Coverage, Barriers and Facilitators of Tetanus Toxoid Immunization among Pregnant Women in Selected Local Government Area in Ogun State

Yusuf Amuda RABIU
LCU/PG/001371

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Certification

This is to certify that **Yusuf Amuda RABIU** with Matriculation number **LCU/PG/001371** carried this thesis **"Coverage, Barriers and Facilitators of Tetanus Toxoid Immunization among Pregnant Women in Selected Local Government in Ogun State"**, in the Department of Public Health, under my thorough supervision in the Faculty of Basic Medical & Applied Sciences, Lead City University, Ibadan, Oyo State, Nigeria and that this work had not been previously submitted.

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Dr. Adesola Z. Musa	**Date**
Supervisor	
Dr. T.A. Olowolafe	**Date**
Co-Supervisor	
Dr. F.T. Akinsolu	**Date**
Head of Department	

Dedication

This thesis is dedicated to Almighty God.

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Even though the above institution(s) and persons above have assisted in the process of this research, I alone stand responsible of errors if any in this research.

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Abstract

Tetanus remains one of the persistent vaccine-preventable diseases contributing significantly to maternal and neonatal morbidity and mortality in developing countries, particularly Nigeria. Despite global progress, maternal and neonatal tetanus elimination targets remain unmet in several regions due to suboptimal immunization coverage. This study investigated the coverage, barriers, facilitators, and determinants of tetanus toxoid immunization among pregnant women in Ogun State, Nigeria. A cross-sectional study design was employed, and data were obtained from 1,014 pregnant women selected through multistage sampling across three senatorial local government area of Ogun State. Most of the participants (84.2%) received information during antenatal visits, emphasizing on the critical role of antenatal care attendance in facilitating awareness and vaccine uptake. Healthcare worker motivation (83.1%) and health education during antenatal care (44%) were the major facilitators of uptake. Furthermore, 85.9% of respondents acknowledged the supportive role of community health workers, while 77.9% and 72.0% reported that community awareness campaigns and local leaders, respectively, encouraged TT immunization. Chi-square analysis showed a significant association between place of residence and accessibility to immunization services ($\chi^2 = 13.258$, $p = 0.001$), indicating that women in rural areas reported easier access compared to their urban counterparts. Similarly, educational level ($p = 0.001$), occupation ($p = 0.001$), ethnicity ($p = 0.001$), and income status ($p = 0.006$) were significantly related to TT awareness and uptake. Partner support was a major determinant, with a significant influence on both vaccine uptake ($\chi^2 = 120.74$, $p = 0.001$) and adherence to full dosage ($\chi^2 = 36.807$, $p = 0.001$). Binary logistic regression further revealed that knowledge of tetanus toxoid immunization was a strong predictor of access (OR = 3.619, 95% CI: 1.691–7.616, $p = 0.001$). Ethnicity also showed a significant effect, with Yoruba women being over five times more likely to access TT than Hausa women (OR = 5.038, $p = 0.027$). Educational level was a significant predictor, as women without formal education were less likely to access TT immunization (OR = 0.828, $p = 0.03$). The study concludes that tetanus toxoid immunization coverage among pregnant women in Ogun State is relatively high but remains below the optimal threshold for complete maternal and neonatal protection. Uptake is significantly influenced by educational attainment, ethnicity, knowledge level, partner support, and healthcare accessibility, while socioeconomic barriers, cultural perceptions, and logistical constraints continue to hinder universal coverage. It is therefore recommended that government and health authorities intensify community-based health education to improve awareness, especially among uneducated and low-income women.

Keywords: Tetanus toxoid, pregnant women, immunization coverage, barriers, facilitators

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List of Acronyms

Acronym	Meaning
WHO	World Health Organization
SSA	Sub-Saharan Africa
TT	Tetanus Toxoid
NPHCDA	National Primary Health Development Agency

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Chapter One

Introduction

1.1 Background to the Study

Tetanus is a life-threatening bacterial infection caused by Clostridium tetani, which can enter the body through open wounds or cuts. Pregnant women and their newborns are particularly vulnerable to tetanus infection, leading to severe morbidity and mortality if left untreated[1]. Tetanus toxoid immunization during pregnancy has proven to be a highly effective preventive measure, reducing the risk of maternal and neonatal tetanus significantly[2].The World Health Organization (WHO) recommends Tetanus toxoid immunization for all pregnant women as a part of routine antenatal care in order to protect both the mother and the newborn from tetanus infection[2]. The vaccine stimulates the production of antibodies that provide passive immunity to the fetus, thereby preventing tetanus infection in the newborn[3].

Globally, efforts have been made to eliminate maternal and neonatal tetanus through immunization programs. The World Health Organization (WHO) recommends Tetanus toxoid immunization for all pregnant women as a part of routine antenatal care in order to protect both the mother and the newborn from tetanus infection[5]. The vaccine stimulates the production of antibodies that provide passive immunity to the fetus, thereby preventing tetanus infection in the newborn.

In developed countries, such as the United States, Canada, and European nations, Tetanus toxoid immunization coverage among pregnant women is generally high due to well-established healthcare systems and effective immunization programs[6]. These countries

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have achieved significant success in reducing the burden of tetanus and eliminating maternal and neonatal tetanus cases.

In developing countries, including those in Sub-Saharan Africa (SSA), the coverage of Tetanus toxoid immunization among pregnant women varies. While some countries have made substantial progress, others still face challenges in achieving high coverage rates. Factors such as access to healthcare services, availability and affordability of vaccines, education and awareness, and cultural beliefs and practices influence immunization uptake among pregnant women in these regions[7,8].

In Nigeria, the national immunization program includes Tetanus toxoid immunization for pregnant women. However, achieving high coverage remains a challenge. According to the Nigeria Demographic and Health Survey (NDHS) conducted in year 2018, the coverage of Tetanus toxoid immunization among pregnant women nationwide was approximately 62.3%[9]. This indicates the need for further improvement to ensure adequate protection against tetanus for pregnant women and their newborns.

Within Nigeria, there are regional variations in the coverage of Tetanus toxoid immunization among pregnant women. Studies have shown disparities in immunization rates across different regions, with some areas experiencing higher coverage rates compared to others[10,11]. Factors such as healthcare infrastructure, accessibility of services, socioeconomic status, cultural beliefs, and community engagement play a role in these variations.

Regionally the immunization coverage among pregnant mothers ranges from 27% Indiato 71% Ghana[22,23]. In Ethiopia, the coverage of tetanus toxoid immunization was found to be 52.2%[21].

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In the context of this study, Ogun State in southwestern Nigeria presents a unique opportunity to explore the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in a specific region. Understanding the factors influencing immunization uptake in Ogun State will provide valuable insights for targeted interventions and strategies to improve coverage and protect pregnant women and their infants from tetanus.

Globally, the barriers to Tetanus toxoid immunization are multifaceted and can vary across different regions and populations. Some common barriers identified in literature include:

i. **Lack of Awareness**: Limited knowledge and awareness about Tetanus toxoid immunization can hinder vaccine uptake. Many individuals may not be aware of the importance of receiving the vaccine during pregnancy or may lack information about the recommended immunization schedule. Insufficient health education efforts and inadequate dissemination of information can contribute to this barrier[12].

ii. **Access and Availability:** Limited access to healthcare services and vaccine availability poses a **significant** barrier, particularly in remote and underserved areas. Inadequate healthcare infrastructure, including a shortage of healthcare facilities and trained healthcare providers, can impede the delivery of Tetanus toxoid immunization services. Geographic remoteness, transportation challenges, and lack of resources, such as cold chain storage for vaccines, further limit access to immunization services[13,14].

iii. **Socioeconomic Factors:** Socioeconomic factors play a crucial role in vaccine uptake. Poverty, low income, and lack of insurance coverage can hinder access to

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Tetanus toxoid immunization services. Out-of-pocket expenses for vaccines and associated healthcare visits may pose financial barriers for individuals and families, particularly in resource-constrained settings. Inadequate social support systems and disparities in healthcare services further contribute to this barrier[15,16].

iv. **Cultural and Religious Beliefs:** Cultural and religious beliefs and practices can influence attitudes towards immunization, including Tetanus toxoid vaccination. Some communities may hold misconceptions or have concerns about vaccine safety, effectiveness, or religious compatibility. For instance, in certain regions, cultural practices related to childbirth and traditional beliefs may influence the acceptance or refusal of immunization services. Understanding and addressing these cultural and religious factors are essential in promoting vaccine acceptance[17].

v. **Vaccine Misconceptions and Mistrust:** Vaccine hesitancy, driven by misinformation, misconceptions, and mistrust, can impede Tetanus toxoid immunization. False beliefs about vaccine safety, effectiveness, and potential side effects can create doubts and reluctance among individuals and communities. Mistrust in healthcare systems, concerns about vaccine quality, and the influence of anti-vaccine movements or vaccine skepticism can further exacerbate this barrier[13,18].

In developed countries, additional barriers may include complacency due to the perception that tetanus is rare, leading to a reduced sense of urgency for vaccination. Challenges in reaching specific population groups, such as marginalized or homeless populations, who may have limited access to healthcare services, can also contribute to lower vaccine coverage rates. Furthermore, the influence of anti-vaccine movements or

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vaccine skepticism, fueled by misinformation in the digital age, can undermine vaccine acceptance[19].

In sub-Sahara Africa countries, in addition to the barriers mentioned above, there are specific challenges related to weak healthcare systems, limited resources for vaccine procurement and delivery, and inadequate healthcare infrastructure. These factors significantly impact the availability, accessibility, and quality of Tetanus toxoid immunization services, particularly in rural and underserved areas. Poverty, low literacy rates, political instability, and conflicts may further contribute to lower vaccine coverage rates[20].

In Nigeria, specific barriers to Tetanus toxoid immunization include inadequate vaccine supply, particularly in remote areas with limited access to healthcare facilities. Lack of awareness and knowledge about the benefits of immunization, coupled with cultural and religious beliefs, can influence vaccine acceptance. Socioeconomic factors, such as poverty and transportation challenges, can also hinder access to immunization services[15,19].

It is important to note that the barriers to Tetanus toxoid immunization are complex and context-specific. Identifying and addressing these barriers requires a comprehensive understanding of the local context, cultural beliefs, and healthcare system challenges. Implementing targeted interventions, such as improving health education, strengthening healthcare infrastructure, addressing vaccine misinformation, and promoting community engagement, are essential for overcoming these barriers and improving Tetanus toxoid immunization coverage.

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Additional barriers to Tetanus toxoid (TT) immunization identified in the literature, specifically focusing on developing countries, sub-Saharan African (SSA) countries, and Nigeria.

Sub-Sahara Africa:

Health System Challenges: Weak health systems in developing countries, including limited infrastructure, inadequate healthcare workforce, and insufficient resources, can pose barriers to Tetanus toxoid immunization. This may result in inadequate vaccine supply, inconsistent vaccination services, and challenges in implementing immunization programs effectively.

Fragmented Healthcare Delivery: Fragmented healthcare delivery systems, particularly in rural and remote areas, can hinder access to Tetanus toxoid immunization services. Limited healthcare facilities, long distances to travel, and lack of reliable transportation can make it difficult for individuals, especially those in marginalized communities, to access vaccination sites.

Supply Chain and Cold Chain Management: Challenges in the supply chain and cold chain management can impact the availability and quality of Tetanus toxoid vaccines. Inadequate storage facilities, improper handling of vaccines, and disruptions in the vaccine distribution system can lead to vaccine shortages or reduced vaccine potency, affecting immunization coverage rates[20].

In Sub-Saharan African (SSA) Countries:

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Socioeconomic Inequalities: Socioeconomic disparities, prevalent in many SSA countries, can act as barriers to Tetanus toxoid immunization. Poverty, limited access to education, and low health literacy can contribute to lower vaccine uptake among disadvantaged populations.

Cultural Beliefs and Practices: Cultural beliefs and practices, including traditional birth practices, may influence the acceptance of Tetanus toxoid immunization. Cultural norms, such as preference for home births or reliance on traditional healers, can hinder access to antenatal care and vaccination services.

Limited Health Education and Awareness: Inadequate health education and awareness campaigns about the importance of Tetanus toxoid immunization can contribute to low vaccine uptake. Lack of knowledge about immunization schedules, benefits, and safety can lead to misconceptions and vaccine hesitancy[21].

In Nigeria:

Security Challenges: In regions affected by conflict or insecurity, access to healthcare services, including vaccination, can be severely compromised. Security challenges may hinder the delivery of healthcare, disrupt immunization campaigns, and prevent individuals from seeking vaccination services.

Geographical Barriers: Nigeria's vast size and geographical diversity present challenges in delivering healthcare services, including Tetanus toxoid immunization, to remote and hard-to-reach areas. Limited infrastructure, poor road networks, and geographical barriers can hinder the accessibility of vaccination services.

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Vaccine Stockouts: In some instances, vaccine stockouts or inadequate vaccine supply can occur, leading to temporary unavailability of Tetanus toxoid vaccines. This can contribute to missed opportunities for immunization and lower coverage rates[22].It is essential to review specific studies and reports focused on developing countries, SSA countries, and Nigeria to gain a more comprehensive understanding of the context-specific barriers to Tetanus toxoid immunization. These additional barriers provide a broader perspective on the challenges faced in different regions and can inform targeted interventions and strategies to improve immunization coverage.

In Nigeria, the National Primary Healthcare Development Agency (NPHCDA) has implemented a comprehensive immunization program, which includes Tetanus toxoid immunization for pregnant women[10,11]. The program aims to improve maternal and child health outcomes by providing universal access to quality antenatal care services, including immunization[10]. However, achieving high coverage and identifying and addressing the barriers and facilitators to Tetanus toxoid immunization uptake among pregnant womenis crucial for the success of the program[23].

Ogun State, located in southwestern Nigeria, has its unique healthcare landscape, including a diverse population and specific healthcare challenges. Understanding the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in Ogun State is essential for designing targeted interventions and strategies to improve immunization rates and protect pregnant women and their infants from tetanus[24].

Despite the importance of Tetanus toxoid immunization, studies examining its coverage and factors influencing its uptake among pregnant women in Ogun State are limited. Available studies in Nigeria have focused more broadly on immunization coverage

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without specific attention to Tetanus toxoid immunization among pregnant women in Ogun State. Therefore, this research aims to fill this knowledge gap and provide valuable insights into the current status of Tetanus toxoid immunization and the specific barriers and facilitators faced by pregnant women in accessing the vaccine in Ogun State.

1.2 Statement of the Problem

Despite the global and national efforts to eliminate the magnitude of maternal and child mortality as a result of tetanus through immunization programs, there is a lack of comprehensive understanding regarding the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in Ogun State[12].

Tetanus toxoid immunization is a crucial component of antenatal care, providing protection against tetanus for pregnant women and their infants. However, the success of immunization programs relies heavily on achieving high coverage rates among the target population. In Ogun State, there is a need to assess the current status of Tetanus toxoid immunization coverage among pregnant women and identify the barriers and facilitators influencing its uptake[13].

Limited research has been conducted specifically focusing on Tetanus toxoid immunization coverage in Ogun State, which hinders the identification of gaps and challenges in achieving high immunization rates. While national immunization programs in Nigeria include Tetanus toxoid immunization for pregnant women, it is crucial to assess the actual coverage and factors influencing the uptake of the vaccine in this specific population.

Moreover, the unique characteristics and healthcare landscape of Ogun State may pose additional challenges to achieving optimal coverage. Factors such as socio-economic

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status, education level, accessibility of healthcare facilities, cultural beliefs, and awareness about the importance of immunization may all play a role in determining the uptake of Tetanus toxoid immunization among pregnant women in Ogun State.

The existing literature in Nigeria provides broader insights into immunization coverage and barriers but does not specifically address the unique context of Tetanus toxoid immunization among pregnant women in Ogun State. Therefore, there is a gap in knowledge regarding the specific factors that influence the coverage and utilization of Tetanus toxoid immunization services among pregnant women in this region.

This research aims to address this gap by conducting a comprehensive study to determine the coverage of Tetanus toxoid immunization, identify the barriers that hinder its uptake, and explore the facilitators that can promote immunization among pregnant women in Ogun State. The findings will contribute to evidence-based interventions and strategies to improve immunization coverage and ultimately reduce the burden of tetanus in this population.

1.3 Justification of the Study

Conducting research on the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in Ogun State is of utmost importance and holds significant relevance for several reasons.

Firstly, Ogun State, like other regions in Nigeria, faces challenges in achieving high immunization coverage among pregnant women. Regionally the immunization coverage among pregnant mothers ranges from 27% Indiato 71% Ghana[22,23]. In Ethiopia, the coverage of tetanus toxoid immunization was found to be 52.2%[21].

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By focusing specifically on Tetanus toxoid immunization, this study aims to shed light on the factors contributing to suboptimal coverage in the region. Understanding these factors is crucial for designing targeted interventions and strategies to improve immunization rates and protect pregnant women and their infants from the risks of tetanus infection.

Secondly, the findings of this study can contribute to the existing knowledge on Tetanus toxoid immunization in Nigeria. While previous studies have explored immunization coverage more broadly, there is a dearth of research specifically focusing on Tetanus toxoid immunization among pregnant women in Ogun State. This study will fill this knowledge gap and provide valuable insights into the coverage, barriers, and facilitators of Tetanus toxoid immunization in this specific population.

The results of the study can also inform intervention policies aimed at improving maternal and neonatal health outcomes. By identifying the specific barriers that pregnant women in Ogun State face in accessing Tetanus toxoid immunization, healthcare providers and policymakers can develop targeted strategies to overcome these challenges. This may involve improving the availability and accessibility of immunization services, addressing socio-cultural factors influencing vaccine uptake, and enhancing health education and awareness programs on the importance of immunization during pregnancy.

Furthermore, the study findings can contribute to the existing body of knowledge on immunization programs and strategies in resource-limited settings. Ogun State represents a unique context with its healthcare landscape and challenges. By examining the factors that impact Tetanus toxoid immunization coverage in this specific region, the study can provide valuable insights that can be extrapolated to similar settings, both within Nigeria and in other countries facing similar challenges.

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In conclusion, conducting research on the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in Ogun State is not only important but also highly relevant. The findings of this study can contribute to existing knowledge, inform public health interventions, and ultimately improve maternal and neonatal health outcomes in the region.

1.4 Aim and Objectives of the Study

The overall aim of this research is to examine the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in Ogun State in recent years.

To achieve this aim, specific objectives for this study are to;

i. determine the current coverage level of Tetanus toxoid immunization among pregnant women in Ogun State.
ii. identify the barriers and challenges faced by pregnant women in accessing Tetanus toxoid immunization in Ogun State.
iii. determine the facilitators that promote Tetanus toxoid immunization uptake among pregnant women in Ogun State.
iv. assess the knowledge and attitudes associated with uptake of Tetanus toxoid immunization among pregnant women in Ogun State.
v. identify factors influencing uptake of Tetanus toxoid immunization among pregnant women in Ogun State.

1.5 Research Questions

To address the aim and objectives of the study, the following research questions are formulated:

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i. What is the coverage rate of Tetanus toxoid immunization among pregnant women in Ogun State?

ii. What are the barriers faced by pregnant women in accessing Tetanus toxoid immunization in Ogun State?

iii. What are the facilitators that promote Tetanus toxoid immunization uptake among pregnant women in Ogun State?

vi. What is the knowledge and attitudes associated with uptake of Tetanus toxoid immunization among pregnant women in Ogun State?

iv. What are the factors influencing uptake of Tetanus toxoid immunization among pregnant women in Ogun State.

1.6 Significance of the Study

This research holds significant importance for maternal and neonatal health in Ogun State and can contribute to policy-making, program planning, and the improvement of healthcare services for pregnant women. The potential impacts of this study are as follows:

i. **Improved Tetanus Toxoid Immunization Coverage**: The study aims to assess the coverage of Tetanus toxoid immunization among pregnant women in Ogun State. By determining the current coverage rate, the research findings can identify gaps and areas for improvement. This information can be utilized by policymakers, healthcare providers, and program planners to implement targeted interventions and strategies to increase immunization coverage. Improved coverage will help protect both pregnant women and their newborns from the risk of tetanus infection.

ii. **Identification of Barriers and Facilitators:** Understanding the barriers faced by pregnant women in accessing Tetanus toxoid immunization is crucial for

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designing effective interventions. By identifying and addressing these barriers, such as lack of awareness, financial constraints, or limited access to healthcare services, the study findings can inform the development of programs and policies to overcome these challenges. Additionally, identifying facilitators that promote immunization uptake, such as effective communication, community engagement, and supportive healthcare services, can be incorporated into interventions to improve coverage.

iii. **Enhanced Knowledge and Awareness:** The study will explore the knowledge, attitudes, and beliefs of pregnant women regarding Tetanus toxoid immunization. By identifying knowledge gaps and misconceptions, the research findings can contribute to educational interventions aimed at improving awareness and understanding. Increasing knowledge and addressing misconceptions can positively influence pregnant women's decision-making regarding immunization, leading to increased vaccine acceptance and uptake.

iv. **Policy and Program Development:** The findings of this study can provide valuable evidence for policy-makers and stakeholders involved in maternal and child health programs. The research can inform the development and revision of policies related to Tetanus toxoid immunization, ensuring that they are evidence-based and responsive to the specific context of Ogun State. The insights gained from the study can also contribute to program planning and implementation, enabling the design of targeted interventions to address the identified barriers and enhance the uptake of Tetanus toxoid immunization.

v. **Improved Maternal and Neonatal Health Outcomes:** By improving the coverage and uptake of Tetanus toxoid immunization among pregnant women, this

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research has the potential to contribute to improved maternal and neonatal health outcomes in Ogun State. Tetanus is a preventable disease, and ensuring that pregnant women receive the necessary immunization can significantly reduce the risk of tetanus infection and its associated complications. Ultimately, the study findings can contribute to reducing maternal and neonatal mortality and morbidity related to tetanus.

The significance of this research lies in its potential to directly inform policy-making, program planning, and healthcare service delivery, ultimately leading to improved maternal and neonatal health outcomes in Ogun State.

1.7 Scope of the Study

The scope of this study is defined in terms of its geographical, demographic, and temporal aspects, as well as the target population and any inclusion/exclusion criteria. The following scope is outlined:

The study will focus specifically on Ogun State, Nigeria. Ogun State is located in the southwestern region of Nigeria and is known for its diverse population and healthcare facilities. The research will be conducted within selected communities, health facilities, or districts within Ogun State.

The target population for this study includes pregnant women residing in Ogun State. The study will encompass pregnant women from various age groups, socioeconomic backgrounds, educational levels, and ethnicities. The demographic characteristics of the study participants will be considered during data analysis to provide a comprehensive understanding of the coverage, barriers, and facilitators of Tetanus toxoid immunization across different subgroups.

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Data collection will be for about 3 months which will be clearly defined. The study will include pregnant women who meet the following criteria:

- Residing in Ogun State during the study period,
- Receiving antenatal care services within selected communities in Ogun State,
- And willing to participate in the study.
- Pregnant women who do not meet these criteria will be excluded from the study.

It is important to note that the geographical, demographic, and temporal scope may be refined further based on practical considerations, availability of resources, and the specific research objectives. The scope should be clearly defined to provide a focused and manageable framework for data collection and analysis.

1.8 Limitation of the Study

This study on the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in Ogun State, Nigeria, has several limitations that should be acknowledged: The study is limited to Ogun State, Nigeria, and findings may not be generalizable to other regions within Nigeria or internationally. Variations in healthcare access, cultural beliefs, and socioeconomic conditions across different regions may affect the applicability of these findings elsewhere. Data on immunization coverage and barriers to uptake may rely on self-reported information from participants, which could be subject to recall bias or social desirability bias, potentially impacting the accuracy of the findings. The data collection period is limited to approximately three months, which may restrict the ability to observe changes in immunization behavior over time or to account for seasonal fluctuations in immunization service uptake. Due to available resources, data collection may be confined to selected communities and health facilities within Ogun

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State, potentially overlooking areas where barriers or facilitators of immunization might differ. This study focuses solely on pregnant women who are receiving antenatal care and are willing to participate. Women outside of these criteria may experience different barriers and facilitators, and their perspectives will not be captured in this study.

Despite these limitations, the study was designed to ensure robust data collection and analysis processes, thereby minimizing any impact on the credibility and authenticity of the findings. These limitations do not, in any way, detract from the validity of the study or the relevance of its conclusions, which remain essential to understanding the Tetanus toxoid immunization landscape in Ogun State

1.9 Operational Definition of Terms

To ensure common understanding among readers, the following key terms used in this research are operationally defined:

Antenatal Care: Healthcare services provided to pregnant women before the birth of their baby, including medical check-ups, screenings, and health education.

Attitudes: Refers to the opinions, beliefs, and feelings of pregnant women towards Tetanus toxoid immunization. Attitudes can influence their acceptance, willingness, and decision-making regarding immunization.

Barriers to Immunization: Factors that hinder or prevent pregnant women from accessing or receiving Tetanus toxoid immunization. Barriers may include lack of awareness, financial constraints, distance to healthcare facilities, cultural beliefs, and social norms.

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Exclusion Criteria: The specific characteristics or criteria that result in the exclusion of certain pregnant women from the study. Exclusion criteria may include factors such as a history of adverse reactions to vaccines or a medical condition that contraindicates immunization.

Facilitators of Immunization: Factors that promote or support pregnant women's access to and acceptance of Tetanus toxoid immunization. Facilitators may include effective communication, availability of healthcare services, supportive policies, and community engagement.

Healthcare Providers: Medical professionals, including doctors, nurses, midwives, and other healthcare personnel, involved in providing antenatal care and administering Tetanus toxoid immunization to pregnant women.

Healthcare Services: The range of medical, preventive, and supportive services provided by healthcare facilities and professionals to promote health, prevent diseases, and provide care and treatment.

Immunization Coverage: The proportion of individuals who have received the recommended immunization as per the established schedule which is 8 times during pregnancy.

Immunization: The process of inducing or enhancing immunity against a specific infectious disease through the administration of a vaccine.

Inclusion Criteria: The specific characteristics or criteria that determine the eligibility of pregnant women to participate in the study. Inclusion criteria may include factors such as age, residency in Ogun State, and receiving antenatal care services.

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Maternal Mortality: The number of maternal deaths per 100,000 live births within a specified time period, typically one year. Maternal mortality is an indicator of the health status and safety of pregnant women during pregnancy, childbirth, and the postpartum period.

Neonatal Mortality: The number of deaths of infants within the first 28 days of life per 1,000 live births within a specified time period. Neonatal mortality is an important indicator of the health and survival of newborns and reflects the quality of healthcare provided during the early stages of life.

Policy-Making: The process of formulating guidelines, regulations, and decisions by governmental or organizational authorities. Policy-making in the context of this study refers to the development and revision of policies related to Tetanus toxoid immunization, based on evidence and research findings.

Pregnant women: Women who are expecting a baby and have a confirmed pregnancy.

Program Planning: The process of developing and organizing activities, resources, and strategies to achieve specific objectives. In the context of this study, program planning refers to the development and implementation of interventions to enhance Tetanus toxoid immunization among pregnant women.

Public Health Interventions: Strategies, programs, and actions implemented by public health authorities to improve the health and well-being of populations. In the context of this study, public health interventions may include immunization campaigns, health education programs, and policy initiatives aimed at increasing Tetanus toxoid immunization coverage.

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Tetanus: A potentially life-threatening bacterial infection caused by the bacterium Clostridium tetani, which can enter the body through wounds or cuts and produce toxins that affect the nervous system.

Toxoid: A modified form of the toxin produced by the Clostridium tetani bacterium. The toxoid is used as a vaccine to stimulate an immune response without causing the disease.

Vaccine Doses: The number of times the Tetanus toxoid vaccine is administered to a pregnant woman during antenatal care visits. It typically involves a series of doses to achieve optimal immunity.

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Chapter two

Literature Review

Tetanus toxoid immunization during pregnancy is a critical component of maternal and neonatal health programs globally. This section provides a comprehensive review of key concepts related to Tetanus toxoid immunization, including its importance in preventing maternal and neonatal tetanus, the immunological response elicited by the vaccine, the role of vaccination in maternal immunity transfer, and the impact on maternal and neonatal health outcomes.

2.1 Conceptual Review

2.1.1 Tetanus

Tetanus is a potentially life-threatening bacterial infection caused by the bacterium Clostridium tetani. This bacterium is commonly found in soil, dust, and animal feces. Tetanus can enter the body through wounds or cuts, particularly if they are deep or contaminated with soil, rust, or manure. Once inside the body, Clostridium tetani produces toxins known as tetanospasmin and tetanolysin[1].

Tetanospasmin is the primary toxin responsible for the characteristic symptoms of tetanus. It targets the nervous system, specifically the motor neurons that control muscle movement. Tetanospasmin interferes with the release of neurotransmitters, which are chemical messengers that enable communication between nerves and muscles. As a result, it causes prolonged and excessive muscle contractions, leading to muscle stiffness and spasms. The muscle contractions caused by tetanus commonly begin in the jaw muscles, giving rise to a condition known as "lockjaw" or trismus. The spasms can then spread to

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other muscles in the body, including the neck, back, abdomen, and limbs. Severe muscle spasms may cause the body to arch backward in a characteristic posture known as opisthotonus. In some cases, the spasms can be strong enough to cause bone fractures[2].The severity of tetanus symptoms can vary, ranging from mild to severe and potentially life-threatening. Severe cases of tetanus can lead to respiratory failure and other complications, requiring intensive care and medical intervention[3].

It is important to note that tetanus is preventable through vaccination. Tetanus toxoid, a component of the Tetanus-Diphtheria-Pertussis (TDAP) vaccine, stimulates the production of protective antibodies that neutralize the tetanus toxins. Vaccination against tetanus is recommended as part of routine childhood immunization schedules and is often administered in combination with other vaccines[4].

2.1.2 Tetanus Toxoid Immunization

Tetanus toxoid immunization is a crucial preventive measure that involves the administration of a vaccine containing Tetanus toxoid to induce immunity against tetanus, a potentially life-threatening bacterial infection caused by Clostridium tetani. The Tetanus toxoid vaccine is a safe and effective way to protect individuals from the harmful effects of tetanus and is a vital component of immunization programs worldwide[5].

The Tetanus toxoid vaccine is typically administered as part of combination vaccines, such as the Tetanus-Diphtheria-Pertussis (Tdap) vaccine or Tetanus-Diphtheria (Td) vaccine. These vaccines not only provide protection against tetanus but also offer immunity against diphtheria and pertussis (whooping cough). The World Health Organization (WHO) recommends routine administration of these vaccines in childhood and booster doses in adolescence and adulthood to maintain long-term immunity[6].

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The Tetanus toxoid vaccine contains inactivated and purified toxins derived from the bacterium Clostridium tetani. During the manufacturing process, the toxins are treated to remove their harmful effects while retaining their ability to stimulate an immune response. When the vaccine is administered, the body recognizes the toxoid as foreign and mounts an immune response. This immune response involves the production of specific antibodies, known as tetanus antitoxin, which can neutralize the effects of the tetanus toxin[7].The administration of Tetanus toxoid immunization has been highly successful in reducing the incidence of tetanus globally. In countries with high vaccination coverage, tetanus cases have become rare. However, maintaining high coverage rates and ensuring access to immunization remains a challenge, particularly in resource-limited settings[8].Tetanus toxoid immunization is particularly important for pregnant women. Maternal immunization against tetanus protects both the mother and the newborn. When a pregnant woman receives the Tetanus toxoid vaccine, she produces protective antibodies that are transferred to the fetus through the placenta, providing passive immunity against tetanus to the newborn during the first few months of life[9].It is worth noting that Tetanus toxoid immunization is generally safe, with few reported side effects. Common side effects include pain or swelling at the injection site, mild fever, and body aches. Severe allergic reactions are rare but can occur[9].

In summary, Tetanus toxoid immunization plays a vital role in protecting individuals from tetanus infection. It is a safe and effective vaccine that is administered as part of routine immunization programs. By ensuring high vaccination coverage rates and improving access to immunization services, the burden of tetanus can be further reduced, leading to improved health outcomes globally.

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2.1.3 Toxoid

Toxoid refers to a modified form of the toxin produced by the Clostridium tetani bacterium. Toxoids are used in vaccines to induce an immune response without causing the disease itself. In the case of tetanus, the toxoid used is derived from the tetanus toxin produced by Clostridium tetani. The toxin is treated to eliminate its toxic properties while retaining its ability to stimulate an immune response. This process involves chemical or physical modifications that render the toxin harmless, yet still capable of eliciting an immune reaction[10,11].The use of toxoids in vaccines is based on the principle of immunological memory. When the toxoid is administered as part of a vaccine, it is recognized by the immune system as a foreign substance. This recognition triggers the production of specific antibodies that target the toxoid. These antibodies bind to the toxoid and neutralize its effects, preventing it from causing the disease[12].

The primary objective of using toxoids in vaccines is to generate an immune response that provides protection against future exposure to the actual disease-causing toxin. By stimulating the immune system to produce antibodies specific to the toxoid, the body develops immunity against the disease[13].Toxoid vaccines have been widely successful in preventing diseases caused by bacterial toxins. Examples include tetanus toxoid, diphtheria toxoid, and pertussis toxoid, which are used in combination vaccines such as Tdap and DTaP. These vaccines have significantly reduced the incidence of diseases and their associated complications[14,15].

It is important to note that the protection conferred by toxoid vaccines may require periodic booster doses to maintain long-term immunity. These booster doses serve to

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reinforce the immune response and ensure continued protection against the targeted disease[16].

2.1.4 Immunization

Immunization refers to the process of inducing or enhancing immunity against a specific infectious disease by administering a vaccine. It is a crucial strategy in public health for preventing the spread of diseases and reducing their associated morbidity and mortality. The goal of immunization is to stimulate the immune system to recognize and mount a protective response against specific pathogens or disease-causing agents. Vaccines contain either weakened or inactivated forms of the infectious agent, parts of the pathogen, or toxins produced by the pathogen. When administered, vaccines trigger an immune response, leading to the production of antibodies, memory cells, and other immune factors that provide protection against subsequent encounters with the disease-causing agent[17,18].

Immunization plays a vital role in controlling and eradicating infectious diseases. By vaccinating individuals, populations can develop herd immunity, which occurs when a large proportion of the population is immune to a specific disease. This indirectly protects individuals who are unable to receive vaccines due to medical reasons or those who have a weaker immune response. Immunization programs have successfully eradicated diseases such as smallpox and significantly reduced the burden of diseases like polio, measles, and rubella[19].

Immunization is administered through various routes, including intramuscular, subcutaneous, oral, or intranasal administration, depending on the specific vaccine and the target population. Vaccination schedules and recommendations vary depending on the

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disease, age group, and individual risk factors. National immunization programs and public health authorities provide guidelines on immunization schedules and prioritize vaccines based on the disease burden, epidemiology, and vaccine effectiveness.(World Health Organization[4]. Immunization is not only beneficial for the individual receiving the vaccine but also for the wider community. By reducing the transmission of infectious agents, immunization contributes to the overall control and prevention of diseases. Vaccines have played a crucial role in preventing epidemics and improving global health outcomes[20].

2.1.5 Antenatal Care

Antenatal care, also known as prenatal care, refers to the healthcare services provided to pregnant women before the birth of their baby. It involves a series of medical check-ups, screenings, and health education aimed at ensuring the well-being of both the mother and the developing baby[21].The primary goal of antenatal care is to monitor the progress of the pregnancy, detect any potential complications, and provide necessary interventions or treatments to promote a healthy pregnancy and a safe delivery. It plays a crucial role in promoting maternal and fetal health, preventing and managing pregnancy-related complications, and providing support and education to expectant mothers[22].

During antenatal care visits, healthcare providers conduct regular check-ups to assess the overall health of the pregnant woman. This may include measuring blood pressure, monitoring weight gain, checking for signs of fetal growth and development, and evaluating maternal well-being. These routine assessments help in identifying any deviations from the normal course of pregnancy and enable timely interventions or referrals to specialized care if needed[23].Antenatal care also involves a series of screenings

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and tests to assess the health status of both the mother and the baby. These screenings may include blood tests, urine tests, genetic screenings, and ultrasounds. They help in identifying potential risks or complications such as gestational diabetes, preeclampsia, or fetal abnormalities. Early detection of these conditions allows for appropriate management and interventions to optimize maternal and fetal health outcomes[24].

In addition to the medical aspect, antenatal care also provides an opportunity for health education and counseling. Pregnant women receive information and guidance on various aspects of pregnancy, childbirth, and postnatal care. They are educated about healthy lifestyle choices, proper nutrition, exercise, breastfeeding, and preparation for labor and delivery. Antenatal care also offers a platform for addressing any concerns or anxieties that expectant mothers may have and provides support and reassurance throughout the pregnancy journey[25].The frequency and content of antenatal care visits may vary depending on factors such as the gestational age, individual risk factors, and national or regional guidelines. However, regular and consistent antenatal care is recommended for all pregnant women to optimize maternal and fetal health outcomes[4].

2.1.6 Immunization Coverage

Immunization coverage is a critical measure of the proportion of individuals or a specific population group who have received the recommended immunizations as per the established schedule. It reflects the extent to which the population is protected against vaccine-preventable diseases and is an essential indicator of the effectiveness of immunization programs[26].Immunization coverage is typically assessed by considering the specific vaccines recommended for different age groups, including infants, children, adolescents, and adults. The coverage rates are calculated by dividing the number of

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individuals who have received the required vaccines by the total population or the target population for a specific age group[27].High immunization coverage is a fundamental goal of public health efforts as it helps to prevent the spread of infectious diseases and reduce the burden of illness and mortality. It not only protects vaccinated individuals but also contributes to community protection by reducing the transmission of diseases[28].

Monitoring immunization coverage provides valuable insights into the success of immunization programs and identifies areas where efforts should be focused to improve vaccine uptake. It helps to identify gaps in coverage, disparities in vaccine access, and specific population groups that may be at a higher risk of vaccine-preventable diseases[29].By analyzing immunization coverage data, public health authorities and policymakers can develop targeted strategies to address barriers and increase vaccine accessibility. This may involve implementing outreach programs, improving vaccine distribution systems, strengthening healthcare provider training, and enhancing public awareness campaigns[30].Regular monitoring of immunization coverage is crucial for evaluating the impact of immunization programs and making informed decisions regarding vaccination policies and interventions. It allows for the assessment of progress in achieving national and global immunization targets and guides resource allocation to ensure equitable access to vaccines[31].

Furthermore, immunization coverage data contributes to surveillance efforts by providing information on the epidemiology of vaccine-preventable diseases. It helps to identify potential outbreaks, track trends in disease incidence, and assess the effectiveness of specific vaccines in real-world settings[32].

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2.1.7 Vaccine Doses

Vaccine doses refer to the number of times the Tetanus toxoid vaccine is administered to a pregnant woman during antenatal care visits. This vaccine is typically given in a series of doses to ensure optimal immunity and protection against Tetanus[33].The Tetanus toxoid vaccine is usually administered during pregnancy to prevent maternal and neonatal Tetanus, a potentially life-threatening bacterial infection. The vaccination schedule for Tetanus toxoid immunization during pregnancy typically involves multiple doses to ensure sufficient antibody production and transfer to the baby[34].

The World Health Organization (WHO) recommends a standard immunization schedule for Tetanus toxoid vaccination during pregnancy, which varies depending on the country and regional guidelines. In most cases, it involves a series of three doses administered at specific intervals. The first dose is often given early in the pregnancy, ideally during the second trimester, followed by the second and third doses at appropriate intervals[35].The timing and number of doses may vary depending on factors such as the woman's immunization history, the time of pregnancy when she initiates antenatal care, and the recommendations of the national immunization program[36].Administering multiple doses of the Tetanus toxoid vaccine during pregnancy helps to boost the mother's immunity against Tetanus and also provides passive immunity to the newborn. The antibodies produced in response to the vaccine are transferred to the baby through the placenta, offering protection during the first months of life when the baby's immune system is still developing[37].

It is important for pregnant women to receive the recommended number of vaccine doses as per the immunization schedule to ensure optimal protection for both the mother and the

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baby. Missing or incomplete doses may compromise the effectiveness of the vaccine and increase the risk of Tetanus infection[38].Healthcare providers play a crucial role in ensuring that pregnant women receive the appropriate number of Tetanus toxoid vaccine doses during their antenatal care visits. They follow the recommended guidelines, monitor the vaccine administration, and maintain accurate records of the doses given to each pregnant woman[39].

2.1.8 Healthcare Providers

Healthcare providers refer to the medical professionals involved in providing healthcare services, including antenatal care, and administering Tetanus toxoid immunization to pregnant women. They play a crucial role in ensuring the well-being of pregnant women and promoting maternal and neonatal health[40].Healthcare providers involved in antenatal care may include doctors, obstetricians, gynecologists, midwives, nurses, and other trained healthcare personnel. They have the knowledge, skills, and expertise to deliver comprehensive care to pregnant women, monitor their health during pregnancy, and address any potential risks or complications[41].When it comes to Tetanus toxoid immunization, healthcare providers are responsible for administering the vaccine according to the recommended schedule. They follow established protocols and guidelines for vaccine administration, ensuring that pregnant women receive the appropriate doses at the right time[42].Healthcare providers play a crucial role in educating pregnant women about the importance of Tetanus toxoid immunization, explaining the benefits and addressing any concerns or misconceptions. They provide information about the vaccine, its safety, and the potential risks of Tetanus infection for both the mother and the baby[43].

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During antenatal care visits, healthcare providers assess the eligibility for Tetanus toxoid immunization, review the woman's immunization history, and determine the appropriate timing and number of vaccine doses[44]. They administer the vaccine using safe and sterile techniques, following standard precautions and guidelines to minimize the risk of infection.In addition to vaccine administration, healthcare providers offer counseling and support to pregnant women regarding other aspects of their health and well-being. They monitor the progress of the pregnancy, conduct necessary screenings and tests, provide nutritional advice, and address any concerns or questions that the woman may have[45].

Healthcare providers also play a critical role in maintaining accurate records of immunizations given to pregnant women. They ensure proper documentation of the vaccine doses administered, record any adverse reactions or side effects, and update the woman's immunization history accordingly[46].By providing high-quality antenatal care and administering Tetanus toxoid immunization, healthcare providers contribute to reducing the burden of Tetanus and improving maternal and neonatal health outcomes. Their expertise, skills, and dedication are essential in promoting safe pregnancies, preventing infectious diseases, and ensuring the well-being of both the mother and the baby[4].

2.1.9 Public Health Interventions

Public Health Interventions refer to strategies, programs, and actions implemented by public health authorities to improve the health and well-being of populations. In the context of this study, public health interventions specifically pertain to efforts aimed at increasing Tetanus toxoid immunization coverage among pregnant women in Ogun State[47].Public health interventions play a crucial role in addressing health challenges and

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promoting preventive measures to reduce the burden of diseases. They involve a range of activities designed to reach target populations, raise awareness, and facilitate access to healthcare services[4].

In the context of Tetanus toxoid immunization, public health interventions may include:

1. **Immunization Campaigns:** Public health authorities may organize targeted campaigns to raise awareness about the importance of Tetanus toxoid immunization during pregnancy. These campaigns aim to reach a large number of pregnant women through various channels, such as community outreach, mass media, and healthcare facilities. They provide information about the benefits, safety, and availability of the vaccine, as well as the immunization schedule and locations where the vaccine can be obtained[48].
2. **Health Education Programs:** Public health interventions often include health education programs that focus on Tetanus toxoid immunization. These programs aim to enhance knowledge and understanding among pregnant women, their families, and communities about the benefits of immunization and the risks associated with Tetanus infection. They may provide information on the mode of transmission, symptoms, and potential complications of Tetanus, as well as dispel myths or misconceptions surrounding the vaccine[49].
3. **Policy Initiatives:** Public health authorities can implement policy initiatives to improve Tetanus toxoid immunization coverage. These initiatives may include developing and enforcing regulations that require healthcare providers to offer the vaccine during antenatal care visits, integrating immunization services into routine maternal healthcare programs, or establishing incentives or support systems to

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encourage healthcare providers to prioritize immunization services for pregnant women[50].

4. **Strengthening Healthcare Systems:** Public health interventions may also focus on strengthening healthcare systems to ensure the availability, accessibility, and quality of Tetanus toxoid immunization services. This may involve training healthcare providers on immunization practices, improving supply chain management for vaccine distribution, enhancing data collection and monitoring systems, and addressing barriers that hinder pregnant women from accessing immunization services, such as geographical or financial constraints[51].

By implementing these public health interventions, it is expected that Tetanus toxoid immunization coverage among pregnant women in Ogun State will be increased, leading to improved maternal and neonatal health outcomes. These interventions address barriers, promote awareness, and provide opportunities for pregnant women to receive the vaccine and protect themselves and their babies from Tetanus infection[52].

2.1.10 Maternal Mortality

Maternal mortality refers to the number of maternal deaths per 100,000 live births within a specified time period, usually one year. It is an important indicator of the health status and safety of pregnant women during pregnancy, childbirth, and the postpartum period. Maternal mortality reflects the overall quality of maternal healthcare services, access to appropriate medical interventions, and the socio-economic and environmental factors that impact maternal health outcomes[53].Maternal mortality encompasses deaths directly related to pregnancy and childbirth, as well as deaths caused by pregnancy-related complications or aggravation of pre-existing conditions. These deaths can occur during

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pregnancy, during labor and delivery, or within 42 days after the termination of pregnancy, irrespective of the duration and site of the pregnancy[54].

Measuring maternal mortality is crucial for understanding the health needs of pregnant women and evaluating the effectiveness of healthcare interventions. It provides insights into the progress made in reducing maternal deaths, identifies gaps in healthcare services, and guides policy and programmatic efforts to improve maternal health outcomes[55].Maternal mortality rates vary significantly across countries and regions, with high-income countries generally having lower rates compared to low-income countries. Factors contributing to maternal mortality include inadequate access to quality antenatal care, skilled birth attendance, emergency obstetric care, and postpartum care. Other factors include poverty, limited education, inadequate nutrition, cultural practices, and gender inequalities[56].

Reducing maternal mortality is a global health priority, and efforts are focused on achieving the Sustainable Development Goal (SDG) target of reducing the global maternal mortality ratio to less than 70 deaths per 100,000 live births by 2030[57]. This requires comprehensive strategies that address the social determinants of health, improve healthcare infrastructure, strengthen health systems, and ensure universal access to quality maternal healthcare services[58].

2.1.11 Neonatal Mortality

Neonatal mortality refers to the number of deaths of infants within the first 28 days of life per 1,000 live births within a specified time period. It is a critical indicator of the health and survival of newborns and reflects the quality of healthcare provided during the early stages of life[59].Neonatal mortality is a key component of infant mortality, which includes

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deaths occurring in the first year of life. However, focusing specifically on neonatal mortality allows for a more detailed examination of the factors influencing newborn health and the effectiveness of interventions targeting this vulnerable population[60].The first 28 days of life are a particularly high-risk period for newborns, as they undergo critical transitions and adjustments outside the womb. Factors contributing to neonatal mortality include prematurity, low birth weight, birth asphyxia, infections, congenital anomalies, and complications related to childbirth[61].

Measuring neonatal mortality is essential for assessing the progress of healthcare systems in ensuring the survival and well-being of newborns. It provides insights into the quality of prenatal care, skilled birth attendance, postnatal care, and access to essential interventions, such as neonatal resuscitation, breastfeeding support, and infection prevention[62].Efforts to reduce neonatal mortality require a comprehensive approach that addresses the underlying causes and associated risk factors. This includes improving access to quality antenatal care, ensuring skilled attendance at birth, promoting early and exclusive breastfeeding, enhancing neonatal and postnatal care services, and strengthening healthcare infrastructure and systems[63].

Reducing neonatal mortality is a global health priority, and the Sustainable Development Goals (SDGs) aim to reduce neonatal mortality rates to as low as 12 deaths per 1,000 live births by 2030. Achieving this target requires coordinated efforts from governments, healthcare providers, communities, and international organizations to implement evidence-based interventions, improve healthcare access and utilization, and address social determinants of health affecting newborns[64].

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2.1.12 Why Tetanus Toxoid Immunization

Tetanus toxoid immunization is a crucial intervention to prevent tetanus, a potentially life-threatening bacterial infection caused by the bacterium Clostridium tetani. The primary goal of Tetanus toxoid immunization is to provide individuals, particularly pregnant women, with protection against tetanus and its associated complications[65].

Here are some key reasons why Tetanus toxoid immunization is important:

1. Prevention of Maternal and Neonatal Tetanus: Tetanus is a preventable disease, and immunization is the most effective way to protect against it. Immunizing pregnant women with Tetanus toxoid vaccine helps prevent both maternal and neonatal tetanus. Maternal tetanus occurs when the infection affects the mother, while neonatal tetanus occurs when newborns contract the infection during delivery or through unhygienic umbilical cord care practices[66].
2. Protection during Pregnancy and Childbirth: Tetanus toxoid immunization provides active immunity to pregnant women, which helps protect them from tetanus infection during pregnancy and childbirth. By receiving the vaccine, pregnant women develop antibodies against the tetanus toxin, which can neutralize the effects of the bacteria if they are exposed to it[67].
3. Prevention of Maternal and Neonatal Mortality: Tetanus infection can be severe and lead to serious complications, including respiratory failure, muscle stiffness, and death. By preventing tetanus through immunization, the risk of maternal and neonatal mortality associated with this infection is significantly reduced. Immunization plays a vital role in improving maternal and neonatal health outcomes[68].

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4. Promotion of Safe Delivery Practices: Tetanus toxoid immunization is often provided as part of antenatal care, which presents an opportunity to educate pregnant women about safe delivery practices and hygiene. By promoting immunization, healthcare providers can also raise awareness about the importance of clean delivery environments, sterile cord care, and the prevention of infection-related complications during childbirth.
5. Public Health Impact: Tetanus toxoid immunization programs have had a significant impact on reducing tetanus cases and deaths globally. Through widespread immunization efforts, many countries have successfully eliminated maternal and neonatal tetanus. Immunization campaigns, routine antenatal care, and integration of immunization services within healthcare systems have been instrumental in achieving these successes.World Health Organization[4].

2.1.13 Tetanus Toxoid Immunization: Benefits and Rationale

Protection of the Mother:

Tetanus toxoid immunization provides essential protection to pregnant women against tetanus infection, offering several benefits:

a. **Prevention of Maternal Tetanus**: Maternal tetanus is a severe and often fatal form of tetanus that can occur when tetanus spores contaminate a wound during childbirth or pregnancy. By receiving Tetanus toxoid immunization, pregnant women develop immunity to tetanus, reducing the risk of contracting the infection and its associated complications.
b. **Prevention of Maternal Mortality:** Maternal tetanus is a leading cause of maternal mortality in areas with limited access to healthcare and proper hygiene

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practices during childbirth. Immunizing pregnant women with Tetanus toxoid vaccine significantly reduces the risk of developing tetanus, thus contributing to the reduction of maternal deaths.

c. **Protection during Emergency Obstetric Care**: Pregnant women may face unforeseen circumstances requiring emergency obstetric interventions, such as cesarean sections or medical procedures. Tetanus toxoid immunization ensures that pregnant women are protected against tetanus infection, even in emergency situations, reducing the risk of tetanus-related complications[69].

2.1.14 Protection of the Newborn

Tetanus toxoid immunization during pregnancy also benefits newborns in the following ways:

a. Prevention of Neonatal Tetanus: Through passive immunity, Tetanus toxoid immunization during pregnancy transfers protective antibodies from the mother to her unborn child, offering newborns temporary protection against tetanus during their first months of life. This protection is particularly crucial in areas where clean delivery practices may be limited[70].

b. Reduction of Neonatal Mortality: Neonatal tetanus is a significant contributor to neonatal mortality, and immunizing pregnant women with Tetanus toxoid vaccine plays a vital role in reducing the incidence of this infection. By preventing neonatal tetanus, the vaccine helps save the lives of newborns, contributing to improved neonatal survival rates[71].

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2.1.15 Herd Immunity and Community Protection

In addition to individual protection, Tetanus toxoid immunization provides broader benefits to the community:

a. Herd Immunity: High immunization coverage among pregnant women contributes to the development of herd immunity. When a significant proportion of the population is immunized, the transmission of tetanus is reduced, protecting vulnerable individuals who may not be eligible for vaccination or have weaker immune responses.
b. Community-wide Impact: By reducing the prevalence of tetanus in the community, Tetanus toxoid immunization programs help improve overall public health. Lowering the incidence of tetanus contributes to a safer environment for childbirth, decreases the burden on healthcare systems, and promotes the well-being of the entire population.
c. Cost-Effectiveness: Tetanus toxoid immunization is a cost-effective intervention, as it helps prevent the costly treatment of tetanus cases and reduces the economic burden on individuals, families, and healthcare systems[72].

It is crucial to prioritize Tetanus toxoid immunization during pregnancy as part of comprehensive antenatal care. By ensuring high coverage and accessibility to the vaccine, we can maximize the protection provided to both mothers and newborns, leading to improved maternal and neonatal health outcomes[73].

2.1.16. Safety and Efficacy of Tetanus Toxoid Immunization in Pregnancy

1. **Vaccine Composition and Administration:** The tetanus toxoid vaccine used in pregnancy is typically a combination vaccine, such as Tdap (Tetanus, Diphtheria,

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and Pertussis), which provides protection against multiple diseases. The vaccine contains inactivated toxins or toxoids that stimulate the production of antibodies specific to the respective diseases.The vaccine is administered via intramuscular injection to ensure optimal immune response. The deltoid muscle of the upper arm is the most common site for administration. The recommended schedule for Tetanus toxoid immunization during pregnancy may involve multiple doses, with specific intervals between doses to maximize protection[74].

2. **Immunogenicity and Duration of Protection:** Tetanus toxoid immunization has been proven to be highly immunogenic, meaning it elicits a robust immune response in vaccinated individuals. The vaccine stimulates the production of antibodies that bind to the tetanus toxin, neutralizing its effects and preventing the development of tetanus.The duration of protection provided by Tetanus toxoid immunization is variable but generally long-lasting. While antibody levels may decline over time, individuals who have received the complete recommended series of vaccine doses during pregnancy typically maintain sufficient immunity to protect against tetanus for many years. Booster doses may be recommended to maintain optimal protection[75].
3. **Safety Profile:** Tetanus toxoid immunization in pregnancy has a well-established safety profile. Extensive research and surveillance have demonstrated that the benefits of vaccination outweigh the risks. The vaccine has undergone rigorous testing to ensure its safety and effectiveness.Common side effects of Tetanus toxoid immunization are usually mild and transient, such as pain or tenderness at the injection site, swelling, or a low-grade fever. Serious adverse events are rare

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but can occur, including severe allergic reactions. However, the overall incidence of severe adverse events is extremely low[76].

The safety of Tetanus toxoid immunization during pregnancy has been confirmed through numerous studies and real-world use. It is crucial for healthcare providers to follow recommended immunization practices, adhere to proper vaccine storage and handling procedures, and closely monitor for any potential adverse events[77].

The safety and efficacy of Tetanus toxoid immunization have contributed to its widespread use and successful incorporation into antenatal care programs globally.

2.1.17 Recommended Tetanus Toxoid Vaccination Schedule

World Health Organization (WHO) Recommendations: The World Health Organization (WHO) provides global guidelines for tetanus toxoid vaccination, including recommendations for pregnant women. These recommendations are based on scientific evidence and aim to ensure optimal protection against tetanus for both mothers and newborns[78].

According to WHO, it is recommended that all pregnant women receive a minimum of two doses of Tetanus toxoid-containing vaccine during pregnancy, spaced at least four weeks apart. The first dose is typically administered early in the pregnancy, ideally during the first or second trimester, while the second dose is given at least four weeks after the first dose[79].

Vaccination Timing and Dosing: The timing of Tetanus toxoid immunization during pregnancy is crucial to provide sufficient protection against tetanus for both the mother and the newborn. Early vaccination allows for the development of maternal antibodies that can be transferred to the fetus, providing passive immunity to the newborn[80].

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The first dose is usually given as early as possible during pregnancy, ideally within the first 16 weeks. This early administration ensures the production and transfer of protective antibodies to the fetus, providing passive immunity in the early stages of life. The second dose is given at least four weeks after the first dose to enhance and sustain the immune response[81].

In addition to the routine immunization schedule, there are specific situations where additional doses may be recommended. For example, if a pregnant woman has not received a complete primary immunization series, she may require additional doses during pregnancy to ensure adequate protection[82,83].

Booster Doses and Interval Recommendations: To maintain long-term protection against tetanus, booster doses of Tetanus toxoid vaccine are recommended following the initial series during pregnancy. These booster doses help to reinforce the immunity acquired through primary immunization.The timing and interval for booster doses may vary depending on the previous immunization history of the individual. In general, a booster dose is recommended every 10 years to ensure ongoing protection against tetanus[84].

It is important for healthcare providers to adhere to the recommended vaccination schedule and ensure that pregnant women receive the appropriate number of vaccine doses at the recommended intervals. This ensures optimal immune response and protection against tetanus for both the mother and the newborn[85].

2.1.18 Global Impact of Tetanus Toxoid Immunization Programs

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Progress in Maternal and Neonatal Tetanus Elimination: The implementation of Tetanus toxoid immunization programs has resulted in significant progress in the elimination of maternal and neonatal tetanus globally. The World Health Organization (WHO) estimates that the number of newborns dying from tetanus has decreased by more than 90% since the initiation of immunization campaigns[86]. This reduction is attributed to the widespread availability and utilization of Tetanus toxoid vaccines during pregnancy. The success of these programs has contributed to the achievement of key global targets, including the Sustainable Development Goals (SDGs) and the Global Vaccine Action Plan (GVAP)[87].

Challenges in Achieving Universal Coverage: Despite the progress made, achieving universal coverage of Tetanus toxoid immunization remains a challenge in certain regions. Barriers to coverage include inadequate healthcare infrastructure, limited access to immunization services, cultural and religious beliefs, and socioeconomic disparities[88]. Additionally, conflicts, natural disasters, and population displacement can disrupt immunization services and hinder efforts to reach pregnant women with the vaccine. These challenges necessitate targeted strategies to address the specific barriers in each context and ensure equitable access to immunization for all pregnant women[89].

Success Stories: Lessons Learned from Countries: Several countries have demonstrated success in achieving high coverage of Tetanus toxoid immunization, providing valuable lessons for other settings. For example, Ghana implemented a comprehensive immunization program that integrated Tetanus toxoid vaccination into antenatal care services, resulting in increased coverage and improved maternal and neonatal health outcomes[90]. In Bangladesh, community-based initiatives were effective in reaching

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pregnant women in remote areas, utilizing trained community health workers to administer the vaccine. These success stories emphasize the importance of tailored approaches, community engagement, strong partnerships, and capacity building in achieving high coverage and sustainable immunization programs[91].

Future Directions and Innovations: To further enhance the impact of Tetanus toxoid immunization, ongoing efforts are focused on improving vaccine delivery and monitoring systems. Innovations such as the use of mobile technology for vaccine tracking, data collection, and reminders have shown promising results in improving coverage and ensuring timely immunization[92]. Additionally, research and development are ongoing to explore the feasibility of new vaccine formulations, such as combined vaccines that protect against multiple diseases, to simplify the immunization schedule and increase vaccine acceptance.

2.1.19 Strategies to Improve Tetanus Toxoid Immunization Uptake

Strengthening Routine Immunization Services: Efforts should be made to strengthen routine immunization services to ensure the effective delivery of Tetanus toxoid vaccines. This includes improving vaccine storage and cold chain management, implementing proper vaccine handling and administration practices, and maintaining accurate immunization records. Regular monitoring and supervision of immunization services can help identify and address any bottlenecks or challenges in the system[93,94].

Integration with Antenatal Care: Integration of Tetanus toxoid immunization with antenatal care services has proven to be a successful approach. By incorporating immunization into routine antenatal visits, pregnant women can conveniently access the vaccine, and healthcare providers can ensure timely administration. Integration also

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allows for the provision of other important antenatal care services, such as screening for other infectious diseases and providing health education on pregnancy-related topics[95].

Community Engagement and Awareness Programs: Community engagement and awareness programs play a crucial role in improving Tetanus toxoid immunization uptake. It is important to involve community leaders, religious groups, and influential individuals in promoting the benefits of immunization and addressing any concerns or misconceptions. Community-based activities, such as health talks, group discussions, and community mobilization events, can help increase awareness, dispel myths, and build trust in the vaccination process[96].

Addressing Vaccine Hesitancy: Vaccine hesitancy, influenced by various factors including safety concerns, lack of information, and misinformation, can hinder immunization uptake. To address vaccine hesitancy, healthcare providers should engage in open and non-judgmental conversations with pregnant women and their families, addressing their concerns and providing accurate information about the safety and effectiveness of Tetanus toxoid vaccines. Clear and transparent communication, backed by scientific evidence, can help alleviate vaccine hesitancy and promote informed decision-making[97,98].

Strengthening Health Education: Comprehensive health education is essential for increasing Tetanus toxoid immunization uptake. This includes educating pregnant women about the importance of immunization, the benefits of Tetanus toxoid vaccination for both themselves and their babies, and the recommended vaccination schedule. Health education materials, such as brochures, posters, and audio-visual aids, can be used to disseminate information in a clear and culturally appropriate manner[99,100].

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Strengthening Health System Coordination: Effective coordination among various stakeholders involved in immunization services is crucial. This includes collaboration between healthcare providers, policymakers, program managers, community leaders, and development partners. Coordinated efforts can help address system-level barriers, allocate resources efficiently, and ensure consistent and sustainable delivery of Tetanus toxoid immunization services[101,102].

2.1.20 Tetanus Toxoid Immunization Program in Ogun State

Today, Ogun State is known for its diverse cultural heritage, traditional festivals, historical landmarks, and thriving industries. It is home to several notable institutions, including Olabisi Onabanjo University and the Federal University of Agriculture, Abeokuta. The state continues to play a vital role in Nigeria's socio-economic development and remains an important hub for trade and commerce in the region[104].The Tetanus toxoid immunization program in Ogun State is an essential component of the state's overall healthcare strategy to protect pregnant women and their newborns from Tetanus infection. The program focuses on ensuring widespread coverage of Tetanus toxoid vaccination among pregnant women through various initiatives and interventions[105].

The Ogun State Ministry of Health, in collaboration with other stakeholders, implements and oversees the Tetanus toxoid immunization program. The program follows the guidelines and recommendations set by the World Health Organization (WHO) and the National Primary Health Care Development Agency (NPHCDA) in Nigeria.

Key features of the Tetanus toxoid immunization program in Ogun State include:

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1. Routine Antenatal Care: Tetanus toxoid immunization is integrated into the routine antenatal care services provided to pregnant women. Healthcare facilities, including primary health centers and hospitals, offer antenatal care visits where Tetanus toxoid vaccination is administered.
2. Vaccination Schedule: The program follows a recommended vaccination schedule for pregnant women. This typically involves administering Tetanus toxoid vaccine doses during the antenatal care visits. The number and timing of doses are determined based on the gestational age of the pregnant woman.
3. Training and Capacity Building: Healthcare providers involved in antenatal care are trained on the proper administration and handling of Tetanus toxoid vaccines. This ensures that healthcare workers have the necessary knowledge and skills to deliver the vaccines effectively and safely.
4. Community Sensitization and Mobilization: The program conducts community awareness campaigns to educate pregnant women and their families about the importance of Tetanus toxoid immunization. This includes disseminating information through various channels, such as community meetings, radio programs, and printed materials.
5. Monitoring and Evaluation: The program has monitoring and evaluation mechanisms in place to assess the coverage and effectiveness of Tetanus toxoid immunization. Data on vaccination coverage, uptake rates, and adverse events are collected and analyzed to inform program improvements and decision-making[106].

2.1.21 Coverage, Barriers and Facilitators of Tetanus Toxoid Immunization in Ogun State

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The coverage, barriers, and facilitators of Tetanus toxoid immunization in Ogun State have significant implications for the overall health and well-being of pregnant women and their newborns. To understand these factors in more detail, it is necessary to delve into specific aspects that influence immunization coverage and access. By exploring the available literature and conducting primary research, a deeper understanding can be gained regarding the coverage, barriers, and facilitators of Tetanus toxoid immunization in Ogun State[107].

Coverage of Tetanus Toxoid Immunization: The coverage of Tetanus toxoid immunization among pregnant women in Ogun State may vary depending on several factors. These include the availability and accessibility of healthcare facilities, the reach of immunization campaigns, and the level of awareness and knowledge among pregnant women about the importance of receiving the vaccine. By conducting a survey or analyzing existing data, the coverage rate can be determined, providing insights into the current state of immunization coverage in Ogun State[108].

Barriers to Tetanus Toxoid Immunization: Various barriers may hinder pregnant women from accessing and receiving the Tetanus toxoid vaccine. Some common barriers include:

- Limited awareness and knowledge about Tetanus toxoid immunization: Pregnant women and their families may lack information about the importance and benefits of receiving the vaccine. This could be due to limited health education initiatives or inadequate dissemination of information through various channels[109].
- Inadequate availability and accessibility of healthcare facilities: The presence of healthcare facilities providing immunization services may be limited in certain

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areas of Ogun State, resulting in challenges in accessing the vaccine. Additionally, long distances to healthcare facilities and transportation constraints may further hinder pregnant women from receiving the vaccine[110,111].

- Financial constraints: Pregnant women may face financial difficulties in accessing healthcare services, including immunization. This could be due to the cost of transportation to healthcare facilities or out-of-pocket expenses associated with the vaccine[112].
- Cultural beliefs and vaccine hesitancy: Some communities may hold cultural beliefs or misconceptions about immunization, leading to vaccine hesitancy. Addressing these beliefs and promoting accurate information is crucial to overcome this barrier[113].
- Fear of side effects or concerns about vaccine safety: Pregnant women may have concerns about the potential side effects of the vaccine or its impact on their health and the health of their unborn child. Addressing these concerns through proper counseling and education is essential to mitigate this barrier[114].
- Facilitators of Tetanus Toxoid Immunization:Several factors can act as facilitators to improve Tetanus toxoid immunization uptake among pregnant women in Ogun State.
- Integration of immunization services with antenatal care: Incorporating Tetanus toxoid immunization as a routine component of antenatal care can enhance access and coverage. This integration ensures that pregnant women receive the vaccine during their regular healthcare visits[115].
- Effective communication and health education programs: Implementing targeted health education initiatives that highlight the importance and benefits of Tetanus

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toxoid immunization can improve awareness and knowledge among pregnant women. This can be achieved through various channels, such as community health workers, mass media, and informational materials[116].

- Community engagement and involvement: Engaging local leaders, community health workers, and religious institutions can help disseminate accurate information, address misconceptions, and build trust within the community regarding immunization. Their involvement canpromote acceptance and uptake of the vaccine[117].
- Supportive policies and strategies: The implementation of supportive policies and strategies by government and healthcare authorities plays a crucial role in improving immunization coverage. These may include ensuring the availability of vaccines, training healthcare providers, and strengthening the healthcare infrastructure[118].
- Availability of trained healthcare providers: Having a sufficient number of trained healthcare providers who can administer the Tetanus toxoid vaccine safely and effectively is essential. They can address concerns, provide accurate information, and offer counseling to pregnant women, thereby increasing vaccine acceptance and uptake[119].

2.1.22 Global Overview of Childhood Immunization

It is important to consider the factors influencing immunization coverage, barriers, and facilitators not only in low and middle-income countries (LMICs) but also in high-income countries. The literature review you provided highlights the disparities in immunization

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coverage between different countries and the challenges faced in achieving high vaccine coverage rates[120].

One key aspect to consider is the impact of immunization on reducing neonatal, infant, and childhood morbidities and mortalities due to infectious diseases[121]. Immunization has been recognized as a cost-efficient public health intervention that plays a significant role in achieving the sustainable development goal of ending preventable deaths among newborns and children under five[122]. The positive impact of immunizations is not limited to the reduction of disease rates but also includes the development of herd immunity, benefitting both vaccinated and unvaccinated individuals[123].

Immunization coverage serves as a crucial indicator of national progress in reducing infant and child morbidity and mortality[124]. However, despite the proven benefits, there are still significant gaps in vaccine coverage globally, with millions of infants not receiving necessary vaccines[125]. These gaps can be attributed to various barriers such as vaccine refusal, delay, lack of trust, and confidence in vaccine efficacy[126]. To address these challenges and inequalities, the Global Vaccine Action Plan was established, aiming to improve vaccine coverage worldwide[127].

It is important to note that disparities in immunization coverage are not limited to LMICs. Even in high-income countries like the United States and the United Kingdom, there are pockets of low vaccine coverage and declining immunization rates[128]. Factors such as household size, racial and economic disparities, and vaccine hesitancy contribute to incomplete vaccine coverage in these settings. The decline in immunization rates in high-income countries poses a risk not only to individual children but also to herd immunity in communities that are free from vaccine-preventable diseases[129].

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Addressing low immunization coverage in LMICs is crucial, as these countries bear the highest burden of childhood vaccine-preventable diseases[130]. Africa, in particular, has the lowest childhood immunization coverage globally, emphasizing the need for global efforts to improve coverage rates[131]. Strategies that stimulate vaccine demand, such as monetary incentives and communication campaigns, have been proposed to improve coverage in both LMICs and communities with poor health indicators in high-income countries[132]. By considering the global overview of childhood immunization, along with the coverage, barriers, and facilitators identified in your research, a comprehensive understanding of the challenges and potential solutions for improving immunization coverage can be gained. This knowledge can inform policy and programmatic interventions aimed at achieving high vaccine coverage rates and reducing the burden of vaccine-preventable diseases worldwide[133].

2.1.23 The Significance of Immunization in Early Infancy

The significance of immunization in early infancy cannot be overstated. Routine immunization plays a vital role in preventing and reducing mortality due to vaccine-preventable diseases in infants and children[134]. Achieving high immunization coverage, ideally 90%, can have a profound impact on global health by averting two to three million child and infant deaths worldwide[135]. In Nigeria, increasing immunization coverage could potentially prevent about 22% of childhood deaths attributed to vaccine-preventable diseases[136,137].

Immunization also has far-reaching implications beyond health outcomes. By addressing challenges in immunization delivery and uptake, nations can reduce the burden of infectious diseases, increase productivity, and improve national economies[138,139,140].

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Moreover, investing in immunization helps save lives and ensures that opportunities for growth and development are not missed.During pregnancy, advocating for immunization becomes critical for the protection of both mothers and newborns. A significant proportion of under-five child deaths occur within the first 28 days of life, emphasizing the vulnerability of newborns to vaccine-preventable diseases[141]. Vaccinating pregnant mothers can provide indirect protection and passive immunity to newborns, safeguarding them against diseases like pertussis[142]. Maternal vaccination against tetanus during pregnancy is also recommended to protect mothers and newborns from this vaccine-preventable disease[143].

While there is clear evidence of the potential benefits of immunizing pregnant women and transferring immunity to newborns, the correlation between uptake of vaccinations during pregnancy and childhood immunization remains inconclusive[145]. Encouraging pregnant women to attend and actively participate in antenatal care services can improve the vaccination status of children and increase overall immunization coverage[146].

The required number of tetanus vaccinations to confer passive immunity to newborns is an area that requires further investigation. Studies have shown that maternal tetanus vaccination plays a significant role in preventing neonatal deaths, with newborns of mothers who received more than two tetanus vaccinations having a lower likelihood of neonatal mortality[147]. However, the specific number of vaccinations needed to provide optimal protection for newborns has not been documented. This research aims to explore the association between the number of tetanus vaccinations received by pregnant women and the uptake of childhood immunization within two months of birth.

The significance of immunization in early infancy:

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Prevention of Lifelong Disabilities: Immunization in early infancy helps prevent diseases that can lead to lifelong disabilities. Many vaccine-preventable diseases, such as polio and measles, can cause severe complications, including paralysis, hearing loss, and cognitive impairments. By ensuring high immunization coverage, these debilitating conditions can be significantly reduced or eliminated[148].

Protection of Vulnerable Populations: Infants and young children are particularly vulnerable to infectious diseases due to their developing immune systems. Immunization provides a crucial shield of protection for this age group, helping to prevent severe illness, hospitalization, and even death. It also helps protect those who cannot receive vaccines, such as infants too young to be vaccinated or individuals with weakened immune systems[149].

Herd Immunity and Community Protection: Immunization not only protects vaccinated individuals but also contributes to the concept of herd immunity. When a large portion of the population is immunized, the transmission of infectious diseases is disrupted, providing indirect protection to unvaccinated individuals. This is especially important for infants who may be too young to receive certain vaccines[150].

Long-Term Cost Savings: Investing in early childhood immunization can lead to significant cost savings for individuals, families, communities, and healthcare systems. By preventing illness and reducing the need for medical interventions, immunization helps alleviate the economic burden associated with healthcare expenses, lost productivity, and disability-related costs[151].

Sustainable Development Goals (SDGs): Immunization is directly linked to the achievement of several SDGs, particularly SDG 3, which aims to ensure healthy lives and

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promote well-being for all at all ages. By preventing infectious diseases in early infancy, immunization contributes to reducing child mortality and improving overall health and well-being[152].

Equity and Social Justice: Immunization programs strive to reach all segments of the population, including marginalized and disadvantaged communities. Achieving high immunization coverage ensures that every child has an equal opportunity for protection against vaccine-preventable diseases, regardless of their socioeconomic status, geographic location, or access to healthcare[153].

Global Public Health Security: Immunization plays a crucial role in global efforts to control and eradicate infectious diseases. By ensuring high immunization coverage globally, the spread of vaccine-preventable diseases can be contained, reducing the risk of outbreaks and pandemics. This is particularly important in our interconnected world, where diseases can easily cross borders and impact populations worldwide[154].

2.1.24 Immunization in Nigeria

Immunization plays a crucial role in preventing outbreaks or epidemics of vaccine-preventable diseases. However, Nigeria faces significant challenges in achieving high immunization coverage and ensuring the timely administration of vaccines.

There were over 18 million incompletely immunized children worldwide in 2011, with more than 50% residing in India, Nigeria, and Indonesia[155]. Some scholars reported that Nigeria had the worst percentage coverage for vaccines, including BCG, DPT1-3, OPV1-3, and measles, with correspondingly low Full Immunization Coverage (FIC) compared to other West African nations[156]. A scholar highlighted that Nigeria has approximately one million unvaccinated children annually, the highest number on the African continent.

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Some researchers further stated that 20% of avoidable childhood mortalities in sub-Saharan Africa occur in Nigeria. Nigeria was the last African nation to be removed from the list of polio-endemic countries in September 2015, which has subjected the country to increased scrutiny regarding immunization delivery, uptake, and coverage[157].

To address these challenges, the Nigerian government launched the Expanded Program on Immunization (EPI) in 1979. The program aims to provide routine immunization free of charge to all children at risk of vaccine-preventable diseases[158]. The Federal government procures vaccines and distributes them to the 36 states in Nigeria, including the Federal Capital Territory, which are responsible for delivering routine immunization through their local governments[159].

Despite the national goal of achieving a 90% routine immunization coverage for all antigens by the year 2020, the actual immunization coverage in Nigeria has been reported to be far below the desired rate[160]. This low coverage has contributed to a significant proportion of childhood, neonatal, and infant deaths, accounting for 22% annually[161]. Nigeria continues to experience high rates of infant and childhood mortality, making it one of the highest globally[162]. To prevent and reduce vaccine-preventable diseases, it is crucial for the government and all health stakeholders to prioritize strategies to improve national immunization coverage[163].

Despite the implementation of the EPI for nearly four decades, Nigeria still struggles with the burden of vaccine-preventable diseases in infants and children due to low immunization coverage[164]. The consistent poor performance in achieving the primary objective of the EPI in Nigeria is influenced by various identified and unrecognized factors[165].

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2.1.25 Tetanus Toxoid Immunization in Nigeria

Tetanus toxoid immunization is an essential component of routine immunization in Nigeria. Tetanus is a severe bacterial infection that can lead to muscle stiffness, spasms, and potentially life-threatening complications. Immunization against tetanus is crucial in protecting individuals, particularly pregnant women and newborns, from this preventable disease[166].

In Nigeria, the National Primary Health Care Development Agency (NPHCDA) oversees the implementation and delivery of immunization services, including tetanus toxoid vaccination. The administration of tetanus toxoid vaccine is integrated into the routine immunization schedule and is provided free of charge to eligible individuals.Tetanus toxoid immunization is primarily targeted at pregnant women to protect both the mother and the newborn. The World Health Organization (WHO) recommends that pregnant women receive at least two doses of tetanus toxoid vaccine during pregnancy. The vaccine is usually administered as part of antenatal care services, with the first dose given early in pregnancy and the second dose provided at least four weeks after the initial dose[167].The Nigerian government, in collaboration with development partners and organizations such as UNICEF and WHO, has implemented various strategies to improve tetanus toxoid immunization coverage. These efforts include strengthening the immunization supply chain, training healthcare workers, conducting immunization campaigns, and promoting community engagement and awareness about the importance of tetanus toxoid vaccination.

Despite these efforts, challenges persist in achieving high tetanus toxoid immunization coverage in Nigeria. Some of the challenges include limited access to healthcare services,

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inadequate awareness and knowledge about immunization, cultural and religious beliefs, and logistical constraints in reaching remote and underserved communities. Efforts are ongoing to address these challenges through targeted interventions, improved service delivery, and community mobilization[168].

Tetanus Toxoid Vaccine

The tetanus toxoid vaccine is an inactive vaccine administered to prevent tetanus infection in individuals. It was initially developed in 1924 by Pierre Descombey and later utilized by the United States military during World War II to protect soldiers from tetanus infection[169]. Since its discovery, the vaccine has significantly reduced the incidence of tetanus in developed countries and has been widely employed in developing countries as a key tool for eradicating the disease[170]. To combat the global burden of neonatal tetanus, the World Health Organization introduced the vaccination of tetanus toxoid for pregnant women in national immunization policies and strategies[171]. However, despite these efforts, deaths from neonatal tetanus still persist as a problem in Nigeria and India, primarily due to poor coverage of tetanus toxoid vaccines in rural communities[172].

Immunization coverage surveys conducted in Nigeria have shown low rates of tetanus toxoid vaccination among mothers. For instance, a survey of 601 mothers revealed that only 25.2% received the first dose of tetanus toxoid, 13.6% received the second dose, and 61.2% received both doses[173]. The Nigerian 2007 to 2010 immunization coverage survey indicated less than 50% national coverage of tetanus toxoid annually[174]. Similarly, a survey conducted on 1540 pregnant women in Southern Nigeria reported first and second tetanus toxoid coverage rates of 64% and 50%, respectively, in 2012[175]. Limited evidence

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is available regarding the actual coverage of tetanus toxoid among pregnant women in Northern Nigeria[176].

The tetanus toxoid vaccine is administered to pregnant women during antenatal visits to provide protection against tetanus infection for both the mother and the baby. The recommended dosage is 0.5ml administered intramuscularly. After the first dose, the vaccine stimulates the immune system to produce anti-tetanus antibodies, which are transferred to the fetus through the placenta, conferring passive immunity against neonatal tetanus for the first 28 days of life. However, the level of protection gradually declines, which is why a second dose (TT2+) is administered four weeks after the first dose to boost immunity for an additional three years. Subsequent doses, such as the third dose (TT3+) given six months after TT2+, provide immunity for five years, and the fourth dose (TT4+) given one year after TT3+ confers immunity for ten years. The fifth and final dose (TT5+) is administered one year after TT4+ and provides lifelong protection against tetanus[18].

The main process and output indicator for tetanus toxoid immunization in a community is the proportion of pregnant women who have received the second dose of tetanus toxoid (TT2+), also known as "protected at birth" (PAB). The 2013 PAB for Nigeria is 60%[177]. Neonatal tetanus can be fatal, and newborns born to unimmunized or partially immunized mothers may lack sufficient anti-tetanus antibodies, making them susceptible to the infection. Neonatal death in tetanus cases often occurs due to prolonged lack of oxygen supply to the brain (hypoxia) caused by tetanus toxin-induced spasms and rigidity in the respiratory muscles[178].

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Several studies conducted in different regions have explored the association between tetanus toxoid vaccine and neonatal mortality. For example, some scholars analyzed Nigerian Demographic and Health Survey data and found that tetanus toxoid injection was associated with a decrease in neonatal mortality rate. A scholar examined prenatal interventions and neonatal mortality in sub-Saharan Africa and reported that newborns whose mothers received two or more tetanus toxoid injections had a lower neonatal mortality rate. Some scholars analyzed Indian Family Health Survey data and observed a significant association between a higher number of tetanus toxoid injections and a reduced neonatal mortality rate[179]. Similarly, another researcher found that newborns born to mothers who received more than two tetanus toxoid injections in Indonesia had a decreased neonatal mortality rate[98].

Antenatal Care (ANC)

The importance of antenatal care (ANC) in ensuring the well-being of pregnant women and their babies cannot be overstated. ANC involves regular visits to a qualified health worker throughout pregnancy, starting from conception and continuing until delivery. These visits include physical examinations, laboratory investigations, health education, and interventions such as tetanus toxoid immunization, nutritional supplementation, and management of pregnancy-related conditions.

Studies have shown that ANC utilization rates vary across sub-Saharan Africa, but there has been limited exploration of the association between ANC utilization and neonatal mortality. In African countries, ANC utilization also differs between urban and rural areas, with women in urban settings generally accessing ANC services more than those in rural

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areas. This disparity may be due to uneven distribution of health centers, which tend to be concentrated in developed regions[179].

For example, studies conducted in Nigeria, Kenya, and Tanzania have indicated higher ANC utilization rates in urban areas compared to rural areas. The urban-to-rural ANC utilization ratios were reported as 70.7% to 8.3% in Nigeria, 88.6% to 21.2% in Kenya, and 72.1% to 22.9% in Tanzania. A study in Southern Nigeria also found that women from urban settings were twice as likely to utilize ANC services compared to women from rural settings[180].

Tetanus toxoid immunization is a vital component of ANC and plays a role in determining the neonatal tetanus (NNT) mortality rate in a community. High tetanus toxoid coverage during ANC visits reduces the risk of neonatal tetanus infection. However, there is limited empirical evidence on missed opportunities for immunization against neonatal tetanus during ANC visits and its association with neonatal mortality in developing countries[180].

A five-year review conducted in a tertiary health center in Southwest Nigeria identified only six clinically diagnosed NNT cases out of 1,130 cases. Interestingly, 66.7% of the NNT cases had mothers who did not attend ANC during pregnancy. However, the study did not assess the association between the lack of ANC visits and NNT mortality rate[181].Contradictory findings have been reported regarding the association between ANC attendance during pregnancy and neonatal mortality. Some studies conducted in Nigeria found a higher risk of neonatal mortality among neonates whose mothers attended ANC, but these studies did not specifically focus on NNT mortality. In an Asian study, no significant association was found between ANC visits and NNT mortality[107].

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Given the limited evidence available, it would be valuable to investigate the association between the frequency of ANC visits among mothers of neonatal tetanus cases and NNT mortality in a specific study area. This research would help further understand the relationship between ANC utilization and NNT outcomes.

Place of Delivery

The place of delivery plays a crucial role in maternal and neonatal mortality rates. Home births, where a baby is delivered at the mother's place of residence, are common in developing countries. A multi-country survey conducted in developing countries from 2003 to 2008 found that over 70% of women in these countries delivered at home[182].The study revealed that the most common reason cited for home delivery was the perception that it was "not necessary," which accounted for 68% of the respondents. Other reasons included "lack of access" (24%) and "cost"(7%). In many developing countries, home births are attended by unskilled health workers who may have limited capacity to improve maternal and neonatal outcomes[182].

On the other hand, health facility-based deliveries are more likely to be attended by skilled birth attendants, who are trained health workers such as physicians, nurses, or midwives. Skilled birth attendants possess the necessary skills to manage uncomplicated pregnancies, normal deliveries, and postnatal care. They are also capable of identifying, managing, and referring complications in mothers and newborns[23].It is important to note that traditional birth attendants (TBAs), who are unskilled workers, are not considered skilled birth attendants. In developing countries, pregnant women who deliver at home often rely on the assistance of TBAs[24].

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The presence of skilled birth attendants during delivery is crucial in reducing neonatal mortality. Skilled birth attendants employ safe and hygienic delivery practices to minimize the risk of neonatal tetanus (NNT) infection. They use sterilized instruments to cut and clean the umbilical cord, preventing contamination. In contrast, unskilled birth attendants may engage in unhygienic practices that increase the risk of NNT, such as treating the umbilical cord with soil or cow feces, which can be contaminated with Clostridium tetani, the causative agent of neonatal tetanus. The use of unclean or unsterilized razor blades during delivery is another common unhygienic practice associated with unskilled birth attendants[183].

Improving access to skilled birth attendants and promoting health facility-based deliveries are essential strategies for reducing maternal and neonatal mortality rates, as skilled birth attendants can provide the necessary care and interventions to ensure safe deliveries and minimize the risk of complications.Several studies have found significant associations between the place of delivery and neonatal outcomes. A researcher conducted a systematic review of 21 studies and found a 23% decrease in neonatal deaths among babies delivered by skilled personnel in health facilities. Another study in India reported that 84% of neonatal deaths occurred at home and were attended by unskilled birth attendants[183].

In Nigeria, a researcher conducted a survey over six years and found a disparity in the proportion of deliveries in health facilities between the Northern (41%) and Southern (74%) regions of the country. The study also revealed a similar disparity in neonatal tetanus mortality rates between the two regions[183]. A scholar conducted a survey in a

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tertiary health center in southern Nigeria and found that only 16.7% of neonates whose mothers delivered in the health facility died of neonatal tetanus.

In another study in Northern Nigeria, a researcher reported a low proportion of mothers delivering in health facilities (5.9%) and a high neonatal tetanus mortality rate (66.7%). A researcher found a significant association between delivering outside health facilities and neonatal death in southern Nigeria[98]. Conversely, a researcher reviewed neonatal tetanus cases in a tertiary hospital in Southern Nigeria and reported a significant association between delivering outside health facilities (89.6%) and neonatal tetanus mortality rate[184].

These studies highlight the importance of skilled birth attendance in health facilities in reducing neonatal mortality and preventing neonatal tetanus. Delivering in a health facility with skilled personnel improves the chances of safe delivery practices and reduces the risk of neonatal infections and complications.

Cord Care

Cord care refers to the specialized care provided to the umbilical cord of a newborn from delivery until it naturally separates to prevent infection transmission. Poor cord care practices have been associated with umbilical cord infections, including neonatal tetanus, which contributes to approximately 25% of global neonatal deaths[185].The incidence of omphalitis (umbilical cord infections) has been reported to be high in certain countries, such as Turkey with 77 cases per 1000 live births and Pakistan with 217 cases per 1000 live births[186]. Poor cord care practices, including cleansing the umbilical cord with contaminated substances and using direct thermal heat for sterilization, can lead to bacterial infections and increase the risk of neonatal tetanus[186].

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In some parts of Southern Nigeria, unskilled birth attendants have been observed to cleanse the umbilical cord with herbal preparations, cow dung, ash, coconut oil, or mud[187]. However, there is limited literature on the incidence of neonatal tetanus due to poor cord care practices and its association with neonatal death in Nigeria.The World Health Organization (WHO) recommended the use of 4% chlorhexidine for cleaning the umbilical cord stump in newborns delivered at home in countries with a neonatal mortality rate of 30 or more deaths per 1000 live births[8]. However, in countries with a lower neonatal mortality rate, the application of any antiseptic to the umbilical cord stump is not recommended for newborns delivered at home or in health facilities[24]. This approach is known as dry cord care.

Studies have shown the effectiveness of chlorhexidine in reducing omphalitis and neonatal mortality in developing countries. A scholar conducted a systematic review and meta-analysis, which demonstrated a 23% reduction in neonatal mortality with chlorhexidine application. A researcher conducted a systematic review of community-based randomized controlled trials in India, Pakistan, and Nepal, indicating a 17% decrease in neonatal mortality compared to dry cord care. Similarly, a study in Bangladesh showed a 20% reduction in neonatal mortality with chlorhexidine cord care. Another meta-analysis in Pakistan, Nepal, and Bangladesh conducted by a scholar reported a 23% decrease in neonatal mortality among the experimental group compared to the control group[186].

These studies highlight the positive impact of chlorhexidine cord care in reducing neonatal mortality and emphasize the importance of adopting appropriate cord care practices to prevent infections and improve newborn health outcomes. It is essential for

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pregnant women in Nigeria to receive tetanus toxoid immunization to protect themselves and their newborns from the devastating effects of tetanus. The government and healthcare stakeholders continue to work towards improving tetanus toxoid immunization coverage to ensure the health and well-being of the population[187].

2.2 Theoretical Framework

2.2.1 Social Cognitive Theory (SCT)

This theory has been selected as the conceptual framework for this study to provide a comprehensive understanding and logical explanations of the research work. Originally known as social learning theory, SCT evolved in the mid-1980s to encompass a more holistic approach that emphasizes the role of cognition in predicting human behavior. It is widely used in the field of health behavior and forms the basis for many community health promotion programs[188].

SCT is based on the interaction between behavioral, cognitive, and socio-environmental influences, known as reciprocal determinism. A scholar emphasize that understanding reciprocal determinism is essential for applying SCT to health issues. In the context of this study, the different constructs of SCT can shed light on how various maternal factors influence the uptake of immunization, including educational level, wealth index, literacy level, religion, ethnicity, and number of co-wives[189].The constructs of personal cognitive influences, such as self-efficacy, collective efficacy, outcome expectations, and knowledge, play a crucial role in this study. They are based on the mother's confidence in the efficacy of vaccines and the expected positive health outcomes from receiving scheduled immunizations. The constructs of behavioral influences, including behavioral skills, intentions, and reinforcement or punishment, determine the likelihood of engaging

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in health behaviors, such as attending antenatal and postnatal services, which in turn influence the chances of receiving childhood immunization[189].

According to the SCT model, behavioral change is not only influenced by personal experiences but also by observing the actions of others and the benefits they produce. Therefore, the cognitive and behavioral influences are fundamental to this study. Factors such as maternal confidence in vaccine efficacy, the application of features of antenatal care services, and socio-cultural influences may impact the uptake of childhood immunization. SCT have been applied in various studies evaluating outcome and behavioral changes in lifestyle[190]. For example, a researcher found a significant association between nutritional behavior in pregnant women and SCT constructs such as self-efficacy, outcome expectations, and social support. This model can serve as a foundation for assessing the influences of behavioral changes and can be applied to mothers' capability to determine the uptake of childhood immunizations[191].

Some scholars reported on a project conducted in Ethiopia that applied the constructs of SCT to improve child survival through community engagement and behavioral change. The project achieved significant successes, including increased immunization coverage, antenatal care coverage, and improved household hygienic practices. The application of SCT constructs provided explanations for these achievements, such as the adoption of positive behaviors by community members (collective efficacy), provision of support by different groups (social support), and addressing societal barriers and creating conducive systems for sustainability[192].By utilizing the SCT framework, this study aims to provide insights into the factors influencing Tetanus toxoid immunization among pregnant women and to facilitate behavioral changes that promote immunization uptake.

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2.2.2 Behavioral Model of Health Services

The Behavioral Model of Health Services Use proposes that healthcare utilization is influenced by predisposing factors (e.g., socio-demographic characteristics, knowledge), enabling factors (e.g., accessibility, availability of services), and need factors (e.g., perceived need, severity of the condition). This model has been utilized in studies examining the utilization of maternal healthcare services, including Tetanus toxoid immunization[193]. It can help in understanding the factors that influence pregnant women's utilization of immunization services, including barriers and facilitators at individual and healthcare system levels.

2.2.3 Ecological Model

The Ecological Model posits that individual behavior is shaped by multiple interacting factors at various levels, including individual, interpersonal, community, and societal levels. This model has been employed in studies exploring maternal and child health, including immunization uptake[194]. Applying an ecological perspective to your study can help identify the multilevel influences on Tetanus toxoid immunization, such as individual knowledge and beliefs, social support networks, community norms, and healthcare system factors.

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2.2.4 Socio-ecological Model

The Socio-ecological Model expands on the ecological model by emphasizing the dynamic interplay between individual, interpersonal, organizational, community, and

policy factors. This model has been used in studies examining various health behaviors, including vaccination uptake[195]. It can provide a comprehensive framework for understanding the complex determinants of Tetanus toxoid immunization among pregnant women and guide interventions that target multiple levels of influence.

2.2.5 Health Communication Models

Various health communication models, such as the Health Communication-Persuasion Model and the Integrated Model of Behavior Prediction, have been applied in studies related to immunization behavior. These models emphasize the role of effective communication strategies, including message content, source credibility, and delivery channels, in shaping health-related behaviors[196]. Incorporating a health communication perspective into your study can help identify effective communication strategies to promote Tetanus toxoid immunization among pregnant women.

2.3 Review of Empirical Studies

In a study which was conducted as a cross-sectional survey in Gambia and Senegal to determine the factors that influence tetanus toxoid immunization among pregnant women. Data was collected using a thematic guide through face-to-face interviews with 1,200 women aged 15-49 years who had given birth within the last two years. The study provides valuable insights into the determinants of tetanus toxoid immunization among women in The Gambia and Senegal. It is based on a large sample size and uses face-to-face interviews to collect data directly from participants. One potential weakness of the study is that it only includes women who had given birth within the last two years, which may not be representative of all pregnant women in these countries. Additionally, the study did not include any qualitative data to provide more detailed insights into

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participants' experiences and perceptions. The study found that several factors influenced tetanus toxoid immunization among women in The Gambia and Senegal, including education level, knowledge about tetanus toxoid vaccination, access to health care services, and cultural beliefs about pregnancy and childbirth. These findings can help inform efforts to improve vaccination rates among women in these countries[197].

In a study, "Determinants of utilization of sufficient tetanus toxoid immunization during pregnancy: evidence from the Kenya demographic and health survey, 2008–2009", the study aimed to identify the determinants of sufficient tetanus toxoid (TT) immunization during pregnancy in Kenya using data from the 2008-2009 Kenya Demographic and Health Survey. The study found that maternal education, antenatal care visits, and knowledge about TT were significant predictors of sufficient TT immunization. Cross-sectional study was used; the study makes use of data from the Kenya Demographic and Health Survey, 2,427 women who had given birth in the five years preceding the survey. Findings revealed, maternal education, antenatal care visits, and knowledge about TT were significant predictors of sufficient TT immunization. The study relied on self-reported data which may be subject to recall bias[198].

In a study; "Immunization coverage of pregnant women with tetanus toxoid in Dormaa East District – Brong Adara Region, Ghana". The study aimed to determine the coverage of tetanus toxoid (TT) immunization among pregnant women in Ghana's Dormaa East District. The study found that only 56% of pregnant women received at least two doses of TT vaccine during their last pregnancy. Cross-sectional study using data from a survey conducted in the Dormaa East District, with a sample size of 400 pregnant women. Findings revealed that only 56% of pregnant women received at least two doses of TT

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vaccine during their last pregnancy. Limitation of the study is that the sample size was relatively small and may not be representative of the entire population[199].

In a study that aimed to assess the knowledge, beliefs, and practices regarding tetanus toxoid (TT) immunization among nursing mothers in Benue State, Nigeria. The study found that the majority of nursing mothers had good knowledge about TT immunization but there were gaps in their understanding of the number of doses required and the timing of vaccination. Cross-sectional study using a structured questionnaire was used as the methodology, with a sample size of 400 nursing mothers. Findings revealed that majority of the nursing mothers had good knowledge, beliefs, and practices tetanus toxoid (TT) immunization[200].

A scholar conducted a study in Kenya to identify the determinants of utilization of sufficient tetanus toxoid immunization during pregnancy. The study used data from the Kenya Demographic and Health Survey, 2008-2009 and found that maternal education, antenatal care visits, and place of residence were significant predictors of tetanus toxoid immunization coverage. A researcher conducted a cross-sectional study in Ghana to determine the immunization coverage of pregnant women with tetanus toxoid in Dormaa East District - Brong Adara Region. The study found that only 56% of pregnant women received at least two doses of tetanus toxoid vaccine during pregnancy. In another study, this aimed to assess the knowledge, beliefs, and practices regarding tetanus toxoid immunization among nursing mothers in Benue State. The study found that only 38% of nursing mothers had received at least two doses of tetanus toxoid vaccine during pregnancy[201]. The studies suggest that there are significant gaps in tetanus toxoid immunization coverage among pregnant women in low-income settings such as Kenya,

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Ghana, and Nigeria. Barriers to vaccination include lack of education, inadequate antenatal care visits, and poor knowledge about the benefits of vaccination. However, there are some limitations to these studies such as small sample sizes or reliance on self-reported data which may be subject to recall bias or social desirability bias. Additionally, there is a need for more research on the specific barriers and facilitators to vaccination among different subgroups of pregnant women such as those living in rural areas or those with low levels of education[201].

A scholar conducted a study in Pakistan to assess the coverage and factors associated with tetanus toxoid immunization among pregnant women. The study found that only 47% of pregnant women had received at least two doses of tetanus toxoid vaccine during pregnancy, and identified lack of awareness, poor access to health services, and low socioeconomic status as barriers to vaccination. In another study conducted in Bangladesh to evaluate the effectiveness of a community-based intervention to improve tetanus toxoid immunization coverage among pregnant women. The intervention included community mobilization, health education, and provision of free vaccines. The study found that the intervention significantly increased tetanus toxoid immunization coverage from 44% to 84%[202].

A researcher conducted a study in India to assess the knowledge, attitudes, and practices regarding tetanus toxoid immunization among pregnant women and healthcare providers. The study found that while most healthcare providers had good knowledge about the benefits of vaccination, many pregnant women had misconceptions or fears about the safety of vaccines during pregnancy. The study used a qualitative research design to explore the barriers and facilitators to timely birth-dose vaccination in Kinshasa Province

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of the Democratic Republic of Congo (DRC). The researchers conducted 36 in-depth interviews with mothers who had given birth within the past year and 12 focus group discussions with community members and health workers. One of the strengths of this study is that it provides an in-depth understanding of the factors that influence timely birth-dose vaccination in a low-income setting like Kinshasa Province. The use of qualitative methods allowed for rich data collection and analysis that captured the perspectives of different stakeholders. One potential weakness is that the sample size was relatively small, which may limit generalisability to other settings. Additionally, there may have been some social desirability bias in participants' responses since they were aware that they were being interviewed about their vaccination practices. The study found several barriers to timely birth-dose vaccination including lack of knowledge about vaccines and their importance, financial constraints, long waiting times at health facilities, and inadequate communication from health workers. Facilitators included community mobilization efforts and support from family members. One limitation is that the study did not explore other potential factors such as cultural beliefs or religious practices that may influence vaccine uptake. Additionally, since this was a qualitative study design it cannot establish causality between variables. One potential gap is that the study did not explore the perspectives of fathers or male partners, who may play an important role in decision-making around vaccination. Additionally, the study did not explore potential solutions to address the identified barriers to vaccination[203].

In a study, "Barriers to tetanus toxoid vaccination uptake among pregnant women in rural Nigeria", the study used a cross-sectional design to investigate the barriers to tetanus toxoid vaccination uptake among pregnant women in rural Nigeria. Data were collected using a structured questionnaire from 400 pregnant women attending antenatal clinics,

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with a sample size of 400 pregnant women. The study found that the main barriers to tetanus toxoid vaccination uptake were lack of awareness about the vaccine, fear of side effects, and distance to health facilities. The study was limited by its cross-sectional design, which cannot establish causality between variables[204].

In a study, "Factors associated with tetanus toxoid immunization status among pregnant women in Ethiopia", the study used a cross-sectional design to investigate the factors associated with tetanus toxoid immunization status among pregnant women in Ethiopia. Data were collected using a structured questionnaire from 422 pregnant women attending antenatal clinics, with a sample size of 422 pregnant women, findings of the study found that factors associated with tetanus toxoid immunization status included maternal education level, knowledge about the vaccine, and access to health facilities. The study was limited by its cross-sectional design and potential for recall bias[205].

In a study, "Tetanus Toxoid Immunization Coverage and Associated Factors among Pregnant women Attending Antenatal Care (ANC) in Mizan-Aman General Hospital, Southwest Ethiopia". The study used a cross-sectional design to investigate the tetanus toxoid immunization coverage and associated factors among pregnant women attending antenatal care in Mizan-Aman General Hospital, Southwest Ethiopia. Data were collected using a structured questionnaire from 422 pregnant women. The study found that the tetanus toxoid immunization coverage among pregnant women was 89.8%. Factors associated with tetanus toxoid immunization coverage included maternal education level, knowledge about the vaccine, and number of antenatal care visits. The study was limited by its cross-sectional design and potential for recall bias[206].

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In a study; "Barriers to tetanus toxoid immunization among pregnant women in rural India: a qualitative study", the study used a qualitative design to investigate the barriers to tetanus toxoid immunization among pregnant women in rural India. Data were collected through in-depth interviews with 30 pregnant women and 10 healthcare providers, the sample size consist of 30 pregnant women and 10 healthcare providers. The study found that the main barriers to tetanus toxoid immunization were lack of awareness about the vaccine, fear of side effects, and lack of trust in healthcare providers. The study was limited by its small sample size and potential for selection bias. The study highlight some common barriers to tetanus toxoid immunization among pregnant women such as lack of awareness about the vaccine, fear of side effects, and distance to health facilities. They also identify factors associated with higher immunization coverage such as maternal education level, knowledge about the vaccine, and access to health facilities. However, there are still gaps in the literature regarding effective interventions to increase tetanus toxoid immunization coverage among pregnant women in low-resource settings. Future research should focus on developing and evaluating interventions that address these barriers and improve access to vaccination services for pregnant women[207].

In an article titled "A facility-based survey of maternal anti-tetanus vaccination schedule completion in a Nigerian university community" was published in the Annals of Health Research. The study aimed to determine maternal anti-tetanus vaccination schedule completion rates and the reasons for non-completion of the schedule among Nigerian antenatal clinic attendees using an interviewee-administered questionnaire. The study was a cross-sectional survey conducted among antenatal clinic attendees at Babcock University Teaching Hospital in Nigeria. The study used an interviewee-administered questionnaire to collect data on maternal anti-tetanus vaccination schedule completion

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rates and the reasons for non-completion. The study included 260 pregnant women who were attending antenatal clinics at the hospital during the study period. The strength of this study is that it provides important insights into the challenges faced by pregnant women in completing their tetanus toxoid (TT) vaccination schedules in Nigeria. The study also highlights the need for improved communication strategies between healthcare providers and pregnant women to increase vaccine coverage. One weakness of this study is that it was conducted at a single hospital in Nigeria, which may limit its generalizability to other settings. Additionally, the study relied on self-reported data from pregnant women, which may be subject to recall bias or social desirability bias. The study found that only 38.5% of pregnant women completed the recommended TT vaccination schedule. Lack of awareness about the importance of TT vaccination and poor communication between healthcare providers and pregnant women were identified as major reasons for non-completion. The authors suggest that improving communication strategies could increase TT vaccination coverage and reduce maternal and neonatal tetanus in Nigeria[208].

Overall, this study provides important insights into the challenges faced by pregnant women in completing their TT vaccination schedules in Nigeria, and highlights the need for improved communication strategies to increase vaccine coverage. However, further research is needed to confirm these findings and to identify effective communication strategies that can be implemented in other settings[208].

2.4 Conceptual Framework (Model)

This study utilizes the Mosley and Chen (1984) model as a guiding framework for understanding the elements of child survival in developing countries. The model proposes

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that socioeconomic determinants of child mortality operate through intermediate variables or common biological pathways that ultimately influence mortality outcomes. For this study, a modified version of the Mosley and Chen framework was adopted, focusing only on the variables and constructs relevant to the research objectives.

The conceptual framework (Figure 2.1) depicts three categories of independent variables: community factors, socioeconomic factors, and proximate factors. According to the framework, child mortality is not solely attributed to isolated occurrences of diseases but rather a cumulative effect of various processes influenced by community, socioeconomic, and proximate factors.

In this study, particular emphasis is placed on the relationships between selected proximate factors and neonatal mortality, as shown in Figure 2.2. The selected proximate factors include the frequency of antenatal visits to healthcare facilities, the number of tetanus toxoid injections received during pregnancy, the place of delivery, and cord care practices during delivery. Neonatal mortality serves as the dependent variable, indicating the outcome of interest.

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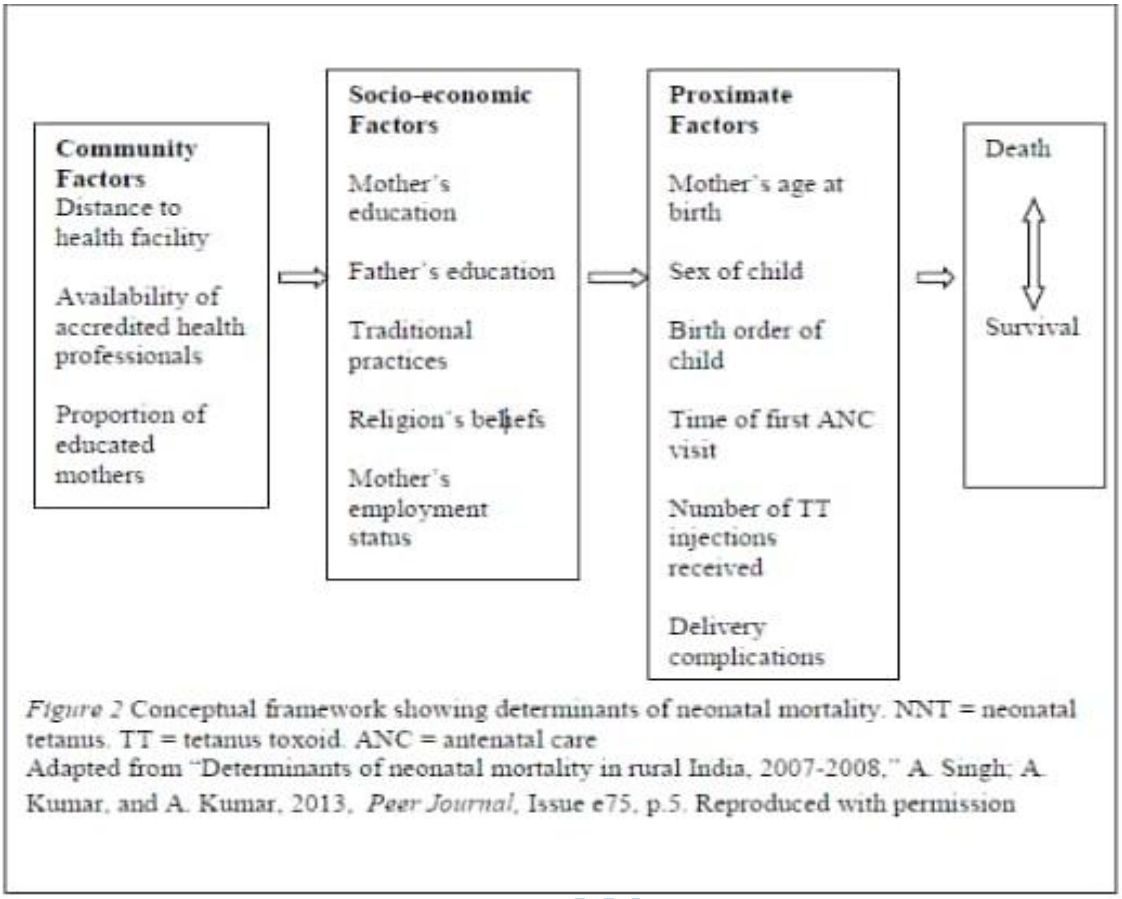

Figure 2 Conceptual framework showing determinants of neonatal mortality. NNT = neonatal tetanus. TT = tetanus toxoid. ANC = antenatal care
Adapted from "Determinants of neonatal mortality in rural India, 2007-2008," A. Singh; A. Kumar, and A. Kumar, 2013, *Peer Journal*, Issue e75, p.5. Reproduced with permission

Figure 2.1: Conceptual framework showing determinants of neonatal mortality. NNT = neonatal tetanus. TT = tetanus toxoid. ANC = antenatal care.thatb

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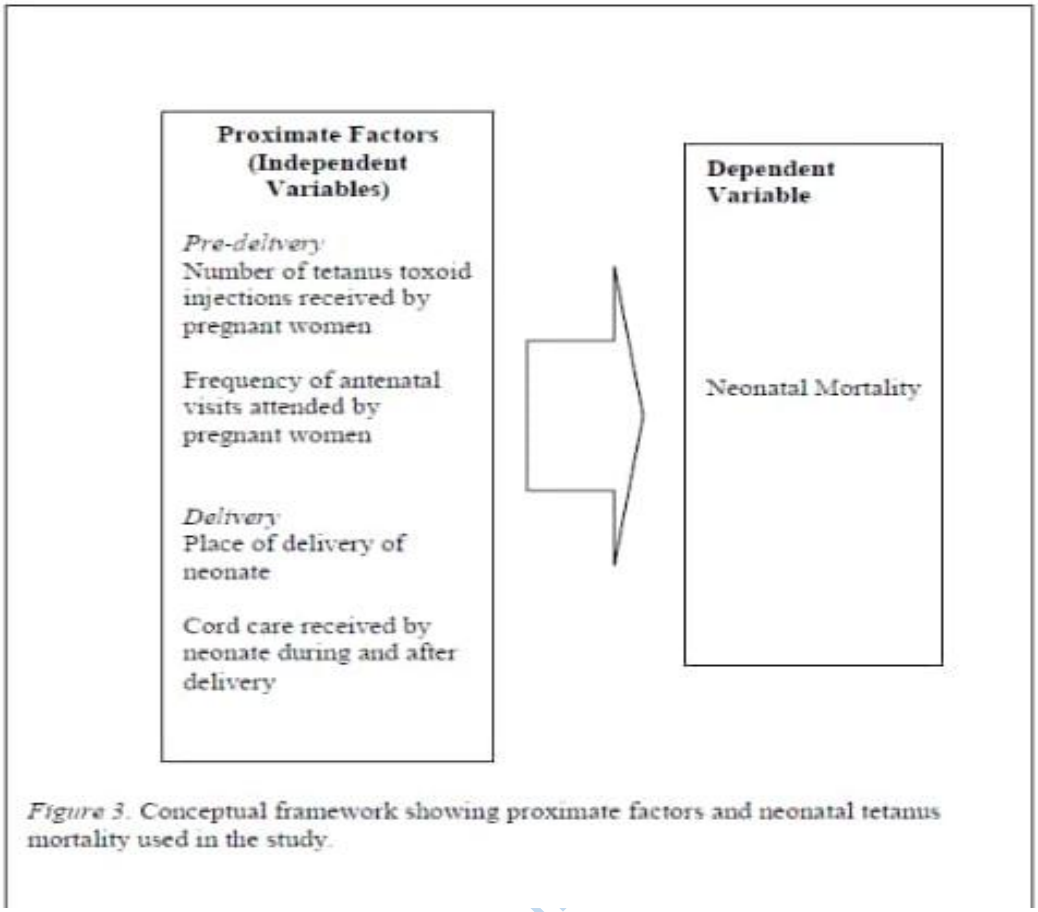

Figure 3. Conceptual framework showing proximate factors and neonatal tetanus mortality used in the study.

Figure 2.2: Conceptual Framework showing Proximate Factors and Neonatal Tetanus Mortality used in the Study[209].

This study was guided by the framework proposed by a scholar for examining child survival. The framework emphasizes the influence of socioeconomic and cultural factors, which operate through intermediate factors known as proximate factors, on child mortality[210]. Mosley and Chen developed this framework to integrate socioeconomic and cultural variables with disease processes in understanding child health[211].

Socioeconomic factors encompass various aspects such as parental marital and employment status, parental education, race, place of residence, and beliefs, among others. These factors contribute to the overall context within which child mortality occurs. On the

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other hand, proximate factors are the immediate determinants that are directly linked to the occurrence of the outcome.

In accordance with Mosley and Chen's framework, five classes of proximate factors have been identified, as depicted in Table 2[212]. These proximate factors represent the specific events or conditions that are most closely associated with child mortality.

Overall, the utilization of the Mosley and Chen framework in this study allows for a comprehensive understanding of the interplay between socioeconomic, cultural, and proximate factors in influencing child survival. By examining the relationships among these variables, the study aims to shed light on the complex mechanisms underlying child mortality and identify potential areas for intervention and improvement.

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Table 2

Mosley and Chen's Classification of Proximate Factors

Category	Sub-category	Examples
Environmental Pollution	Air	Climate change
	Water	Industrial & sewage leaks
	Soil	Oil spills & waste dumps
Malnutrition	Micronutrients	Vitamin deficiency
	Macronutrients	Protein Energy Malnutrition
Injury	Intentional	Sexual Assault, Suicide
	Unintentional	RTA, Burns, Drowning
Self-illness control measures	Preventive	Healthy eating & Exercise
	Curative	Health care services
Maternal	Pre-delivery	Maternal immunization status
	Delivery	Place of delivery, Cord care
	Post-delivery	Child immunization

Figure 2.3: Mosely and Chen's classification of proximate factors

Note: RTA = road traffic accident

Source[213]

The concept of modeling proximate factors of child survival was initially introduced by Davis and Blake in 1956 when they conducted a study to assess the influence of intermediate variables on fertility levels within a community[214]. They categorized the proximate determinants of fertility into three groups: factors affecting conception before intercourse, factors affecting conception after intercourse, and factors affecting live birth following conception. Over time, the Mosley and Chen framework has proven valuable for researchers in identifying socioeconomic, cultural, and physiological determinants of child morbidity and mortality[215].

In contrast to the modeling of proximate factors, other child survival models have been developed by scholars, which focus solely on the fundamental determinants of child morbidity and mortality, such as sanitation, nutritional status, socioeconomic status, and health inequality[216]. A scholar developed a framework based on the roles of biological factors in child mortality. However, this model does not incorporate socioeconomic factors and disease processes, as it primarily focuses on the classical model of infectious diseases. Meegama's model investigates a broad range of determinants of child death, including modes of transmission (such as water, air, and food) and causes of exposure[217]. Meegama's study conducted in Bangladesh attributed the significant reduction in child mortality from 30 per 1000 live births to 18 per 1000 live births in 1920 to the implementation of public health programs that led to a decrease in child malnutrition and diarrheal diseases caused by contaminated water[218].

2.5 Summary of Gaps in Literature Reviewed

The literature review has revealed several gaps in the existing research on Tetanus toxoid immunization among pregnant women, particularly in terms of coverage, barriers, and

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facilitators. These gaps indicate areas where limited research, conflicting findings, or unanswered questions exist, highlighting the need for further investigation. The significance of these gaps lies in the potential to improve maternal and neonatal health outcomes by addressing key challenges and promoting effective immunization strategies.

One notable gap is the limited research on the coverage of Tetanus toxoid immunization among pregnant women in specific regions or populations. While some studies have assessed immunization coverage at a global or national level, there is a lack of granular data that examines coverage rates in specific subpopulations, such as women in rural areas or marginalized communities. Understanding the disparities in coverage within different populations is crucial for developing targeted interventions and ensuring equitable access to immunization services.

Additionally, conflicting findings have been identified regarding the barriers and facilitators of Tetanus toxoid immunization. Some studies have identified factors such as lack of awareness, misconceptions, and cultural beliefs as barriers to immunization uptake, while others have highlighted the importance of factors such as maternal education, socio-economic status, and access to healthcare services as facilitators. These inconsistencies emphasize the need for further research to provide a more comprehensive and nuanced understanding of the complex factors influencing Tetanus toxoid immunization among pregnant women. By addressing these gaps, future studies can inform the development of context-specific strategies that effectively address barriers and enhance facilitators to improve immunization rates.

Moreover, several unanswered questions remain regarding the optimal timing, frequency, and delivery strategies for Tetanus toxoid immunization during pregnancy. While the

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current standard is to administer a primary series of three doses, the optimal timing and intervals between doses have not been definitively established. Furthermore, the most effective approaches for delivering immunization services to pregnant women, such as through antenatal care visits or community-based outreach programs, require further investigation. By filling these gaps in knowledge, research can inform evidence-based recommendations and guidelines for optimizing Tetanus toxoid immunization during pregnancy.

Overall, this research aims to contribute to filling these gaps in the literature by providing a comprehensive assessment of the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women. Through a rigorous examination of these factors, this study seeks to generate insights that can inform targeted interventions, improve immunization rates, and ultimately enhance maternal and neonatal health outcomes. By addressing these gaps, this research will contribute to the broader goal of eliminating maternal and neonatal tetanus and improving immunization practices among pregnant women.

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Chapter Three

Methodology

3.1 Study Design

The study design for this study is quantitative. Semi structure questionnaire was administered to pregnant women within the selected community over the three months data collection period.

Eligibility Criteria

- Women of child bearing age who have at least one pregnancy.
- Last pregnancy should not be more than two years to prevent recall bias.
- Must have been living in Ogun state within the last five years or since the last pregnancy.

Exclusion Criteria

- Those who do not consent.
- Those seriously sick.

3.2 Population of the Study

The population for this study are pregnant women, who has had one or more pregnancy in the last 2 years in the selected community across Ogun state.

Study Area

Ogun State is a state in southwestern Nigeria. As a Nigerian state, Ogun is the second most industrialized state after Lagos, with a focus on metal processing. It has good road and rail connections to the harbors in Lagos and Lekki. It is one of the richest and most

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developed areas in Nigeria and has one of the lowest incidences of extreme poverty (around 5% of the population against a national average of 31%) according to World Bank data from 2018. Nicknamed the "Gateway to Nigeria", the state is notable for having a high concentration of industrial Estates and being a major manufacturing hub in Nigeria.

Abeokuta is both Ogun State's capital and most populous city; other popular cities in the state include Ijebu-Ode, the capital of the Ijebu Kingdom, and Sagamu, Nigeria's leading kola nut grower. Ogun state is covered predominantly by rain forest and has wooden savanna in the northwest. Ogun State had a total population of 3,751,140 residents as of 2006, making Ogun State the 16th most populated state in Nigeria. In terms of landmass, Ogun State is the 24th largest State in Nigeria with land area of 16,762-kilometer square.

Ogun State is predominantly Yoruba, with the Yoruba language serving as the lingua franca of the state. The dominant religions in Ogun State are Islam and Christianity although a certain amount of traditional religion is still practiced. Ogun State is noted for being the almost exclusive site of Ofada rice production.

Ogun State is divided into three senatorial districts, and characterized by different local government areas and communities. The population of pregnant women in this study came from one local government each in the three (3) senatorial districts. The selected local governments for this study are; Ipokia local government from Ogun West Senatorial District, Obafemi Owode local government from Ogun Central Senatorial District, and Ijebu North local government from Ogun East Senatorial District. The L.G.As is both rural and urban settings. The Local Government Area are both rural and urban settings.

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3.3 Sample and Sampling Techniques

A multistage stratified sampling technique was used to select the study participants. In the three senatorial districts in Ogun state, which are Ogun Central Senatorial District, Ogun West Senatorial District, and Ogun East Senatorial District, one local government were selected.

- At the first stage:

  A simple random sampling was used to select one local government out of 6 local governments in Ogun Central Senatorial District, one local government out of the 5 local governments in Ogun West Senatorial District and one local government was also selected out of 9 local governments in Ogun east senatorial district.

- At stage two: Ward level

  Each local government was stratified into rural and urban by ward, from each local government a simple random sampling was used to select two wards each from rural and urban.

- At stage three:

  Eligible household was selected using systematic sampling technique.

- At the stage three:

  A purposive sampling was used to select the pregnant women from each wards selected.

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Ogun State

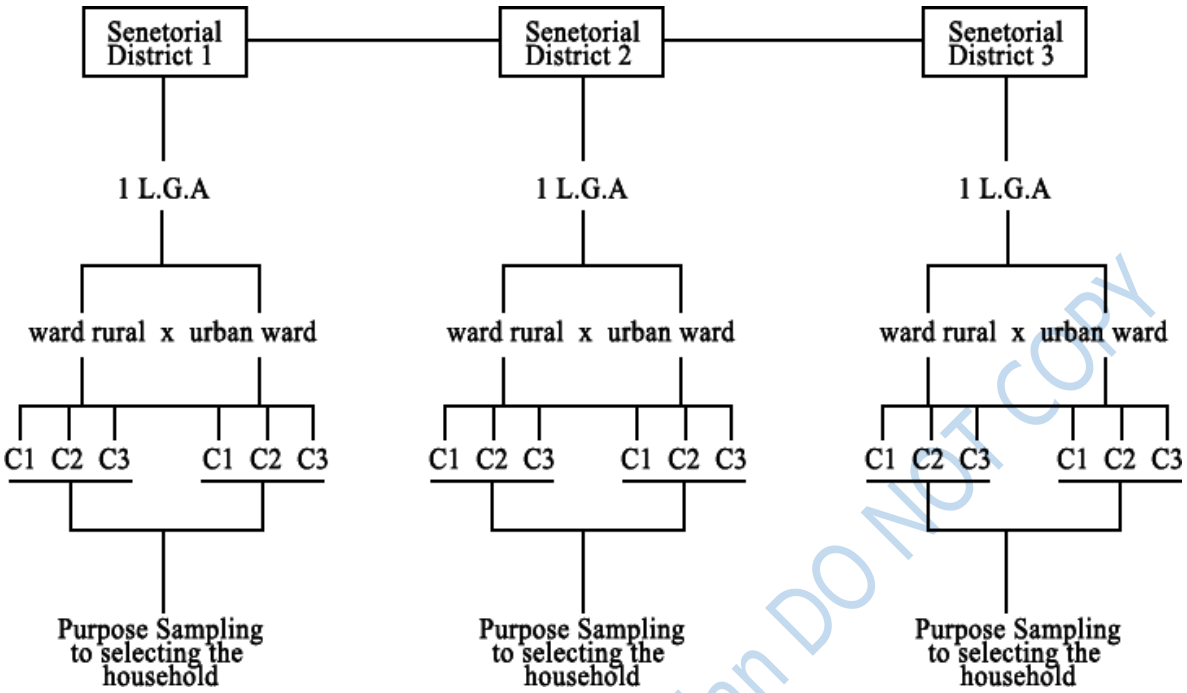

Figure 3.1: Population of the Study

Source[1]

Based on the population of the three local government selected, 36% of the participant came from Obafemi Owode local government area, that is (365), 42% from Ijebu north (425 respondents) and 22% from Ipokia Local Government (223 respondents).

Sample Size Calculation

The prevalence of tetanus toxoid immunization among pregnant women in Nigeria was used to calculate the sample size for this study using Leslie Fisher's Calculation.

$$n = \frac{Z^2Pq}{d^2}$$

Where;

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Z = number of deviation (95% confidence interval = 1.96)

P = proportion of population exhibiting a defined quality (P = 1-q, at maximum variability = 0.5)

q = 0.5

d = degree of accuracy (at 95% C.I = 0.03)

P = 69% = 0.69 (Vaccine 2023)

q = 1-P = 0.69

= 0.31

$$n = \frac{(1.96)^2 \times 0.69 \times (1 - 0.69)}{0.03^2}$$

$$n = \frac{3.8416 \times 0.69 \times 0.31}{0.0009}$$

= 913

Calculating for non- response

1

1-f

f = non response of 10%

1

(1-0.1)

= 1.111

= 1.111 x 913

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n = 1014.4

n = 1014

3.4 Description of the Research Instrument

The research instrument used in this study was a semi-structure questionnaire. Quantitative data was used to collect data.

Semi structured questionnaire was used to gather information from the respondents. The eligible women was interviewed to gather information on;

Section A: Socio-demographic Characteristics

Section B: Tetanus Toxoid Immunization Coverage

Section C: Knowledge and Awareness

Section D: Perception of Tetanus Toxoid Immunization

Section E: Community Support

Section F: Accessibility of Healthcare Services

3.5 Validity and Reliability of the Research Instrument

The questionnaire was adapted from similar studies. However, this was pretested before the study commences.

3.6 Method of Data Collection

Research assistants who are bilingual in English and Yoruba was engaged in data collection. The data collection procedures involved approaching participants, obtaining informed consent, and administering the research instruments to gather the necessary data

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on Tetanus toxoid immunization coverage, barriers, and facilitators among pregnant women in Ogun State. The following steps were followed:

Participants were approached at community settings in Ogun State. The purpose of the study was explained to them, emphasizing the voluntary nature of their participation. Informed consent was obtained from each participant before their inclusion in the study. A consent form was provided that outlines the purpose of the study, the procedures involved, potential risks and benefits, confidentiality measures, and their rights as participants. Participants have the opportunity to ask questions and clarify any concerns before providing their written consent. The selected research instruments, such as questionnaires or interview guides, was administered to the participants. The instruments were administered in a private and comfortable setting to ensure confidentiality and encourage honest responses.

Ethical considerations were strictly adhered to throughout the data collection process. The study obtained ethical approval from the relevant institutional review board or ethics committee. Participants' privacy and confidentiality was protected by assigning unique identifiers to each participant and ensuring that collected data is stored securely. Any personal identifiers were removed or anonymized during data analysis and reporting. Measures were taken to ensure the protection and confidentiality of the collected data.

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Variables

Explanatory variables

Educational Level

The definition of this variable is the total amount of time that the pregnant women spent attending educational institutions to earn a formally recognized degree. The first group, 0 represent no education; the second group, 1 represent primary education; the third group, 2 represent secondary educations and the last group represent the tertiary education.

Religion

This is a reference to the particular religious practice that the woman upholds in her life. These individuals have been placed into the categories of 0= Christianity, 1= Islam, 2= Traditional and 3= Other religion.

Ethnicity

This is a reference to the particular ethnic group that the pregnant women are from. The individuals have been placed into the categories of 0= Igbo, 1= Hausa, 2= Yoruba, 3= others

Age

This is the age of the respondent stated in the number of years that have passed as of the date of the interview. In this investigation, age was left as open ended.

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Marital Status

The variable serves as an indicator of whether or not the respondent is in any type of relationship or single. It is characterized as 0= Single, 1= Married, 2= Separated and 3= Widowed.

Place of residence

The variable serves as an indicator of the place where the pregnant women is living in the community. It is characterized as 0= Rural and 1= Urban.

Partner's Age

This shows the age of the partner to know the gap shared. The years are left open-ended.

Occupation

This variable serves as an indicator of whether or not the respondent is gainfully employed and it is left open ended.

3.7 Method of Data Analysis

Statistical package for Social Sciences (SPSS), version 26 waS used to enter and analyze the data collected.

Quantitative data collected was entered into the computer and analyzed using Statistical Package for social sciences (SPSS) version 26. Frequency and percentages were presented as table and charts.

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Logistic Regression Analysis was used to assess and identify the factors associated with uptake of tetanus toxoid immunization among pregnant women in Ogun State. A P-value of 0.05 was considered statistically significant at 95% Confidence Interval (CI).

Table 3.1: Analysis Plan

No.	Objectives	Variables	Analysis Plan	Statistical Test
1.	To determine the current coverage level of Tetanus Toxoid Immunization	i. TT immunization received during current pregnancy. ii. TT immunization receives during previous pregnancy. iii. How many doses of TT vaccine received	i. Frequency and Proportion ii. Frequency and Proportion iii. Frequency and Proportion	
2.	To identify the barriers and challenges faced by pregnant women in accessing tetanus toxoid immunization	i. Reasons why you have not received tetanus toxoid immunization ii. Challenges or obstacles faced in accessing tetanus toxoid immunization services iii. Awareness of the recommended schedule for TT immunization iv. Do you face any financial constraints in receiving tetanus toxoid immunization	i. Frequency and Proportion ii. Frequency and Proportion iii. Frequency and Proportion iv. Frequency and Proportion	
3.	Explore the facilitators that promote TT immunization uptake among pregnant women	i. Factors that influenced your decision to receive TT immunization ii. Information about tetanus toxoid	i. Frequency and proportion ii. Frequency and proportion	

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		provided during antenatal care visit		
		iii. Did healthcare providers play a role in encouraging or facilitating TT immunization	iii. Frequency and proportion	
4.	Assessing knowledge and attitude	i. Benefit of tetanus toxoid immunization for pregnant women	i. Frequency and proportion	
		ii. Recommended timing for receiving the first dose of tetanus toxoid immunization	ii. Frequency and proportion	
		iii. Number of additional booster recommended for tetanus toxoid immunization	ii. Frequency and proportion	
5.	Factors associated with uptake of tetanus toxoid immunization	**Dependent Variable** i. Intake of tetanus toxoid immunization **Independent Variables** i. Age ii. Marital status iii. Educational level iv. Religion v. Ethnicity vi. Knowledge vii. Attitude viii. Place of previous birth ix. Income Status x. Place of Residence		
6	Identify factors influencing uptake of tetanus toxoid immunization among	**Dependent Variable** i. Intake of tetanus toxoid immunization	Logistic Regression was used to achieve	Regression

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pregnant women	**Independent Variables** i. Age ii. Marital status iii. Educational level iv. Religion v. Ethnicity vi. Knowledge vii. Attitude viii. Place of previous birth ix. Income Status x. Place of Residence	this objective

Source: Researcher's Compilation, 2024

3.8 Ethical Consideration

Ethical approval for this study was obtained from the University Research Ethics Committee (HREC) of Lead City University, Ibadan and Ogun State Ministry of Health Department of Planning Research & Statistics Division. Official permission was obtained from each of the Local Government selected and head of each community included in this study. An information statement was provided to all participants prior to obtaining informed verbal consent. To ensure verbal consent from participants, the information statement was read in the local language, Yoruba. The study contained women who had formal education and women with no formal education, so informed verbal consent was more appropriate. Before administering the questionnaire and collecting the measurement, informed consent was sought from the respondents. It was optional to participate. Respondents had option to leave the study whenever they want.

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Chapter Four

Results and Discussion of Findings

This section provides an in-depth examination of the data gathered from respondents regarding the coverage, barriers, facilitators, knowledge, attitudes, and influencing factors related to Tetanus toxoid immunization among pregnant women in Ogun State. It presents a structured analysis aimed at addressing the key objectives of the study, which include determining the current coverage of Tetanus toxoid immunization, identifying challenges and facilitators, and exploring knowledge and perceptions surrounding the immunization process.

The analysis is divided into subsections, beginning with the demographic characteristics of the respondents, which will set the context for understanding the data. This demographic profile includes variables such as age, marital status, educational level, and occupation, all of which play a significant role in shaping immunization behaviors and access.

Subsequent sections delved into each specific research objective, offering a detailed interpretation of findings related to the coverage rate of Tetanus toxoid immunization, the barriers women encounter in accessing the vaccine, and the facilitators that promote uptake. Further analysis will focus on the level of knowledge and awareness among women regarding Tetanus toxoid immunization, their perceptions of its importance, and the factors that influence their decision to receive or not receive the vaccine.

The section also highlights the role of healthcare providers, community support, and accessibility of healthcare services, all of which are essential in understanding the overall

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landscape of Tetanus toxoid immunization in Ogun State. Through a careful examination of the data, this section will uncover patterns, trends, and insights that are critical to improving the uptake of Tetanus toxoid immunization and addressing the challenges faced by women in this context.

Each subsection is structured to align closely with the research questions and objectives, ensuring a comprehensive and cohesive interpretation of the data in relation to the study's goals. The findings will not only shed light on the current state of Tetanus toxoid immunization in Ogun State but will also provide evidence-based insights to inform policy recommendations and interventions aimed at increasing coverage and improving maternal and neonatal health outcomes.

4.1 Demographic Data Analysis

4.1.1 Bio-Data of Respondents

In this section, the bio-data of respondents is analyzed to provide a comprehensive understanding of their demographic and socioeconomic characteristics. Descriptive analysis methods, including the use of measures such as minimum, maximum, range, variance, frequency, percentage, mean, and standard deviation, were employed to present a detailed profile of the respondents.

The variables covered include age, marital status, educational level, religion, occupation status, ethnicity, reproductive history, and partner-related data. Each variable's analysis aims to provide insights into the distribution and variability of the respondents' characteristics.

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For example, marital status, being a categorical variable, was explored through frequency and percentage distributions to understand the prevalence of different marital categories among respondents. Similarly, variables like educational level, occupation status, religion and ethnicity were also explored using frequency distributions and percentages to depict the educational attainment, employment types, religion and ethnic backgrounds of respondents.

Descriptive statistics such as minimum, maximum, mean, variance and range were applied to variables like age, number of previous pregnancies, number of life birth, age at first pregnancy, age at first childbirth and partner's age to examine the central tendencies, spread and variability within these continuous data points.

Reproductive health variables such as place of residence, place of previous childbirth, antenatal visit history and income status were further analyzed based on their relevance, offering both a descriptive narrative and numerical breakdown.

The analysis in this section aims to offer a well-rounded profile of the respondents, illustrating key demographic patterns and identifying relationships between the bio-data variables that may impact the broader research findings. This approach will enable a clearer understanding of the respondents' backgrounds, which is vital for interpreting subsequent sections of the study.

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4.1.1.1 Respondents' Demography: Respondents' and Partners' Key Demographic Variables

This section presents a detailed analysis of the demographic characteristics of the study respondents, focusing on their marital status, educational level, religious affiliation,

employment status, ethnic background, and partner-related variables such as education, occupation, and income. Descriptive statistical measures such as frequency and percentage were employed to provide insights into the profile of respondents, with selected variables analyzed. The purpose of this demographic analysis is to contextualize the findings of the study by understanding the socio-economic and cultural background of the women under study and their partners. This understanding is critical in identifying factors influencing Tetanus toxoid immunization coverage and uptake among pregnant women in Ogun State.

Table 4.1: Summary of Marital Status, Education, Religion, Employment, and Partner Information

Variables	**(n=1,013)**	**%**
Marital Status		
Single	60	5.9
Married	886	87.5
Divorced	30	3.0
Widowed	4	0.4
Separated	33	3.3
Total	**1,013**	**100.0**
Respondent's Education		
Primary Education	187	18.5
Secondary Education	205	20.2
Higher/Tertiary Education	347	34.3
None	274	27.0
Total	**1,013**	**100.0**
Religious Affiliation		
Christianity	465	45.9
Islam	450	44.4
Traditional	89	8.8

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Others	9	0.9
Total	**1,013**	**100.0**
Employment Status		
Skilled	690	68.1
Unskilled	216	21.3
Unemployed	31	3.1
Housewife	76	7.5
Total	**1,013**	**100.0**
Ethnic Group		
Igbo	110	10.9
Hausa	95	9.4
Yoruba	686	67.7
Others	122	12.0
Total	**1,013**	**100.0**
Partner's Education		
Primary Education	99	9.8
Secondary Education	210	20.7
OND/NCE	46	4.5
HND/BSc.	350	34.6
MSC	2	0.2
None	306	30.2
Total	**1,013**	**100.0**
Partner's Occupation		
Unskilled	747	74.7
Skilled/Artisan	69	6.8
Civil Servant	47	4.6
Cleric	3	0.3
Professional	76	7.5
None	71	7.0
Total	**1,013**	**100.0**

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Partner's Monthly Income		
0 - 50,000	284	28.0
50,001 - 100,000	116	11.5
100,001 - 150,000	37	3.7
150,001 - 200,000	33	3.3
More than 200,000	112	11.1
None	431	42.5
Total	**1,013**	**100.0**

Field Result, 2024

The analysis of the respondents' demographic data, as shown in table 4.1, reveals several important patterns. Marital status shows that the vast majority (87.5%) of respondents are married, with only 5.9% being single, suggesting that family context may significantly influence health-related decisions like immunization uptake. A similar trend is reflected in the educational level, where 34.3% of respondents have attained higher/tertiary education, but a notable 27% reported no formal education, which may present a barrier to accessing health services like Tetanus toxoid immunization.

In terms of religious affiliation, the respondents are predominantly Christian (45.9%) and Muslim (44.4%), reflecting the major religious groups in the region. This is a potential factor for understanding cultural or religious influences on immunization uptake. Employment status shows that a large portion (68.1%) of respondents are skilled workers, which could be associated with better access to healthcare, while 21.3% are unskilled, and 3.1% are unemployed.

The ethnic composition shows that the majority (67.7%) are Yoruba, which aligns with the geographic context of Ogun State. However, the inclusion of other ethnicities like Igbo (10.9%) and Hausa (9.4%) highlights the diversity in the population.

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Looking at the respondents' partners, partner's education level is a significant factor, with 34.6% having attained HND/BSc degrees, although a substantial 30.2% reported no formal education. This disparity in educational attainment could have implications for household health decisions. In terms of partner's occupation, 74.7% of partners are unskilled, and the income analysis shows that 28% earn below ₦50,000 per month, while a striking 42.5% reported no income. These economic factors are likely to influence healthcare access and affordability, key considerations in the study's objectives to understand barriers to Tetanus toxoid immunization.

These demographic insights are crucial for addressing the study's objectives, as they highlight the socio-economic and cultural factors that potentially influence immunization uptake, and they will inform targeted interventions to improve Tetanus toxoid immunization coverage among pregnant women in Ogun State.

4.1.1.2 Respondents' Demography: Age, Pregnancy History, and Partner's Age

In this section, a detailed analysis of selected demographic variables, including respondent age, ethnicity, pregnancy history, and partner's age, was conducted to provide insights into the reproductive and demographic characteristics of the respondents. Descriptive statistics such as range, minimum, maximum, mean, and variance were employed to summarize key variables like the number of previous pregnancies, the number of live births, age at first pregnancy, and partner's age. These statistical measures offer a comprehensive overview of the respondent profile and enable a deeper understanding of their reproductive experiences, which directly connects to the study's objective of understanding factors influencing Tetanus toxoid immunization uptake.

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Table 4.2: Descriptive Summary of Respondent and Partner Age, Pregnancy History, and Birth Details

Variables	Mean (Variance)	Min (Max)	Range
Respondent Age	33.45 (59.27)	18 (68)	50
Number of previous pregnancy	2.51 (1.68)	1 (9)	8
Number of life birth	2.31 (1.49)	0 (9)	9
Age at First Pregnancy	25.97 (44.29)	15 (45)	30
Age at First Childbirth	26.75 (46.04)	15 (46)	31
Partner's Age	37.46 (64.53)	18 (70)	52
N			1,013

Field Result, 2024

As displayed in table 4.2, the age of respondents ranged from 18 to 68 years, with a mean age of 33.45 years and a variance of 59.27, indicating a moderate spread of age within the sample. The respondents reported between 1 to 9 previous pregnancies, with an average of 2.51 pregnancies (variance: 1.68), suggesting that the sample mostly comprised women with a moderate number of pregnancies.

The number of live births recorded varied from 0 to 9, with an average of 2.31 (variance: 1.49), implying that many respondents had experienced multiple childbirths. Additionally, the age at first pregnancy ranged from 15 to 45 years, with a mean of 25.97 years (variance: 44.29), while the age at first childbirth was slightly higher, with a mean of 26.75 years and a variance of 46.04.

Regarding the partners, their ages ranged from 18 to 70 years, with an average age of 37.46 years (variance: 64.53). This suggests that the majority of respondents have partners in their late thirties or older. The findings underscore the reproductive maturity of

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the sample population, which is relevant to understanding factors such as healthcare-seeking behavior and uptake of Tetanus toxoid immunization, in line with the study's objectives. The variation in age and reproductive history might also affect accessibility and attitudes toward immunization services, particularly for those with higher pregnancy counts.

4.1.1.2.1 Respondents' Demography: Age Distribution

The age distribution of the respondents is presented in Table 4.3 showing the varying age ranges of the sample population. The age groups were categorized into five intervals, ranging from 18 to over 58 years.

Table 4.3: Respondents' Age

Age	Frequency	Percent (%)
18 – 28	300	29.6
29 - 38	448	44.2
39 - 48	239	23.6
49 - 58	23	2.3
Greater than 58	3	0.3

Field Result, 2024

The analysis shows that the majority of the respondents, 44.2% (n=448), were within the age range of 29 to 38 years, followed by 29.6% (n=300) in the 18 to 28-year category. Only a small percentage of respondents, 2.3% (n=23), were aged between 49 and 58, and just 0.3% (n=3) were older than 58. This suggests that the sample predominantly comprised younger to middle-aged respondents, which could have significant implications for the study. Given the younger age distribution, the results may reflect

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higher awareness or engagement with reproductive health interventions, such as Tetanus toxoid immunization, as younger women are typically more involved in maternal and child health care services. This age structure aligns with the study's objectives of exploring barriers, facilitators, and attitudes toward immunization among pregnant women.

4.1.1.2.2 Respondents' Demography: Previous Pregnancy History

Table 4.4 presents the distribution of respondents based on the number of previous pregnancies. The data distinguishes between respondents who had four or fewer pregnancies and those who had more than four.

Table 4.4: Number of Previous Pregnancy

No. of previous pregnancy	Frequency	Percent (%)
≤ 4	890	93.4
> 4	63	6.6

Field Result, 2024

The analysis reveals that the overwhelming majority of respondents, 93.4% (n=890), had four or fewer previous pregnancies, while only 6.6% (n=63) had more than four. This distribution indicates that most respondents fall within a lower-parity category, which may suggest that they are still within their reproductive years. The relatively small percentage of women with more than four pregnancies may reflect trends in family planning or access to reproductive health services in the population. This finding aligns with the study's objective of understanding barriers to immunization among pregnant women, as women with fewer pregnancies might face different challenges and facilitators compared to those with higher parity.

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4.1.1.2.3 Respondents' Demography: Number of Live Births

Table 4.5 outlines the distribution of respondents based on the number of live births. The data categorizes respondents into those with four or fewer live births and those with more than four.

Table 4.5: Number of Life Birth

No. of Life Birth	Frequency	Percent (%)
≤ 4	894	94.8
> 4	49	5.2

Field Result, 2024

The analysis shows that 94.8% (n=894) of respondents had four or fewer live births, while only 5.2% (n=49) reported having more than four. This distribution suggests that the majority of respondents have relatively smaller family sizes, which may reflect factors such as access to family planning services, fertility preferences, or economic constraints. The lower proportion of women with more than four live births may also indicate trends toward reduced fertility rates, which could have implications for health interventions, such as immunization coverage for both women and children. This finding supports the study's goal of exploring factors influencing Tetanus toxoid immunization uptake among women, as family size could affect healthcare access and decision-making within households.

4.1.1.2.4 Respondents' Demography: Age at First Pregnancy

Table 4.6 presents the distribution of respondents based on their age at first pregnancy. The data is categorized into five distinct age groups, providing insight into the respondents' reproductive health timeline.

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Table 4.6: Age at First Pregnancy

Age at First Pregnancy	**Frequency**	**Percent (%)**
15 – 21	275	29.0
22 – 27	337	35.5
28 – 33	193	20.3
34 - 39	103	10.9
40 - 45	41	4.3

Field Result, 2024

The analysis reveals that a majority of respondents (35.5%) experienced their first pregnancy between the ages of 22 and 27, followed by 29.0% who had their first pregnancy between 15 and 21 years. Meanwhile, 20.3% of respondents had their first pregnancy at ages 28 to 33, while fewer respondents entered motherhood at later ages: 10.9% were between 34 and 39, and only 4.3% were between 40 and 45 years old. This distribution suggests that the majority of respondents experienced early to mid-pregnancies, which may reflect cultural or socioeconomic factors influencing early marriage or family formation. The age at first pregnancy is significant for this study, as it can influence health behaviors and the uptake of services such as Tetanus toxoid immunization. Women who start childbearing earlier may have more frequent healthcare interactions, potentially improving access to and awareness of immunization services. These findings are critical in assessing the health needs of pregnant women in Ogun State, aligning with the study's objective to explore factors influencing Tetanus toxoid immunization uptake.

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4.1.1.2.5 Respondents' Demography: Age at First Childbirth

Table 4.7 outlines the age distribution of respondents at the time of their first childbirth. This provides a demographic snapshot relevant to the reproductive health and life stages of the respondents.

Table 4.7: Age at First Childbirth

Age at first childbirth	Frequency	Percent (%)
15 – 21	237	25.3
22 – 27	336	35.9
28 – 33	201	21.5
34 – 39	113	12.1
40 - 45	50	5.3

Field Result, 2024

The analysis shows that the highest proportion of respondents (35.9%) had their first child between the ages of 22 and 27, followed by 25.3% who gave birth between the ages of 15 and 21. Additionally, 21.5% experienced their first childbirth between the ages of 28 and 33, while fewer respondents had their first child later in life—12.1% were aged 34 to 39, and 5.3% were aged 40 to 45. This trend indicates that a significant portion of respondents began childbearing in their early to mid-twenties, reflecting a typical pattern of early adulthood childbearing. The timing of first childbirth is an important demographic factor, as it could affect access to maternal health services, including Tetanus toxoid immunization. Those who start families earlier may have more frequent exposure to healthcare systems, potentially impacting their immunization uptake and contributing to meeting the study's objectives of understanding health behaviors and factors influencing the use of maternal health services.

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4.1.1.2.6 Respondents' Demography: Respondents' Partner's Age

Table 4.8 presents the age distribution of respondents' partners at the time of the study. This data provides insight into the general age characteristics of the partners of the respondents, which may have implications for family dynamics and health behaviors.

Table 4.8: Respondents' Partner's Age

Partner's Age	Frequency	Percent (%)
18 – 31	249	25.4
32 - 44	569	58.1
45 - 57	145	14.8
58 - 70	17	1.7

Field Result, 2024

The analysis shows that the majority of respondents' partners (58.1%) were between the ages of 32 and 44, followed by 25.4% who were between 18 and 31 years old. A smaller proportion of partners fell into the 45 to 57 age range (14.8%), and only 1.7% were aged 58 to 70. The distribution of partners' ages suggests that most respondents are partnered with individuals in their early to mid-adult years, which could have a bearing on reproductive and health decisions within the household. Understanding the age distribution of partners is relevant to assessing the role of household dynamics and partner influence on health-related decisions, such as Tetanus toxoid immunization uptake, which aligns with the study's objectives.

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4.1.1.3 Respondents' Demography: Childbirth, Antenatal Visits, and Income Status

This section presents a detailed analysis of respondents' childbirth locations, antenatal visit patterns, and income status. These variables provide crucial insights into healthcare access and socio-economic conditions among the study population, reflecting their childbirth practices, engagement with health services, and economic status. The findings contribute to understanding the context in which respondents make health decisions, aligning with the study's objectives on healthcare utilization and socio-economic factors.

Table 4.9: Place of Previous Childbirth

Places	Frequency	Percent (%)
Traditional Birth Attendant	56	5.9
Church/Maternity	78	8.3
Home	145	15.4
Health Centre	311	33.0
Hospital	352	37.4

Field Result, 2024

Table 4.9 shows that the most common place of childbirth among respondents was hospitals, accounting for 37.4%, followed by health centers at 33.0%. A smaller proportion gave birth at home (15.4%) or with traditional birth attendants (5.9%), indicating a significant reliance on formal health institutions for childbirth. This trend aligns with the study's focus on health service utilization, suggesting that a majority of respondents have access to healthcare facilities during childbirth.

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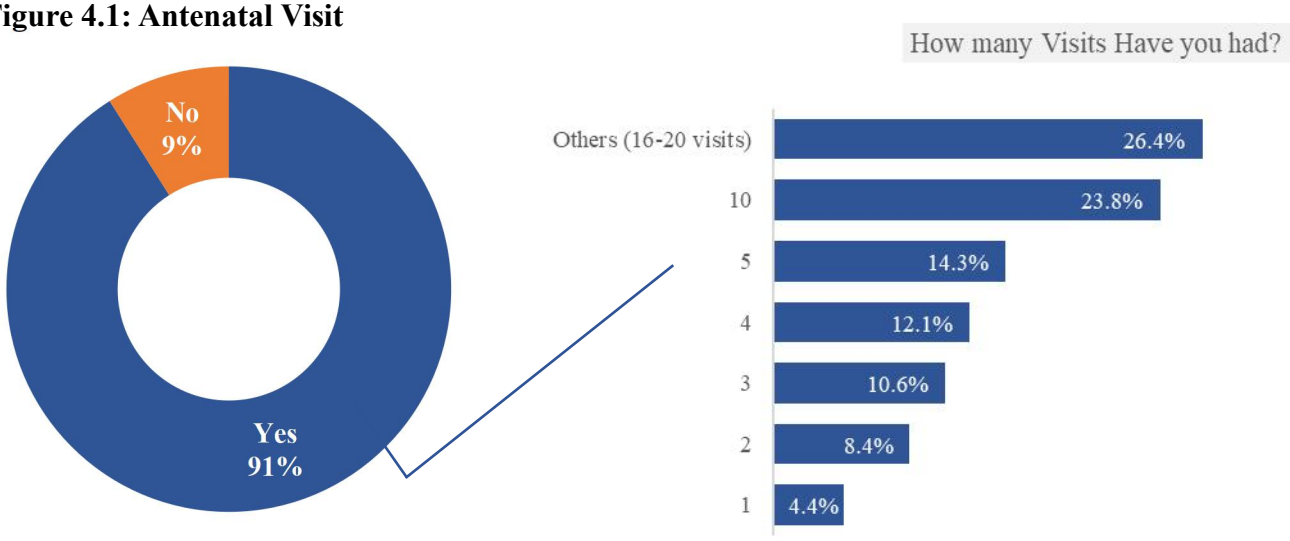
Figure 4.1: Antenatal Visit



Field Result, 2024

As displayed in figure 4.1, antenatal care was highly utilized, with 91.0% of respondents attending antenatal visits, reflecting a strong awareness of maternal health practices. The number of antenatal visits varied, with a notable 23.8% attending 10 visits, which aligns with standard healthcare recommendations. This high engagement in antenatal care could have implications for positive health outcomes for both mothers and children, as frequent antenatal visits are linked to better health monitoring and interventions during pregnancy.

Table 4.10: Respondents' Income Status

Income Status	Frequency	Percent (%)
Low-income	423	43.7
Middle-income	464	48.0
High-income	80	8.3

Author's computation (2024)

As presented in table 4.10 and figure 4.9, 48.0% of respondents identified as middle-income, while 43.7% fell into the low-income category. Only 8.3% reported being high-

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income earners. The distribution of income levels highlights the socio-economic challenges faced by many respondents, particularly those in the low-income bracket, which may impact their access to quality healthcare services and other resources.

4.1.1.4 Respondents' Demography: Childbirth, Antenatal Visits, and Income Status

This section focuses on the analysis of respondents' places of residence, both in terms of local government areas and specific communities. Understanding the residential distribution of respondents is crucial for the study, as it helps to contextualize socio-economic and healthcare variables according to rural and urban settings. These factors play a significant role in access to services, economic opportunities, and social support systems, which may influence the overall findings and objectives of the study.

Table 4.11: Distribution of Respondents by Local Government and Residence Type

Local Government	Rural (%)	Urban (%)
Ijebu north	213 (40.9)	212 (43.0)
Ipokia	108 (20.8)	115 (23.3)
Obafemi owode	199 (38.3)	166 (33.7)
Total	**520 (100)**	**493 (100)**

Field Result, 2024

Table 4.11 reveals that a nearly balanced proportion of respondents resided in rural and urban areas across the three local governments surveyed. Ijebu North shows an almost equal split between rural (213 respondents) and urban (212 respondents), while Ipokia had a slight majority residing in urban areas (115 respondents) compared to rural areas (108 respondents). Obafemi Owode, on the other hand, had more respondents residing in rural areas (199) than urban areas (166). These findings indicate a diverse population with

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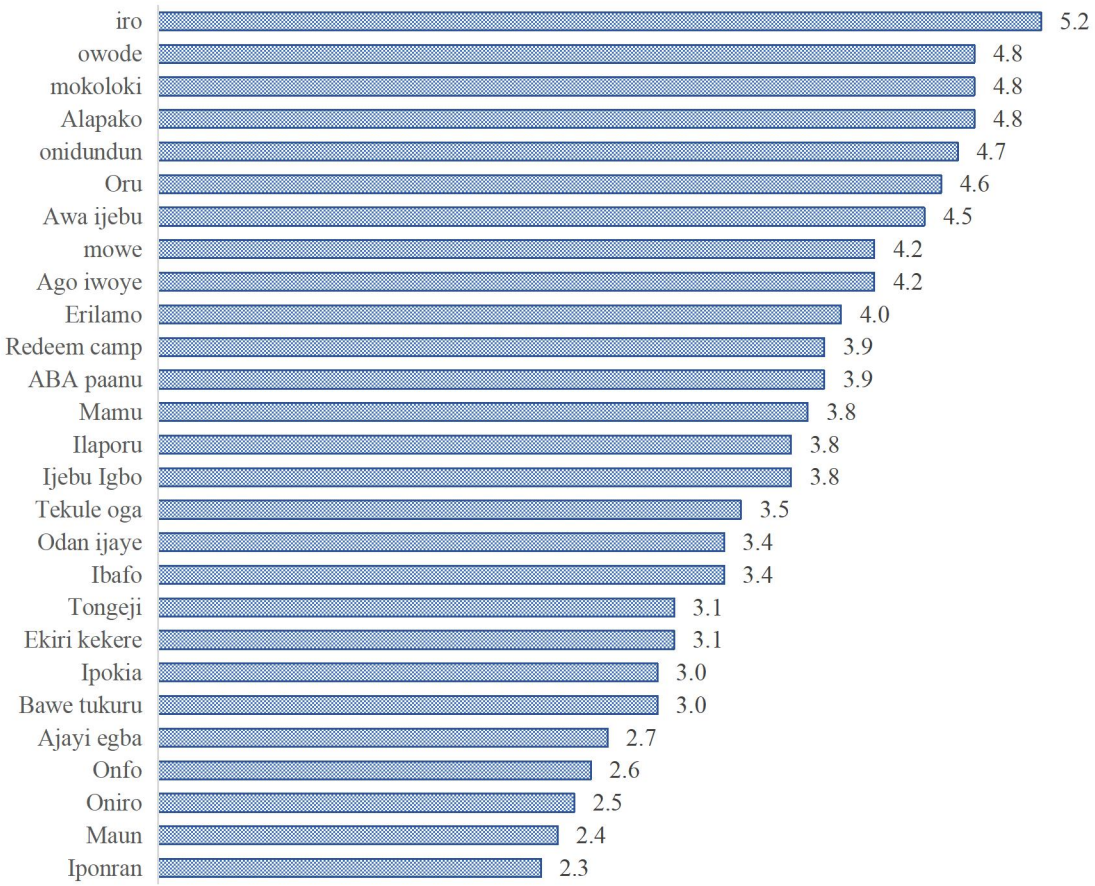
varied experiences of rural and urban living, which could influence their access to resources and services.

Fig. 4.2: Distribution of Respondents by Community



Field Result, 2024

The community-wise distribution highlights the diverse locations where respondents reside. The most populous communities were Iro (5.2%), Mokoloki (4.8%), and Alapako (4.8%), while smaller communities like Maun (2.4%) and Iponran (2.3%) had fewer respondents. The broad distribution of communities across the study area ensures that the data reflects various geographical and socio-economic conditions. This variation in residence may influence access to healthcare, income levels, and general living conditions,

directly connecting to the study's objectives on understanding healthcare access and socio-economic disparities.

The analysis of respondents' place of residence, particularly their distribution across rural and urban settings, highlights how location may impact respondents' healthcare choices, income status, and lifestyle, which are critical to the study's examination of health service utilization and socio-economic factors.

4.2 Presentation of Data

4.2.1 Analysis of Key Factors Influencing Tetanus Toxoid Immunization Uptake Among Pregnant women in Ogun State

This section delves into the core objectives of the study, aimed at understanding various aspects related to Tetanus toxoid immunization among pregnant women in Ogun State. It provides an in-depth analysis based on the collected data, addressing each research objective systematically. By focusing on immunization coverage, barriers, facilitators, and knowledge surrounding Tetanus toxoid, the analysis offers insights into the factors that shape immunization behaviour in the region. Furthermore, it explores the challenges encountered by women in accessing immunization services, alongside the strategies that promote uptake. Each subsection corresponds to a specific research objective, revealing patterns in the data and offering evidence-backed interpretations. The findings from the analysis contribute to a comprehensive understanding of the current state of Tetanus toxoid immunization and the potential improvements necessary to enhance coverage and accessibility. This structured approach ensures clarity in addressing the study's goals while paving the way for actionable recommendations. A total of 1013 women were covered in three local government areas in Ogun state, of which 60 respondents had no

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previous pregnancy in their lifetime. Nine hundred and fifty-three (953) respondents were either currently pregnant or had been pregnant before.

4.2.2 Objective I: Current Coverage Level of Tetanus Toxoid Immunization

Table 4.12 provides the current coverage level of Tetanus Toxoid (TT) immunization among pregnant women. The result shows that out of the 953 respondents sampled, 78.7% (797 out of 953) of women had received tetanus toxoid immunization during their current pregnancy, indicating a strong uptake of preventive care. similarly, 74.8% (758 out of 953) reported receiving tetanus toxoid immunization during previous pregnancies, suggesting consistent immunization practices across multiple pregnancies. however, the table shows areas for improvement, as 15.4% and 19.2% of women did not receive tetanus toxoid immunization in their current and previous pregnancies, respectively. the dosage breakdown further clarifies the immunization dosage received, while 15.4% (156) of women received no doses, a combined 63.4% received either one dose (37.6%, 381 women) and two doses (25.8%, 261 women) of the tetanus toxoid vaccine. notably, only 15.3% (155) received three doses, which indicate a need for increased awareness about the recommended immunization schedule. these figures collectively show the coverage level of tetanus toxoid vaccine.

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Table 4.12: Tetanus Toxoid Immunization Coverage Among Pregnant Women

Variable	Frequency (N)	Percent (%)
Tetanus Toxoid immunization received during current pregnancy		
Yes	797	78.7
No	156	15.4
Tetanus Toxoid immunization receives during previous pregnancy		
Yes	758	74.8
No	195	19.2
how many doses of Tetanus Toxoid vaccine received		
None	156	15.4
One dose	381	37.6
Two doses	261	25.8
Three doses	155	15.3

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4.2.3 Objective 2: Barriers and Challenges faced by Pregnant women in Accessing Tetanus Toxoid Immunization

Table 4.13 explain barriers and challenges that pregnant women encounter when accessing tetanus toxoid immunization. The most significant reason why some women have not received tetanus toxoid immunization was Distance to healthcare facilities, with 367 women (36.2%) reporting that long distances hinder their ability to receive the vaccine. Also lack of awareness is another major barrier, with 198 women (19.5%) stating they were unaware of the need for the vaccine. Financial constraints affect a smaller but little portion of the population, with 75 women (7.4%) identifying it as a challenge.

Additionally, fear of side effects discourages 108 women (10.7%), while cultural or religious beliefs are only a barrier for a small minority, 19 women (1.9%). A significant number (18.4%) selected "Others," indicating there may be additional unidentified reasons impacting access which is best k own to them. The second section of the table deals with specific obstacles women face when attempting to access tetanus toxoid vaccine. Difficult access to a healthcare facility was reported by 240 women (32.0%), making it the leading obstacle. The Cost of transportation to the healthcare facility also poses a significant challenge for 224 women (29.8%), showing that financial and logistical barriers are key issues hindering their access to the facilities. Long waiting times at healthcare facilities were a frustration for 192 women (25.6%), further emphasizing service-related barriers. Other challenges include inadequate information or communication, reported by 52 women (6.9%), and lack of vaccine availability, affecting 36 women (4.8%). Only a very small percentage (0.9%) reported other unspecified challenges. Also, in awareness of the recommended schedule for tetanus toxoid immunization, majority 620 women (61.2%) are aware of the schedule, while 333 women (32.9%) are not, indicating an important gap in public health education. Financial barriers, with 388 women (38.3%) reporting financial constraints in receiving the vaccine, though a majority, 565 women (55.8%), did not experience such financial limitations.

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Table 4.13: Barriers and Challenges in Accessing Tetanus Toxoid Immunization among Pregnant women

Variable	Frequency (N)	Percent (%)
Reasons Tetanus Toxoid immunization has not been received		
Lack of awareness	198	19.5
Financial constraints	75	7.4
Distance to healthcare facilities	367	36.2
Fear of side effects	108	10.7
Cultural or religious beliefs	19	1.9
Others	186	18.4
Challenges or obstacles faced in accessing Tetanus Toxoid immunization services		
Cost of transportation to the healthcare facility	224	29.8
Difficult access to a healthcare facility	240	32
Long waiting times at healthcare facilities	192	25.6
Inadequate information or communication	52	6.9
Lack of availability of vaccines	36	4.8
Other	7	0.9
Awareness of the recommended schedule for Tetanus Toxoid immunization		
Yes	620	61.2
No	333	32.9
Financial constraints in receiving tetanus toxoid immunization		
Yes	388	38.3
No	565	55.8

Source: Field Result, 2024

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4.2.4 Association between Place of Residence and Access to Healthcare Services for Immunization

The association between place of residence (rural vs. urban) and key factors influencing access to tetanus toxoid immunization, including the ease of accessing healthcare services, distance to healthcare facilities, transportation difficulties, and the impact of cultural or religious beliefs was explained in this table. Healthcare services for tetanus toxoid immunization are easily accessible in rural versus urban communities. The data shows that 355 rural women reported easy access to services, compared to 125 who did not. In urban areas, 298 women indicated that services were easily accessible, while 175 said they were not. The Chi-square value of 13.258 and a P-value of 0.001. There is a statistically significant difference, which shows that rural women are more likely to report easy access to healthcare services for tetanus toxoid immunization compared to their urban counterparts. This could reflect better outreach or localized healthcare efforts in rural areas. Distance to the nearest healthcare facility offering tetanus toxoid immunization also shows that majority of respondents in both rural and urban areas live within 1-5 kilometers of a facility (229 rural compared to 231 urban), with a smaller proportion living less than 1 kilometer away (155 rural compared to 131 urban). Fewer women live further from facilities (60 rural compared to 56 urban at 5-10 kilometers, and 26 rural compared to 46 urban at more than 10 kilometers). The Chi-square value of 7.678 and P-value of 0.053 this shows a narrow significant different. Rural women are somewhat more likely to live closer to healthcare facilities, although this is not strongly conclusive. Transportation difficulties in reaching healthcare facilities in rural areas, 280 women reported difficulties arranging transportation, compared to 287 in urban areas. Conversely, 200 rural women and 186 urban women indicated no difficulties. The Chi-

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square value of 0.543 and a P-value of 0.461 suggest that there is no statistically significant difference in transportation challenges between rural and urban residents. Cultural or religious beliefs affect women's decisions to receive tetanus toxoid immunization. In rural areas, 198 women stated that these beliefs influenced their decisions, while 267 said they did not. In urban areas, 164 women reported that cultural or religious beliefs affected their decision-making, while 299 said they were not influenced by such factors. The Chi-square value of 5.951 and P-value of 0.051 indicate a narrow significant difference.

Table 4.14: Influence of Place of Residence on Accessibility, Transportation, and Cultural Beliefs Regarding Tetanus Toxoid Immunization

Variables	**Place of residence**		**Chi-square**	**P-value**
	Rural	Urban		
Accessibility of healthcare services for Tetanus toxoid immunization in your community				
Yes	355	298	13.258	0.001
No	125	175		
Distance of healthcare facility providing Tetanus toxoid immunization services from your residence				
Less than 1 km	155	131	7.678	0.053
1-5 km	229	231		
5-10 km	60	56		
More than 10 km	26	46		
Difficulties in arranging transportation to healthcare facilities for Tetanus toxoid immunization				
Yes	280	287	0.543	0.461
No	200	186		
Cultural or Religious beliefs affect your decision to receive Tetanus toxoid immunization during pregnancy				
Yes	198	164	5.951	0.051
No	267	299		
Not applicable	15	10		

Source: Field Result, 2024

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4.2.5 Objective 3: Facilitators that Promote TT Immunization Uptake among Pregnant Women

Table 4.15 explains the factors that have positively influenced women's decisions to receive tetanus toxoid immunization with a focus on healthcare provider involvement and antenatal care as key motivators. Using multiple choice response, the primary reasons women chose to receive vaccine were assessed and the result shows that the most influential factor was Recommendations from healthcare providers, cited by 702 women (44.0%) highlighting the critical role that medical professionals play in promoting immunization. Information disseminated during antenatal care visits also had a substantial impact, with 605 women (38.0%) indicating that they were motivated to get vaccinated through this avenue. Awareness of the benefits of immunization was another motivating factor for 177 women (11.1%), which can also be seen as the importance of education and understanding of vaccine efficacy. The Influence of family or friends was much less significant, affecting only 66 women (4.1%) which shows that personal social networks play a smaller role compared to formal medical advice. A minority of women (2.8%) selected "Other" as their reason, indicating that some women may have had different or unspecified reasons for choosing to receive the vaccine. Information about Tetanus Toxoid provided during antenatal care visit is also assesses whether women were informed about tetanus toxoid during antenatal care visits. The majority of women, 853 (84.2%), reported receiving information about tetanus toxoid during these visits, which underscores the importance of antenatal care as a platform for disseminating crucial health information. However, 100 women (9.9%) indicated that they did not receive such information, suggesting that there may be gaps in communication in some healthcare settings. The role of healthcare providers in actively encouraging or facilitating tetanus

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toxoid immunization shows that a significant portion, 842 women (83.1%) confirmed that healthcare providers played a role in their decision to receive the vaccine, either through direct encouragement or logistical support. Whereas, just 111 women (11.0%) indicated that they did not receive such support from healthcare providers, which could reflect different levels of healthcare engagement across regions or facilities.

Table 4.15: Factors that Promote Tetanus Toxoid Immunization Uptake Among Pregnant women

Variable	Frequency (N)	Percent (%)
Factors that influenced decision to receive Tetanus Toxoid immunization		
Recommendations from healthcare providers	702	44
Information provided during antenatal care visits	605	38
Awareness of the benefits of immunization	177	11.1
Influence of family or friends	66	4.1
Other	44	2.8
Information about Tetanus Toxoid provided during antenatal care visit		
Yes	853	84.2
No	100	9.9
Healthcare providers role in encouraging or facilitating Tetanus Toxoid immunization		
Yes	842	83.1
No	111	11

Source: Field Result, 2024

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4.2.6 Objective 4: Knowledge and Attitudes Associated with Intake of Tetanus Toxoid Immunization among Pregnant Women

Table 4.16 explains women's understanding of the benefits of tetanus toxoid immunization and their knowledge of the recommended timing and booster doses for the vaccine. When the women were asked to identify the perceived benefits of tetanus toxoid immunization, majority 525 women (51.8%), correctly recognized that the primary benefit of the vaccine is protection against tetanus infection. Another notable benefit is Enhancing maternal and neonatal health which was cited by 211 women (20.8%), highlighting awareness of broader health outcomes. One hundred and eighty-three women (18.1%), associated the vaccine with reducing the risk of neonatal tetanus of which is significance in preventing a serious neonatal condition. Just 34 women (3.4%) selected Others which may represent less common or mare specific beliefs about the vaccine's benefits. Also, women's knowledge about the recommended timing for receiving the first dose of tetanus toxoid immunization. Was accessed of which 657 women (64.9%) reported knowing the correct timing for the first dose, showing a good level of awareness. However, a significant gap remains, with 296 women (29.2%) unaware of the proper timing which shows for proper public health sensitization in such area. Knowledge about the number of additional booster doses recommended for tetanus toxoid immunization shows that majority of women, 626 (61.8%) were aware of the need for additional booster doses, which is crucial for maintaining long-term immunity but a substantial portion of women, 327 (32.3%), did not know this important aspect of the immunization schedule which could hinder proper immunization coverage over time.

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Table 4.16: Benefits and Knowledge of Tetanus Toxoid Immunization Timing Among Pregnant women

Variable	Frequency (N)	Percent (%)
Benefit of tetanus toxoid immunization for pregnant women		
Protects against tetanus infection	525	51.8
Reduces the risk of neonatal tetanus	183	18.1
Enhances maternal and neonatal health	211	20.8
Others	34	3.4
Recommended timing for receiving the first dose of tetanus toxoid immunization		
Yes	657	64.9
No	296	29.2
Number of additional booster recommended for tetanus toxoid immunization		
Yes	626	61.8
No	327	32.3

Source: Field Result, 2024

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4.2.7 Perception of Tetanus Toxoid Immunization

Table 4.16 provides perceptions of women regarding the importance, safety, and effectiveness of tetanus toxoid immunization during pregnancy, as well as their satisfaction with the information provided by healthcare providers. A large amount of women 590(58.2%), consider the immunization "Very important," while 270 women (26.7%) believe it is Important. Also small percentage, 40 women (3.9%), rate it as Somewhat important and 42 women (4.1%) do not view it as important at all, that only shows minority may lack awareness of the vaccine's critical role in preventing tetanus in

both the mother and newborn. Also, in assesses women's confidence in the safety and effectiveness of tetanus toxoid immunization. Most respondents expressed a high level of confidence, with 547 women (54%) feeling Very confident and 304 women (30%) being Confident. However, 66 women (6.5%) were only Somewhat confident, and a very small minority, 15 women (1.5%), were Not confident. satisfaction with the information provided by healthcare providers regarding tetanus toxoid immunization during pregnancy shows numbers of women are satisfied, with 568 women (56.1%) reporting that they are Very satisfied and 306 women (30.2%) feeling Satisfied. A smaller group expressed neutral feelings (4.7%), while dissatisfaction was minimal, with only 11 women (1.1%) being Dissatisfied and 7 women (0.7%) Very dissatisfied. On whether healthcare providers have adequately addressed women's concerns and questions about tetanus toxoid immunization. An overwhelming respondent, 724 women (71.5%), reported that their questions and concerns were Always addressed, and 189 women (18.7%) felt that their concerns were addressed Sometimes. A very small amount indicated that their concerns were addressed rarely (1.6%) or never (0.8%).

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Table 4.17: Perceptions of Importance, Confidence, and Satisfaction with Tetanus Toxoid Immunization Among Pregnant Women

Variable	Frequency (N)	Percent (%)
Importance of Tetanus toxoid immunization during pregnancy		
Not important	42	4.1
Somewhat important	40	3.9
Important	270	26.7
Very important	590	58.2
Confident in the safety and effectiveness of Tetanus toxoid immunization		
Not confident	15	1.5
Somewhat confident	66	6.5
Confident	304	30
Very confident	547	54
Satisfied with the information provided by healthcare providers regarding Tetanus toxoid immunization during pregnancy		
Very dissatisfied	7	0.7
Dissatisfied	11	1.1
Neutral	48	4.7
Satisfied	306	30.2
Very satisfied	568	56.1
Healthcare providers Ever addressed your concerns and questions about Tetanus toxoid immunization adequately		
No, never	8	0.8
No, rarely	16	1.6
Yes, sometimes	189	18.7
Yes, always	724	71.5

Source: Field Result, 2024

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4.2.8 Objective 5: Logistic Regression Analysis of Factors Influencing Access to Tetanus Toxoid Immunization Among Pregnant Women

Table 4.18 explain in detailed the breakdown of how different socio-demographic and contextual factors impact the likelihood of women accessing tetanus toxoid immunization (TTI) services. The logistic regression results are presented with coefficients, odds-ratios (OR), p-values, and 95% confidence intervals (CI). For age of the respondents, Women older than 30 years exhibit an odds ratio (OR) of 2.08 compared to those aged 30 or younger, indicating they are more than twice as likely to access TTI services. However, this relationship is not statistically significant (p-value = 0.965). The wide confidence interval (CI: 0.822–4.957) showing a high variability in the estimate. This outcome implies that while age might have some influence, it does not play a significant role in predicting access to TTI in this study. Marital status shows interesting trends, with married women having slightly lower odds (OR = 0.841) of accessing immunization compared to divorced women (the reference group). Single women have slightly higher odds (OR = 1.058), though the p-values (0.284 and 0.107) suggest these results are not significant. Separated women, with an odds ratio of 1.918, are almost twice as likely to access TTI, but again, this result lacks statistical significance (p = 0.781). Widowed women have lower odds of access (OR = 0.551), but this also lacks statistical strength (p = 0.965). Marital status can often reflect household dynamics and support systems.

Furthermore, Educational level of the respondents plays a reasonable role in accessing TTI. Women with no formal education have significantly lower odds of accessing TTI (OR = 0.828, p = 0.03) compared to those with tertiary education (the reference group). This result highlights how education empowers women with knowledge about health

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services and the importance of immunization. Women with higher levels of education are more likely to understand health benefits, comply with vaccination schedules, and overcome misinformation about vaccines. Those with secondary education also show a higher likelihood of access (OR = 1.039), though the result is not significant (p = 0.365). The link between maternal education and health-seeking behavior is well-established. Also, Religion plays a role, women practicing Islam (OR = 0.776) and those following other religious practices (OR = 1.087) do not show significant differences in their likelihood of accessing TTI compared to Christian women (the reference group), with high p-values (0.861 and 0.791, respectively). Traditional religious beliefs show a slightly higher odds ratio (OR = 1.656), though this also lacks statistical significance (p = 0.809). Religion can influence health behaviors, often through cultural norms or religious teachings. In some cases, it may serve as a barrier, especially when cultural or religious beliefs conflict with medical practices.

Ethnicity differences significantly influence access to TTI, particularly among Yoruba women, who are over five times more likely (OR = 5.038, p = 0.027) to access the immunization compared to Hausa women (the reference group). Igbo women also show higher odds of access (OR = 1.65), though this result is not significant (p = 0.194). These findings could reflect regional differences in healthcare availability, cultural attitudes toward immunization, or community-level health interventions. Ethnic disparities in access to healthcare are well-documented, some ethnic groups experience better access due to cultural familiarity or targeted health campaigns.

Knowledge of Tetanus Toxoid Immunization is a strong predictor of access. Women who ware knowledgeable about the vaccine ware more than three times as likely to access the

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immunization compared to those who are not (OR = 3.619, p = 0.001). The narrow confidence interval (CI: 1.691–7.616) and highly significant p-value emphasize the importance of awareness and education in promoting vaccine uptake. Women who previously gave birth in a health center have higher odds of accessing TTI (OR = 1.193, p = 0.001), while those who gave birth at home, hospitals, or through traditional birth attendants show varying odds, with none of the results being statistically significant. Women from low-income backgrounds are less likely (OR = 0.828) to access TTI compared to their high-income counterparts, though this result is not significant (p = 0.3). Middle-income women also have slightly lower odds (OR = 0.954), but again, this result is not significant (p = 0.628). The financial burden of accessing healthcare, including transport and hidden costs, often hinders low-income women from utilizing services, even when they are available. Women living in urban areas have slightly lower odds of accessing TTI (OR = 0.957) compared to their rural counterparts, though the result is not statistically significant (p = 0.825). While urban areas may have better healthcare infrastructure, rural women might benefit from specific government or community-level programs that target immunization in underserved areas.

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Table 4.18: Logistic Regression Analysis of Factors Influencing Access to Tetanus Toxoid Immunization Among Pregnant women

	Coefficient	Odds-Ratio	P-value	95 % Lower CI	95% Upper CI
Age					
≤ 30		1			
> 30	-0.009	2.08	0.965	0.822	4.957
Marital Status					
Single	0.651	1.058	0.284	0.103	24.62
Married	0.733	0.841	0.107	0.243	2.859
Separated	-0.174	1.918	0.781	0.581	6.381
Divorced		1			
Widowed	0.057	0.551	0.965	0.321	0.945
Educational Level					
None	-0.595	0.828	0.03	0.467	1.486
Primary Education	-0.189	1.321	0.521	0.733	2.458
Secondary Education	0.278	1.039	0.365	0.679	1.593
Higher/Tertiary Education		1			
Religion					
Islam	0.038	0.776	0.861	0.14	6.781
Christianity		1			
Others	-0.254	1.087	0.791	0.56	2.187
Traditional	0.084	1.656	0.809	0.775	3.58
Ethnicity					
Igbo	0.505	1.65	0.194	0.753	3.641
Yoruba	0.667	5.038	0.027	3.077	8.25
Hausa		1			
Others	0.501	1.949	0.212	1.062	3.491
Knowledge of Tetanus Toxoid Immunization					
Yes	1.617	3.619	0.001	1.691	7.616
No		1			
Place of previous Birth					
Health Centre	1.286	1.193	0.001	0.552	2.518
Home	0.177	1.051	0.647	0.524	2.014
Hospital	0.050	0.680	0.884	0.272	1.689
Church		1			
Traditional Birth Attendant	-0.385	0.680	0.407	0.271	1.690
Income Status					
Low-income	-0.429	0.828	0.3	0.369	1.714
Middle-income	-0.188	0.954	0.628	0.647	1.409
High-income		1			
place of Residence					
Rural		1			
Urban	-0.044	0.957	0.825	0.648	1.413

Source: Field Result, 2024

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4.2.9 Socio-demographics Influencing on Uptake of Tetanus Toxoid Immunization among Pregnant Women in Ogun State

Table 4.17 shows the association between the influence of socio-demographic variables and women's awareness of the importance of tetanus toxoid immunization during pregnancy. The influence of place of residence among rural residents, 433 women are aware of the importance of immunization, compared to 47 who are not. In urban areas, 413 women are aware, while 60 are not. The Chi-square value of 2.001 and a P-value of 0.157 indicate that the difference in awareness between rural and urban women is not statistically significant, which shows that residence does not strongly affect awareness. Educational level shows a highly significant relationship with awareness (Chi-square = 18.194, P-value = 0.001). Women with higher education (tertiary level) are the most aware (308 aware compared to 24 unaware), followed by those with secondary (179 aware compared to 15 unaware), primary (152 aware compared to 25 unaware), and no formal education (207 aware vs. 43 unaware). This shows that higher educational attainment is strongly associated with greater awareness of the importance of tetanus toxoid immunization. occupation status also reveals a significant association with awareness (Chi-square = 30.789, P-value = 0.001). Skilled workers are the most aware (612 aware compared to 50 unaware), followed by unskilled workers (158 aware compared to 36 unaware). Unemployed women and housewives show lower levels of awareness (20 aware compared to 4 unaware, and 56 aware compared to 17 unaware, respectively). This underscores the role of employment status, particularly skilled work, in enhancing awareness of health-related issues. Ethnicity also shows a statistically significant difference across ethnic groups (Chi-square = 2.641, P-value = 0.001). Yoruba women have the highest awareness (573 aware compared to 67 unaware), followed by

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those from the Igbo (94 aware compared to 12 unaware) and Hausa (82 aware compared to 10 unaware) ethnic groups. Women from other ethnicities shuch as Egun show relatively lower awareness (97 aware compared to 18 unaware), which is a good stand to say cultural differences may play a role in health awareness. Income status, which also shows a statistically significant relationship with awareness (Chi-square = 10.171, P-value = 0.006). Middle-income women have the highest awareness (415 aware compared to 36 unaware), followed by low-income women (330 aware compared to 58 unaware). High-income women show the lowest levels of awareness (71 aware compared to 9 unaware), although this group is relatively small in size, while economic factors are important but may interact with other variables like education and occupation in shaping awareness.

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Table 4.19: Socio-Demographic Determinants of Awareness of the Importance of Tetanus Toxoid Immunization During Pregnancy

Variables	aware of the importance of Tetanus toxoid immunization during pregnancy		Chi-square	P-value
	Yes	No		
Place of residence				
Rural	433	47	2.001	0.157
Urban	413	60		
Educational Level				
None	207	43	18.194	0.001
Primary Education	152	25		
Secondary Education	179	15		
Higher/Tertiary Education	308	24		
Occupation Status				
Skilled	612	50	30.789	0.001
Unskilled	158	36		
Unemployed	20	4		
Housewife	56	17		
Ethnicity				
Igbo	94	12	2.641	0.001
Hausa	82	10		
Yoruba	573	67		
Others	97	18		
Income Status				
Low-income	330	58	10.171	0.006
Middle-income	415	36		
High-income	71	9		

Source: Field Result, 2024

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4.2.10 Association between Partner Influence and the Uptake of Tetanus Toxoid Immunization Vaccine

Table 4.19 explains the association between partner support and tetanus toxoid immunization uptake during pregnancy, specifically whether the presence of partner support influences immunization uptake and the number of doses received. It was assessed if women who received tetanus toxoid immunization during their current pregnancy had the support and encouragement of their partner. Among women assessed, 754 had received the immunization, while only 97 had not. Conversely, among women who did not receive partner support, 35 received the immunization, but a significant 52 had not. A small number of women (8 with support and 7 without) indicated that they do not have a partner. The Chi-square value of 120.74 and a P-value of 0.001 indicate a highly significant association. The number of doses of tetanus toxoid vaccine Among women who received partner support was accessed with 353 received one dose, 249 received two doses, and 152 received three doses. In contrast, among women who did not receive partner support, 23 received one dose, 9 received two doses, and only 3 received three doses. Women without a partner reported lower dose compliance across the board (5 received one dose, 3 received two doses, and none received three doses). The Chi-square value of 36.807 and P-value of 0.001 further shows the significant influence of partner support on not just initial immunization uptake but also on adherence to the full vaccination schedule.

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Table 4.20: Influence of Partner Support on Tetanus Toxoid Immunization Uptake and Dose Adherence During Pregnancy

Variables	Does your partner support and encourage you to receive Tetanus toxoid immunization during pregnancy			Chi-square	P-value
	Yes	No	I don't have a partner		
Have you received Tetanus toxoid immunization during your current pregnancy					
Yes	754	35	8	120.74	0.001
No	97	52	7		
How many doses of Tetanus toxoid vaccine have you received					
None	97	52	7	36.807	0.001
One dose	353	23	5		
Two doses	249	9	3		
Three doses	152	3	0		

Source: Field Result, 2024

4.2.11 Influence of Community Support Received

Table 4.20 explains the role of community health workers, awareness campaigns, and leadership in promoting tetanus toxoid immunization among pregnant women. majority, 870 women (85.9%) reported they receive advice or recommendations from community health workers or nurses about tetanus toxoid immunization which illustrating the significant role of healthcare workers in disseminating information and encouraging immunization. However, 83 women (8.2%) indicated that they did not receive any advice, suggesting some leftover gaps in outreach or access to healthcare personnel. The impact of community awareness campaigns or programs on women's decisions to receive tetanus toxoid immunization also plays a large proportion, 789 women (77.9%) stated that such

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campaigns influenced their decision, emphasizing the effectiveness of public health initiatives in promoting vaccine uptake. Conversely, 164 women (16.2%) reported that these programs did not influence their decision, possibly indicating that other factors or motivations were more significant for them. The role of community leadership in ensuring that pregnant women receive tetanus toxoid immunization shows a substantial impact in 729 women (72%) which indicated that their community leadership played an active role in promoting or enforcing immunization and the importance of local authority figures in supporting public health efforts. However, 224 women (22.1%) reported that their community leadership did not enforce or promote the vaccine which shows that community-based leadership engagement varies across different areas.

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Table 4.21: Influence of Community Health Workers, Awareness Campaigns, and Leadership on Tetanus Toxoid Immunization Uptake

Variable	Frequency (N)	Percent (%)
Received any advice or recommendations from community health worker regarding Tetanus toxoid immunization during pregnancy		
Yes	870	85.9
No	83	8.2
Community awareness campaigns influence your decision to receive Tetanus toxoid immunization		
Yes	789	77.9
No	164	16.2
Community leadership ensure/enforce all pregnant women receive Tetanus toxoid immunization		
Yes	729	72
No	224	22.1

Source: Field Result, 2024

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4.3 Discussion of Findings

This section provides a comprehensive discussion of the findings derived from the analysis of the study's objectives. Each objective is discussed in its subsection, where the results of this research are compared with existing empirical studies and relevant literature in the field. The purpose of this section was to highlight key insights from the data, explain how they align or contrast with previous findings, and provide a deeper understanding of the implications of the research outcomes. For each objective, the discussion aimed to assess whether the findings supported or contradicted established theories, models, or studies, and to explore the reasons for any similarities or discrepancies. This approach facilitated the contextualization of the study's results within the broader body of knowledge on Tetanus toxoid immunization. Additionally, potential explanations for observed patterns, as well as implications for policy and practice, were highlighted where relevant. Each subsection of this section was structured to examine the specific findings related to one of the research objectives. The discussion of findings explored the broader significance of these results by comparing them with the findings of previous studies, thereby offering a critical evaluation of the findings in the context of existing research.

The findings of this study reveal that 78.7% of pregnant women surveyed had received tetanus toxoid (TT) immunization during their current pregnancy, with 74.8% reporting immunization in previous pregnancies. This relatively high coverage aligns with the increasing global emphasis on maternal immunization for tetanus elimination. Similarly, coverage analysis in developing countries such as Nigeria underscores a consistent uptake pattern, as evidenced by UNICEF's findings that highlight the continued prioritization of

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maternal tetanus immunization in many Nigerian states, although some areas still face challenges in achieving high coverage levels due to healthcare access barriers[1].

In parallel, studies from developed nations such as the United States report that high TT immunization coverage is sustained by robust healthcare infrastructure and comprehensive public health strategies. For example, research from the CDC indicates high TT immunization levels across the U.S., where immunization rates are driven by national healthcare guidelines and maternal health monitoring systems[2]. This is mirrored in the UK's efforts, where studies report similar coverage levels attributed to organized antenatal care and vaccination protocols that include consistent reminders and follow-ups during pregnancy[3].

However, the findings of this study show that 15.4% of respondents received no doses of TT, which aligns with observations in areas with limited healthcare access or competing health priorities. This finding is corroborated by a World Health Organization (WHO) report highlighting that despite progress, substantial gaps remain in tetanus vaccination coverage among pregnant women, particularly in regions facing healthcare infrastructure challenges or financial barriers[4]. Additionally, the Global Maternal and Neonatal Tetanus Elimination Initiative has noted coverage disparities within Africa due to such structural and logistical constraints, affecting consistent vaccine delivery and uptake, particularly in rural or underserved areas[5].

In contrast to these observations, a study conducted in Pakistan reported coverage challenges due to cultural and educational barriers that hinder vaccine awareness, with only about 50-60% of pregnant women receiving TT immunizations[6]. This disparity highlights the influence of socio-cultural factors on immunization coverage, indicating

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that even in cases of relatively accessible healthcare, awareness and education play critical roles in vaccine uptake.

These findings collectively underline the importance of targeted interventions, including community health education, accessible immunization services, and strengthened healthcare infrastructure, to improve TT coverage rates among pregnant women in Nigeria and similar regions.

The study identified several barriers that hinder pregnant women from accessing tetanus toxoid immunization in Ogun State, Nigeria, including distance to healthcare facilities, lack of awareness, financial constraints, fear of side effects, and cultural or religious beliefs. These findings align with various studies from both developed and developing countries that highlight similar obstacles.

Distance to healthcare facilities emerged as a significant barrier, with 36.2% of respondents indicating this as a primary challenge. This result is supported by a study conducted in Kenya, which found that rural women faced considerable difficulty in accessing tetanus immunization due to long distances to health centers[7]. Similarly, research in India noted that women in rural settings often travel long distances to obtain vaccinations, impacting immunization uptake[8].

Lack of awareness about the necessity of tetanus toxoid immunization was another major barrier, affecting 19.5% of women in the study. This is in line with findings from a study in Nigeria, which indicated that insufficient health information was a key barrier to vaccination uptake among women[9]. In contrast, a study in the United States, where access to health information is generally better, reported that awareness levels were high among

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women, resulting in better immunization coverage[10]. This highlights a disparity in public health education across different socioeconomic contexts.

Financial barriers also impacted access, with 7.4% of respondents citing financial constraints. This challenge is frequently documented in developing countries. For example, a study from Bangladesh found that women from low-income households were less likely to complete their tetanus vaccination series due to cost-related issues, including transportation and medical fees[11]. In contrast, in developed countries, vaccination costs are often covered by insurance, reducing the financial barrier to accessing immunization services.

Fear of side effects, which deterred 10.7% of women in this study, mirrors findings from both developing and developed contexts. For instance, a survey in the United Kingdom noted that vaccine hesitancy due to fear of side effects is a prevalent concern, even in well-resourced healthcare settings[12]. This underscores the universal nature of vaccine hesitancy as a barrier to immunization and the need for targeted health communication efforts to address these fears.

Cultural and religious beliefs, though affecting only a small minority (1.9%) of respondents, align with findings from various studies indicating that cultural factors influence immunization decisions. Research in rural areas of India and Nigeria has shown that religious beliefs can significantly impact a woman's decision to pursue immunization, highlighting the need for culturally sensitive healthcare interventions[13].

These findings collectively underscore the multifaceted nature of barriers to tetanus toxoid immunization among pregnant women. Addressing these challenges requires a

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combination of strategies, including improving healthcare accessibility, increasing public health awareness, providing financial support for low-income families, and implementing culturally tailored health education.

The study findings reveals that recommendations from healthcare providers are the most influential motivator for tetanus toxoid (TT) immunization uptake, cited by 44% of respondents, align strongly with research from diverse settings. For instance, a study in Ethiopia identified that healthcare provider encouragement during antenatal care (ANC) was crucial in motivating TT uptake among pregnant women. Here, 83.1% of the participants reported that healthcare provider engagement was a significant factor, similar to your finding of 83.1% in Ogun State, suggesting the universal importance of professional medical advice in influencing immunization behavior[14].

Similarly, research in Alexandria, Egypt, highlighted that a significant portion of women (98.1%) considered doctor recommendations as the most trusted source of immunization information, underscoring the impact of healthcare providers in shaping vaccine acceptance. The study also revealed that a high percentage of women viewed the advice from healthcare providers during ANC visits as a critical cue to action, mirroring the role of ANC observed in your findings[15].

The result also highlights the substantial influence of information shared during antenatal care, impacting 38% of women in Ogun State. This result aligns with research conducted in Canada, where ANC sessions were found to be critical touchpoints for disseminating vaccine-related information and promoting vaccine uptake, especially among first-time mothers[16]. This finding demonstrates that regardless of location, ANC serves as an essential platform for promoting maternal immunizations.

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The role of community education and awareness as facilitators of TT immunization uptake is also supported by findings from Nigeria. A study in rural northern Nigeria reported that awareness of the benefits of TT immunization was a strong motivator, with community health initiatives driving vaccine acceptance and overcoming misconceptions[17]. This aligns with the 11.1% of women in your study who cited awareness as their reason for immunization, indicating the value of knowledge dissemination as a key motivator.

In developed countries, research has also highlighted that social support networks play an indirect role in immunization uptake. For instance, a study in the United States found that while healthcare providers remain the primary influencers, support from family and community members fosters a positive attitude toward immunization, especially among hesitant individuals[18]. Although social networks play a smaller role in your findings (4.1%), this influence remains significant in various contexts, as it supports ongoing trust in healthcare guidance.

Together, these studies affirm that healthcare provider recommendations and ANC are consistent, powerful facilitators of TT immunization uptake across both developed and developing contexts, supporting your findings in Ogun State. Such universal factors highlight that structured healthcare engagement, particularly during ANC, is essential for increasing TT immunization coverage.

The findings from this study indicate that awareness and understanding of the benefits of tetanus toxoid (TT) immunization are widespread among pregnant women in Ogun State, Nigeria. A majority of respondents recognize the primary benefit as protection against tetanus, while a significant number also link TT immunization with enhanced maternal

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and neonatal health. These observations align with recent research in various contexts. For instance, a study from Nigeria also reported high awareness levels among women regarding the protective function of TT against neonatal tetanus and its critical role in maternal and neonatal health[19]. Similarly, a study observed in Northern Nigeria that women's awareness directly impacted their immunization uptake, demonstrating that increased knowledge correlates with higher acceptance of the vaccine.

This study also highlights that while many women know the correct timing for the first TT dose, a substantial gap exists in understanding the full immunization schedule. This pattern resonates with findings in Bangladesh, where lack of knowledge about the recommended dosage sequence was identified as a barrier to full TT coverage among pregnant women[20]. The need for booster doses to maintain immunity is often misunderstood or overlooked, emphasizing a critical area for public health education.

The attitudes toward TT immunization in Ogun State, where a significant percentage of women reported high confidence in the vaccine's safety and effectiveness, are similarly positive in other contexts. Studies in both developed and developing regions support these findings. In the United States, for example, researchers found high levels of confidence among women in TT immunization, especially in its role in protecting newborns against tetanus[21]. Conversely, studies in less urbanized regions of Nigeria have identified concerns related to vaccine safety, which suggests that urban-rural differences might influence attitudes and trust in immunization efforts[22].

Factors such as healthcare providers' communication and engagement also play a crucial role in immunization uptake. In Ogun State, most women expressed satisfaction with information provided by healthcare providers, which likely enhances their adherence to

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the TT schedule. This finding is consistent with observations in Ethiopia, where women who reported receiving adequate information from healthcare providers were more likely to complete the TT vaccination series[23]. In contrast, a study from Pakistan highlighted that inadequate information from health workers contributed to lower vaccination rates, suggesting that empowering health workers with effective communication strategies can positively influence vaccine uptake[24].

Overall, the data from Ogun State supports the notion that informed and engaged healthcare providers, alongside educational initiatives, can significantly impact the acceptance and completion of the TT immunization schedule. These results not only align with global trends but also emphasize the importance of context-specific strategies in addressing knowledge gaps and enhancing immunization coverage.

The study reveals that women aged over 30 are more than twice as likely to access TTI compared to younger women, though this association is not statistically significant. Similar findings are observed in a study conducted in India, where older maternal age was linked to increased vaccination access due to heightened health awareness and maternal experience[25]. However, in contrast, a study in the United States found that age did not significantly affect vaccine uptake, possibly due to the uniform access across age groups within the healthcare system. This indicates that age-related disparities in immunization access may be more pronounced in developing countries, where healthcare outreach may be less equitable across age groups.

Marital status demonstrated varying effects on TTI access. Married women in this study showed slightly lower odds of accessing immunization than divorced women, which contrasts with findings from a study in Nigeria, where married women had better access

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to TTI due to family and spousal support[26]. Conversely, separated women showed almost double the likelihood of accessing TTI, aligning with the study by scholars in Canada, which found that women with less spousal dependence were more proactive about personal healthcare. The differential impact of marital status on healthcare-seeking behaviors underscores the influence of social support and autonomy in vaccine access[27].

Education strongly influenced TTI access, with women having no formal education significantly less likely to obtain TTI. This outcome aligns with findings from a study in Nigeria, which emphasizes that maternal education enhances health literacy, increasing immunization adherence. Likewise, a study in India reported that educated women were more knowledgeable about immunization benefits, corroborating the observation that educated women are more likely to adhere to vaccination schedules. The consistency of this pattern across studies from different socioeconomic contexts suggests a universal role of education in promoting vaccination[28].

Religious affiliation was found to have an influence on TTI access, with Muslim women showing lower, albeit non-significant, odds of accessing TTI compared to Christian women. This finding mirrors that of a study in Nigeria, who noted that some religious beliefs may deter vaccine acceptance due to cultural or religious opposition[29]. However, a contrasting study in the Netherlands observed no significant association between religion and immunization access, suggesting that religious impacts on health behaviors might be mitigated in contexts with strong public health infrastructures. This discrepancy highlights the role of cultural context in shaping health behaviors[30].

Ethnic differences significantly impacted TTI access in this study, with Yoruba women showing over five times higher likelihood of access than Hausa women. In line with this,

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research in Nigeria found that ethnocultural factors, including language and trust in healthcare providers, affect immunization uptake[31]. Similarly, a study in India identified ethnic disparities, where certain ethnic groups benefited from localized health campaigns, enhancing access. Ethnic diversity and the associated cultural perceptions of healthcare may thus influence immunization rates, as seen both within Nigeria and in other multicultural societies.

Knowledge was a strong predictor of TTI access, with informed women being three times as likely to receive immunization. This finding is supported by a study in Australia, which established that knowledge and awareness significantly improve vaccine uptake[32]. Further corroborated by a scholar in Nigeria, where community health education increased TTI awareness, the positive association between knowledge and immunization access emphasizes the need for targeted education to bridge informational gaps.

Women who delivered in health centers were more likely to access TTI, highlighting the role of healthcare exposure. This aligns with a study in the United States, where health facility delivery was associated with higher vaccination rates due to immediate postpartum health interventions[33]. Similarly, a study in Nigeria found that women who gave birth at health facilities were more engaged in follow-up immunization due to institutional guidance, underscoring how delivery location impacts subsequent healthcare behaviors[34].

Economic status influenced TTI access, with low-income women showing lower odds of access. This finding is consistent with a scholar in Nigeria, who identified economic barriers, such as transportation costs, that limit healthcare access for low-income women. Likewise, research in Canada found that income levels affected healthcare utilization,

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although subsidies in developed countries mitigated the gap. Financial barriers thus remain a critical consideration in vaccine accessibility, particularly in low-resource settings[35].

Urban women in this study had slightly lower odds of accessing TTI compared to rural women. This outcome contrasts with a study in China, where urban women had better vaccine access due to proximity to healthcare facilities[36]. However, as shown by a study in Nigeria, rural-focused immunization programs in underserved areas could explain higher rural access, as targeted initiatives bridge geographical gaps. This variation suggests that healthcare initiatives can substantially influence rural-urban disparities in immunization access[37].

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Chapter Five

Conclusion

This chapter presents the summary of research findings, conclusion, recommendations and suggestion for further studies.

5.1 Summary of Findings

The goal of this research is to critically examine the coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women in Ogun State. Specifically, the study aim to determine the current coverage level of Tetanus toxoid immunization among women of reproductive; identify the barriers and challenges faced by them in accessing Tetanus toxoid immunization; explore the facilitators that promote Tetanus toxoid immunization uptake among those women; assess the knowledge, attitudes, and factors associated with intake of Tetanus toxoid immunization among Women, and investigate the factors that influence uptake of Tetanus toxoid immunization.

This study explored multiple factors that influence the uptake of tetanus toxoid immunization among pregnant women, particularly during pregnancy. The findings spread across significant associations between socio-demographic variables, healthcare accessibility, cultural beliefs, partner support, and immunization adherence. The summary of the study findings is presented in a detailed and comprehensive form. Based on the first objective of the research which determine the current coverage level of Tetanus toxoid immunization among pregnant women in Ogun State. Of the 953 respondents that either currently have pregnant or had have pregnant before, 78.7% (797 out of 953) of women had received tetanus toxoid immunization during their current pregnancy. This is a very

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good indicator of uptake of preventive care vaccine. Similarly, 74.8% (758 out of 953) reported receiving tetanus toxoid immunization during previous pregnancies which shows a consistent immunization practices across multiple pregnancies.

However, there is still need for areas for improvement, as 15.4% and 19.2% of women did not receive tetanus toxoid immunization in their current and previous pregnancies, respectively. While it is important to look at the coverage it is also very crucial to see the adherence of the dosage breakdown which further clarifies the immunization dosage received, the results of the analysis shows that most women receive one and two doses of the vaccine, 15.3% (155) received three doses.

As regard the second objective of the study which identify the barriers and challenges faced by pregnant women in accessing Tetanus toxoid immunization in Ogun State. A significant proportion of women said distance to healthcare facilities and transportation difficulties as key barriers to receiving tetanus toxoid immunization.

Based on the third objective of the study which assess the facilitators that promote Tetanus toxoid immunization uptake among pregnant women. The factors that have positively influenced women's decisions to receive tetanus toxoid immunization with most recommendations from healthcare providers were cited by 702 women (44%), highlighting the critical role that medical professionals play in promoting immunization. Information about Tetanus Toxoid provided during antenatal care visit is also assesses as key factors for women to uptake the vaccine. The majority of women, 853 (84.2%), reported receiving information about tetanus toxoid during these visits, which underscores the importance of antenatal care as a platform for disseminating crucial health information.

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For the fourth objective of the study which assess the knowledge, attitudes, and factors associated with intake of Tetanus toxoid immunization among pregnant women. The women's understanding of the benefits of tetanus toxoid immunization and their knowledge of the recommended timing and booster doses for the vaccine is crucial to look into and it was found out that majority 525 women (51.8%), correctly recognized that the primary benefit of the vaccine is protection against tetanus infection. Another notable benefit is Enhancing maternal and neonatal health which was cited by 211 (20.8%) women, this figure highlights the awareness of broader health outcomes. One hundred and eighty-three women (18.1%), associated the vaccine with reducing the risk of neonatal tetanus of which is significance in preventing a serious neonatal condition. After the knowledge, it is also very important to access their knowledge about the adherence of which 657 women (64.9%) reported knowing the correct timing for the first dose which shows a good level of awareness. Also, the cultural and Religious Beliefs shows their attitude towards the immunization decisions, 267 of women, particularly in rural areas said such belief hinder their decision to receive the vaccine.

The last objectives look into factors influencing uptake of Tetanus toxoid immunization among pregnant women. Socio-Economic and Educational level is a key factor, Women with higher levels of education were significantly more likely to be aware of the importance of tetanus toxoid immunization. Women with tertiary education had the highest awareness levels (308 women), compared to those with no formal education (207%). Also, partner support plays a vital role in influencing tetanus toxoid immunization was substantial, with 84% of women reporting that their partner's support encouraged them to receive the vaccine. The study found a significant relationship between healthcare accessibility and immunization uptake. Women who reported easy

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access to healthcare services were significantly more likely to receive the vaccine (64.5%).

5.2 Conclusion

Tetanus toxoid immunization plays a critical role in reducing maternal and neonatal tetanus, particularly in low- and middle-income countries where maternal health services may be underutilized. The findings of this study critically look into coverage, barriers, and facilitators of Tetanus toxoid immunization among pregnant women. Socio-demographic, cultural, and other factors influence tetanus toxoid immunization uptake. Barriers such as distance to healthcare facilities, transportation challenges, and cultural or religious beliefs remain significant obstacles to achieving higher immunization coverage. However, socio-economic factors, particularly education and partner support, emerge as strong facilitators of immunization adherence. Furthermore, the involvement of community leaders and the presence of supportive government policies significantly enhance vaccine uptake, particularly in rural areas.

More so, the study highlights that improving immunization rates requires approach that addresses both personal and general barriers. While education and awareness campaigns can mitigate vaccine hesitancy driven by cultural beliefs, infrastructural improvements are necessary to enhance access to healthcare services, particularly in rural areas. Additionally, engaging partners and communities in maternal health initiatives can significantly improve immunization coverage, as demonstrated by the strong correlation between partner support and vaccine uptake.

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5.3 Recommendations

The following recommendations were suggested by the study

i. **Enhance Healthcare Accessibility**: The government should prioritize improving healthcare infrastructure, particularly in rural areas, to ensure that healthcare services for tetanus toxoid immunization are within reasonable reach. Mobile vaccination units or outreach programs can be developed to bridge the gap in hard-to-reach areas.

ii. **Public Awareness Campaigns**: There is a need for comprehensive public health campaigns aimed at increasing awareness about the importance of tetanus toxoid immunization. These campaigns should specifically target women with low education levels and those from cultural or religious backgrounds that are associated with vaccine hesitancy. Utilizing mass media, social media, and community health workers can help disseminate vital information.Similarly, Antenatal care visits should be utilized as platforms for delivering clear and consistent information about the benefits of immunization and proper dosage adherence.

iii. **Engage Male Partners in Maternal Health**: Programs that encourage male involvement in maternal health should be promoted, as partner support has been shown to significantly influence immunization decisions. Antenatal care should include counseling sessions for couples to improve understanding and uptake of essential maternal vaccines.

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iv. **Strengthen Government Policies**: Governments should ensure the enforcement of existing policies that mandate tetanus toxoid immunization for pregnant women as part of routine antenatal care. Moreover, they should support initiatives that provide financial or transportation assistance to women facing economic barriers to accessing healthcare services.

v. **Community-Based Interventions**: Local community leaders should be actively involved in promoting tetanus toxoid immunization. Community-driven initiatives have proven to be effective in improving healthcare outcomes, as demonstrated in studies conducted in regions like rural India and sub-Saharan Africa.

5.4 Contribution to Knowledge

This research provides significant contributions to the domains of maternal health and immunization. This study emphasizes the existing coverage of tetanus toxoid immunization among pregnant women in Ogun State, offering critical insights into areas requiring enhancement. The findings highlight the important influence of socio-economic factors, including education and partner support, on vaccine adherence, providing a detailed understanding of the elements that facilitate immunization uptake.

The study identifies barriers that impede access to tetanus toxoid immunization, especially in rural regions. This information is essential for public health officials and policymakers seeking to enhance immunization coverage in comparable contexts. The research integrates cultural and religious sensitivities into the analysis, contributing to the discourse on vaccine hesitancy and offering a framework for developing targeted interventions to address these challenges.

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This study enhances the understanding of the impact of healthcare accessibility on immunization decisions, indicating that advancements in healthcare infrastructure can substantially increase immunization rates. This research provides evidence-based recommendations for healthcare providers, policymakers, and community leaders aimed at improving maternal health outcomes in Ogun State and beyond.

5.5 Suggestion for Further Studies

Future research should investigate the long-term effects of tetanus toxoid immunization on maternal and neonatal health outcomes in Ogun State and other areas. This would enhance understanding of the direct impact of immunization campaigns on maternal and neonatal mortality rates. Additionally, research is required to evaluate the effectiveness of targeted interventions that tackle specific barriers identified in this study, including transportation and cultural factors.

Additional research may evaluate the impact of digital technology on enhancing awareness and accessibility regarding tetanus toxoid immunization. This may involve assessing the practicality of utilizing mobile health platforms for educating women in remote regions or for monitoring immunization schedules and follow-up appointments. Future studies should examine the role of healthcare providers in addressing vaccine hesitancy and explore ways to improve their training for effectively communicating the benefits of immunization to pregnant women.

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Ouma, P.E.O. *Spatial Access to Comprehensive Emergency Obstetric and Neonatal Care and Its Relationship to Mortality at the Regional Level in Sub-Saharan Africa and at a National Level in Kenya*. Open University (United Kingdom), 2020.

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Appendix I

Informed Consent

Title of Study

Coverage, Barriers and Facilitators of Tetanus Toxoid Immunization among Pregnant women in Ogun State

Principal Investigator

Yusuf Amuda RABIU

Public Health Department, Lead City University

Lead City University, Toll Gate, Ibadan,

+2348035800215

arablink70@gmail.com

Purpose of Study

My name is Yusuf Amuda Rabiu, a P.hD student at the Faculty of public health, Lead City University, Ibadan. I am conducting a study on Coverage, Barriers and Facilitators of Tetanus Toxoid Immunization among Pregnant women in Ogun State.

I am interested in understanding the current coverage level of tetanus toxoid immunization and their knowledge and attitude associated with the uptake of tetanus toxoid immunization among pregnant women in Ogun State. I hereby solicit your support in completing this questionnaire.

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Research Procedure

If you agree to be in this study, you will be asked to answer questions about yourself pertaining to the purpose of this study described above. These questions will be asked using a structured questionnaire. The questionnaire will take about 5 to 10 minutes of your time to complete.

Risks and Benefits

There are no known risks if you take part in this study. There are also no incentives but the information you provide would hopefully serve as an important input to intervene in programs that aim at improving children health.

Compensation

Participant will not be compensated for participation in this study. Participation is voluntary.

Confidentiality

All information you provide will be confidential and used for research purpose only. Your name will not be required and will never be used in connection with any information you give. Your response is completely anonymous. No personal identifying information will be collected. Every effort will be made by the researcher to preserve your confidentiality. Only the research team will have access to the answered questionnaires. Confidentiality and privacy will be maintained.

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Contact Information

If you have questions at any time about this study, or you experience adverse effects as the result of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Primary Investigator, please contact the Supervisor at olowolafe.tubosun@lcu.edu.ng

Voluntary-Participation

Your decision to participate in this study is completely voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason.

Withdrawal from the Study/Withdrawal of Authorization

If you decide to participate in this study, you may withdraw from your participation at any point without penalty. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

Consent

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

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Appendix II

Questionnaire

Department of Public Health, Faculty of Basic Medical and Health Sciences, Lead City University, Ibadan, Oyo State

Dear Respondents,

You are being invited to participate in research titled **"Coverage, Barriers and Facilitators of Tetanus Toxoid Immunization among Pregnant women in OGUN State**". This study is being carried out by Yusuf Amuda Rabiu, a post-graduate student of the Faculty of Public Health at the Lead City University, Ibadan. Your participation in this research is completely voluntary you may decline altogether, or leave blank any questions you do not wish to answer.

Please assess these questions and pick the one that best defines you answer.

1. Age: _____
2. Marital Status: (a) ☐ Single (b) ☐ Married (c) ☐ Divorced (d) ☐ Widowed (e) ☐ Separated
3. Educational Level (a) ☐ None (b) ☐ PrimaryEducation (c) ☐ Secondary Education (d)☐ Higher/Tertiary Education
4. Religion**:** (a) ☐ Christianity (b) ☐ Islam (c) ☐ Traditional (d) ☐ Others
5. Occupation Status: (a) ☐ Skilled (b) ☐ Unskilled (b) ☐ Unemployed (b) ☐ Housewife

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6. Ethnicity: (a)☐ Igbo (b) ☐ Hausa (c) ☐ Yoruba (d) ☐ Others

7. Number of previous pregnancy _____

8. Number of life birth _____

9. Age at first pregnancy_____

10. Age at first child birth_____

11. Place of residence (a) ☐ Rural (b) ☐ Urban

12. Partner's age_____

13. Partner's education level _____

14. Partner's occupation_____

15. Partner's income per month_____

16. Place of previous child birth: (a) ☐ Traditional Birth Attendant (b) ☐ Church ☐ Maternity (c) ☐ Home (d) ☐ Health Centre (e) ☐ Hospital

17. Antenatal visit: (a) ☐ Yes (b) ☐ No

18. If Yes, How many visit have you had?_____

19. IncomeStatus: (a) Low-income☐ (b) Middle-income☐ (c)High-income☐

Section B: Tetanus Toxoid Immunization Coverage:

20. Have you received Tetanus toxoid immunization during your current pregnancy?

(a) Yes☐

(b) No☐

21. If Yes, Where?_____

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22. How many doses of Tetanus toxoid vaccine have you received?

    (a) None

    (b) One dose

    (c) Two doses

    (d) Three doses

23. Did you receive Tetanus toxoid immunization during previous pregnancies?

    (a) Yes

    (b) No

Section C: Knowledge and Awareness

24. Are you aware of the importance of Tetanus toxoid immunization during pregnancy?

    (a) Yes

    (b) No

25. What do you know about the benefits of Tetanus toxoid immunization for pregnant women and newborns?

    (a) Protects against tetanus infection

    (b) Reduces the risk of neonatal tetanus

    (c) Enhances maternal and neonatal health

    (d) Other (Please specify)

26. Are you aware of any potential risks or side effects associated with Tetanus toxoid immunization?

    (a) Yes

    (b) No

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27. Do you know the recommended timing for receiving the first dose of Tetanus toxoid immunization during pregnancy?
    (a) Yes
    (b) No
28. Do you know the number of additional booster doses recommended for Tetanus toxoid immunization during pregnancy?
    (a) Yes
    (b) No
29. Where did you obtain information about Tetanus toxoid immunization during pregnancy?
    (a) Healthcare providers
    (b) Family or friends
    (c) Media (TV, radio, internet)
    (d) Other (Please specify)
30. Do you face any financial constraints in receiving Tetanus toxoid immunization?
    (a) Yes
    (b) No
31. Are you aware of the recommended schedule for Tetanus toxoid immunization during pregnancy?
    (a) Yes
    (b) No

Section D: Perception of Tetanus Toxoid Immunization

32. How would you rate the importance of Tetanus toxoid immunization during pregnancy?

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(a) Very important

(b) Important

(c) Somewhat important

(d) Not important

33. How confident are you in the safety and effectiveness of Tetanus toxoid immunization?

(a) Very confident

(b) Confident

(c) Somewhat confident

(d) Not confident

34. How satisfied are you with the information provided by healthcare providers regarding Tetanus toxoid immunization during pregnancy?

(a) Very satisfied

(b) Satisfied

(c) Neutral

(d) Dissatisfied

(e) Very dissatisfied

35. Have healthcare providers addressed your concerns and questions about Tetanus toxoid immunization adequately?

(a) Yes, always

(b) Yes, sometimes

(c) No, rarely

(d) No, never

Section E: Barriers to Tetanus Toxoid Immunization

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36. What are the main reasons why you have not received Tetanus toxoid immunization?
    (a) Lack of awareness
    (b) Financial constraints
    (c) Distance to healthcare facilities
    (d) Fear of side effects
    (e) Cultural or religious beliefs
    (f) Other (Please specify)
37. Are there any challenges or obstacles you face in accessing Tetanus toxoid immunization services?
    (a) Yes
    (b) No
    (c) If yes, please specify:
        - Cost of transportation to the healthcare facility
        - Difficult access to a healthcare facility
        - Long waiting times at healthcare facilities
        - Inadequate information or communication
        - Lack of availability of vaccines
        - Other (Please specify)

Section F: Facilitators of Tetanus Toxoid Immunization

38. What factors influenced your decision to receive Tetanus toxoid immunization?
    (a) Recommendations from healthcare providers
    (b) Information provided during antenatal care visits
    (c) Awareness of the benefits of immunization

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(d) Influence of family or friends

(e) Other (Please specify)

39. Were you provided with information about Tetanus toxoid immunization during your antenatal care visits?

(a) Yes

(b) No

40. Did healthcare providers play a role in encouraging or facilitating your Tetanus toxoid immunization?

(a) Yes

(b) No

Section G: Community Support

41. Have you received any advice or recommendations from community health worker or nurses regarding Tetanus toxoid immunization during pregnancy?

(a) Yes

(b) No

42. Did community awareness campaigns or programs influence your decision to receive Tetanus toxoid immunization?

(a) Yes

(b) No

43. Does the community leadership ensure/enforce that all pregnant women receive Tetanus toxoid immunization?

(c) Yes

(d) No

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Section H: Accessibility of Healthcare Services

44. How far is the nearest healthcare facility providing Tetanus toxoid immunization services from your residence?
    (a) Less than 1 km
    (b) 1-5 km
    (c) 5-10 km
    (d) More than 10 km
45. Are healthcare services for Tetanus toxoid immunization easily accessible in your community?
    (a) Yes
    (b) No
46. Have you faced any difficulties in arranging transportation to healthcare facilities for Tetanus toxoid immunization?
    (a) Yes
    (b) No
47. Which sources of information do you trust the most for accurate information about Tetanus toxoid immunization during pregnancy? (Select all that apply)
    (a) Healthcare providers
    (b) Government health agencies
    (c) Internet/websites
    (d) Friends or family
    (e) Social media
    (f) Television/radio
    (g) Other (Please specify)

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48. Do any cultural or religious beliefs affect your decision to receive Tetanus toxoid immunization during pregnancy?
    (a) Yes
    (b) No
    (c) Not applicable
49. Have you received other vaccinations (besides Tetanus toxoid) during your current pregnancy?
    (a) Yes
    (b) No
    (c) Not sure
50. Have you experienced any instances where Tetanus toxoid vaccine was not available at the healthcare facility?
    (a) Yes
    (b) No
51. Do you have someone, such as a family member or friend, who reminds or encourages you to receive Tetanus toxoid immunization during pregnancy?
    (a) Yes
    (b) No
52. How concerned are you about the safety of Tetanus toxoid immunization during pregnancy?
    (a) Very concerned
    (b) Somewhat concerned
    (c) Not concerned

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53. Are there any government policies or programs that have positively influenced your decision to receive Tetanus toxoid immunization during pregnancy?

    (a) Yes

    (b) No

54. Does your partner support and encourage you to receive Tetanus toxoid immunization during pregnancy?

    (a) Yes

    (b) No

    (c) I don't have a partner

55. Based on your experiences and knowledge about Tetanus toxoid immunization, what recommendations would you make to improve its coverage among pregnant women in Ogun State?

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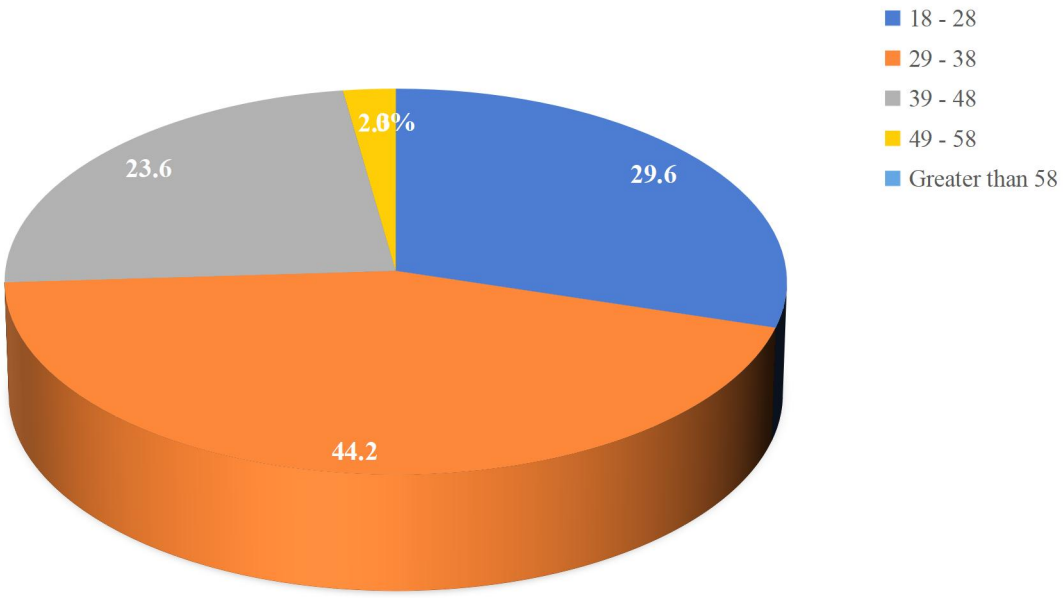
Appendix III

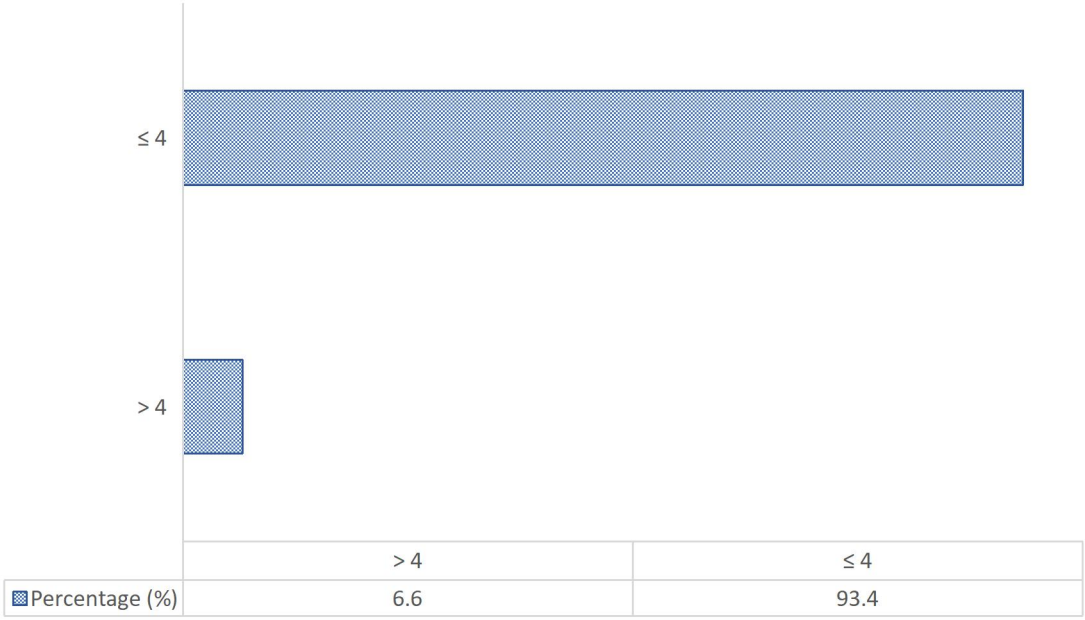
Result Outputs

Respondents' Age



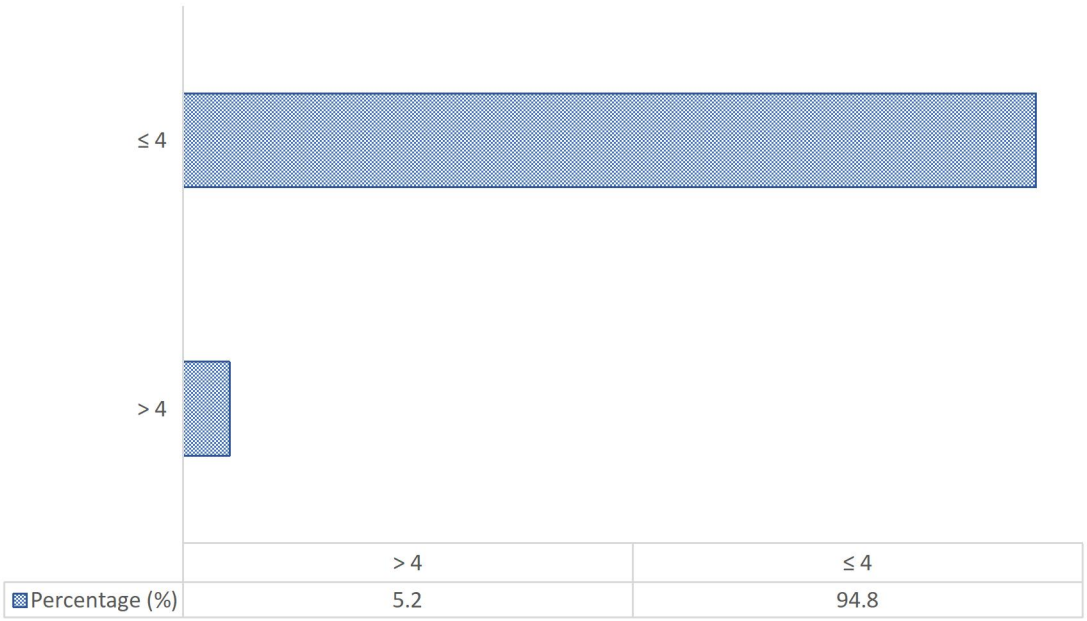
Field Result, 2024

Number of Previous Pregnancy



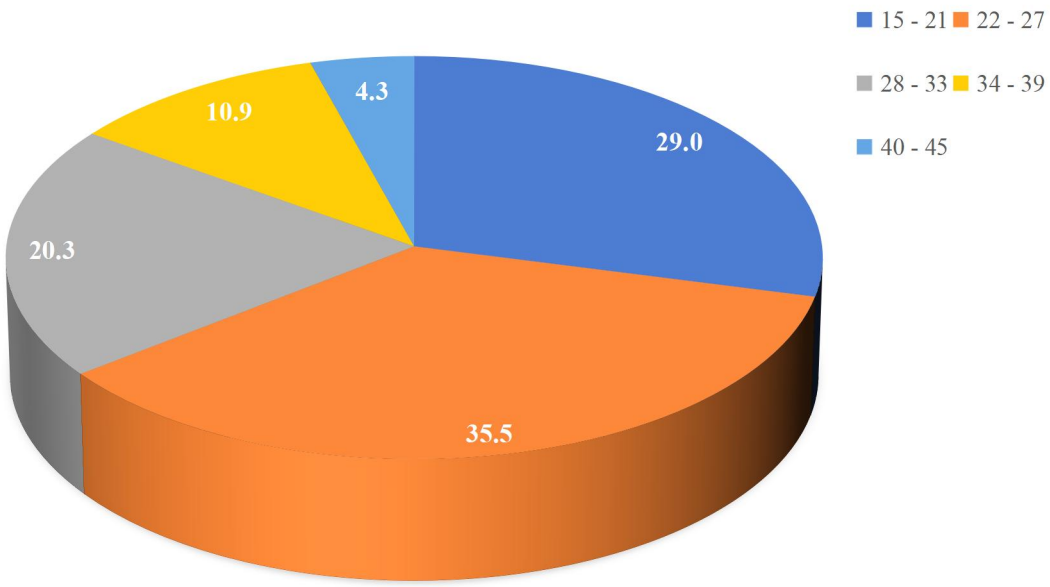
Field Result, 2024

Number of Life Birth



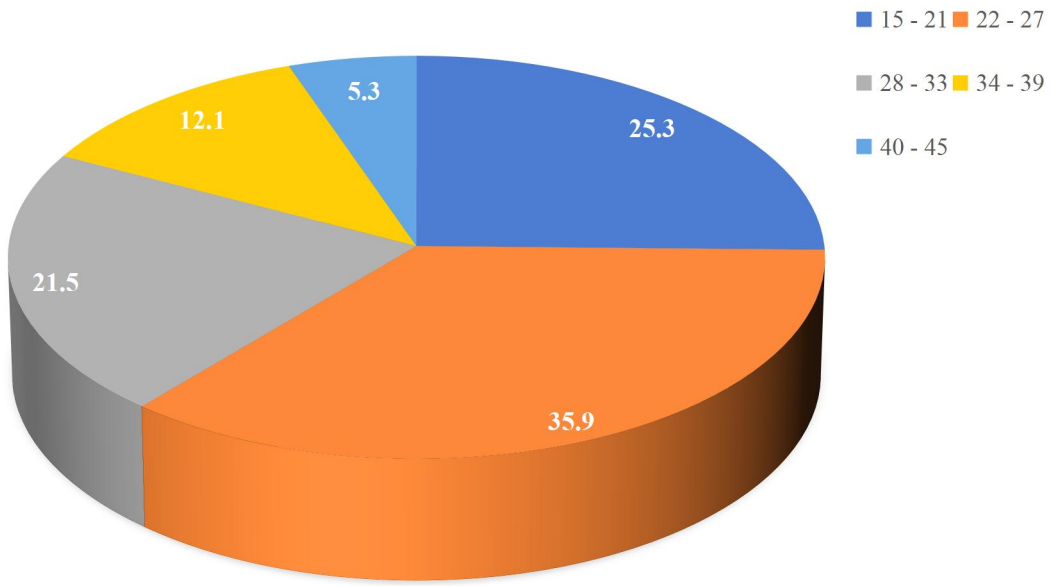
Source: Field Result, 2024

Age at First Pregnancy



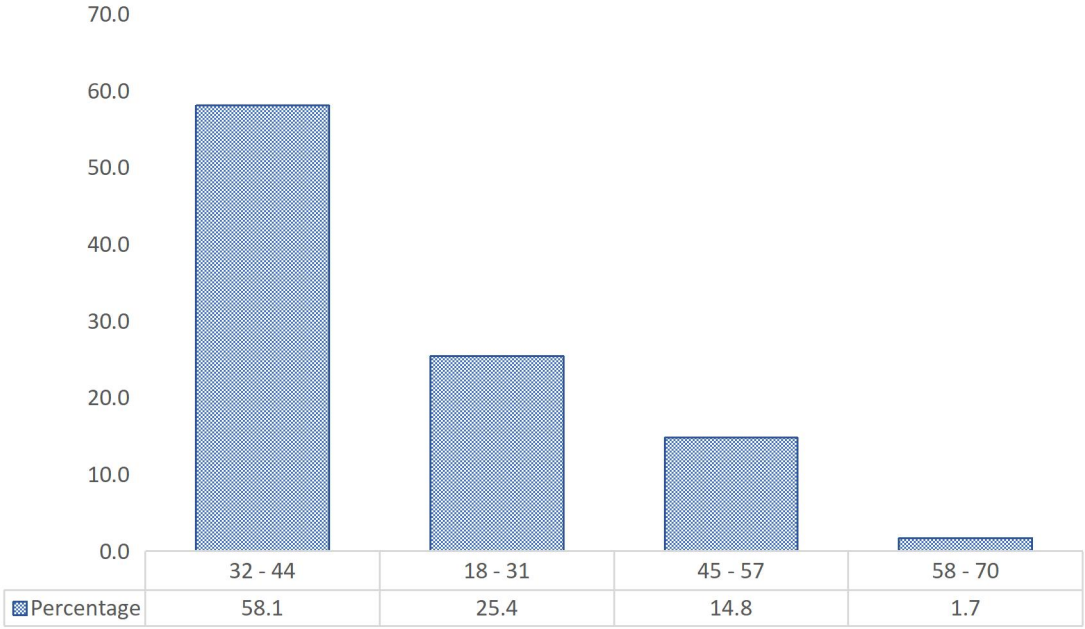
Field Result, 2024

Age at First Childbirth



Field Result, 2024

Respondents' Partner's Age



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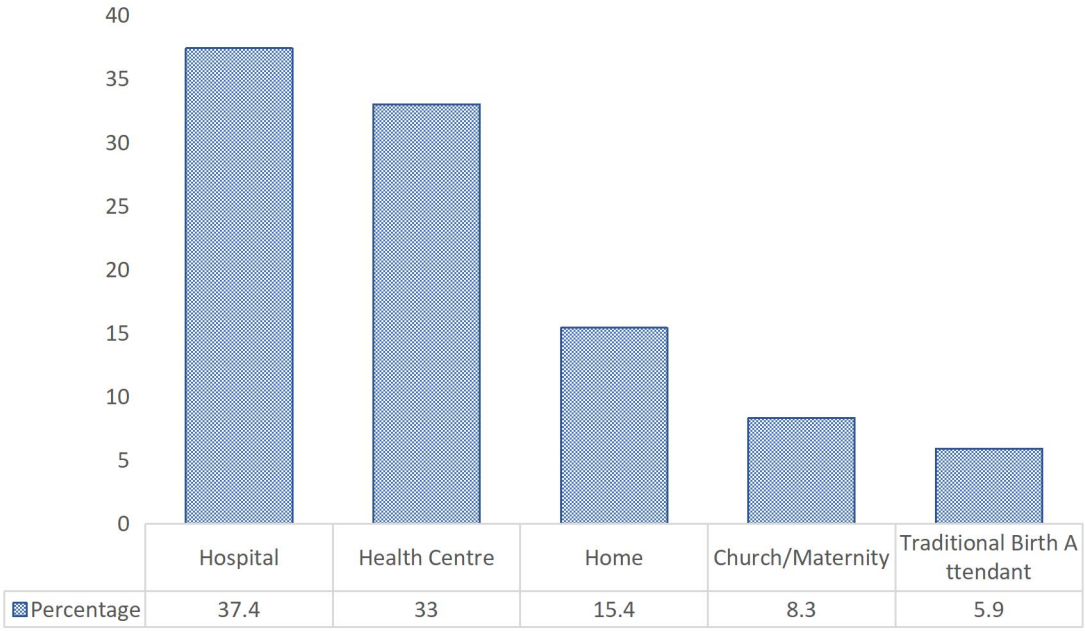
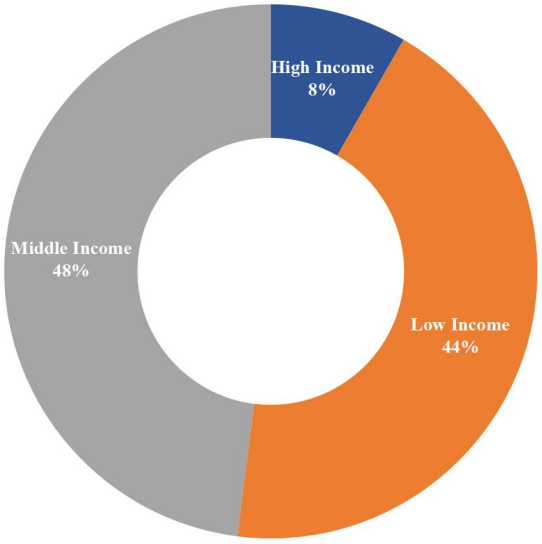
Place of Previous Childbirth



Field Result, 2024

Respondents' Income Status



Field Result, 2024

Biodata

A. Personal Data

1. Full Name: Yusuf Amuda RABIU
2. Email: arablink70@gmail.com
3. Phone No: 08035800215
4. Address: 2, Kola Fagbohun Street, Ota, Ogun State.
5. Date & Place of Birth: 1970, Agosasa, Ogun State.
6. Nationality: Nigerian
7. Name and Address of Next of Kin: Pharm. Ajibola Rabiu. 2, Kola Fagbohun Street, Ota, Ogun State.

B. Educational Background and Academic Qualification with Dates

1. Educational Background with Dates

- Agosasa Community High School, Agosasa	1980-1985
- Ijamido High School, Ota	2000
- Ogun State College of Health Tech., Ilese	1989-1991
- Lagos University Teaching Hospital	2007- 2008
- Houdegbe North American University, Cotonou	2009-2011
- Ladoke Akintola University of Technology, Ogbomoso	2011-2013
- University College Hospital, Ibadan	2013-2014
- Leadcity University, Ibadan	2019- Till Date.

2. Academic Qualification with Dates

- G.C.E/O'level/WAEC	2000/2010
- Diploma in Community Health	1989-1991
- Higher Diploma in Community Health	2007-2008
- BSc Community Health	2009-2011
- M.P.H	2011-2013
- Diploma in Education (PHC Tutor)	2013-2014

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- PhD in View 2019-Till Date

3. Professional Qualification with Dates

- Registered Community Health Officer 2007-2008
- Primary Health Care Tutor 2013-2014

C. Working Experience with Dates

- Clinical Experience; Work at different Hospital and Clinic. 1995-Till Date
- College of Hygiene, Ibadan (Teaching Practice). 2014
- Guest Lecturer at Lagos University Teaching Hospital (School of Community). 2016-Till Date
- Crestfield College of Health Tech. Erin Osun (HOD). 2018-Till Date

D. Award and Fellowship

- Fellow African Institute of Public Health. 2017
- Best Student in Practical Teaching (NCH), Principle of Education. 2014
- Best Student in Medical Sociology UCH, Ibadan. 2014

E. Member of Academic Professional Bodies

- National Association of Community Health Practitioners of Nigeria
- Association of Private Community Health Practitioners of Nigeria
- Association of Primary Health Care Tutors of Nigeria

F. Publications

- Accessing Coverage Barriers and Impact of Social Cultural Factors on Tetanus Toxoid Immunization Uptake Among Women of Clinical Bearing Age in Ogun State, Nigeria.
- Associated Factors of Tetanus Toxoid Vaccine Uptake Among Women of Reproductive Age in Ogun State, Nigeria.

G. Major Conferences Attended with Dates

- African Institute of Public Health Conference, Abuja, 2017.

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H. References

- Professor Bisiriyu Lukmon (Obafemi Awolowo University, Department of Demography and Social Statistics).

- Dr. Musa Z. (Biostatistics Submit) Nigeria Institute of Medical Research, Yaba, Lagos, Nigeria.

- Dr. Onawola (Director Institute Community Health, Abuja.

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_____ _____

Signature **Date**

The University Compliance Certification

This is to certify that, this thesis was written by **Yusuf Amuda RABIU** with Matriculation number **LCU/PG/001371** in the Department of Public Health, Faculty of Basic Medical and Applied Sciences, Lead City University, Ibadan Oyo State in full compliance with the approved University format and style.

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_____ _____

Signature **Date**