includes a Municipal Hospital and Richard Novati Hospital located in the capital town, various health centres, maternity homes, and Community-based Health Planning Services (CHPS) compounds that extend services to more remote communities. The municipality has three(3) dental clinics (2 public and 1 private), with a maxillofacial surgeon, a dentist, two physician assistant dental), two dental surgery technicians, and two dental assistants.

In recent years, there has been increasing investment in education, health, and sanitation infrastructure, but gaps persist. These factors make South Tongu an ideal setting for this study.

1.8 Scope of Study

This study focused on assessing the oral health knowledge, attitudes, and practices among pregnant women attending antenatal care at the South Tongu Municipal Hospital in the Volta Region of Ghana. The research specifically examined the level of awareness regarding oral health during pregnancy, perceptions toward oral healthcare, and the oral hygiene practices adopted by pregnant women.

The study was limited to pregnant women receiving antenatal services at the South Tongu Municipal Hospital during the study period. It also explored the association between oral health knowledge, attitudes, and practices, as well as selected socio-demographic factors that may influence these variables.

Geographically, the study was confined to the South Tongu Municipality, and the findings are therefore primarily representative of pregnant women attending antenatal care services within this setting. The study did not include pregnant women who were not attending antenatal care at the facility or those residing outside the municipality.

Additionally, the study employed a quantitative cross-sectional design, which allowed data to be collected at a single point in time. As such, the study assessed existing knowledge, attitudes, and practices but did not examine changes over time or establish causal relationships between variables.

1.9 Organization of Report

This report is organized into four main chapters.

Chapter One presents the introduction to the study. It provides the background of the study, problem statement, rationale for the study, conceptual framework, research questions, general and specific objectives, profile of the study area, scope of the study, and the organization of the report.

Chapter Two presents the review of related literature relevant to the study. It examines existing empirical and theoretical evidence on oral health knowledge, attitudes, and practices among pregnant women, as well as the relationship between oral health knowledge and oral health practices.

Chapter Three describes the methodology used for the study. It outlines the study design, study site, study population, inclusion and exclusion criteria, sample size determination, sampling procedure, data collection methods and instruments, data handling procedures, statistical analysis, and ethical considerations.

Chapter Four presents the results and findings of the study. It includes the analysis and interpretation of data on the socio-demographic characteristics of respondents, oral health knowledge, attitudes, practices, and the statistical associations between key variables.

Chapter Five presents the discussion of the study findings. The results are interpreted in relation to existing literature, highlighting similarities, differences, and possible explanations for the observed patterns.

Chapter Six provides the conclusions and recommendations of the study. It summarizes the key findings, outlines implications for maternal health practice and policy, and provides recommendations for improving oral health education and service utilization among pregnant women.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Maternal oral health has increasingly been recognized as an important yet under-integrated component of maternal and child health. Although oral diseases are largely preventable, they remain among the most prevalent health conditions globally, affecting an estimated 3.5 billion people (World Health Organization [WHO], 2022). The WHO Global Oral Health Status Report further highlights that periodontal diseases and untreated dental caries disproportionately affect populations in low- and middle-income countries, where access to preventive and curative services remains limited (WHO, 2022). Within this broader burden, pregnancy represents a particularly sensitive period due to hormonal, immunological, and behavioral changes that can increase susceptibility to oral conditions such as gingivitis and periodontitis.

The implications of poor oral health during pregnancy extend beyond localized discomfort. Systematic reviews and meta-analyses have demonstrated associations between maternal periodontal disease and adverse pregnancy outcomes, including preterm birth, low birth weight, and preeclampsia (Le *et al.*, 2022; Castaño-Suárez *et al.*, 2024). Despite this evidence, oral health remains insufficiently integrated into routine antenatal care (ANC) services in many settings, particularly in sub-Saharan Africa. This disconnect suggests that biomedical evidence alone is insufficient; individual knowledge, attitudes, practices, and contextual health system factors also shape maternal oral health outcomes.

This chapter reviews existing literature in line with the objectives of the present study. It examines evidence on oral health knowledge, attitudes, and practices among pregnant women, as well as the

relationship between knowledge and behavior. Using a funnel approach, the review synthesizes global, sub-Saharan African, and Ghanaian evidence, and identifies empirical gaps that justify the current study, particularly the lack of municipality-level data relevant to districts such as South Tongu.

2.2 Oral Health Knowledge Among Pregnant Women

Knowledge of oral health during pregnancy extends beyond general awareness of tooth brushing and dental hygiene. It includes understanding the physiological changes that increase susceptibility to gingival inflammation, recognition of common pregnancy-related oral conditions, awareness of the safety of dental treatment during pregnancy, and knowledge of the potential relationship between maternal periodontal disease and adverse pregnancy outcomes. Hormonal changes during pregnancy, particularly elevated estrogen and progesterone levels, increase gingival vascular permeability and inflammatory response to plaque, predisposing women to gingivitis even in the presence of minimal plaque accumulation (Sachelarie *et al.*, 2024). Without adequate knowledge of these biological mechanisms, symptoms such as gum bleeding may be normalized as inevitable aspects of pregnancy rather than interpreted as preventable conditions requiring care. Thus, maternal oral health knowledge influences both symptom recognition and preventive behavior.

Globally, evidence indicates that maternal oral health knowledge remains inconsistent and often incomplete. The World Health Organization reports that oral diseases affect approximately 3.5 billion people worldwide and emphasizes that inadequate preventive awareness continues to undermine oral health outcomes, particularly among vulnerable groups (WHO, 2022). Even in high-income settings, pregnancy-specific knowledge gaps persist. In Switzerland, Lazaridi *et al.* (2022) found that while many pregnant women reported routine oral hygiene practices, fewer demonstrated adequate understanding of the association between periodontal disease and adverse

pregnancy outcomes. Similarly, research in the United Arab Emirates showed that only a minority of pregnant women recognized that pregnancy increases the risk of gum disease, and many reported not receiving oral health counselling during antenatal visits (Raeesi *et al.*, 2023). In Saudi Arabia, Hebbal *et al.* (2025) observed that although awareness of daily brushing was relatively high, knowledge regarding the safety of dental procedures and the maternal–fetal oral health link was substantially lower. Together, these findings suggest that basic hygiene awareness does not necessarily translate into comprehensive understanding of pregnancy-related oral risks.

In sub-Saharan Africa, knowledge deficits are often more pronounced and are shaped by educational inequalities and limited integration of oral health education within antenatal care services. In Ethiopia, Wassihun *et al.* (2022) reported that only 34.1% of pregnant women demonstrated good knowledge of oral health during pregnancy, with education level significantly associated with knowledge status. In Nigeria, Buhari *et al.* (2024) found that awareness of the relationship between pregnancy and gingival inflammation was low, and dental visits were largely symptom-driven rather than preventive. Similarly, in Burkina Faso, Wendkouni *et al.* (2024) documented that more than half of pregnant women lacked knowledge of the link between maternal oral health and pregnancy outcomes. Across these studies, antenatal visits were rarely structured to include routine oral health counselling, limiting opportunities to improve maternal awareness during pregnancy.

Within Ghana, available evidence suggests similar gaps, although studies remain geographically concentrated. In Accra, Goka *et al.* (2022) reported that 76.2% of pregnant women attending antenatal clinics had a Community Periodontal Index of Treatment Needs (CPITN) score of 2 or higher, indicating the need for scaling and oral hygiene instruction. While this study primarily assessed periodontal status rather than knowledge directly, the high prevalence of treatment needs

underscores a likely disconnect between preventive awareness and oral health outcomes. Complementing this, Hewlett *et al.* (2022) documented a high burden of gingival inflammation in the Greater Accra Region, reflecting broader patterns of suboptimal preventive oral health behavior. Although not limited to pregnant women, these findings highlight the underlying population-level vulnerability that may also influence maternal oral health knowledge.

Broader maternal health analyses in Ghana further reveal regional disparities in antenatal care access and quality (Aboagye *et al.*, 2024), which may influence the extent to which pregnant women receive structured oral health information during ANC visits. However, despite evidence of periodontal burden and maternal health system inequalities, few Ghanaian studies have systematically quantified pregnancy-specific oral health knowledge using composite indices, particularly outside major urban centers.

Across global, sub-Saharan African, and Ghanaian contexts, the literature consistently demonstrates that while basic awareness of oral hygiene practices may exist, knowledge of pregnancy-specific oral risks, safety of dental treatment, and maternal–fetal health linkages remains incomplete. Importantly, there is limited municipality-level evidence in Ghana, and no known published study has comprehensively assessed oral health knowledge among pregnant women in districts such as Lower Manya Krobo. The absence of localized data constrains targeted intervention design and weakens advocacy for integration of oral health into routine antenatal care at the district level. The present study therefore addresses this empirical gap by systematically assessing maternal oral health knowledge within a defined municipal setting.

2.3 Attitudes of Pregnant Women Toward Oral Healthcare During Pregnancy

Attitudes toward oral healthcare during pregnancy play a critical role in shaping preventive behavior and service utilization. While knowledge reflects cognitive awareness, attitudes capture perceptions of seriousness, perceived susceptibility, fear, cultural beliefs, and perceived safety of dental treatment. During pregnancy, attitudes are particularly influential because women often weigh perceived risks to the fetus against perceived benefits of care. If dental procedures are believed to be harmful or unnecessary, even knowledgeable women may avoid seeking professional services. Therefore, understanding maternal attitudes is essential for interpreting patterns of oral healthcare utilization.

Globally, studies demonstrate that misconceptions and fear remain persistent barriers to oral healthcare during pregnancy. In the United Arab Emirates, Raeesi *et al.* (2023) reported that a substantial proportion of pregnant women were uncertain about the safety of dental treatment, and many had not received reassurance from healthcare providers. Similarly, Hebbal *et al.* (2025) in Saudi Arabia found that although respondents expressed general agreement that oral health is important, many harbored concerns about dental procedures affecting fetal safety. This ambivalence reflects a common pattern in which women conceptually value oral health but remain hesitant about clinical interventions during pregnancy. In Switzerland, Lazaridi *et al.* (2022) observed that fear and uncertainty regarding dental radiographs and local anesthesia influenced attitudes toward seeking care, even among women with moderate knowledge levels. These findings suggest that in high-income contexts, attitudinal barriers are less about outright rejection of oral health importance and more about safety concerns and risk perception.

In sub-Saharan Africa, attitudinal patterns are often shaped by sociocultural beliefs and limited exposure to structured oral health counselling during antenatal care. In Burkina Faso, Wendkouni

et al. (2024) documented that a significant proportion of pregnant women believed that dental problems during pregnancy were normal and not serious, while others expressed fear that dental treatment could harm the fetus. Similarly, in Nigeria, Buhari *et al.* (2024) reported that many women avoided dental visits due to fear and the perception that dental care was only necessary when pain became severe. In Ethiopia, Wassihun *et al.* (2022) found that unfavorable attitudes toward dental care were common and were significantly associated with lower knowledge levels and limited prior dental exposure. Across these contexts, fear is often intertwined with uncertainty about procedural safety and mistrust or unfamiliarity with dental services, reinforcing delay in preventive care.

Within Ghana, attitudinal dynamics appear to follow similar patterns, though empirical documentation remains uneven. In Accra, Goka *et al.* (2022) reported low utilization of dental services among pregnant women despite high periodontal treatment needs, suggesting that perceptions of necessity or safety may influence care-seeking behavior. Although the study did not directly quantify attitude scales, the disconnect between treatment need and service uptake implies potential attitudinal barriers. Broader Ghanaian research on oral health perceptions indicates that cultural beliefs, misconceptions about tooth loss being a normal part of aging or life stages, and low prioritization of preventive dental care remain prevalent (Hewlett *et al.*, 2022). While not limited to pregnant women, such beliefs form part of the broader social environment in which maternal attitudes are shaped. Additionally, analyses of antenatal care service quality in Ghana show that counselling content varies across regions (Aboagye *et al.*, 2024), meaning that pregnant women may not consistently receive reassurance regarding the safety and importance of dental treatment during pregnancy.

Across contexts, a consistent pattern emerges: most pregnant women express general agreement that oral health is important, yet significant proportions remain uncertain or fearful about the safety of dental procedures during pregnancy. This attitudinal ambivalence creates a gap between abstract appreciation of oral health and actual service utilization. Importantly, attitudes are not solely determined by knowledge; they are influenced by counselling experiences, prior healthcare interactions, cultural narratives, and perceived health system responsiveness. In settings where oral health is not visibly integrated into antenatal care, uncertainty may persist even among women with moderate awareness. Rather than reflecting mere informational deficits, these attitudinal patterns suggest deeper issues related to trust, risk perception, and health system integration. Understanding these nuances within specific municipal contexts is essential for designing interventions that move beyond information provision toward addressing fear, reassurance, and culturally embedded beliefs.

2.4 Oral Health Practices Among Pregnant Women

Oral health practices during pregnancy refer to the daily and preventive behaviors adopted to maintain oral hygiene and prevent disease progression. These include frequency of tooth brushing, use of fluoride-containing toothpaste, interdental cleaning, reduction of sugary intake, rinsing after vomiting, and utilization of professional dental services. While knowledge and attitudes influence these behaviors, practices are also shaped by accessibility of services, cost, cultural norms, and the degree to which oral health is integrated within antenatal care. Pregnancy introduces unique behavioral considerations; frequent vomiting increases acid exposure to enamel, while gingival sensitivity may discourage brushing if proper technique is not understood (Sachelarie *et al.*, 2024; WHO, 2022). Thus, oral health practices during pregnancy are influenced by both individual behavior and structural health system factors.

Globally, routine tooth brushing is commonly reported among pregnant women; however, preventive dental service utilization remains comparatively low. In Switzerland, Lazaridi *et al.* (2022) found that while most respondents brushed at least twice daily, dental visits during pregnancy were less consistent and often dependent on perceived need rather than routine preventive scheduling. Similarly, Hebbal *et al.* (2025) in Saudi Arabia reported high rates of daily brushing but low uptake of professional dental services during pregnancy. In the United Arab Emirates, Raesi *et al.* (2023) observed that although many women acknowledged the importance of oral hygiene, a substantial proportion had not visited a dentist during pregnancy. Across high-income contexts, therefore, daily hygiene behaviors appear more established than preventive service utilization, indicating that service uptake is influenced by perceived necessity rather than routine integration into maternal care.

In sub-Saharan Africa, disparities in oral health practices are more pronounced and frequently shaped by structural constraints. In Ethiopia, Wassihun *et al.* (2022) reported low levels of preventive dental attendance, with many women brushing once daily or irregularly. Buhari *et al.* (2024) similarly found that dental visits among pregnant women in Nigeria were predominantly complaint-driven rather than preventive. In Burkina Faso, Wendkouni *et al.* (2024) documented limited use of interdental cleaning and minimal preventive dental consultations. Across these settings, financial limitations, limited distribution of dental services, and absence of structured oral health counselling during antenatal visits contribute to weak preventive practices. Importantly, even where brushing frequency is reported as adequate, professional dental engagement remains low.

Within Ghana, the available evidence on oral health practices during pregnancy is more clinically oriented than behavior-scale oriented. In Accra, Goka *et al.* (2022) reported that 76.2% of pregnant

women attending antenatal clinics had a CPITN score of 2 or higher, indicating the need for scaling and oral hygiene instruction. While this study did not comprehensively quantify daily hygiene behaviors, the high treatment requirement suggests gaps in sustained preventive practices and early professional care. Similarly, Hewlett *et al.* (2022) documented a high burden of periodontal disease in the Greater Accra Region, reflecting broader population-level vulnerability. These findings highlight that clinical treatment need remains substantial, yet detailed assessments of everyday hygiene behaviors and preventive dental attendance during pregnancy remain limited in Ghanaian municipal contexts. Furthermore, analyses of antenatal care utilization demonstrate regional variation in the comprehensiveness of maternal counselling services (Aboagye *et al.*, 2024), which may influence whether oral hygiene reinforcement and dental referrals are consistently incorporated into routine care.

Across global and regional contexts, a consistent pattern emerges: reported brushing frequency is often relatively high, yet preventive dental service utilization during pregnancy remains low. This suggests that oral health practices are not solely determined by individual motivation but are significantly shaped by perceived risk, structural accessibility, and the extent to which oral health is visibly embedded within maternal healthcare systems. In the Ghanaian context, the predominance of clinical burden studies over detailed behavioral assessments indicates the need for more context-specific examination of how daily hygiene behaviors and professional service utilization interact within district-level maternal populations.

2.5 Association Between Oral Health Knowledge and Oral Health Practices

Understanding the relationship between oral health knowledge and practices during pregnancy is central to interpreting maternal oral health outcomes. While knowledge is often assumed to influence behavior, empirical evidence suggests that the relationship is neither automatic nor

uniform. Knowledge may enhance awareness of risk and benefits, yet actual practices are mediated by attitudes, access to services, cultural beliefs, and structural constraints. In the context of pregnancy, even women who understand the importance of oral hygiene may delay or avoid professional care due to fear, cost, or uncertainty about safety. Therefore, examining whether higher knowledge translates into improved daily hygiene behaviors and increased preventive service utilization remains an important analytical question.

Globally, studies show mixed but generally positive associations between knowledge and oral health practices. In Saudi Arabia, Hebbal *et al.* (2025) reported that pregnant women with higher knowledge scores were more likely to engage in favorable oral hygiene behaviors and utilize dental services, although service uptake remained suboptimal overall. Similarly, in Switzerland, Lazaridi *et al.* (2022) found that greater awareness of pregnancy-related oral risks was associated with better self-reported hygiene practices. However, these studies also noted that knowledge alone did not fully explain preventive dental attendance, suggesting that structural and attitudinal factors moderated the relationship. The World Health Organization (2022) emphasizes that oral health behaviors are shaped by broader social determinants, including affordability, availability of services, and health system integration, reinforcing the idea that knowledge is necessary but not sufficient for behavior change.

In sub-Saharan Africa, evidence demonstrates variability in the strength of the knowledge–practice association. In Ethiopia, Wassihun *et al.* (2022) found a statistically significant association between knowledge level and oral health practices, with women demonstrating good knowledge more likely to report appropriate hygiene behaviors. In Nigeria, Buhari *et al.* (2024) similarly observed that better knowledge was associated with improved self-reported practices; however, preventive dental visits remained low even among knowledgeable respondents. Wendkouni *et al.*

(2024) in Burkina Faso reported that poor knowledge was correlated with unfavorable practices, yet structural barriers such as limited service access and cost continued to constrain preventive engagement. Across these contexts, knowledge appears to influence daily hygiene behaviors more consistently than professional service utilization, indicating that access-related factors may attenuate the knowledge–practice relationship.

Within Ghana, empirical studies examining the statistical association between oral health knowledge and practices among pregnant women are limited. Goka *et al.* (2022) primarily assessed periodontal treatment need rather than behavioral determinants, and while low dental attendance was observed, formal modeling of knowledge–practice relationships was not conducted. Broader Ghanaian oral health research suggests that preventive service utilization remains low despite substantial treatment need (Hewlett *et al.*, 2022), but detailed analyses linking knowledge levels to specific behaviors within pregnant populations remain sparse. Consequently, although international evidence suggests that knowledge may positively influence oral hygiene behaviors, the strength and consistency of this association within Ghanaian municipal contexts remain insufficiently characterized.

Taken together, the literature suggests that knowledge is an important but incomplete predictor of oral health practices during pregnancy. While higher knowledge levels are frequently associated with better self-reported hygiene behaviors, the translation of knowledge into preventive dental service utilization appears more dependent on health system integration, affordability, and perceived safety. The variability observed across settings underscores the importance of examining this relationship within specific contextual environments, where social, economic, and healthcare delivery factors may modify the extent to which knowledge shapes behavior.

2.6 Empirical Review and Critical Comparison of Previous Studies

The empirical literature on oral health among pregnant women shows a consistent concern across settings: pregnancy increases vulnerability to oral conditions, yet knowledge, attitudes, practices, and professional dental service utilization remain inadequate in many populations. However, the studies reviewed differ considerably in their objectives, designs, measurements, sample sizes, and analytical approaches. These methodological differences are important because they influence how findings should be interpreted and compared. Some studies focus mainly on clinical oral health status, using indices such as the Community Periodontal Index of Treatment Needs (CPITN), while others examine self-reported knowledge, attitudes and practices through structured questionnaires. Others are systematic reviews or meta-analyses that synthesize evidence across several studies. As a result, the empirical literature provides useful evidence, but the findings cannot always be compared directly without considering how each study was conducted.

Clinical and epidemiological studies have provided strong evidence on the burden of oral disease during pregnancy. For example, Chen, Hong and Yu (2022), in a systematic review and meta-analysis of 20 studies, reported that approximately 67% of pregnant women experienced bleeding on probing, while the prevalence of periodontitis was estimated at 40%. Similarly, Le et al. (2022), in a meta-analysis of 30 studies, found that pregnant women with periodontitis had a higher risk of preeclampsia. These studies are methodologically useful because they synthesize evidence across several populations and provide stronger estimates of disease burden than single-facility studies. However, their focus is mainly clinical and biomedical. They do not provide sufficient detail on how pregnant women understand oral health, how they perceive dental treatment, or why they may fail to seek preventive dental care. Therefore, while such studies establish the importance

of maternal oral health, they do not fully explain the behavioural and perceptual dimensions that KAP studies seek to address.

Studies conducted in higher-resource and middle-income settings have generally used facility-based or hospital-based cross-sectional designs to assess oral health knowledge, attitudes, practices, and service utilization among pregnant women. Raeesi et al. (2023), for instance, found in the United Arab Emirates that only 15% of pregnant women believed pregnancy increased the likelihood of gum disease, while 66% reported that their gynecologists did not advise dental visits during pregnancy. This finding is important because it shows that even in better-resourced health systems, contact with maternal healthcare providers does not automatically translate into oral health counselling. Similarly, Hebbal et al. (2025) conducted a large cross-sectional survey among 1,120 pregnant women in government and private maternal hospitals in Riyadh, Saudi Arabia. Their study found that 59.7% of respondents had very poor oral health knowledge, 23.8% had poor knowledge, 66.4% had poor practices, and 39.6% had never sought dental care during pregnancy. Unlike smaller facility-based studies, the large sample size and inclusion of both government and private hospitals strengthen the reliability of the findings. The study also went beyond simple description by using correlation and regression analysis to examine relationships among knowledge, practices, and dental service utilization. However, like most KAP studies, it relied on self-reported responses, which may be affected by recall bias or social desirability bias.

Evidence from sub-Saharan Africa shows similar gaps, but the methodological approaches vary. Wassihun, Ayinalem and Beyene (2022) conducted an institution-based cross-sectional study among pregnant women attending antenatal care at public hospitals in South Omo Zone, Ethiopia. The study used systematic random sampling, face-to-face interviews, and logistic regression analysis. It found that only 34.1% of pregnant women had good knowledge of oral health during

pregnancy. The study also reported that educational status, income, occupation, access to health services and oral hygiene counselling during ANC were significantly associated with good knowledge. This study is useful because it applied inferential statistics and identified predictors of knowledge, rather than merely describing the level of awareness. However, its focus was mainly on knowledge and associated factors, and it did not provide a full KAP assessment including attitudes and practices in the same depth as some other studies.

Wendkouni et al. (2024) provide a more comprehensive KAP-based African comparison. Their descriptive cross-sectional study among 400 pregnant women in university hospitals in Ouagadougou, Burkina Faso generated separate knowledge, attitude and practice scores. The study found that 51.2% of respondents had poor overall knowledge, 76.3% had poor attitudes, and 79.5% had poor practices, resulting in a generally poor overall KAP level. The study also found significant variation in KAP level according to educational level and information received on oral health and its implications for pregnancy. This study is particularly relevant to the present work because it used a KAP framework and scoring approach similar to the current study. However, it was conducted in university hospital settings, which may differ from municipal hospital settings in terms of patient profile, service availability, and provider exposure. The comparison suggests that while poor oral health KAP among pregnant women is a recurring issue in sub-Saharan Africa, the extent of poor knowledge, attitudes and practices may vary depending on study setting, measurement tools and service context.

Studies from Nigeria also show that dental service utilization during pregnancy is generally low and often symptom-driven rather than preventive. Buhari et al. (2024) reported low awareness of the relationship between pregnancy and gingival inflammation, while evidence from Nigerian studies suggests that pregnant women often seek dental care only when symptoms such as pain

become severe. This pattern is consistent with Marchi et al. (2019), who found that many pregnant women tend to use dental care reactively rather than as part of routine preventive care. The methodological limitation in several of these studies is that dental attendance is often measured by self-report, without clinical confirmation of treatment need. Nevertheless, the consistency of findings across different settings strengthens the argument that professional dental care during pregnancy is commonly underutilized.

The Ghanaian evidence is particularly important for the present study, but it is more limited and methodologically different from many KAP studies. Goka et al. (2022) assessed periodontal health status among pregnant women attending three antenatal clinics in Accra and found that 72% of women had never seen a dentist, while 76.2% had a CPITN score of 2 or higher, indicating the need for oral hygiene instruction and scaling. The strength of this study is that it used a clinical periodontal index rather than relying only on self-reported practices. This makes its findings useful for estimating actual treatment need. However, because the study focused mainly on periodontal status, it did not fully assess knowledge, attitudes and self-reported preventive practices. Therefore, it provides strong evidence of clinical burden but less evidence on the behavioural and perceptual factors that may explain low dental service utilization. Similarly, Hewlett et al. (2022) documented a high burden of gingival inflammation in the Greater Accra Region, but the study was not limited to pregnant women. Its relevance lies in showing the broader oral health burden in Ghana, while its limitation is that it cannot be used alone to explain pregnancy-specific oral health knowledge or practices.

A critical comparison of the empirical studies therefore shows that the existing literature is useful but uneven. Meta-analyses and clinical studies provide strong evidence that oral disease during pregnancy is common and potentially linked to adverse maternal and neonatal outcomes. However,

they are less able to explain women's knowledge, beliefs, attitudes and decision-making. KAP studies provide better insight into awareness, misconceptions and behaviours, but they often rely on self-reported data and cross-sectional designs, which limit causal interpretation. Some studies use large samples and multivariable analysis, while others are descriptive and facility-based, making generalization difficult. There are also differences in how “good knowledge,” “positive attitude,” and “good practice” are defined. Some studies use mean scores, others use percentage cut-offs, and others generate composite indices without fully explaining the scoring process. These differences affect comparability across studies.

Another important methodological difference is the study setting. Research conducted in tertiary hospitals, university hospitals, public hospitals, private hospitals and municipal health facilities may produce different findings because respondents may differ in education, socioeconomic background, exposure to health information and access to dental services. For instance, findings from Riyadh, the United Arab Emirates or university hospitals in Burkina Faso may not fully reflect the experiences of pregnant women attending a municipal hospital in South Tongu. Similarly, Accra-based Ghanaian studies may not adequately represent the Volta Region because health service availability, rural–urban characteristics, and access to dental professionals may differ.

Overall, the empirical evidence shows a common pattern of inadequate pregnancy-specific oral health knowledge, uncertainty about the safety of dental care, and low utilization of professional dental services during pregnancy. However, the methodological differences among studies show the need for localized KAP studies that clearly define their measurement approach and focus on specific maternal populations. The present study responds to this gap by assessing oral health knowledge, attitudes and practices among pregnant women attending antenatal care at South

Tongu Municipal Hospital. By using a facility-based quantitative cross-sectional design and composite KAP scoring, the study contributes municipality-level evidence from the Volta Region, where published data on maternal oral health KAP remain limited.

2.7 Chapter Summary and Synthesis of Key Insights

This chapter has reviewed existing literature on oral health knowledge, attitudes, practices, and their interrelationships among pregnant women across global, sub-Saharan African, and Ghanaian contexts. Across these settings, maternal oral health emerges as a significant yet inconsistently integrated component of antenatal care. Although pregnancy is associated with physiological changes that increase susceptibility to gingival inflammation and periodontal disease, preventive oral healthcare remains insufficiently embedded within routine maternal health services.

The literature consistently demonstrates that while many pregnant women report routine tooth brushing, knowledge of pregnancy-specific oral risks, safety of dental treatment, and the maternal–fetal health link is often incomplete. Even in higher-income settings, awareness of systemic implications and appropriate timing of dental visits remains uneven. In sub-Saharan Africa, knowledge deficits are more pronounced and are frequently shaped by educational disparities and limited exposure to structured oral health counselling during antenatal visits. Within Ghana, available studies highlight substantial periodontal treatment needs among pregnant women, yet detailed assessment of pregnancy-specific oral health knowledge at municipal levels remains underexplored.

Attitudinal patterns across contexts further complicate preventive engagement. Although most pregnant women express general agreement that oral health is important, uncertainty about the safety of dental procedures during pregnancy persists. Fear of harming the fetus, normalization of

gum bleeding, and perception that dental care is only necessary when pain arises contribute to delayed or reactive care-seeking behaviors. These attitudinal dynamics are not solely products of individual belief but are shaped by counselling experiences, cultural narratives, and the visibility of oral health within antenatal service structures.

With respect to practices, a recurring global pattern is evident: daily hygiene behaviors such as tooth brushing are relatively common, yet preventive dental service utilization during pregnancy remains consistently low. In sub-Saharan Africa and Ghana in particular, structural factors including affordability, limited distribution of dental services, and inconsistent integration of oral health counselling into antenatal care appear to constrain preventive engagement. Moreover, many Ghanaian studies emphasize clinical burden and treatment need rather than detailed behavioral assessments, limiting understanding of how everyday hygiene practices interact with professional care utilization at district levels.

The relationship between knowledge and practices, although frequently positive, is not uniform. Evidence suggests that higher knowledge levels are often associated with improved hygiene behaviors; however, the translation of knowledge into preventive dental visits is moderated by attitudes, perceived safety, and structural access barriers. This variability underscores that maternal oral health behavior is multidimensional, shaped by cognitive, perceptual, and systemic influences operating simultaneously.

Overall, the literature reveals a persistent gap between biological vulnerability during pregnancy and the extent to which oral health is operationalized within maternal healthcare systems. While global evidence increasingly supports integration of oral health into antenatal services, contextual variation remains substantial. In the Ghanaian setting, particularly at municipal levels, a more

nuanced understanding of how knowledge, attitudes, and practices interact within specific healthcare environments is essential for informing targeted and context-sensitive interventions.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

This study employed a quantitative cross-sectional design to assess the knowledge, attitudes, and practices (KAP) of pregnant women regarding oral health. The cross-sectional design enabled the collection of quantitative data from respondents during antenatal visits without follow-up, making it cost-effective and logistically practical for a hospital-based setting.

3.2 Study Site

The study was conducted at the South Tongu Municipal Hospital, located in Sogakope in the Volta Region of Ghana. The facility serves as the primary referral and maternal healthcare provider in the municipality and caters to a large population of pregnant women from both rural and peri-urban communities. The hospital provides antenatal services daily, making it a suitable site for obtaining a representative sample of pregnant women.

3.3 Study Population

The study population comprised pregnant women attending antenatal care (ANC) at the South Tongu Municipal Hospital during the study period. Participants included women at various stages of gestation, irrespective of age, parity, or socioeconomic status. This approach ensured that the sample reflected the diversity of the antenatal care population in the municipality.

3.4 Inclusion Criteria

- Pregnant women attending antenatal care at South Tongu Municipal Hospital.
- Pregnant women who had made more than 6 months of continuous stay in the district

- Pregnant women who provided informed consent to participate in the study.
- Women who were willing and able to respond to a structured questionnaire.

3.5 Exclusion Criteria

- Pregnant women who were not receiving antenatal care at the facility during the data collection period.
- Pregnant women who had not stayed continuously for more than 6 months in the district
- Respondents who declined to provide informed consent.

3.6 Sample Size

The sample size was calculated using Cochran's formula:

$$n = \frac{Z^2 \times pq}{e^2}$$

Where:

- n = sample size
- Z = z-score for 95% confidence level = 1.96
- p = estimated proportion of pregnant women with adequate oral health knowledge = 60% (Noah-Quarm, 2016)
- $q = 1 - p = 0.4$
- e = margin of error = 0.05

Therefore,

$$n = \frac{(1.96)^2 \times (0.6 \times 0.4)}{(0.05)^2} \cong 369$$

To accommodate a potential non-response or incomplete data, a slightly larger sample size was used. An additional non-response rate of 10% was estimated on the projected sample size which resulted in the final adjusted sample size of $369 + (0.10 \times 369) = 406$.

A total of 406 pregnant women were targeted for inclusion in the study. However, only 334 participants of the estimated working sample were able to submit cleaned data for the analysis.

3.7 Sampling Procedure

A consecutive sampling technique was used for this study. Pregnant women attending antenatal care at South Tongu Municipal Hospital during the data collection period were screened based on the inclusion and exclusion criteria. All eligible women who met the study criteria and provided informed consent were approached and invited to participate. Recruitment was carried out on each antenatal clinic day until the required sample size was reached. This approach was considered appropriate for the facility-based design because eligible respondents were recruited as they became available during routine antenatal care attendance.

3.8 Data Collection Methods and Instruments

Data were collected using a structured questionnaire adapted from validated KAP instruments used in similar studies (Hebbal *et al.*, 2025; Wendkouni *et al.*, 2024). The questionnaire comprised four sections:

1. Socio-demographic characteristics (age, education, parity, occupation, etc.)
2. Knowledge of oral health during pregnancy
3. Attitudes toward oral health and dental care
4. Oral health practices

The questionnaire included both closed-ended and semi-closed-ended items. It was administered in English and Ewe, depending on the respondent's preference. Trained data collectors assisted participants in understanding the questions where necessary. KoboCollect was used for electronic data entry to ensure accuracy and minimize errors.

3.9 Pre-testing

The data collection instrument was pre-tested among 40 pregnant women attending antenatal care at the Adidome Government Hospital in the neighboring Central Tongu District in the Volta Region. The pre-test helped determine the clarity, flow, and cultural relevance of the questions. Feedback from the pre-test informed necessary revisions to improve the tool's validity and comprehension level.

3.10 Data Handling

Data collected through KoboCollect were uploaded daily to a secure cloud server and downloaded into encrypted files for backup. Only the research team had access to the dataset using password-protected devices. All participants were assured of the confidentiality of their responses. No identifying information such as names or contact details was collected. The data will be stored securely for five years and will be destroyed thereafter in line with institutional ethical guidelines.

3.11 Statistical Analysis

STATA statistical software package (*StataCorp. 2007. Stata Statistical Software. Release 18. StataCorp LP, College Station, TX, USA*) was used for data analysis. Descriptive statistics (frequencies, means, and percentages) were used to summarize socio-demographic variables and KAP indicators.

Composite scores were generated for oral health knowledge, attitudes and practices. For the knowledge items, correct responses were scored as 1, while incorrect responses and “don’t know” responses were scored as 0. The scores for all knowledge items were summed to obtain a total knowledge score for each respondent. The mean knowledge score of the study population was then used as the cut-off point. Respondents who scored equal to or above the mean were classified as having good knowledge, while those who scored below the mean were classified as having poor knowledge.

For attitude items, responses were scored so that higher scores reflected more positive attitudes toward oral healthcare during pregnancy. Positively worded items were scored in the direction of agreement, while negatively worded items were reverse-coded before the total attitude score was computed. The total attitude score for each respondent was obtained by summing the attitude item scores. The mean attitude score was used as the cut-off point. Respondents who scored equal to or above the mean were classified as having a positive attitude, while those who scored below the mean were classified as having a negative attitude.

For oral health practice items, recommended oral health practices were scored as 1, while non-recommended practices were scored as 0. The practice items were summed to generate a total oral health practice score for each respondent. The mean practice score of the study population was used as the cut-off point. Respondents who scored equal to or above the mean were classified as having good oral health practices, while those who scored below the mean were classified as having poor oral health practices.

Bivariate analysis was conducted using the Chi-square test to determine associations between key variables (e.g., knowledge and practices). Multivariate logistic regression analysis was performed

to identify independent predictors of good oral health practices among pregnant women. Findings were presented in tables, graphs, and charts for clarity.

3.12 Ethical Considerations

Prior to data collection, ethical clearance was obtained from the Institutional Review Board (IRB) of Ensign Global University. An official introductory letter was presented to the South Tongu Municipal Health Directorate and the administration of the Municipal Hospital to seek permission for the study.

All participants provided written informed consent. The purpose of the study was clearly explained to them, and they were informed of their right to decline or withdraw at any stage without consequences. Participation was voluntary, and no incentives were provided. Anonymity and confidentiality were emphasized throughout the study process.

There were no physical or psychological risks associated with participation in the study. However, some participants experienced minor inconvenience due to the time required to complete the questionnaire. While there were no direct benefits to individual participants, the findings contribute to improving maternal oral healthcare services in the municipality and strengthening antenatal care policies.

3.13 Limitations of Study

Despite the valuable insights generated by this study, several limitations should be acknowledged.

First, the study employed a cross-sectional design, which involved collecting data at a single point in time. As a result, the study could identify associations between variables but could not establish

causal relationships between oral health knowledge, attitudes, and practices among pregnant women.

Second, the study was conducted in one health facility, the South Tongu Municipal Hospital. Although the hospital serves a large population within the municipality, the findings may not be fully generalizable to all pregnant women in the Volta Region or Ghana as a whole.

Third, the study relied on self-reported data obtained through questionnaires. Self-reported responses may be subject to recall bias or social desirability bias, where respondents may provide answers they perceive as socially acceptable rather than their actual practices.

Additionally, although the study assessed oral health practices among pregnant women, it did not include clinical dental examinations to objectively determine the actual oral health status of participants. Therefore, the findings reflect reported behaviors rather than clinically verified oral health conditions.

Despite these limitations, the study provides important evidence on oral health knowledge, attitudes, and practices among pregnant women in the South Tongu Municipality and highlights areas for improving oral health education and integration within antenatal care services.

3.14 Assumptions

This study was conducted based on several assumptions.

First, it was assumed that all respondents provided honest and accurate responses to the questions asked during the data collection process. Since the study relied on self-reported information, the validity of the findings depended largely on the sincerity of participants' responses.

Second, it was assumed that the structured questionnaire used for the study adequately captured the knowledge, attitudes, and practices related to oral health among pregnant women attending antenatal care at the South Tongu Municipal Hospital.

Third, it was assumed that the pregnant women attending antenatal care at the South Tongu Municipal Hospital were reasonably representative of pregnant women within the municipality, making the findings relevant to the broader population within the district.

Finally, it was assumed that the data collection process was conducted consistently and objectively by trained data collectors, thereby minimizing potential errors or biases during data collection.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic Characteristics of Study Respondents

Out of the total of 406 questionnaires that were administered, 334 came out very clean for the final analysis, thereby yielding a response rate of about 82%. The largest proportion of participants were aged 25–29 years (30.24%), followed by those aged 30–34 years (23.05%) and 35–39 years (18.86%). Adolescents aged 15–19 years constituted 6.89% of the sample, while women aged 40–49 years represented the smallest proportion (3.89%) of the total respondents.

With respect to education, respondents who indicated Junior High School was their highest attained educational at the time of the survey constituted the majority (39.27%), followed by Senior High School (32.33%). A smaller proportion had tertiary education (12.08%), while 7.25% of respondents had no formal education. In terms of occupation, trading or small-scale business activities constituted the largest occupational group (32.93%), followed by farming or fishing (19.46%) and artisanship (11.98%). Formal employment accounted for 8.68% of respondents, while 10.48% were unemployed or housewives.

Regarding gravidity, over half of the respondents (53.29%) had experienced two to three pregnancies, while 23.65% were primigravida and 23.05% had four or more previous pregnancies. Concerning the stage of pregnancy at the time of the survey, most respondents were in the later stages of gestation. Nearly half were in the third trimester (45.81%), while 44.31% were in the second trimester. Only 9.88% were in the first trimester.

Table 4.1 Demographic Characteristics of the Respondents

Variable	Category	Frequency (n)	Percent (%)
Age group (years)	15–19	23	6.89
	20–24	57	17.07
	25–29	101	30.24
	30–34	77	23.05
	35–39	63	18.86
	40–49	13	3.89
Education level	No formal education	24	7.25
	Primary	30	9.06
	Junior High School	131	39.27
	Senior High School	108	32.33
	Tertiary	41	12.08
Occupation	Trader/Business	110	32.93
	Artisan	40	11.98
	Farmer/Fisher	65	19.46
	Formal employment	29	8.68
	Student	6	1.80
	Unemployed/Housewife	35	10.48
	Other	49	14.67
Gravidity	Primigravida (1)	79	23.65
	2–3 pregnancies	178	53.29
	4 or more	77	23.05
Trimester	First trimester	33	9.88
	Second trimester	148	44.31
	Third trimester	153	45.81

Source: *Field data, 2026*

4.2 Level of Knowledge of Pregnant Women Regarding Oral Health During Pregnancy

Overall, awareness of oral health problems among respondents was low. Only 18.98% of women reported that they had heard about oral health problems, while the majority (81.02%) had not. Knowledge of the relationship between pregnancy and gum disease was also poor. Only 21.58% correctly indicated that pregnancy increases the risk of gum disease, while 19.76% believed it does not, and the majority (58.66%) reported that they did not know. With respect to oral problems experienced during pregnancy (multiple responses), the most commonly reported symptoms were gum bleeding (16.17%), bad breath (13.77%), tooth loss (14.67%), and tooth decay (8.98%). However, more than half of the respondents (58.68%) reported none of these problems.

Knowledge of recommended dental visit frequency during pregnancy was particularly poor. Only 15.41% correctly identified that women should visit the dentist at least once every trimester, while 12.39% believed dental visits were necessary only when in pain, and a large majority (72.21%) did not know the recommended frequency. Regarding the perceived effects of maternal oral health on the baby, half of the respondents (50.15%) correctly acknowledged that poor oral health can affect the baby's health. However, a substantial proportion either did not know (40.62%) or believed that oral health has no effect on the baby (9.23%), indicating an incomplete understanding of the potential maternal–fetal health linkages.

Perceptions about the safety of dental treatment during pregnancy were mixed. While 45.59% correctly indicated that dental treatment is safe during pregnancy, an equal proportion (45.59%) did not know, and 8.81% believed that dental treatment is unsafe. Finally, knowledge of the effects of poor oral hygiene on pregnancy outcomes was very low. Only 25.84% correctly identified that poor oral hygiene can affect pregnancy outcomes, while the majority (65.65%) reported that they did not know.

Table 4.2 Level of Knowledge of Pregnant Women Regarding Oral Health

Variable	Category	Frequency (n)	Percent (%)
Heard about oral health problems	Yes	64	18.98
	No	270	81.02
Pregnancy increases risk of gum disease	Yes	73	21.58
	No	67	19.76
	Don't know	194	58.66
Oral problems during pregnancy (Multiple response)	Gum bleeding	54	16.17
	Tooth decay	30	8.98
	Bad breath	46	13.77
	Tooth loss	49	14.67
	None of the above	196	58.68
Recommended dental visit frequency	Once every trimester (Correct)	52	15.41
	Only when in pain	42	12.39
	Do not know	240	72.21
Can poor oral health affect baby's health?	Yes (Correct)	166	50.15
	No	31	9.23
	Don't know	135	40.62
Dental treatment safe during pregnancy	Yes (Correct)	152	45.59
	No	31	8.81
	Don't know	151	45.59
Poor oral hygiene affects pregnancy outcomes	True (Correct)	87	25.84
	False	30	8.51
	Don't know	217	65.65

Source: *Field data, 2026*

Overall oral health knowledge was assessed using a composite index derived from multiple knowledge items. Individual scores were summed to generate a total knowledge score for each respondent, and the mean score of the study population was used as the cut-off point to categorize respondents into “*good knowledge*” and “*poor knowledge*”. As shown in **Figure 4.2** below, a

majority of the total respondents (57.78%) demonstrated poor overall knowledge of oral health during pregnancy, while only 42.22% demonstrated good knowledge based on the answers provided to the survey.

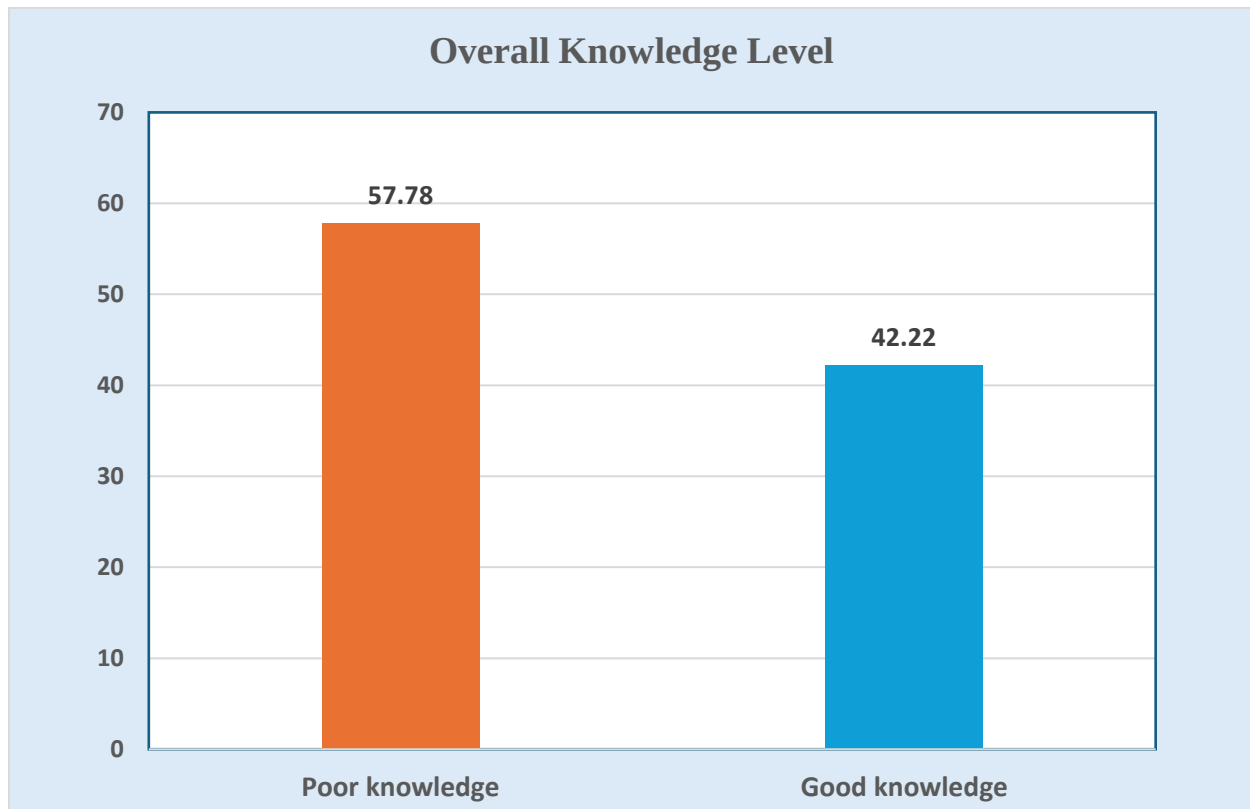


Figure 4.2 Overall Knowledge of Pregnant Women Concerning Oral Health

4.3 Attitudes of Pregnant Women Towards Oral Healthcare During Pregnancy

Most women did not perceive oral health problems during pregnancy as trivial. Nearly two-thirds disagreed or strongly disagreed with the statement that oral health problems during pregnancy are not serious (65.85%). However, about one in eight respondents (13.42%) agreed or strongly agreed with this statement, while 20.73% were neutral. Fear of visiting the dentist during pregnancy was not evident among a substantial proportion of respondents. Approximately 26.97% agreed or

strongly agreed that they were afraid to visit the dentist during pregnancy, compared with 62.13% who disagreed or strongly disagreed.

Misconceptions regarding the safety of dental treatment during pregnancy were also common. About 23.19% of respondents agreed or strongly agreed that dental treatments can harm the fetus, while 43.98% disagreed or strongly disagreed with this belief. Notably, nearly one-third of respondents (32.83%) were neutral. Willingness to follow advice on oral healthcare during pregnancy was very high. A large proportion of respondents (91.29%) agreed or strongly agreed that they were willing to follow advice on oral healthcare.

Concerns about the potential harm of dental procedures to the baby were widespread. Nearly one-third of respondents (30.70%) agreed or strongly agreed that they worried dental procedures might harm their baby, while 40.43% disagreed or strongly disagreed. Finally, the belief that tooth loss is a normal part of pregnancy persisted among some respondents. About 17.27% agreed or strongly agreed with this misconception, while 44.55% disagreed or strongly disagreed. However, a substantial proportion (38.18%) were neutral.

Table 4.3 Attitudes of Pregnant Women Towards Oral Healthcare During

Variable	Category	Frequency (n)	Percent (%)
Oral health problems during pregnancy are not serious	Strongly Agree	22	6.10
	Agree	25	7.32
	Neutral	69	20.73
	Disagree	67	20.12
	Strongly Disagree	151	45.73
I am afraid to visit the dentist during pregnancy	Strongly Agree	66	19.70
	Agree	25	7.27
	Neutral	37	10.91
	Disagree	105	31.52
	Strongly Disagree	101	30.61
	Strongly Agree	46	13.55

Dental treatments can harm the fetus	Agree	33	9.64
	Neutral	109	32.83
	Disagree	90	27.11
	Strongly Disagree	56	16.87
I am willing to follow advice on oral healthcare	Strongly Agree	166	56.45
	Agree	104	34.84
	Neutral	14	3.83
	Disagree	14	3.83
	Strongly Disagree	6	1.05
I worry dental procedures might harm my baby	Strongly Agree	65	19.45
	Agree	38	11.25
	Neutral	96	28.88
	Disagree	74	22.19
	Strongly Disagree	61	18.24
Tooth loss is part of pregnancy	Strongly Agree	27	7.88
	Agree	32	9.39
	Neutral	127	38.18
	Disagree	77	23.03
	Strongly Disagree	71	21.52

Source: *Field data, 2026*

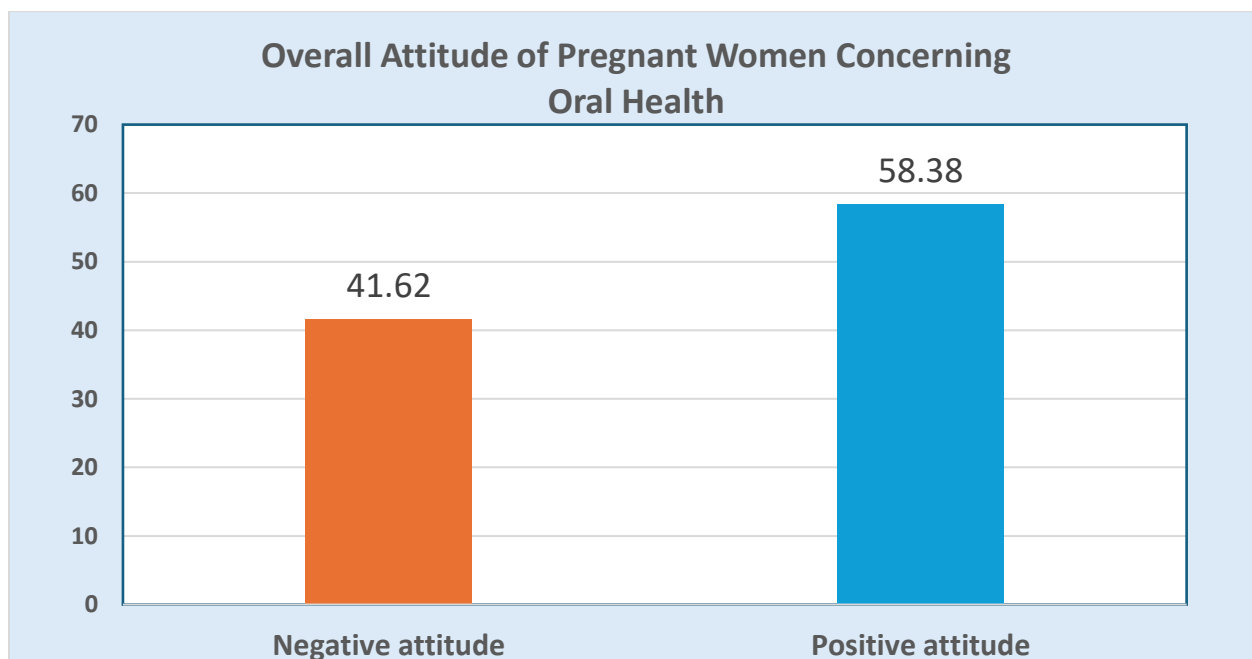


Figure 4.3 Overall Attitude of Pregnant Women Concerning Oral Health

4.4 Oral Health Practices Adopted by Pregnant Women During Pregnancy

The majority of women brushed their teeth at least twice daily, with 79.34% brushing twice and 14.37% brushing more than twice per day. Only a very small proportion reported brushing once daily (5.99%) or rarely/never (0.30%). Despite good brushing habits, the use of dental floss was low. Only 23.57% of respondents reported using dental floss, while the majority (76.43%) did not.

Utilization of dental services during pregnancy was particularly low. Only 7.51% of respondents reported visiting a dentist during pregnancy, while majority (92.49%) had not sought professional dental care. This highlights a substantial gap between personal oral hygiene practices and the use of preventive or curative dental services during pregnancy.

With respect to toothpaste type, most respondents used fluoride-containing toothpaste (86.53%), which is appropriate for caries prevention. However, a minority reported using charcoal (8.38%) or herbal/natural toothpaste (3.59%).

Most women reported efforts to reduce sugary intake, with 69.49% indicating regular reduction and 15.71% reporting occasional reduction. However, 14.80% did not reduce sugar intake. Self-reported experience of oral problems during pregnancy was low, with only 7.02% reporting any oral problems. Regarding toothbrush replacement, the majority of respondents (63.77%) reported changing their toothbrush every three months, which aligns with recommended practice. However, a quarter (26.05%) reported changing monthly, and a small proportion changed quarterly (6.59%) or yearly (3.59%).

Finally, most respondents demonstrated appropriate practice of rinsing after vomiting during pregnancy. A large majority (81.38%) reported always rinsing after vomiting, while 12.91% did so sometimes. However, 5.71% never rinsed.

Table 4.4 Oral Health Practices Adopted by Pregnant Women During Pregnancy

Variable	Category	Frequency	Percentage (%)
Brushing frequency	Once	20	5.99
	Twice	265	79.34
	More than twice	48	14.37
	Rarely/Never	1	0.30
Use of dental floss	Yes	74	23.57
	No	240	76.43
Visited a dentist during pregnancy	Yes	25	7.51
	No	308	92.49
Type of toothpaste	Fluoride toothpaste	289	86.53
	Charcoal	28	8.38
	Herbal/Natural	12	3.59
	Don't know	4	1.20
	Other	1	0.30
Reduced sugary intake	Yes regularly	230	69.49
	Sometimes	52	15.71
	No	49	14.80
Experienced oral problems	Yes	16	7.02
	No	212	92.98
Toothbrush change frequency	Monthly	87	26.05
	Once every 3 months	213	63.77
	Quarterly	22	6.59
	Yearly	12	3.59
Rinse after vomiting	Always	271	81.38
	Sometimes	43	12.91
	Never	19	5.71

Source: *Field data, 2026*

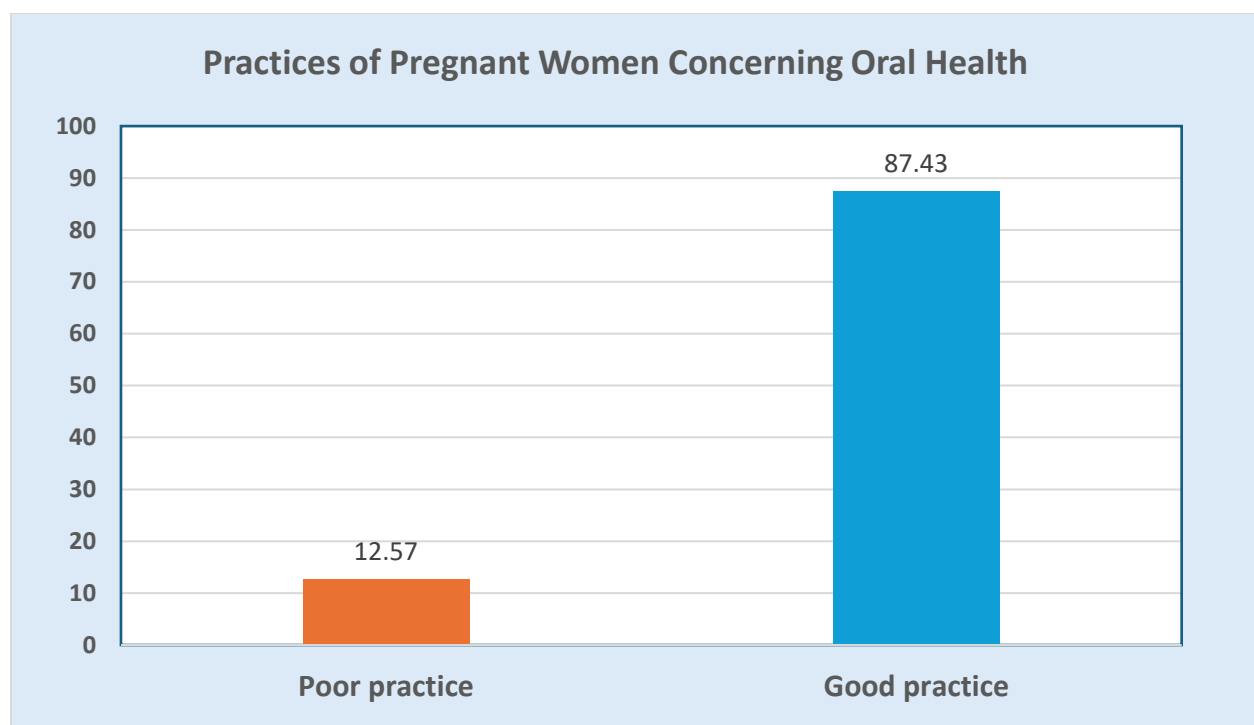


Figure 4.4 Practices of Pregnant Women Concerning Oral Health

4.5 Bivariate Analysis of Socio-Demographic Factors with Oral Health Practices

There was no statistically significant association between oral health practices and age group and ($\chi^2 = 3.61$, $p = 0.607$), the highest level of education attained ($\chi^2 = 2.53$, $p = 0.640$), occupation ($\chi^2 = 4.50$, $p = 0.609$). and gravidity ($\chi^2 = 2.34$, $p = 0.311$).

Table 4.5: Association between Socio-Demographic Factors and Oral Health Practices

Variable	Category	Oral Health Practices		χ^2 -test Stat	P-value
		Poor practice n (%)	Good practice n (%)		
Age group	15–19	1 (4.35)	22 (95.65)	3.61	0.607
	20–24	5 (8.77)	52 (91.23)		
	25–29	16 (15.84)	85 (84.16)		
	30–34	10 (12.99)	67 (87.01)		
	35–39	9 (14.29)	54 (85.71)		
	40–49	1 (7.69)	12 (92.31)		

Highest level of education	Junior High	13 (10.00)	117 (90.00)	2.53	0.640
	No formal education	3 (12.50)	21 (87.50)		
	Primary	5 (16.67)	25 (83.33)		
	Senior High	17 (15.89)	90 (84.11)		
	Tertiary	4 (10.00)	36 (90.00)		
Occupation	Trader/Business	15 (13.64)	95 (86.36)	4.50	0.609
	Artisan	4 (10.00)	36 (90.00)		
	Farmer/Fisher	11 (16.92)	54 (83.08)		
	Formal employment	5 (17.24)	24 (82.76)		
	Student	1 (16.67)	5 (83.33)		
	Unemployed	3 (8.57)	32 (91.43)		
	Other	3 (6.12)	46 (93.88)		
Gravidity	Primigravida	6 (7.59)	73 (92.41)	2.34	0.311
	2–3 pregnancies	25 (14.04)	153 (85.96)		
	4 or more	11 (14.29)	66 (85.71)		

Source: *Field data, 2026*

4.6 Bivariate Analysis of Socio-Demographic Factors with Oral Health Knowledge

Table 4.6 presents the bivariate analysis examining the association between selected socio-demographic characteristics and oral health knowledge among pregnant women attending antenatal care at South Tongu Municipal Hospital.

Educational level showed a statistically significant association with oral health knowledge ($\chi^2 = 20.2805$, $p < 0.001$). Respondents with tertiary education had a higher proportion of good knowledge (19.29%) compared to those with no formal education (4.29%) and primary education (4.29%). A statistically significant association was also observed between occupation and oral health knowledge ($\chi^2 = 17.6945$, $p = 0.007$). Respondents engaged in formal employment showed a relatively higher proportion of good knowledge (14.89%) compared with those in informal

occupations such as farming/fishing (13.48%) and artisanship (10.64%). In contrast, gravidity ($\chi^2 = 0.9178$, $p = 0.632$) and age group, ($\chi^2 = 3.4672$, $p = 0.628$) were not significantly associated with oral health knowledge.

Table 4.6 : Association between Socio-Demographic Factors and Oral Health Knowledge

Variable	Category	Oral Health Knowledge		χ^2 -test Stats	P-value
		Poor Knowledge n (%)	Good Knowledge n (%)		
Age group	15–19	11 (5.70)	12 (8.51)	3.4672	0.628
	20–24	37 (19.17)	20 (14.18)		
	25–29	61 (31.61)	40 (28.37)		
	30–34	42 (21.76)	35 (24.82)		
	35–39	36 (18.65)	27 (19.15)		
	40–49	6 (3.11)	7 (4.96)		
Highest level of education	Junior High	78 (40.84)	52 (37.14)	20.2805	<0.001
	No formal education	18 (9.42)	6 (4.29)		
	Primary	24 (12.57)	6 (4.29)		
	Senior High	58 (30.37)	49 (35.00)		
	Tertiary	13 (6.81)	27 (19.29)		
Occupation	Trader/Business	63 (32.64)	47 (33.33)	17.6945	0.007
	Artisan	25 (12.95)	15 (10.64)		
	Farmer/Fisher	46 (23.83)	19 (13.48)		
	Formal employment	8 (4.15)	21 (14.89)		
	Student	2 (1.04)	4 (2.84)		
	Unemployed	22 (11.40)	13 (9.22)		
	Other	27 (13.99)	22 (15.60)		
Gravidity	Primigravida	42 (21.76)	37 (26.24)	0.9178	0.632
	2–3 pregnancies	105 (54.40)	73 (51.77)		
	4 or more	46 (23.83)	31 (21.99)		

Source: Field data, 2026

4.7 Bivariate Analysis of Socio-Demographic Factors with Attitude Towards Oral Health

Table 4.8 presents the bivariate analysis examining the association between selected socio-demographic characteristics and attitude toward oral health among pregnant women attending antenatal care at South Tongu Municipal Hospital.

With respect to socio-demographic characteristics, trimester of pregnancy showed a statistically significant association with attitude toward oral health ($\chi^2 = 11.1808$, $p = 0.011$). Respondents in the third trimester had the highest proportion of positive attitudes (49.74%) compared with those in the first trimester (6.15%) and second trimester (40.51%).

In contrast, age group ($\chi^2 = 6.9156$, $p = 0.227$), educational level ($\chi^2 = 4.4752$, $p = 0.346$), occupation ($\chi^2 = 4.8423$, $p = 0.564$), and gravidity ($\chi^2 = 0.0010$, $p = 0.999$) were not significantly associated with attitude toward oral health among the respondents.

Table 4.7: Association between Socio-Demographic Factors and Attitude Towards Oral Health

Variable	Category	Attitude Towards Oral Health		χ^2 -test Stats	P-value
		Negative n (%)	Positive n (%)		
Age group	15–19	10 (7.19)	13 (6.67)	6.9156	0.227
	20–24	20 (14.39)	37 (18.97)		
	25–29	36 (25.90)	65 (33.33)		
	30–34	41 (29.50)	36 (18.46)		
	35–39	26 (18.71)	37 (18.97)		
	40–49	6 (4.32)	7 (3.59)		
Highest level of education	Junior High	53 (38.41)	77 (39.90)	4.4752	0.346
	No formal education	14 (10.14)	10 (5.18)		
	Primary	14 (10.14)	16 (8.29)		
	Senior High	39 (28.26)	68 (35.23)		
	Tertiary	18 (13.04)	22 (11.40)		
Occupation	Trader/Business	46 (33.09)	64 (32.82)	4.8423	0.564
	Artisan	19 (13.67)	21 (10.77)		

	Farmer/Fisher	29 (20.86)	36 (18.46)		
	Formal employment	12 (8.63)	17 (8.72)		
	Student	2 (1.44)	4 (2.05)		
	Unemployed	9 (6.47)	26 (13.33)		
	Other	22 (15.83)	27 (13.85)		
Trimester of pregnancy	Third trimester	56 (40.29)	97 (49.74)	11.180	0.011
	First trimester	21 (15.11)	12 (6.15)		
	Second trimester	61 (43.88)	79 (40.51)		
	Other	1 (0.72)	7 (3.59)		
Gravidity	Primigravida	33 (23.74)	46 (23.59)	0.0010	0.999
	2–3 pregnancies	74 (53.24)	104 (53.33)		
	4 or more	32 (23.02)	45 (23.08)		

Source: Field data, 2026

4.8 Test for Association Between Oral Health Knowledge, Attitudes on Practices

There was no statistically significant association between oral health knowledge level and oral health practices ($\chi^2 = 3.666$, $p = 0.056$). Although a higher proportion of respondents with good knowledge demonstrated good oral health practices (91.49%) compared with those with poor knowledge (84.46%), this difference did not meet the threshold for statistical significance. Similarly, there was no statistically significant association between attitude level and oral health practices ($\chi^2 = 1.36$, $p > 0.244$).

Table 4.8 Association Between Knowledge, Attitudes, and Practices of Oral Health

Variables	Category	Practice Level		χ^2 -Test Stats	P-value
		Good n (%)	Poor n (%)		
Knowledge level	Poor	163 (84.46%)	30 (15.54%)	3.666	0.056
	Good	129 (91.49%)	12 (8.51%)		
Attitude level	Negative	125 (89.93%)	14 (10.07%)	1.36	0.244
	Positive	167 (85.64%)	28 (14.36%)		

Source: Field data, 2026

4.9 Logistic Regression Analysis of Factors Associated with Oral Health Practice

Table 4.9 presents the multivariable logistic regression analysis of factors associated with oral health practices among pregnant women attending antenatal care at South Tongu Municipal Hospital. After adjusting for potential confounders, knowledge level was found to be an independent predictor of oral health practices (AOR = 2.14; 95% CI: 0.99–4.66; $p = 0.05$). Respondents with good oral health knowledge were approximately twice as likely to demonstrate good oral health practices compared to those with poor knowledge, holding all covariates constant.

In contrast, gravidity, occupation, educational level, and age group were not independently associated with oral health practices.

Table 4.9 Logistic Regression Analysis of Factors Associated with Oral Health Practice

Variable	Category	Unadjusted Model		Adjusted Model	
		OR(95% CI)	p-value	OR(95% CI)	p-value
Knowledge level	Poor (<i>Ref</i>)	1	-	1	-
	Good	1.98 (0.97–4.02)	0.059	2.14(0.99–4.66)	0.054
Attitude level	Negative (<i>Ref</i>)	1	-	1	-
	Positive	0.67 (0.34–1.32)	0.246	0.72(0.34 –1.50)	0.378
Trimester of pregnancy	Third (<i>Ref</i>)	1	-	1	-
	First	1.59 (0.45–5.68)	0.475	1.23(0.31–4.82)	0.766
	Second	1.15 (0.59–2.26)	0.687	1.00(0.49–2.06)	0.996
Gravidity	Primigravida (<i>Ref</i>)	1	-	1	-
	2–3	0.50 (0.20–1.28)	0.149	0.54 (0.18–1.59)	0.264
	≥4	0.49 (0.17–1.41)	0.187	0.54 (0.14–2.07)	0.315
Occupation	Trader/Business (<i>Ref</i>)	1	-	1	-
	Artisan	1.42 (0.44–4.57)	0.555	1.36(0.40–4.64)	0.626
	Farmer/Fisher	0.78 (0.33–1.81)	0.555	0.72 (0.28–1.83)	0.486
	Formal employment	0.76 (0.25–2.29)	0.623	0.43 (0.09–2.19)	0.311
	Student	0.79 (0.09–7.23)	0.834	0.15(0.01–4.13)	0.263
	Unemployed/Housewife	1.68 (0.46–6.20)	0.433	1.38 (0.34–5.52)	0.649
	Other	2.42 (0.67–8.78)	0.179	2.40 (0.60–9.55)	0.213
Educational level	JHS (<i>Ref</i>)	1	-	1	-
	No formal education	0.80 (0.21–3.04)	0.745	0.91 (0.22–3.77)	0.899
	Primary	0.55 (0.18–1.67)	0.289	0.68 (0.20–2.27)	0.530
	Senior High School	0.58 (0.27–1.25)	0.178	0.48 (0.20–1.15)	0.100
	Tertiary	0.98 (0.30- 3.20)	0.978	1.28 (0.22- 7.52)	0.788
Age group	15–19 (<i>Ref</i>)	1	-	1	-
	20–24	0.47 (0.05–4.28)	0.505	0.38 (0.02–8.11)	0.533
	25–29	0.24 (0.03–1.92)	0.179	0.20 (0.01–4.40)	0.305
	30–34	0.30 (0.04–2.52)	0.270	0.24 (0.01–5.74)	0.379
	35–39	0.27 (0.03–2.28)	0.231	0.20 (0.01–4.86)	0.320
	40–49	0.55 (0.03–9.52)	0.678	0.42 (0.01–19.34)	0.656

CHAPTER FIVE

5.0 DISCUSSION

5.1 level of knowledge of pregnant women regarding oral health during pregnancy

The findings of this study reveal that oral health knowledge among pregnant women in South Tongu Municipality in the Volta Region of Ghana is generally low, with more than half of respondents demonstrating poor overall knowledge. This is reflected not only in the limited awareness of oral health problems but also in the substantial gaps in understanding key issues such as the relationship between pregnancy and gum disease, the recommended frequency of dental visits, and the potential effects of maternal oral health on pregnancy outcomes. These patterns may suggest that oral health is a relatively neglected component of maternal health awareness within this setting.

Although ANC attendance provides a critical platform for health education, this study did not directly assess the content of ANC counselling received by respondents. However, one possible explanation for the observed knowledge gaps is that oral health may receive less attention during routine maternal health education compared with more immediate maternal and neonatal concerns such as nutrition, malaria prevention, and delivery preparedness. This interpretation aligns with global evidence indicating that oral health is frequently under-integrated into primary healthcare systems, particularly in low- and middle-income countries (WHO, 2022). In such contexts, knowledge gaps may not necessarily reflect individual negligence, but could partly point to possible omissions in health education delivery.

The findings of this study are consistent with those reported in other low-resource settings. For instance, Wassihun et al. (2022) found that knowledge of oral health among pregnant women in Ethiopia was generally low, particularly with respect to periodontal disease and its implications.

Similarly, Bain et al. (2020) observed that while some women were familiar with routine oral hygiene practices, knowledge of pregnancy-specific oral health risks and safe dental care remained inadequate. Evidence from Zimbabwe further supports this pattern, with Mushayabasa et al. (2021) reporting that many pregnant women had limited understanding of preventive oral healthcare and rarely received oral health information during ANC visits. These findings suggest that the low knowledge levels observed in South Tongu are not isolated, but may be consistent with a broader regional pattern in which oral health is not always strongly integrated into maternal healthcare services.

However, the findings contrast with studies conducted in more resource-rich settings, where higher levels of awareness have been reported. George et al. (2019), for example, noted that pregnant women in developed contexts generally demonstrate better understanding of oral health importance, although misconceptions about the safety of dental treatment may still persist. Similarly, Silk et al. (2020) reported relatively higher baseline awareness of oral hygiene practices, even though knowledge of the oral–systemic link remains incomplete. These differences may reflect, in part, the influence of health system capacity and the extent to which oral health education is incorporated into routine maternal care. In settings where oral health education is systematically integrated into ANC, knowledge outcomes may be more favorable, underscoring the possible role of institutional support in shaping health awareness.

A particularly important finding in this study is the poor understanding of the relationship between pregnancy and gum disease, as well as the limited awareness of how maternal oral health can affect pregnancy outcomes. This is concerning given the growing body of evidence linking periodontal disease to adverse outcomes such as preterm birth and low birth weight. Systematic reviews by Teshome and Yitayeh (2021) and Machado et al. (2023) have demonstrated significant associations

between periodontal conditions and adverse pregnancy outcomes, suggesting that inadequate knowledge in this area could have implications for maternal and neonatal health. The fact that a substantial proportion of respondents were unaware of these links indicates a critical gap in risk perception, which may reduce motivation to adopt preventive behaviors.

Equally noteworthy is the poor knowledge regarding recommended dental visit frequency during pregnancy, with the majority of respondents unable to identify appropriate visitation patterns. This finding may support the interpretation that dental care is often perceived as a reactive service rather than a preventive one. Marchi et al. (2019) similarly found that many pregnant women tend to seek dental care only when experiencing pain or discomfort, rather than as part of routine preventive care. Although this study did not directly assess provider counselling or referral systems, such perceptions may be further reinforced where oral health counselling is limited or where structured referral linkages within ANC services are weak.

When viewed through the lens of the Knowledge–Attitude–Practice (KAP) framework underpinning this study, the findings suggest that knowledge, as a foundational component, is relatively weak within this population. While the framework posits that knowledge should influence attitudes and subsequently shape practices, the low levels of knowledge observed here may indicate a potential disruption in this pathway. This may help explain why certain oral health practices, such as regular tooth brushing, can still be relatively good despite poor knowledge, as these behaviors may be driven more by habit or cultural norms than by informed understanding. However, more complex and preventive behaviors, such as seeking professional dental care, may remain suboptimal where adequate knowledge, perceived need, and access to professional guidance are limited.

Overall, the findings highlight the need for deliberate efforts to strengthen oral health education within antenatal care services. Integrating oral health counselling into routine ANC visits, training healthcare providers to deliver basic oral health messages, and establishing referral linkages with dental services could potentially improve knowledge levels among pregnant women. Such interventions are consistent with global recommendations advocating for the integration of oral health into primary healthcare systems (WHO, 2022). If oral health remains weakly integrated into maternal health education, knowledge gaps may persist, limiting the effectiveness of preventive strategies and efforts to improve maternal and child health outcomes.

5.2 Attitudes of Pregnant Women Towards Oral Healthcare During Pregnancy

The findings of this study indicate that, although a majority of respondents demonstrated generally positive attitudes toward oral healthcare during pregnancy, important areas of concern remain, particularly with respect to uncertainty and lingering misconceptions. While most women disagreed with the notion that oral health problems during pregnancy are not serious and expressed a strong willingness to follow oral health advice, a considerable proportion remained uncertain or held incorrect beliefs about the safety of dental treatment and the potential risks to the fetus. This suggests that attitudes, although broadly favorable, may not be firmly grounded in accurate knowledge, but may instead be shaped by partial understanding and uncertainty.

One possible explanation for this pattern is the nature of health information pregnant women may receive during antenatal care. Although this study did not directly assess the content of ANC counselling, evidence from other settings suggests that health education provided during ANC often emphasizes general maternal health behaviours without giving adequate attention to specific concerns related to oral healthcare, particularly issues surrounding the safety of dental procedures. As a result, even when women develop a positive disposition toward maintaining oral health, they

may simultaneously harbor doubts about engaging with formal dental services. This interpretation aligns with broader global observations that oral health is often inadequately integrated into maternal healthcare systems, leading to persistent informational gaps despite frequent contact with health services (WHO, 2022).

The relatively low levels of fear reported in this study, where the majority of respondents indicated that they were not afraid to visit the dentist, are encouraging and may suggest that overt dental anxiety is not the primary barrier in this population. However, this finding must be interpreted cautiously, as fear may not always appear as explicit anxiety but may instead take the form of subtle concerns about safety. The fact that nearly one-third of respondents expressed worry that dental procedures might harm their baby, and a similar proportion remained neutral on this issue, may indicate underlying apprehension rooted in uncertainty rather than outright fear. This distinction is important, as uncertainty can be just as powerful as fear in influencing health-seeking behavior.

These findings are consistent with existing literature from similar contexts. Detman et al. (2016) reported that misconceptions about the safety of dental treatment during pregnancy are widespread, with many women avoiding dental care due to fears of harming the fetus. Likewise, Marchi et al. (2019) found that even among women who acknowledged the importance of oral health, concerns about safety often led to delayed or avoided dental visits. In sub-Saharan African settings, such attitudes may be reinforced by limited access to accurate information and inconsistent counselling from healthcare providers, although these factors were not directly measured in the present study. This may contribute to continued uncertainty around dental care during pregnancy.

In contrast, studies from higher-resource settings have reported more stable and informed attitudes toward oral healthcare during pregnancy. For instance, George et al. (2019) observed that although

some misconceptions persist, pregnant women in developed contexts are generally more confident about the safety of dental care, largely due to better access to information and stronger integration of oral health into maternal care services. Similarly, Silk et al. (2020) emphasized that clear clinical guidelines and consistent provider communication play a crucial role in shaping positive and informed attitudes. The differences observed between these settings and the present study may reflect, in part, the possible influence of health system capacity and quality of patient education in shaping maternal perceptions.

Another important finding from this study is the persistence of certain cultural misconceptions, such as the belief that tooth loss is a normal part of pregnancy. Although a majority of respondents disagreed with this statement, a substantial proportion remained neutral or agreed, suggesting that such beliefs may not have been fully dispelled. These misconceptions may be deeply embedded within community narratives and may not be easily corrected through routine health education alone. Nazir (2017) notes that misconceptions about oral health are common in many populations and can significantly influence health behaviors if not actively addressed.

From a conceptual perspective, the findings highlight the complex relationship between knowledge and attitudes within the KAP framework. While knowledge is expected to shape attitudes, the results of this study suggest that attitudes may develop even in the absence of comprehensive knowledge, but such attitudes may be fragile and susceptible to misinformation. The high willingness to follow oral health advice observed among respondents is particularly noteworthy, as it represents an important opportunity for intervention. However, without addressing underlying misconceptions and uncertainties, this willingness may not translate into appropriate health-seeking behavior.

Overall, the findings suggest that although attitudes toward oral healthcare during pregnancy are generally positive in this population, they are characterized by ambiguity and incomplete understanding, particularly regarding the safety of dental treatment. This underscores the need for targeted educational interventions within antenatal care services that go beyond general health promotion to specifically address common fears, clarify misconceptions, and provide reassurance about the safety and importance of dental care during pregnancy. Strengthening provider–patient communication in this area could potentially play a critical role in transforming positive but uncertain attitudes into informed and confident health behaviors.

5.3 To evaluate the oral health practices adopted by pregnant women during pregnancy

The findings of this study indicate that oral health practices among pregnant women in South Tongu Municipality are generally favorable with respect to routine hygiene behaviors, yet markedly poor in terms of professional dental service utilization. A substantial majority of respondents reported brushing their teeth at least twice daily, using fluoride toothpaste, reducing sugar intake, and engaging in appropriate practices such as rinsing after vomiting. However, despite these positive behaviors, only a very small proportion of respondents reported visiting a dentist during pregnancy. This contrast reveals a critical gap between personal oral hygiene practices and utilization of professional dental care, suggesting that oral health behavior in this population is only partially preventive.

One possible explanation for this pattern is that routine oral hygiene practices such as tooth brushing are often habitual behaviors acquired early in life and reinforced by social norms and general health messaging, rather than by specific knowledge of pregnancy-related oral health risks. As such, these practices may be maintained even in the absence of comprehensive knowledge. In contrast, seeking professional dental care may require a higher level of awareness, perceived need,

confidence in service safety, and interaction with the healthcare system. Although this study did not directly assess the extent to which oral health is integrated into antenatal care services, the low rate of dental visits may suggest that professional dental care is not widely perceived as a necessary component of maternal healthcare. This interpretation aligns with global evidence highlighting that preventive oral health services are often underutilized in low- and middle-income countries where oral health may be weakly integrated into primary healthcare systems (WHO, 2022).

The extremely low level of dental service utilization observed in this study is consistent with findings from other settings. Marchi et al. (2019) reported that dental visits during pregnancy are frequently driven by symptoms rather than preventive intentions, with many women seeking care only when experiencing pain. Similarly, Detman et al. (2016) found that misconceptions about the safety of dental procedures during pregnancy, combined with low prioritization of oral health, may contribute to reduced utilization of dental services. In the African context, Mushayabasa et al. (2021) also observed low levels of dental attendance among pregnant women in Zimbabwe, despite the presence of basic oral hygiene practices. These findings support the view that professional dental service utilization remains a major gap across similar settings.

In the Ghanaian context, the findings are further supported by clinical evidence indicating a high burden of unmet oral health needs. Goka et al. (2022) reported that a large proportion of pregnant women required periodontal treatment, yet many had never visited a dentist, suggesting a disconnect between treatment need and service uptake. Similarly, Hewlett et al. (2022) documented a high prevalence of periodontal disease in the Greater Accra Region, highlighting the broader population-level burden of oral conditions. Together, these findings suggest that low utilization of dental services may not necessarily reflect absence of need, but may instead be partly

explained by factors related to awareness, perceived need, access, and the extent to which oral health is linked to routine maternal healthcare.

Several factors could possibly contribute to this low uptake of professional dental care. First, the findings from the attitude section indicate that although overt fear of dental visits is relatively low, uncertainty regarding the safety of dental procedures during pregnancy persists. Such uncertainty may discourage preventive care-seeking, even in the absence of explicit fear. Second, although this study did not directly measure affordability or geographic access, financial and structural barriers may also influence access to dental services, particularly in semi-rural settings such as South Tongu. Third, where routine dental screening and referral are not strongly incorporated into antenatal care, opportunities for early detection and intervention may be reduced. These possible factors may contribute to a pattern in which dental care is perceived as optional rather than essential.

The findings also reveal low utilization of dental floss and other interdental cleaning practices, despite high levels of tooth brushing. This suggests that while basic oral hygiene behaviors are widely practiced, more comprehensive preventive practices are less common. Such gaps may reflect limited awareness of the importance of interdental cleaning or possible lack of access to appropriate oral hygiene tools. Bain et al. (2020) similarly observed that while tooth brushing was commonly practiced among pregnant women, the use of adjunctive preventive measures such as flossing was relatively low, indicating incomplete adoption of optimal oral hygiene behaviors.

Interestingly, the relatively low self-reported prevalence of oral problems among respondents contrasts with existing evidence on the high burden of oral disease during pregnancy. This may reflect under-recognition of symptoms, rather than true absence of oral health issues. Conditions such as gingival bleeding may be normalized as part of pregnancy and therefore not reported as

problems. This interpretation is supported by broader evidence indicating that periodontal diseases are often under-recognized, particularly in populations with limited oral health knowledge (Nazir, 2017).

From a conceptual perspective, these findings reinforce the complexity of the Knowledge–Attitude–Practice (KAP) framework. While the model assumes that knowledge and attitudes influence behavior, the present study suggests that different components of practice may be influenced by different factors. Routine behaviors such as brushing appear to be less dependent on pregnancy-specific oral health knowledge, whereas more complex behaviors such as seeking professional care may depend more strongly on awareness, perceived risk, perceived safety, and access to professional guidance. This suggests that improving oral health outcomes requires not only enhancing knowledge, but also addressing possible contextual barriers that may limit preventive dental care.

Overall, the findings highlight a critical gap in maternal oral healthcare, where good personal hygiene practices coexist with extremely low utilization of professional dental services. This imbalance may limit the effectiveness of preventive efforts, as many oral conditions require professional assessment and treatment beyond routine self-care. Addressing this gap may require strengthening oral health education within antenatal care services, improving access to dental care, and emphasizing the importance of preventive dental visits during pregnancy. Without such interventions, the burden of untreated oral disease among pregnant women may persist despite improvements in basic hygiene practices.

5.4 The Association Between Oral Health Knowledge and Oral Health Practices Among Pregnant Women Attending Antenatal Care

The findings of this study showed that there was no statistically significant association between oral health knowledge and oral health practices among pregnant women attending antenatal care in South Tongu Municipality. This suggests that higher levels of knowledge did not necessarily translate into better oral health behaviors within this population. At first glance, this may appear counterintuitive, particularly within the framework of the Knowledge–Attitude–Practice (KAP) model, which assumes that increased knowledge should lead to improved practices. However, the results of this study highlight the complexity of health behavior and suggest that the relationship between knowledge and practice is neither direct nor automatic.

One possible explanation for the lack of association lies in the nature of the practices being measured. As observed in earlier findings, many respondents reported good routine oral hygiene behaviors such as frequent tooth brushing and use of fluoride toothpaste, despite demonstrating poor knowledge of oral health during pregnancy. This indicates that such practices may be driven more by habitual behavior and social norms rather than by informed understanding. In many communities, tooth brushing is a culturally ingrained practice learned early in life, and its continuation during pregnancy may not depend on specific knowledge of oral health risks. In contrast, more complex and preventive behaviors, such as seeking professional dental care, may require adequate knowledge, perceived need, confidence in service safety, and interaction with the healthcare system.

The absence of a significant relationship between knowledge and practice in this study is consistent with findings from other settings. Bain et al. (2020) reported that although some pregnant women demonstrated acceptable oral hygiene practices, these behaviors were not always associated with

high levels of knowledge, suggesting that other factors play a role in shaping behavior. Similarly, Marchi et al. (2019) found that dental service utilization among pregnant women was influenced more by perceived need, access, and beliefs about safety than by knowledge alone. These findings support the argument that knowledge, while important, is not sufficient on its own to drive behavior change.

In the African context, similar patterns have been observed. Mushayabasa et al. (2021) reported that even where awareness of oral hygiene practices existed, utilization of dental services remained low, largely due to structural and perceptual barriers. This suggests that factors such as accessibility of services, financial constraints, and health system organization may influence behavior beyond knowledge alone. Although the present study did not directly measure these barriers, the extremely low rate of dental visits despite relatively good hygiene practices may point to the possibility that contextual or system-level factors could affect the relationship between knowledge and practice.

The findings can also be interpreted in light of broader global evidence on oral health behavior. The World Health Organization emphasizes that oral health behaviors are shaped by a range of social determinants, including access to services, affordability, cultural beliefs, and the degree of integration of oral health into primary healthcare systems (WHO, 2022). In settings where dental services are not easily accessible or where oral health is weakly integrated into routine maternal care, knowledge alone may have limited influence on behavior. This perspective may help explain why improving knowledge without addressing possible contextual and structural barriers may not always lead to meaningful changes in practice.

Another important consideration is the role of attitudes as an intermediary factor within the KAP framework. Although knowledge is expected to influence attitudes, which in turn shape practices, the findings of this study suggest that attitudes may not always be strongly aligned with

knowledge. As observed earlier, many respondents expressed positive attitudes toward oral healthcare and a willingness to follow advice, yet uncertainty and misconceptions persisted. This indicates that even when attitudes are favorable, they may not be sufficiently strong or informed to translate into action, particularly where competing factors such as cost, access, or perceived risk may be present.

Furthermore, the cross-sectional design of the study may partly explain the lack of observed association. Because data were collected at a single point in time, it is not possible to determine whether changes in knowledge would lead to changes in practice over time. Behavioral change is often gradual and may be influenced by repeated exposure to information and reinforcement through healthcare interactions. Therefore, the absence of a significant association in this study does not necessarily imply that knowledge is unimportant, but rather that its effects may be mediated by other factors or may require time to manifest.

Overall, the findings highlight that improving oral health outcomes among pregnant women may require a multidimensional approach that goes beyond knowledge enhancement. While increasing awareness remains essential, it may need to be complemented by efforts to address possible structural barriers, strengthen the integration of oral health into antenatal care, and provide clear, consistent guidance on safe dental practices during pregnancy. Without such comprehensive interventions, the gap between knowledge and practice may persist, limiting the effectiveness of oral health promotion strategies.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study assessed the oral health knowledge, attitudes, and practices (KAP) among pregnant women attending antenatal care at South Tongu Municipal Hospital in the Volta Region of Ghana. It was revealed that oral health knowledge among pregnant women was generally low, with significant gaps in awareness of pregnancy-related oral conditions, the relationship between oral health and pregnancy outcomes, and the safety and necessity of dental care during pregnancy. Despite these knowledge gaps, attitudes toward oral healthcare were generally positive, with most women recognizing the importance of oral health and expressing willingness to follow professional advice. However, these positive attitudes were often accompanied by uncertainty and misconceptions, particularly regarding the safety of dental treatment during pregnancy.

In terms of practices, the study found that routine oral hygiene behaviors were relatively good, with most respondents reporting appropriate practices such as frequent tooth brushing and use of fluoride toothpaste. However, utilization of professional dental services was extremely low. Importantly, the study found no significant association between oral health knowledge and oral health practices, suggesting that knowledge alone may not be sufficient to drive behavior change in this context. Instead, oral health practices appear to be shaped by a combination of habitual behaviors, attitudes, and broader health system factors.

In summary, the study highlights a critical gap in maternal oral healthcare in South Tongu Municipality, characterized by low knowledge, positive but uncertain attitudes, good basic hygiene practices, and poor utilization of professional dental services. Addressing these gaps will require

integrated, context-specific interventions that strengthen oral health education, improve service accessibility, and enhance the role of antenatal care as a platform for preventive oral healthcare.

6.2 Recommendations

1. Oral health education should be incorporated by the Ghana Health Service into standard ANC counselling sessions, with emphasis on pregnancy-related oral conditions, the link between oral health and pregnancy outcomes, and the importance of preventive dental care.
2. Community leaders, partners, and family members should be involved in oral health education efforts to help challenge cultural misconceptions and reinforce positive attitudes. Basic oral health screening should be included as part of routine ANC assessments, with clear referral pathways to dental services where necessary.
3. Interventions should combine education with improvements in service delivery, affordability, and accessibility to address both individual and structural barriers.
4. Future research should explore how changes in knowledge influence behavior over time and evaluate the effectiveness of integrated oral health interventions within ANC settings. Future works should also deploy the use of a qualitative research approach to help gain better insight of oral health conditions in relation to selected socio-demographic conditions.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

Section A: Demographic Information

1. Age: ____ years
2. Highest level of education:
 - No formal education
 - Primary
 - Junior High School
 - Senior High School
 - Tertiary (College/University)
3. Occupation: _____
4. Marital status:
 - Single
 - Married
 - Divorced/Separated
 - Widowed
5. Number of pregnancies (including current): ____
6. Current trimester of pregnancy:
 - First trimester (1–3 months)
 - Second trimester (4–6 months)
 - Third trimester (7–9 months)

Section B: Knowledge of Oral Health During Pregnancy

7. Have you heard about oral health problems during pregnancy?
 - Yes
 - No
8. Do you know that pregnancy can increase the risk of gum disease (gingivitis)?

- Yes
 - No
 - Don't know
- 9. Which of the following oral health problems can occur during pregnancy? (Select all that apply)
 - Gum bleeding
 - Tooth decay
 - Bad breath
 - Tooth loss
 - None of the above
- 10. How often should pregnant women visit a dentist?
 - Once every trimester
 - Only when in pain
 - Do not know
- 11. Can poor oral health during pregnancy affect the baby's health?
 - Yes
 - No
 - Don't know
- 12. Is it safe to receive dental treatment during pregnancy?
 - Yes
 - No
 - Don't know
- 13. Poor oral hygiene can affect pregnancy outcomes such as premature birth or low birth weight.
 - True
 - False
 - Don't know

Section C: Attitudes Towards Oral Healthcare During Pregnancy

Please indicate your level of agreement with each statement by ticking one option:

14. Oral health is important during pregnancy.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

15. I am afraid to visit the dentist during pregnancy.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

16. Dental treatments can harm the fetus.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

17. I am willing to follow advice on oral healthcare during pregnancy.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

18. I worry dental procedures might harm my baby.

- ☐ Strongly Agree

- Agree
- Neutral
- Disagree
- Strongly Disagree

19. Oral health problems during pregnancy are not serious.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

20. Tooth loss is part of pregnancy

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Section D: Oral Health Practices

20. How many times do you brush your teeth daily?

- Once
- Twice
- More than twice
- Rarely or never

21. Do you use dental floss or other interdental cleaners?

- Yes
- No

22. Have you visited a dentist during this pregnancy?

- Yes
- No

23. What type of toothpaste do you use?

- Fluoride toothpaste
- Herbal or natural toothpaste
- Other (please specify): _____
- Do not know

24. Do you try to reduce your intake of sugary foods or drinks during pregnancy?

- Yes, regularly
- Sometimes
- No

25. Have you experienced any oral health problems during this pregnancy?

- Yes (please specify): _____
- No

26. How often do you change your toothbrush

- Monthly
- Yearly
- Once every 3 months
- Quarterly

27. Do you rinse mouth thoroughly after vomiting (morning sickness)

- Always
- Sometimes
- Never

APPENDIX II: INFORMED CONSENT FORM

General Information About the Study

My Name is Master of Public Health student conducting a study titled: “Oral Health Patterns Among Pregnant Women Attending Antenatal Clinic at South Tongu Municipal Hospital in the Volta Region of Ghana.” You have been invited to take part in this study because you are attending antenatal care at the hospital.

If you choose to participate, you will be asked to answer some questions in a questionnaire. The questions will focus on your knowledge, attitudes, and practices related to oral health during pregnancy. The questionnaire should take about 20–25 minutes to complete. Your responses will help provide useful information to improve oral health education and services for pregnant women.

Possible Benefits and Risks

There are no expected risks involved in this study. The only inconvenience may be the short time you take to answer the questions. There will be no direct personal benefits for taking part. However, your participation will contribute to research that may help improve oral health policies and antenatal care programs for other pregnant women in the future.

Confidentiality

All information you provide will be kept private and confidential. Your name and any details that could identify you will not be recorded. The information you share will be used for academic purposes only and stored in a password-protected file that only the researcher has access to.

Voluntary Participation and Compensation

Taking part in this study is completely voluntary. You may choose not to take part, or to stop at any time, without any consequences. There is no payment or compensation for participating. However, your time and support are greatly appreciated.

Withdrawal From the Study

You are free to stop participating in the study at any point without giving a reason, and this will not affect the healthcare services you receive. You are also welcome to ask any questions about the study now or at any time during your participation.

PARTICIPANT AGREEMENT

If you agree to take part in the study, please sign the consent form.

I have read the information on the sheet/ the information on the sheet has been read to me. I have been informed that I will be required to give responses to some questions related to the use of digital media to access sexual reproductive health information. I have had the opportunity to ask questions about the study and any question I have asked has been answered to my satisfaction. I understand that I have the right not to take part in this study without in any way affecting me. I have understood the explanation given to me and I voluntarily agree to take part in the study.

Name of Participant

Signature of Participant

Date

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Name of Person who Obtained Consent

Signature of Person Who Obtained Consent

Date

APPENDIX III: ETHICAL CLEARANCE



OUR REF: ENSIGN/IRB/EL/SN-322/02
YOUR REF:

December 4, 2025.

INSTITUTIONAL REVIEW BOARD SECRETARIAT

Uche Blessing
Ensign Global University
Kpong.

Dear Uche,

ETHICAL CLEARANCE TO UNDERTAKE POSTGRADUATE RESEARCH

At the General Research Proposals Review Meeting of the *INSTITUTIONAL REVIEW BOARD (IRB)* of Ensign Global University held on Wednesday, December 3, 2025, your research proposal entitled "Oral Health Patterns Among Pregnant Women Attending Antenatal Clinic at South Tongu Municipal Hospital in The Volta Region of Ghana" was considered.

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

We wish you all the best.

Sincerely,

A handwritten signature in black ink, appearing to read "Rebecca Acquah-Arhin", is written over a horizontal line.

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

APPENDIX IV: PERMISSION LETTER FROM SOUTH TONGU DISTRICT HEALTH DIRECTORATE



**GHANA
HEALTH
SERVICE**

SOUTH TONGU DISTRICT HEALTH DIRECTORATE

P.O. Box SG 6, Sogakope

Digital Address: VU-0000-8799

Quote this number and date on all correspondence

My Ref. No.: STMHD/2025

Your Ref. No.:

Date: 20th October, 2025

TO WHOM IT MAY CONCERN

APPROVAL TO CONDUCT RESEARCH

The South Tongu District Health Directorate has received a request from Ms. Blessing Uche; a Postgraduate Student of the Ensign Global University to undertake a research on the topic **"Oral Health Patterns Among Pregnant Women Attending Antenatal Clinic at South Tongu District Hospital in the Volta Region"**.

The study seeks to assess the oral health knowledge, attitudes, and practices among pregnant women attending antenatal clinics with aim of identifying areas for public health intervention and maternal oral health education.

She has been granted approval to conduct this research at the South Tongu District Hospital.

Thank you.

MS. MAVIS AGUMEH
DISTRICT DIRECTOR OF HEALTH SERVICES
SOUTH TONGU DISTRICT

Email: southtongu.dhdir@ghs.gov.gh
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