Factors Influencing and Significance of Health Promotion on Immunization Programme Uptake among the Caregivers in South-West, Nigeria

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Certification

This is to certify that Augustine Adenola **BANKOLE** with matriculation number LCU/PG/001633 carried out this research work titled "Factors Influencing and Significance of Health Promotion on Immunization Programme Uptake among the Caregivers in South-West, Nigeria." in the Department of Public Health, Faculty of Basic Medical and Health Sciences, Lead City University, Ibadan for the award of Doctor of Philosophy Degree in Public Health and this has not been previously submitted.

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Dedication

This research work is dedicated to the Holy Trinity-one God.

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Abstract

Despite the availability of immunization services, many children in Nigeria remain unprotected against vaccine-preventable diseases, and immunization coverage remains low. The study investigated the social determinants and significance of Health Promotion on childhood immunization programme uptake among the care-givers in South-West, Nigeria. A mixed-method study was conducted, incorporating both qualitative and quantitative data collection and analysis methods. Qualitative data was collected through focus group discussion with caregivers, while quantitative data was collected through a structured survey questionnaire. Quantitative data was collected from 786 caregivers in randomly selected communities in Nigeria and 37 persons comprising of caregivers, health care providers and community leaders participated in the focus group discussion. Most caregivers received antenatal care, yet a small percentage did not, suggesting a potential gap in access or awareness. Primary locations for antenatal care were health centers and general hospitals and diverse birthing practices were observed, with varied locations for childbirth. Child immunization status indicates that 483 respondents (61.5%) reported that their child's immunization is complete. The study identified caregiver's age (P=0.014), religion (P=0.001), monthly income (P=0.011), marital status (P=0.001), occupation (P=0.002), number of children (P=0.023), educational level (P=0.001), knowledge about immunization (P=0.014) and attitude towards immunization (P=0.020) as socio determinants associated with immunization uptake. High awareness of childhood immunization was noted also indicating a high positive attitude towards vaccination, although there were misconceptions. Healthcare providers were identified as influential in promoting vaccination. The multifaceted motivations for completing child immunization were highlighted, along with barriers to be

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addressed. All participants (100%) reported having received health promotion messages or campaigns related to childhood immunization and the channels through which these messages were received varied. Participants express significant concerns about childhood diseases, emphasizing the perceived severity and potential risks associated with vaccine-preventable illnesses. Additionally, social determinants of health, such as poverty, education, and healthcare access, play a role in shaping perceptions of disease severity, as these factors can impact the ability to seek timely and adequate medical care in case of an illness. Financial constraints and the cost of immunization, albeit relatively low, are also acknowledged as potential barriers. Caregivers universally acknowledge the crucial protection provided by childhood immunization against a spectrum of severe and potentially life-threatening diseases. Caregivers exhibit varying levels of confidence in their ability to ensure timely vaccination for their children. Caregivers employ various prompts and reminders to ensure timely vaccination for their children, including setting alarms, relying on healthcare providers' notifications, and marking dates on calendars. The study provides valuable insights into caregiver perceptions and behaviors regarding childhood immunization, emphasizing the importance of comprehensive health promotion strategies.

Keywords: Immunization, Social Determinants, Coverage, Status, Caregivers

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List of Acronyms

Abbreviation	Meaning
BCG	Bacillus Calmette Guerin
COVID-19.	Corona-virus Disease 2019
DPT	Diphteria Pertusis and Tetanus Vaccine
EPI	Expanded Programme on Immunization
FGD	Focus Group Discussion
HBM	Health Belief Model
HIB	Heamophilus Influenza Type B
LGA	Local Government Areas
MDG	Millennium Development Goals
NIS	National Immunization Survey
NPHCDA	National Primary Health Care Development Agency
NPI	National Programme on Immunization
NDHS	Nigeria Demographic Health Survey
OPV	Oral Polio Virus
PRECEDE	Predisposing, Reinforcing and Enabling Constructs in Educational Environmental Diagnosis and Evaluation
RI	Routine immunization
SDG	Sustainable Development Goals
SSA	Sub-Saharan Africa
TRA	Theory of Reasoned Action
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

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Chapter One

Introduction

1.1 Background of the Study

About 4 million children die annually from diseases that could easily be prevented by immunization globally. Many millions more suffered serious illness or became disabled for life from these same diseases [1]. As a result of these, many countries around the world have adopted and implemented immunization programs against several communicable diseases of childhood. Health is one of the most significant aspects of life; it is a resource for daily existence[2]. Additionally, health promotion is integral to societal functioning and decision-making across all levels and domains[3]. Health promotion is seen as a fundamental element of health development. An ecological approach to health and health promotion holds that people, communities, society, and its authorities all bear some responsibility[3]. A variety of factors, including social, cultural, and structural aspects in addition to individual traits, influence health, which is multifaceted. Therefore, a broad strategy for health promotion has been promoted[4]. Public health discussions and health policy development in many nations, including Nigeria, have been greatly impacted by this strategy, particularly the Ottawa Charter for Health Promotion[4].

An essential part of healthcare services is immunization, which ensures that all eligible children under the age of five receive enough protection against illnesses that can be avoided in childhood through vaccination. Around 38% of all paediatric deaths worldwide each year are attributable to illnesses that can be avoided with vaccinations[5].

Immunization represents an essential part of healthcare services, guaranteeing all eligible children under the age of five receive sufficient protection against vaccine preventable diseases, including

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Poliomyelitis, Measles, Diphtheria, Tuberculosis, Tetanus, Yellow Fever, Hepatitis B, Pertussis, Hib, and others. This initiative significantly contributes to the reduction of disability, morbidity, and mortality rates among these children[5].

However, some social determinants of health, such as socioeconomic status, education, and healthcare access, influence childhood immunization rates among caregivers in Nigeria. The socioeconomic standing of a household affects how they perceive and understand the value of vaccinations, as well as their ability to access healthcare services, particularly immunization services. Educational level is also an important determinant of immunization uptake, as a higher level of education has been associated with greater knowledge on immunization and improved access to healthcare services[6]. Health promotion techniques have been proven to be helpful in enhancing childhood immunization rates; these tactics focus on raising awareness and encouraging carers to participate in immunization programs. Some notable examples of health promotion strategies involve community mobilization, interpersonal communication, advocacy, community involvement, community sensitization, community dialogues, focus group discussions, stakeholder meetings, edutainment, and mass media campaigns[7,8].

Immunization is the product of immunity by artificial means. It's a basic and principal measure of prophylaxis and control of infectious diseases. Immunization is also the process of providing immunity against diseases by introducing a substance called a vaccine into the body. It's a significantly useful tool which is responsible for the eradication of smallpox, a natural infection in the world as of 1876[9].

Vaccination is essential worldwide as a cost-effective strategy for decreasing childhood mortality and morbidity in public health. Elements that emphasised personal and household factors influencing health-seeking behaviours, including enhancing individuals' understanding to

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effectively leverage the vaccination program [10]. The purpose of immunization is to ensure that all eligible children in the community receive adequate and lasting protection from deadly diseases, thereby reducing infant morbidity and mortality rates[11]. Assessment of National programme on Immunization benefits on other elements of the health system, particularly those which are not amendable to objective[12]. In this view, Immunization served as an indicator of the performance of the health system as a whole. Therefore, assessment of the factors and significance of health Promotion on childhood immunization programme uptakes among the caregivers in Nigeria was conducted.

1.2 **Statement of the Problem**

Despite the Expanded Programme on Immunization (EPI's) goals, Nigeria is still ranked among the lowest rates of routine vaccination coverage globally. The spread of communicable diseases is growing among the citizenry despite the availability of disease-preventable vaccines. Recently, Nigeria was ranked 187th in the World Health System among 190 member nations, which called for immediate public health interventions[11].

The Nigeria Demographic Health Survey (NDHS) in 2018 recorded children under 5 years mortality rate at 132 per 1,000 live births. They also recorded that the percentage of children who received all basic immunizations is 31, which grossly falls short of Sustainable Development Goal 3, which targets 90% of children towards all basic vaccinations[6]. Globally, childhood vaccination has been shown to lower child mortality and morbidity, making it an essential public health measure. Many Nigerian children are still unprotected against diseases that can be prevented by vaccination, and vaccination uptake rates are still low, even with the availability of immunization programs[1]. The World Health Organization recommends that all children receive a full course of

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immunizations to protect them against preventable diseases such as polio, measles, diphtheria, tetanus, pertussis, and others.

The majority of disease control and prevention initiatives in Nigeria are carried out vertically, which has led to the utilization of limited financial, human, and material resources at the expense of efficiency, coverage, and synergy[14]. The high prevalence of disability, morbidity, and mortality rates among nursing mothers and children, attributable to inadequate economic conditions and negative attitudes towards immunization services, is alarming and presents significant challenges. Recent systematic reviews carried out on a global scale have struggled to pinpoint common factors contributing to incomplete immunisation. This challenge arises from the intricate and contextdependent nature of the decision-making process involved in the choice to vaccinate [15].

Therefore, as part of intervention towards improvement on the above Public Health challenges, this study was conducted to assess the factors influencing and significance of health promotion on childhood Immunization Programme among the caregivers in Nigeria.

1.3 Objectives of the Study

The main objective of this study was to investigate the factors influencing and significance of Health Promotion on childhood immunization programme uptake among the care-givers in South-West, Nigeria.

Specific Objectives:

The specific objectives of this study were to

1. assess the immunization status of children in South-West, Nigeria.
2. assess the factors that influence childhood immunization uptake among the mothers/caregivers in South-West, Nigeria

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3. identify the barriers and motivating factors for completing the childhood uptake among the mothers/caregivers in South-West, Nigeria
4. assess the knowledge and attitudes of caregivers towards immunization uptake among the mothers/caregivers in South-West, Nigeria
5. identify the significance of health promotion campaigns on childhood immunization uptake among the mothers/caregivers in South-West, Nigeria
6. explore the caregiver perceptions and experiences related to childhood immunization uptake in South-West, Nigeria using the health belief model.

1.4 Research Questions

This study answered the following research questions:

1. What is the immunization status of children in South-West, Nigeria?
2. What are the factors that influence childhood immunization uptake among mothers/caregivers in South-West, Nigeria?
3. What are the barriers and motivating factors for completing the childhood immunization uptake in South-West, Nigeria?
4. What is the level of the knowledge and attitudes of caregivers that influence immunization uptake in South-West, Nigeria?
5. How do health promotion campaigns on childhood immunization uptake influence the mothers/caregivers in South-West, Nigeria?
6. What are the caregiver perceptions and experiences related to childhood immunization using the health belief model in South-West, Nigeria?

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1.5 Significance of the Study

By examining the factors that influence childhood immunization rates, this study provided valuable insights into the factors affecting healthcare access and decision-making among caregivers in the region. Understanding these factors can help policymakers and healthcare providers tailor interventions to address barriers to immunization uptake, ultimately improving vaccination coverage and reducing the burden of preventable diseases in children.

Furthermore, the study's focus on the role of health promotion in increasing awareness and participation in immunization programs is essential for developing effective strategies to educate caregivers and communities about the importance of vaccination. By identifying effective health promotion strategies and assessing their impact on immunization uptake, this research contributes to the development of evidence-based interventions that can enhance vaccination rates and promote better health outcomes for children in South-West Nigeria.

Furthermore, the study's use of the health belief model to examine caregivers' views and experiences about childhood vaccination uptake provides significant knowledge on factors affecting caregivers' attitudes and vaccination-related behaviours. Research on carers' knowledge, attitudes, and immunization barriers might help develop focused interventions that address specific challenges and misunderstandings, ultimately creating a supportive atmosphere for vaccination uptake.

1.6 Justification of Study

Immunization is a cornerstone of preventive healthcare, yet low vaccination coverage persists in certain communities, leading to increased risks of vaccine-preventable diseases. By investigating the social determinants that influence childhood immunization rates, this study uncovered

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underlying factors that hinder vaccination uptake among caregivers, such as socioeconomic status, education levels, and access to healthcare services. Understanding these factors is essential for developing targeted interventions that can effectively address barriers to immunization and enhance vaccination coverage in South-West Nigeria.

Furthermore, the study's focus on health promotion strategies underscores the importance of raising awareness and promoting the uptake of immunization services among caregivers. By identifying effective health promotion approaches, such as community mobilization, interpersonal communication, and mass-media campaigns, this research seeks to empower caregivers with the knowledge and resources needed to make informed decisions about vaccinating their children. By evaluating the impact of these strategies on immunization uptake, the study can provide valuable insights into the effectiveness of health promotion efforts in influencing caregiver behavior and improving vaccination rates.

Additionally, the exploration of caregiver perceptions and experiences related to childhood immunization using the health belief model offers a unique perspective on the factors shaping individual attitudes and beliefs towards vaccination. By delving into caregivers' knowledge, attitudes, and motivations regarding immunization, this research can shed light on the underlying reasons for vaccine hesitancy and refusal, ultimately informing the development of tailored interventions that address specific concerns and misconceptions. This personalized approach to understanding caregiver perspectives can help bridge communication gaps, build trust in healthcare services, and promote a culture of vaccination acceptance within the community.

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1.7 Scope of the Study

The study focused on caregivers in South-West Nigeria and aims to assess the immunization status of children, identify social determinants influencing immunization uptake, explore barriers and motivating factors for completing childhood immunization, evaluate caregivers' knowledge and attitudes towards immunization, examine the impact of health promotion campaigns on immunization uptake, and investigate caregiver perceptions and experiences using the health belief model. By analysing vaccination coverage rates, understanding social determinants of health, exploring barriers and motivators for immunization, assessing caregiver knowledge and attitudes, evaluating health promotion effectiveness, and utilizing the health belief model, the study seeks to provide comprehensive insights into improving childhood immunization uptake and ultimately child health outcomes in South-West Nigeria.

1.8 Limitation of Study

The cross-sectional design restricts the ability to establish causality, as the data only capture associations at a single point in time rather than over a prolonged period. Self-reported responses from caregivers may also be affected by recall bias and social desirability bias, particularly since immunization is a sensitive subject tied to health and societal expectations. In addition, the study may not have fully captured the perspectives of caregivers who are less accessible, such as those in remote or marginalized communities, thereby limiting the representativeness and generalizability of the findings across the entire South-West region.

The study used self-reported data, which could be biased by social desirability and memory. This study has certain problems because it had to be done quickly and there were language hurdles when collecting data.

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1.9 Operational Definition of Terms

Immunization Status: The vaccination status of children in South-West Nigeria, indicating whether they have received all recommended vaccines according to the national immunization schedule.

Social Determinants of Health: Factors such as socioeconomic status, education levels, and access to healthcare services that influence childhood immunization uptake among caregivers in South-West Nigeria[16].

Health Promotion Strategies: Approaches such as community mobilization, interpersonal communication, advocacy, community engagement, and mass-media campaigns aimed at creating awareness and promoting the uptake of immunization services among caregivers in South-West Nigeria[17].

Barriers and Motivating Factors: Factors that hinder or facilitate the completion of childhood immunization uptake among caregivers in South-West Nigeria, including obstacles to vaccination and incentives for compliance with vaccination schedules.

Knowledge and Attitudes of Caregivers: The level of understanding and beliefs of caregivers towards immunization practices, including awareness of vaccine-preventable diseases, benefits of vaccination, and perceptions of vaccine safety and efficacy.

Health Belief Model: A theoretical framework used to explore caregiver perceptions and experiences related to childhood immunization uptake in South-West Nigeria, focusing on individual beliefs, attitudes, and behaviors towards vaccination[18].

Vaccination Coverage: The proportion of children in South-West Nigeria who have received the recommended vaccines for their age group, indicating the extent of immunization uptake in the population.

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Chapter Two

2.0 Introduction

This chapter presents a review of relevant literature on health promotion and immunization uptake, with particular emphasis on the role of caregivers in South-West Nigeria. It examines the conceptual and empirical perspectives surrounding immunization programmes, identifies key factors influencing uptake, and highlights the significance of health promotion strategies in addressing gaps in coverage. Existing scholarly works and research findings are explored to provide insight into caregiver-related determinants of immunization, while theoretical perspectives underpinning the study are also discussed. The review further incorporates empirical studies conducted globally and locally to establish areas of convergence and divergence with the present research. The chapter concludes with the identification of gaps in knowledge and practice that this study seeks to address.

2.1 Conceptual Review

2.1.1 Epidemiology of Immunization in Nigeria

By dealing with specific pathogens that cause disease, the adaptive immune system learns how to fight them [1]. The body must first find the disease-causing agent and make the cells it needs to get rid of the problem before it can fight it. This bacterium often makes people very sick before their bodies can recognise it through its antigens. For example, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is causing the world COVID-19 pandemic right now. The body

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recognises the microorganism's antigens after being exposed to them. This starts a chain of events involving immune cells, antibodies, and hormones that get rid of the pathogen [1]. The immune system does have a backup plan, though, that stops that microbe from causing sickness again. Certain immunity cells learn to recognise a certain antigen, and the immune system constantly watches the body to be ready to fight the pathogen when it comes back. This is how shots work. In turn, they give the immune system the tools it needs to find and kill germs before they can make the body sick.

The creation of vaccines has completely changed how diseases are prevented. When you get a vaccine, weak or inactive parts of a certain organism are put into your body. These parts cause your immune system to react [2]. This immune reaction then causes the production of antibodies that are perfectly matched to the pathogen that was found. Vaccines are made from a weaker or changed form of the pathogen that causes the disease and can be given as drops in the mouth or as injections under the skin, into the skin, or into the muscle [2]. Vaccines protect not only the person who gets them, but also the whole community. People in a group reach what is called "herd immunity" when enough of them get vaccinated. When enough people are immune to a sickness, this is called "herd immunity." At this point, enough people are immune to the sickness that it can't spread from person to person anymore. The disease will go away in the end. Because of this, as many people as possible need to get vaccinations.

The World Health Organisation (WHO) says that twice as many as two million deaths could have been avoided with vaccines [3]. Even though vaccines have helped the fight against diseases around the world, some countries still don't have good vaccine coverage. The WHO says that almost half of all deaths of children younger than 5 years old happen in Africa (14). The WHO just said that

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Nigeria will no longer have polio in 2020, but in 2012, it had more than half of the world's polio cases [4].

Nigeria has around 210 million people, making it the most populated country in Africa. There are 36 states and the Federal Capital Territory (FCT) [5]. Nigeria is divided into six geographic zones: North Central, North West, North East, South East, South West, and South South. Most of the time, the southern areas are better developed, have more inhabitants, and have better schools than the northern areas [6]. The way people practice their religion in the two locations is also highly different. People in the north are Muslims, and people in the south are Christians. These disparities have a substantial impact on the country's vaccine coverage and uptake [6].

The government established the Expanded Program on Immunization (EPI) in 1979 to enhance children's health by getting rid of six terrible diseases: polio, whooping cough, measles, diphtheria, tuberculosis, and yellow fever. There was some early success, with an optimum vaccine coverage rate of 81.5% in the 1990s. But in 2003, that success decreased to a pitiful 12.9%[7]. According to the most recent data from the WHO and the UN International Children's Emergency Fund (UNICEF), 57% of Nigerian children have been vaccinated. By the time they are 12 months old, babies should have had 10 shots. These include one dosage of Bacillus Calmette-Guerin (BCG) to guard against tuberculosis, four doses of polio, three doses of Diphtheria, Pertussis (whooping cough), and Tetanus (DPT), one dose of measles, and one dose of yellow fever. The National Primary Health Care Development Agency (NPHCDA) claims that is how baby vaccines should go [9]. Table 1 lists these vaccines and the times they should be given. The Nigerian DPT vaccination is pentavalent, which means it protects against five distinct viruses. The hepatitis B virus and the

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Haemophilus influenzae type B virus are two examples. The WHO also claims that a kid is fully immunized if they have had the BCG vaccination in one dosage, the DPT vaccine in three doses, the polio vaccine in at least three doses, and the measles vaccine [10].

2.1.2 Diseases and Vaccines for the National Programme on Immunization

(a) Tuberculosis Vaccine: Bacillus Calmette-Guérin (BCG)

Mycobacterium tuberculosis, or the tubercle bacillus, is the causative agent of tuberculosis. This bacterium is found globally. The incubation period lasts between four and six weeks. It can be spread through contaminated droplets or air. The main source of infection is man.[11]. The BCG vaccine is free and dried. One of the main issues with the use of BCG vaccination indicates that it provided about eighty percent (80%) protection against child tuberculosis in tuberculin negative individuals subject to a significant risk of infection (WHO, 2017)[12]. Tuberculosis vaccine is administered by intradermal injection, 0.05 ml (equivalent to 0.2mg) is injected with a tuberculin syringe and a twenty-gauge needle as superficially as possible, so that about 8cm to 10cm occurs[13]. It is usually given at birth or any day before eleven (11) months.

(b) **Oral Polio Virus (OPV) Vaccine**

Poliomyelitis is induced by virus types I, II, and III. It is prevalent globally, with an incubation period ranging from four to thirty-five days. Transmission can occur through contaminated food, water, or respiratory droplets. Humans serve as a reservoir for infection. The oral polio vaccination is a Sabin attenuated live virus. This is favored over the Salk vaccine due to its provision of prolonged immunity. It is simpler to administer and elicit an immunological response akin to that generated by spontaneous poliovirus infection. The liquid vaccine is administered orally. The Oral Polio Vaccine has been associated with the emergence of the polio

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virus in extensive geographical regions, and recent data from Africa indicate that the Oral Polio Vaccine (OPV) can substantially decrease the incidence of poliomyelitis even with coverage below sixty percent (60%)[11]. Four vaccine doses are provided at monthly intervals. The vaccine is maintained in a frozen state. When prepared for use, it is maintained in the refrigerator at a temperature not exceeding 80°C. Vials must be refrigerated immediately upon opening and used within seven days. The necessary dosage is two or three administrations per child, depending on the vaccine type.

Diphtheria Pertussis and Tetanus Vaccine (DPT) (TRIPPLE ANTIGEN)

Tetanus is induced by Clostridium tetani; it is prevalent globally, particularly in underdeveloped nations, due to inadequate cleanliness and weak immunization practices. The incubation period ranges from three days to three weeks. The transmission occurs via wounds, and the human host serves as the reservoir of infection. DPT vaccines, commonly referred to as the triple antigen, provide immunity against diphtheria, pertussis, and tetanus. It is administered three times to children at six weeks of age. Ten (10) weeks and fourteen (14) weeks. 0.5 ml is administered into the upper outside region of the thigh, indicating an intramuscular injection. Three doses are administered at monthly intervals, commencing at six weeks of age. The DPT vaccine may be administered concurrently with the trivalent Oral Polio Vaccine.

(c) **Measles Vaccine**

Measles is typically found all over the world and is caused by the measles virus. Droplets, airborne, or contact infection are the modes of transmission, and the incubation period is roughly ten (10) days. Man serves as the infection's reservoir[11]. The live attenuated virus vaccine is used to prevent measles. Before being used, the dried vaccine needs to be diluted with a diluent. A four-year-long active form of immunity is induced by a single dosage. After the vaccine, a rather significant

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feverish reaction occurs. There is a 0.5 ml injectable version of the vaccination. In the upper arm, this is applied subcutaneously. The vaccine should not be given to pregnant women, patients with severe or incapacitating illnesses whose resistance may be reduced by radiation, tonic anti-plastic medications, or steroids, and people who may be allergic to any of the vaccine preparation's ingredients, including egg protein or neomycin[14]. Since incidents of measles are common in many underdeveloped nations, including Nigeria, and because the disease strikes sooner there, children should receive a dose of the vaccine at six and nine months of age, respectively, where resources permit.

(d) **Hepatitis B Vaccine**

Hepatitis B is induced by the infectious Hepatitis B Virus, prevalent globally, with an incubation period of fifteen to forty (15 – 40) days. The route of transmission occurs through direct contact between individuals and indirectly via food and drink. The human population serves as the reservoir of infection. The Hepatitis B vaccine is a human immune serum vaccination. It confers immunity against Hepatitis B. It is administered three times to children at birth, six weeks, and fourteen weeks. It is in liquid form and is often injected intramuscularly in the upper or outer region of the thigh. The dosage is 0.5 ml per administration. The vaccine demonstrates great immunogenicity and has proven to be highly efficient in preventing hepatitis B in well-controlled trials. The Hepatitis B vaccine exhibits high immunogenicity in neonates.

(e) **Yellow Fever Vaccine**

Yellow fever is a febrile disease characterized by jaundice that manifests within two weeks of the commencement of early symptoms. The yellow fever virus is the causative agent. It is indigenous

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to South Africa and tropical Afric[10]. The incubation period ranges from three to six days. The reservoir of infection is humans and monkeys, with transmission occurring via the bites of the Aedes aegypti mosquito. The yellow fever vaccine is a live attenuated viral preparation derived from the Yellow Fever virus strain. The vaccine is highly safe and effective. The vaccination is administered subcutaneously in the outside upper right arm. The dosage is 0.5 ml per administration. Immunity following a single dose may be enduring. Due to the gravity of yellow fever and its erratic nature, the yellow fever vaccine ought to be integrated into standard NPI initiatives in any nation within the endemic-epidemic African zone. The yellow fever vaccination may be administered at nine months of age along with the measles vaccine.

(g) Typhoid Vaccine

Typhoid fever is caused by Salmonella typhi. The incubation phase lasts ten to fourteen days. The transmission occurs via contaminated water, food, and flies. The sources of infection are humans and water[10]. Most clinical disorders caused by Salmonella typhi occur in individuals aged five to thirty (5–30) years. Typical typhoid fever is rare in preschool-aged children[9]. The prevalence of typhi infection is likely underestimated; however, it remains lower than that in school-age children. Typhoid vaccinations have been utilized for nearly a century. The recommended dosage of the typhoid vaccination is three (3) capsules per administration, to be taken before a meal. The vaccination is often administered in capsule form and is taken orally by the clients. Immunity following a single dose may be lifelong.

(f) Tetanus Toxoid Vaccine

Vaccines against tetanus toxoid and diphtheria toxoid, and pertussis can be purchased separately in liquid form or combination as DPT. There are two types of inactivated single antigen tetanus

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toxoid preparations available: aluminum phosphate and solutions. Women who are pregnant or of childbearing age should receive tetanus toxoid. Toxoid tetanus is administered in five consecutive doses. Tetanus toxoid vaccinations should be administered as follows: a first dose at first contact, a second dose four weeks later, a third dose six months later, a fourth dose a year later, or during a subsequent pregnancy. All five doses of tetanus toxoid will leave a woman immune for the remainder of her reproductive years. In the outer region of the upper arm or buttock, the vaccination is administered intramuscularly. There is a 0.5 ml dosage [9].

(h)**Rota-Virus vaccine**

The rotavirus is the cause of rotavirus disease, a type of diarrhea that mostly affects the small intestine and causes acute diarrhea. Although several substances can induce diarrhea, the most frequent pathogen in instances of diarrhea in children is rotavirus. Usually lasting one to two days, the incubation period is followed by infections that are not as severe as the first one[10]. Fever, vomiting, severe diarrhea, and an overall sensation of unwellness, often accompanied by abdominal pain, are among the symptoms. Frequent symptoms of dehydration include thirst, irritability, restlessness, sunken eyes, decreased skin turgor, and sunken fontanelle. This condition is particularly frequent in babies. Diarrhea episodes typically last three to seven days, and they are most common in infants and young children[11]. The fecal-oral route is the mode of transmission, and the virus is extremely stable and long-lived in the environment. Although strain characterization is not frequently done, stool sample collection and testing are usually used for laboratory diagnosis. Rotavirus illness has no known cure, and vaccination is the main method of prevention[12]. Rehydration and symptom alleviation are the main goals of management, with a focus on parenteral or oral fluid administration. Even though the rotavirus vaccine can stop serious infections, it should be used in conjunction with other strategies that support early and exclusive

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breastfeeding, vitamin A supplementation, access to clean drinking water, sanitation, and basic hygiene. It's crucial to remember that while better sanitation and hygiene practices can lower the prevalence of diarrheal illnesses generally, they are not enough to stop rotavirus disease, and the vaccination does not offer protection against other diarrheal illnesses[10].

2.1.3 A New Technology: National Programme on Immunization

The Sustainable Development Goals (SDGs), a global vision which Nigeria shares, prescribe the attainment of health for all by 2030, with less than 75/1000 live births. (SDG-3). The 2012 National Demographic Health Survey (NDHS) assessed Nigeria's under-5 death rate to be decreasing at an annual rate of 1.2%. This rate of advancement is inadequate to ensure the nation remains aligned with the attainment of the Sustainable Development Goals (SDGs). Nigeria must hence dedicate itself to and execute effective measures aimed at decreasing child mortality. The Haemophilus

Influenza type B vaccine, as part of a Pentavalent vaccination, is being incorporated into Nigeria's Expanded Programme on Immunization (EPI) to significantly decrease child mortality from pneumonia and meningitis, potentially saving up to 30,000 lives yearly with complete implementation[8].

a. What is Haemophilus Influenza Type B (HIB)?

Around the world, a bacteria known as Haemophilus Influenzae type B (HIB) infects young children and causes illnesses. More than 90% of serious Haemophilus influenzae infections in children are caused by Haemophilus influenzae type B bacteria, while there are six (6) different forms of the virus. Type B (HIB) Haemophilus influenzae accounts for 98% of pediatric cases in Nigeria.

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b. **Diseases Caused By HIB**

Over half of the cases of bacterial meningitis in infants and children under five are caused by HIB. Up to 25% of all severe pneumonia cases in young children are also caused by it. Infections of the soft tissues, joints, bones, blood, and the heart's outer layer can also be brought on by HIB. When an infected child coughs or sneezes, HIb is transferred from other children in the form of sodium droplets. Additionally, sharing toys and other items that kids have put in their mouths might spread HIb. Even though children frequently carry the HIB bacteria without exhibiting any symptoms, they continue to transmit the infection to others[11].

The 19th World Health Assembly in 1988 formulated the Declaration of the Survival, Protection, and Development of Children, which Nigeria signed. The United Nations held a World Health Summit on children's health in New York in September 1990, which further strengthened the declaration. The level of surveillance is still low, and 55% of reports are thought to be complete. Additionally, the strategy to strengthen the regular National Programme on Immunization (NPI) activities aimed at increasing coverage is justified by the recent outbreak of measles in early 1996 in fourteen states, which resulted in 2,278 cases overall and 213 deaths, as well as the ongoing issue of neonatal tetanus. The effectiveness and utilization of the National Programme on immunization services must be assessed in order to meet the aforementioned goal, and regular monitoring of material and human resources is also crucial. The issue facing Nigeria's National Immunization Program is the numerous obstacles that now prevent the program's services from being delivered in a way that satisfies community members' health demands. According to a study, Nigeria's health care delivery issue is so complicated that it must be resolved amicably and coolly[11]. Contemporary approaches must replace the existing ones, which have demonstrated inadequacy and inefficiency, to ensure adequate health care coverage for the populace within an

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acceptable timeframe. The developing world lacks the financial, material, and human resources to meet its health demands. It is considered that ignorance, poor health, and poverty are critical concerns affecting the progress of Nigerians. Poverty is the principal determinant affecting healthcare in Nigeria and other developing countries, he stated, noting that individuals' health will influence their social and economic progress[12].

In developing countries like Nigeria, there is an absolute shortage of human and material resources, and the situation is often complicated by underutilization or distribution of the resources. A study highlighted that a significant impediment to health promotion advancement in Nigeria is the disproportionate allocation of health services, resulting in the widespread neglect of a significant percentage of the rural population[13]. It was highlighted that for sustainable advancement to occur, Nigeria must implement an effective healthcare delivery system, community development, education, and agricultural technology essential for local growth. The enhancement of the healthcare delivery system is crucial[14].

2.1.4 Vaccine-Preventable Diseases and Child Mortality

In sub-Saharan Africa (SSA), the death rate for children under five is still much higher than it should be [15]. The UN Inter-Agency Group for Child Death Estimation's 2018 report says that 76 out of every 1,000 live births in Sub-Saharan Africa are children under five years old. This is the highest death rate in the world. Still, there are differences between countries [16]. Geographical research showed that compared to other countries, Nigeria and the Democratic Republic of the Congo (DRC) have higher death rates and haven't made much progress in reducing them [16]. Viral diseases are still a major cause of death in children under five, even though many other reasons have been found. [17].

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Pneumonia, meningitis, sepsis, diarrhea, and measles[17] are among the most common infectious causes of child mortality. In SSA, pneumonia is responsible for 15% of the deaths in children under five[17]. Ethiopia, Nigeria, and the Democratic Republic of the Congo are some of the nations where pneumonia causes the greatest number of children's fatalities[18]. Haemophilus influenzae and Streptococcus pneumoniae are the most frequently implicated pathogens[18]. Gram-positive, facultative anaerobic, non-motile, and nonspore-forming, *S. pneumoniae* is a bacterium[19,20]. In contrast, *H. influenzae* is a facultative anaerobic, pleomorphic, coccobacillary, gram-negative bacterium[21]. Based on their capsular antigen, the encapsulated strains of *H. influenza* are divided into six types: a, b, c, d, e, and f [21]. The strains that are not encapsulated are non-typable (NTHi) [22]. These pathogens cause meningitis and sepsis in addition to pneumonia [23].

According to estimates, rotavirus infections caused 250,000 child deaths in SSA in 2000, making them a significant cause of diarrhea in children [23,24,25,26]. Rotavirus was responsible for 121,009, or 38.9%, of the estimated 310,967 diarrheal deaths that occurred in SSA in 2013 (13). SSA [26] is home to seven of the ten nations that cause two-thirds of all rotavirus-related deaths worldwide. In 2013, Nigeria accounted for 14% of all rotavirus deaths in children under five[26].

Measles is a contagious viral infection that significantly contributes to morbidity and mortality in children in Sub-Saharan Africa[27]. In 2014, it was predicted that 73,914 deaths occurred in SubSaharan Africa, accounting for approximately 63% of global child fatalities attributed to the virus. Additional significant contributors to child morbidity and death include pertussis, tetanus, TB, and hepatitis B virus infection, among others[28].

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2.1.5 Childhood Immunization

Immunization is considered to be one of the most important health strategies for maintaining public health and increasing child survival since it can shield kids against these prevalent infectious diseases[29,30]. Due to the significant financial savings it provides for families and governments through disease prevention, it is thought to be incredibly cost-effective[31]. According to the Global Burden of Disease (GBD), population-wide Immunization efforts have been partially responsible for the decline in under-five mortality worldwide, which fell from 16.4 million in 1970 to 5.0 million in 2016[32,33]. The World Health Organization says that immunisation stops about 3 million kid deaths every year [34].

Because vaccinations are so good for you, the World Health Organisation started the Expanded Program on Immunisation (EPI) in 1974. This was the first world health campaign to make sure that all children could get immunisations. Disease surveillance, making alliances, introducing new vaccines, making sure that all people have equal access to vaccines, and eradicating diseases that can be prevented with vaccines are all very important parts of the EPI technical plan structure [35].

Immunisation coverage is one of the most important ways to measure how well EPI is working at the national and world levels [36]. According to the WHO, it is the proportion of a group that has been vaccinated within a certain amount of time. People usually measure it for each vaccine (like a measles vaccine) and each dose of a multi-dose vaccine (like the first, second, and third doses of the diphtheria-tetanus-pertussis vaccine, or DTP1, DTP2, and DTP3) that are given by national immunisation programs [37]. 194 WHO member countries agreed on the goal of the Global Vaccine Action Plan (GVAP) that DTP3 coverage should reach 80% at the district level and at least 90% at the national level by 2020 [38]. According to how things are going now, immunisation programs

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are still not working as well as they should because 19 million babies, mostly in sub-Saharan Africa, do not have access to vaccines. Coverage of DTP3 in Africa has been stuck at 70% to 72% since 2015 [38]. Equatorial Guinea, South Sudan, Chad, and Nigeria are the African countries with the lowest amount [38].

2.1.6 Routine Immunization

Routine immunization (RI) is defined as the sustainable, dependable, and timely interaction among the vaccine, its administrators, and recipients to guarantee comprehensive immunization against vaccine-preventable diseases[24]. This method is characterized by the enhancement of population immunity to certain diseases via the consistent administration of necessary vaccinations to all eligible individuals[24]. Consequently, interrupting disease transmission is feasible when robust routine immunization is in place.

2.1.6.1 Routine Immunization in Nigeria

Routine vaccination is characterized by a predetermined schedule and is administered in Nigeria by the National Programme on Immunization (NPI), which is the successor to the WHO's Expanded Programme on Immunization. BCG, oral and inactivated polio vaccines, Hepatitis B, the pentavalent vaccination (which comprises the vaccines for diphtheria, pertussis, tetanus [DPT], Haemophilus influenzae type b [Hib], and Hepatitis B), PCV, measles, and yellow fever are among the vaccines used in Nigeria as part of routine immunisation[24,32].

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2.1.7 Immunization in Africa

When the WHO created the EPI in 1974, it was the first step in a worldwide movement to use immunisation as a public health measure. Because of this, immunisation has stayed one of the most cost-effective ways to improve the health of babies around the world [33]. Over the years, many efforts have been made to increase EPI coverage around the world. These include the Millennium Development Goals (MDGs), the Global Alliance for Vaccines and Immunisation, the Global Immunisation Vision and Strategy, and most recently, the Global Vaccine Action Plan.

As a result of these efforts, more people around the world have been immunised. This includes regional programs like the Reaching Every District approach, the WHO African regional office EPI strategic plans of action, which ran from 2001 to 2005 and 2006 to 2009, and national EPI programs. In 2010, 85% of children aged 12 months and up had all three doses of the diphtheriatetanus-pertussis (DTP3) vaccine. In 1974, only 5% of children got all three shots. Even with these improvements around the world, sub-Saharan Africa only had 77% DTP3 usage by 2010.

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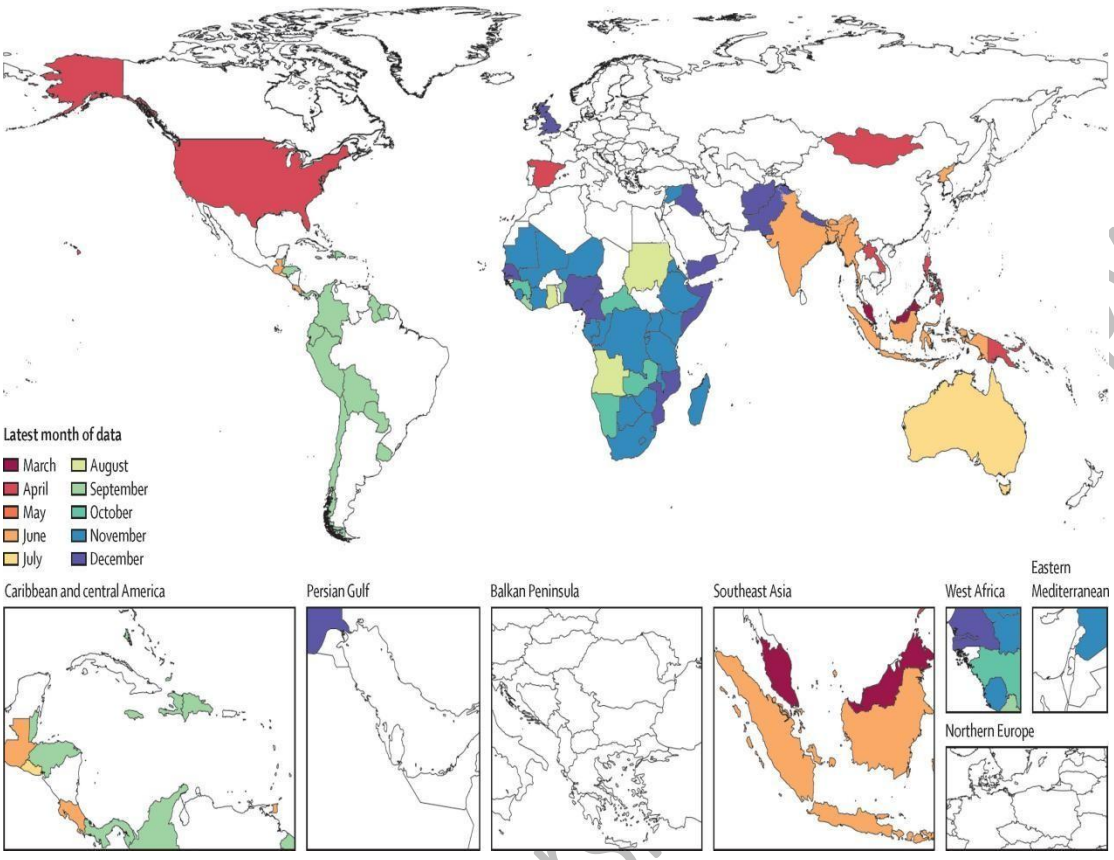


Figure 2.1: Global Distribution of Immunization

Source[33]:

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Significant advancements have been made in the efficacy of the EPI in Africa since its inception in 1974, while disparities both across and within countries persist. The implementation of meningococcal group A, Haemophilus influenzae type B, and hepatitis B vaccines throughout the continent signifies progress and advancement in the appropriate direction. Conversely, national Immunization coverage scorecards from 2014 indicate that polio and measles outbreaks, along with elevated vaccine dropout rates across the continent, signify deficiencies in the EPI system that necessitate evidence-based corrective measures. An urgent necessity exists to devise strategies to enhance the immunization system, fortify inadequate infrastructure, rectify the deficiency of trained personnel, and identify methods to ensure the continuous availability of affordable and suitable vaccines. Enhanced financial and political commitment from African leaders is essential for sustaining and advancing the achievements in EPI within the African region[33].

In 2014, 129 nations, or 66% of the 194 WHO Member States, reached the national coverage goal of 90% or greater for DTP3. For the past three years, 119 of these countries have maintained up this level of coverage, and for the past five years, 109 have kept it up. Also, by 2014, DTP3 use fell below 80% in 35 countries, up from 32 countries in 2013 and 30 countries in 2011. In 2013, 30 of the 35 nations with coverage rates below 80% did so. Eight of those countries had coverage rates higher than 80%, while two had rates higher than 90%. Since 2010, 19 countries have not been able to reach the 80% mark. In 2013, five nations had DTP3 coverage below 80%. However, by 2014, they had all raised it over 80%, and only one obtained a coverage rate of 90%. In 2014, it was said that 18.7 million kids did not obtain all three doses of DTP-containing immunizations. In 2011, there were 19.2 million, and in 2013, there were 18.8 million. There is 75% of Nigeria between those two times.

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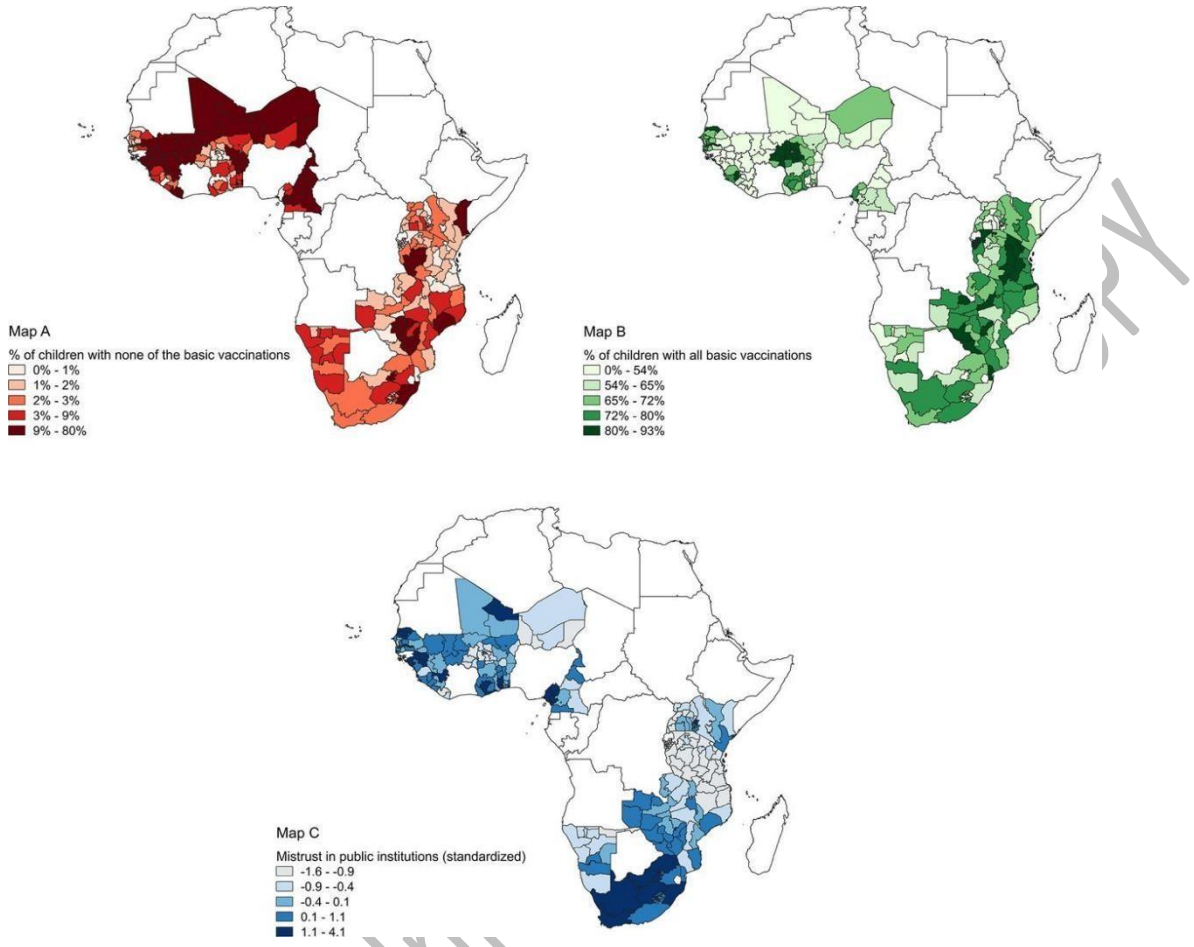


Figure 2.2: Child Vaccination in Africa

Source [33]:

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2.1.8 Routine Immunization Coverage in Nigeria

With 42% DTP3 coverage, Nigeria has the highest percentage of children worldwide who are not and just partially immunized[42]. The most populated nation in sub-Saharan Africa implemented EPI in 1979 to offer all children routine immunization services[43]. National and state primary health care development agencies were established to guarantee the broad implementation of vaccination among other fundamental health services[44]. In order to facilitate the regular implementation of immunization services in primary, secondary, and tertiary healthcare facilities throughout the nation, the National Primary Health Care Development Agency (NPHCDA) develops policies, procedures, and guidelines[45].

Along with other conventional EPI vaccines, the Federal Ministry of Health introduced new vaccines between 2012 and 2015 due to the high rates of child mortality in the nation. These included the pentavalent vaccine (which contains vaccines against diphtheria, tetanus, pertussis, *Haemophilus influenzae* type B, and hepatitis B), *pneumococcal* conjugate vaccine, rotavirus vaccine, and inactivated polio vaccine.

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The country's current routine immunization schedule is shown in Table 2.1 :

Table 2.1: National routine immunization schedule in Nigeria

Age	Vaccine offered
At Birth	BCG, OPV 0, HBV – Birth dose within 24 hours of birth.
At 6 Weeks	PENTA 1, OPV 1, Rotavirus vaccine 1, PCV 1
At 10 Weeks	OPV 2, PENTA 2, PCV 2, Rotavirus vaccine 2
At 14 Weeks	OPV 3, PENTA 3, PCV 3, IPV
At 9 Months	Measles Vaccine, Yellow Fever Vaccine, Vitamin A, Meningtitis Vaccine
At 12 Months	Vitamin A
At 15 Months	Measles Vaccine 2

Source[45]: The country's current routine immunization schedule

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BCG stands for Bacille Calmette Guerin, OPV stands for Oral Polio Vaccine, HBV stands for Hepatitis B Vaccine, PENTA stands for the Pentavalent Vaccine, which includes diphtheria, tetanus, pertussis, Haemophilus influenzae type b, and hepatitis b. PCV stands for Pneumococcal Conjugate Vaccine, and IPV stands for Inactivated Polio Vaccine. These vaccines protect against diseases like tuberculosis, polio, hepatitis B, diphtheria, pertussis, tetanus, pneumonia, meningitis, and sepsis caused by Haemophilus influenzae type b and pneumococcal infection, as well as measles and yellow fever. Nigeria has one of the lowest DTP3 coverage rates in the world, which shows that the country's immunization programs are not working well. The National Immunisation Coverage Survey (NICS) from 2017 shows that just 23% of kids between the ages of 12 and 23 months are fully immunized. diverse states in Nigeria46 have very diverse levels of immunization coverage. For example, Lagos has a coverage rate of 68%, but Jigawa State only has 2%. Figure 2.3 shows a histogram that shows how vaccination rates vary from state to state. The coverage level of each state was used to make the histogram. The Shapiro-Wilk and ShapiroFrancia tests gave p-values of 0.14 and 0.27, which means that the data is normally distributed.

The histogram, on the other hand, shows a range of distributions.

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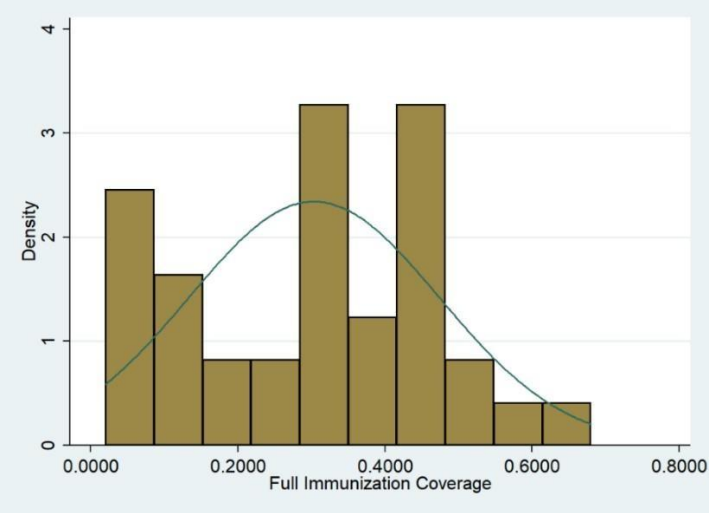
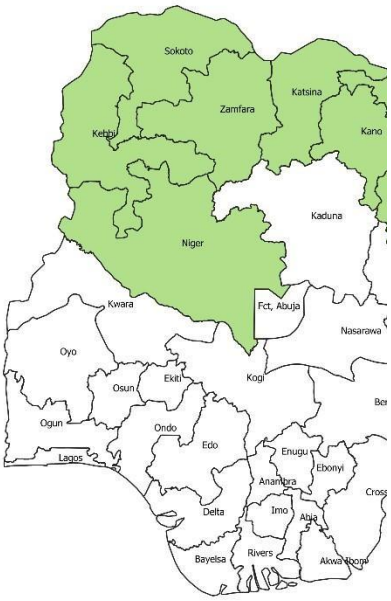


Figure 2.3: Full immunization coverage across states in Nigeria In Nigeria, coverage rates for individual vaccines were 53%, 30%, 47%, 50%, 42%, and 33%, respectively, for Bacillus Calmette-Guerin (BCG), birth dose hepatitis B vaccine, and birth, first, second, and third dose oral polio vaccine (OPV0, OPV1, OPV2, and OPV3) (39). Additionally, the study found that 49%, 40%, 33%, 42%, and 39% of people had received the first, second, and third doses of the vaccines against yellow fever, hepatitis B, and Hemophilus influenzae type B (pentavalent vaccination), as well as measles (39). These fall short of the goals outlined in the Global Vaccine Action Plan (GVAP) and approved by WHO member countries[47].

Most children in the country's northern region are unimmunized or only partially immunised[46]. This was ascertained by splitting the nation's Immunization coverage into quartiles for each state. Figure 2.4 displays the states in Nigeria's lowest quartile (25th) of full Immunization coverage, which include Jigawa, Sokoto, Kebbi, Zamfara, Katsina, Yobe, Kano, Taraba, Niger, and Bauchi[46].

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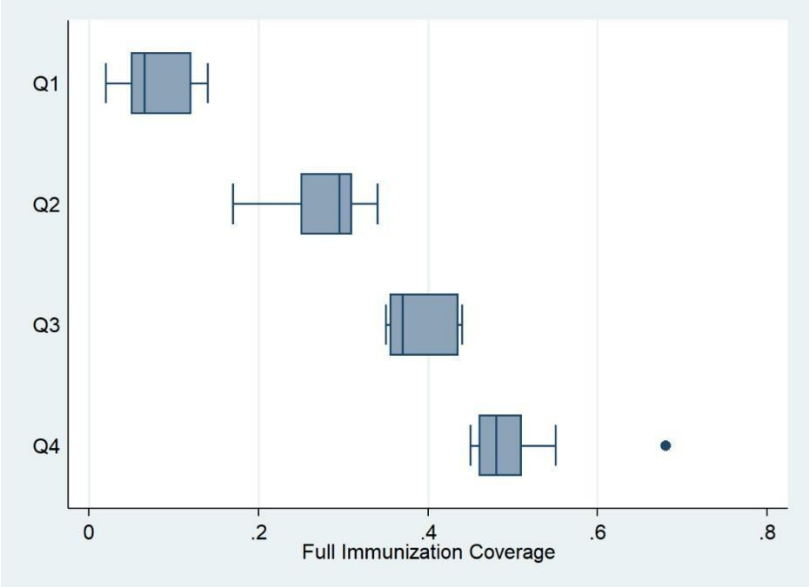


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Colour indicates the 10 states with the lowest immunization coverage in Nigeria.

Figure 2.4: Map of Nigeria showing 10 states with the lowest full immunization coverage A boxplot of Immunization coverage for each of the four quartiles is shown in Figure 2.5. As shown in Figure 2.5, Quartile 1 (Q1), which comprises the ten states with the lowest Immunization coverage, has a median coverage level of 6%, a minimum coverage level of 2%, and a maximum coverage level of 14% [46].

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Q = Quartile

Figure 2.5: Boxplot of full immunization coverage across states in Nigeria

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In Kano State, which is the most populated state in the North West geopolitical zone, only 10% of people are fully vaccinated. Also, the state has immunization rates of 14%, 16%, 22%, and 24% for OPV3, Penta 3, yellow fever vaccine, and measles-containing vaccine, respectively [46].

There are a number of things, including socio-ecological ones, that can predict low routine immunization coverage [48]. These factors include inadequate parental awareness about vaccines, limited access to immunization-related behavioural modifications, and deficiencies in the

organization of the immunization system, among others [48]. A significant difference in immunisation coverage has been observed between slum and non-slum areas in urban settings. A survey conducted in 2010 revealed that less than 10% of children living in slum areas of Nigeria received proper immunisation. Recent studies have confirmed this discrepancy, associating it with the swift growth of urban populations due to rural-urban migration [50]. Studies indicate that children of urban migrants are considerably less likely to receive immunisations in the country when compared to their peers in the neighbourhood. Although immunisation inequity is diminishing in emerging countries like Bangladesh, the disparity is increasing in Nigeria [48].

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2.2 Theoretical Review

2.2.1 Health Belief Model (HBM)

The health belief model (HBM) suggests that individuals' particular beliefs, such as their perceived severity and susceptibility to a disease, along with their perceptions of the benefits and risks associated with a vaccine, are connected to their health behaviours [49].

The understanding that the consequences of acquiring the illness are significant for both the individual and those around them is perceived severity. Individuals tend to exhibit increased

intentions to receive vaccinations for diseases that can be prevented by vaccines when they perceive a threat or believe there is a significant likelihood of contracting such diseases [50]. An individual who perceives a significant likelihood of contracting the disease is considered to be susceptible (i.e., the absolute risk). The current study assesses perceived susceptibility by evaluating how individuals believe they might be at risk of contracting a preventable disease through vaccination with the new vaccine. This conceptualisation captures prevalent concerns in the literature surrounding vaccine hesitancy, particularly regarding the efficacy of the new vaccine [52]. People who believe there is a significant risk of contracting the coronavirus from the new vaccine are likely to express reduced intentions to receive vaccinations for diseases that can be prevented by vaccines [53].

Perceived benefits imply that one believes that the use of vaccines for preventable diseases will diminish the risk or severity of the illness threat. Perceived barriers indicate the belief that vaccination against vaccine-preventable diseases is hindered by mental, physical, or economic challenges. Recognizing obstacles correlates with diminished intentions to vaccinate against vaccine-preventable diseases.

The theoretical framework of the HBM has been utilised in a growing array of cross-sectional studies to explore preventive health behaviours, including general influenza vaccination [54]. In these investigations, varying levels of support were identified for each component of the HBM in forecasting intentions.

A cross-sectional study examining vaccination intentions against COVID-19 utilised the Health Belief Model with a sample of Malaysian respondents. The findings indicated that a strong perception of benefits and minimal perceived barriers were positively associated with a definite intention to receive vaccinations for vaccine-preventable diseases [55]. A greater intention to

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vaccinate was associated with a heightened perception of the risk of contracting a vaccinepreventable illness and a strong belief in the seriousness of the potential consequences of such an infection. The study found that male participants showed a greater intention to receive the vaccine for vaccine-preventable diseases than their female counterparts. No significant correlations were observed between the respondents' age, marital status, residential location, and monthly household income with the objectives. The findings indicated that a significant number of participants expressed a desire to receive the vaccine for preventable diseases [56].

The HBM incorporates an expectancy value framework, indicating that specific beliefs influence the attractiveness of behaviours to varying degrees. Based on this expectancy assumption, one can anticipate a Susceptibility and Severity interaction if susceptibility is viewed as a subjective probability and severity is regarded as disutility, in accordance with the subjective expected utility theory. Current studies, nonetheless, have failed to demonstrate a bilateral relationship, particularly concerning severity and vulnerability or among the other elements of the Health Belief Model. It is possible that the lack of significant interactions among the components may depend on the cross-sectional data used in prior research, particularly in the presence of collinearity and measurement error in the predictor variables [57].

2.2.2 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) says that a person's action is based on their desire to do it, which is shaped by their attitude and subjective norm about the behavior [58]. Intention, which in this case is defined as uptake/immunization status, is the best way to predict behavior. The intention is said to be the direct cause of behavior and is the mental image of how ready a person

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is to do a certain behavior [59]. Three factors influence this intention: their subjective norms (race, religion, and masculinity), their attitude towards the particular behavior (mothers' knowledge, attitude, and practice regarding vaccination), and their perceptions of how those close to them will perceive the behavior in issue[59,60].

Understanding someone's ideas might be just as crucial to predicting their intentions as understanding their attitudes. Finally, intentions are influenced by perceived behavioral control. The term "perceived behavioral control" describes how people view their capacity to carry out a specific behavior (would fathers permit their children to receive vaccinations, and is vaccination beneficial or detrimental?). Intention results from these predictors. According to the literature presented in this section, a person's intention to engage in the behavior in issue is stronger when their attitude and subjective norm are more positive[60].

The TRA has been used to denote a wide range of health practices used by doctors and nurses. TRA says that a person's attitude toward doing something, as well as their perspective and norm, have the largest effect on whether or not they plan to accomplish it [61]. Direct and indirect ways are used to measure attitude and subjective standards.

An individual's attitude toward a behavior is how they feel about the health activity in question, whether they think it is good or bad [62]. Attitude includes beliefs, knowledge, and values, as well as a decision about whether the results of behavior are good or bad [62].

This study involved direct measurement of perception and knowledge, focussing on a comprehensive assessment of behaviour regarding the immunisation of a child as either positive or negative. The indirect measure relied on an individual's perception regarding the likelihood that participating in a specific behaviour would lead to a certain outcome. Consequently, a belief

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regarding the immunisation of a child (the probability of improved health through vaccination) is influenced by the person's assessment of that outcome (promotes child welfare and enhances health).

Subjective norms denote the perceived social influence to engage in a particular behaviour 63. The perception of subjective norms, influenced by social referents like close friends, family, and religious leaders, is shaped by an individual's normative beliefs. The person's belief that each specific reference will either endorse or reject their actions serves as an indirect gauge of the subjective standard, while the direct gauge is determined by the approval of their behaviour by social referents. TRA identifies two key elements that influence an individual's intention to participate in a specific behaviour: attitudes and subjective norms [64]. Consequently, TRA is based on the core idea that intention, shaped by attitudes and societal norms regarding the practice, serves as the most reliable predictor of behaviour [65]. This concept accounts for a significant portion of the variation observed in intentions and behaviours, such as the utilisation of health services, among other factors.

Conversely, consider the normative beliefs that influence an individual's perception, stemming from subjective norms. Such attitudes generate societal expectations to engage in a particular behaviour [66]. Refining an individual's perspective is crucial as it enables active initiatives and essential interventions to be more focused by assessing the beliefs that drive those behaviours. The TRA effectively predicts the relationship between attitude and behaviour, making it an essential theoretical framework for the current study [67].

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2.2.3 **PRECEDE MODEL**

The PRECEDE model, which stands for Predisposing, Reinforcing, and Enabling Constructs in Educational/Environmental Diagnosis and Evaluation, is a planning framework designed to guide the systematic development, implementation, and evaluation of health promotion and public health programs. It is built on the principle that effective interventions must begin with a thorough understanding of the problem and the factors that influence health-related behaviors before any action is taken. The model assumes that health and health behaviors are influenced not only by individual choices but also by social, environmental, and structural conditions[100].

In the PRECEDE component, attention is focused on diagnosing the factors that contribute to a particular health problem. These factors are categorized into three groups. Predisposing factors are the individual characteristics that motivate or provide a reason for behavior; they include knowledge, attitudes, beliefs, values, and perceptions. For example, in immunization uptake, a caregiver's knowledge about vaccines and belief in their effectiveness are predisposing factors. Enabling factors are those that make it possible or easier for individuals to change or maintain health behaviors. These include resources, accessibility of health facilities, availability of trained personnel, affordability of services, and supportive policies. In the context of immunization, enabling factors may include the proximity of vaccination centers, availability of vaccines, and functioning cold chains. Reinforcing factors are the rewards, feedback, or encouragement that influence whether a behavior will be sustained. They include the support of health workers, approval from family and community leaders, or incentives provided by health programs[100].

By identifying and analyzing these three categories of factors, the PRECEDE model helps researchers and program planners to design targeted interventions that address barriers and

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strengthen facilitators of positive health behavior. Thus, in the case of immunization uptake among caregivers in South-West Nigeria, the model provides a structured way to examine why caregivers accept or refuse immunization services and how health promotion efforts can be tailored to improve uptake by addressing predisposing, enabling, and reinforcing influences[100].

2.3 Empirical Studies

2.3.1 Recent Evolution in Routine Immunization In Nigeria

Historically, the standard immunisation schedule did not include the Haemophilus influenzae type b (Hib) vaccine, which plays a critical role in preventing severe illnesses in children, including pneumonia, sepsis, and meningitis. The Hib vaccine was incorporated into the pentavalent immunisation schedule in 2012, thanks to the ongoing advocacy and initiatives of the Paediatric Association of Nigeria (PAN). Prior to 2015, access to the pneumococcal conjugate vaccine (PCV) was limited to a select group of individuals who had the financial means to cover the high cost of the vaccine. In 2015, the introduction of PCV began in select states, subsequently expanding to additional regions. In 2015, Nigeria implemented the inactivated polio vaccine, initiating pilot programs in several northern states, including Borno, Kaduna, Kano, Sokoto, and Yobe, to enhance efforts against poliomyelitis by preventing the spread of the wild polio virus. Following a twoyear period of this trial program, additional states were incorporated by 2018 [68]. While countries may implement diverse vaccines in their routine schedules, the WHO has established a framework of guidelines to facilitate the gathering of immunisation data, with the goal of standardising coverage across surveys. Suggested methods for data collection encompass vaccination cards, health centre records, and recall or verbal accounts of vaccination history. Concerns regarding the validity of

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historical immunisation coverage have been noted; however, certain studies indicate a robust correlation between parental recall and health provider records. Furthermore, in instances where immunisation cards are absent or lost, historical records may serve as the sole method for acquiring immunisation information. Nonetheless, a method that integrates both card and history is likely to be more valid than relying on history alone [69].

Immunisation surveys are conducted to gather data on the coverage of different vaccines. Typically, the vaccines included in a nation's routine schedule undergo examination, either via administrative reports or through various survey methodologies. These surveys involve gathering data on vaccination history as reported by a carer or sourced from vaccination records [70].

2.3.2 Routine Immunization Coverage

Worldwide, regular immunisation rates remain below the 90% benchmark set by the World Health Organisation. The anticipated global coverage for routine immunisations, as indicated by DPT3, was 84%. A variety of studies have indicated variations in immunisation coverage globally. The coverage in affluent areas such as Europe and the United States is remarkably high. Data collected from WHO and UNICEF show that DPT3 coverage rates in Western Europe were primarily between 95% and 99% during the years 2015 and 2016[70]. The immunisation coverage rates for the United States, Australia, and New Zealand were recorded at 95%, 93%, and 92%, respectively. The increased coverage rates could be associated with strong routine immunisation systems, which are viewed as a sign of improved health system performance. Insufficient vaccine coverage is often a challenge faced by low-income nations. A number of countries across Asia, the Americas,

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and various nations in Africa demonstrate low coverage rates, with many sub-Saharan African countries falling notably short of the target benchmark of 90%[71].

Immunisation coverage rates show considerable variation both within nations and over various timeframes. Studies indicate these variations within countries. A cross-sectional study carried out in Lucknow, northern India, focused on children aged 12-23 months, revealing that Gupta, Prakash, and Shrivastava reported an immunisation coverage of 74.7%. An analogous study carried out in the same district eight years earlier revealed a coverage rate of 44.1%. The noted variation can be linked to the progress made in immunisation services throughout the years. Nonetheless, the sites of the study could also play a role in the differences observed in immunisation rates. The previous study took place in tertiary health facilities, whereas the subsequent one was executed in urban slums[70].

The implication suggests that children drawn from impoverished areas are likely to come from families facing disadvantages, which may hinder their access to immunisation services. A study conducted in Kerala, southern India, revealed an immunisation coverage of 96.2%. A coverage rate of 57.7% was observed in the slum areas of the same state of Kerala. The reduced rate indicates a higher probability that individuals residing in slums have a lower rate of immunisation uptake[72].

In South America, vaccination rates are generally high, yet in some areas they slightly decreased in 2017. Chile was the only country to retain coverage above 90%, while Argentina, Brazil, Bolivia, and Chile all reported lower levels of DTP3 coverage. On the other hand, DPT3 coverage was almost universal in Bahrain, Israel, and Jordan, indicating strong coverage rates in the Middle East. Conversely, sub-Saharan African nations have low coverage rates that span the continent's several sub-regions. 76.6% of people in a peri-urban area of Nakuru, Kenya, have received

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vaccinations, according to a cross-sectional community-based survey. The study setting, a lowincome settlement with insufficient health service supply, may have had an impact on this number. The previous low coverage in the area is reflected in the neighboring Baringo County's DPT3 coverage of 55%. They may have contributed to the poor coverage consistently observed in this area by being pastoralists and residing in dispersed communities[72].

Data from National Demographic and Health Survey to report full immunization coverage of 24.3%, where full immunization coverage is defined as receiving at least eight immunizations. In Jijiga, eastern Ethiopia, a community-based cross-sectional study revealed that just 36.6% of children between the ages of 12 and 23 months had received all recommended vaccinations. In a similar vein, Etana and Deressa (2012) discovered that 36% of children in central Ethiopia had received vaccinations[60].

Children in KwaZulu-Natal, South Africa, had an 84.9% DPT3 coverage rate. Full vaccination coverage ranged from 62% to 94% at three South African sites in a prospective analysis. The advanced health care available in South Africa, in comparison to other African nations, may be the reason for the comparatively high coverage levels. Nigeria was one of the ten nations with the lowest DPT3 coverage worldwide in 2015. Two of these nations had a decrease in DPT3 coverage in 2016, while four, including Nigeria, saw no change. In Nigeria, the DPT3 coverage rate for 2015 and 2016 stayed at 49%. The DPT3 standard was the only vaccine with inadequate coverage, and this estimate is consistent with data from other sub-Saharan African nations in 2012. Nigeria's average 2017 estimations for BCG, DPT3, measles, and the third polio vaccination were 53%, 42%, 42%, and 40%, respectively, according to the WHO monitoring system 2018 global summary. Nigeria is one of just three nations still fighting to eradicate poliomyelitis, as these low coverage rates highlight[64].

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In Nigeria, 34.4% of children were fully immunized, according to researchers who conducted a systematic review and meta-analysis of data. Significant regional differences were found in the study; coverage ranged from 9.5% in the North-West to 51.5% in the South-South zone. Due to the inclusion of surveys from 2005, the data chronology may not accurately represent the current state of vaccination coverage in Nigeria. Furthermore, just 25% of the studies used were from three Southern states; therefore, the results might not accurately represent the situation with regard to vaccination coverage nationwide. In a similar vein, a study that used data from the 2013 National Demographic Health Survey found a strong correlation between higher immunization rates and living in southern Nigeria. This discovery may be linked to poverty and the North's restricted access to healthcare services[15].

The disparity in poverty rates between northern and southern Nigeria is notable, with the former experiencing significantly higher levels. This socioeconomic divide has a profound effect on health practices, especially in the realm of immunisation. A community-based investigation in rural Zamfara, northern Nigeria, uncovered that only 7.6% of young individuals were completely immunised. This represented an improvement compared to the immunisation coverage of 5.8% documented by the Nigeria Demographic and Health Survey in the same village two years earlier. Zamfara is situated in the North-West region of the country, marked by prevalent poverty and notable opposition from community leaders towards immunisations, leading to low coverage rates. This stands in stark contrast to the 57.9% coverage rate recorded, a rural region in Osun State, southwestern Nigeria, and reinforces the observed relationship between higher income indices and improved immunisation coverage[66].

A cross-sectional study carried out at four outpatient paediatric clinics in Enugu, eastern Nigeria, found that 84.9% of participants had received all recommended vaccinations, with complete

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coverage for OPV0 and BCG at 100%. The data indicates that these figures are among the highest in Nigeria, aligning with vaccination rates observed in more affluent areas globally. A significant proportion of the population in Enugu, one of Nigeria's largest cities, possesses knowledge about vaccinations and the diseases that they can prevent. The high vaccination coverage rates in Enugu can be attributed to the city's significant number of medical facilities and strong health awareness among the population[67].

2.3.3. Determinants of Immunization Coverage

Multiple elements have been recognised as significant in influencing vaccine coverage. The determinants differ depending on the context. In various regions globally, the male gender has been linked to improved immunisation coverage. In certain cultures, significant value is assigned to the birth of a male child, leading to heightened attention and resources dedicated to their upbringing, including ensuring they receive immunisations[69].

Another factor that positively influences vaccination coverage is hospital delivery as opposed to home delivery. The likelihood of a hospital-born child being fully immunized is higher. On the other hand, compared to children born in a hospital, infants born at home had a lower chance of finishing their vaccinations. People who give birth in hospitals are thought to have a higher chance of using hospital services, such as vaccinations, than people who give birth at home. This assumption stems from the fact that pregnant women who register and give birth in hospitals are given health information, including vaccinations, during their prenatal appointments. Additionally, the choice to give birth in a hospital shows trust in the medical system and its offerings, of which vaccination is a crucial component[71].

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Vaccination coverage is linked to maternal education. Higher levels of education were associated with much higher vaccination coverage in both Africa and Asia. It was also shown that immunization coverage was significantly higher in areas where mothers had some education, even if it was only a little, than in areas where mothers lacked literacy. It was demonstrated in South Africa that moms who attended school for more years had a lower likelihood of receiving an inadequate or delayed education. Maternal education was linked to full immunization, according to nationally representative data from the Nigeria General Household Survey-Panel. The impact of moms who were educated against those who were not was significant, although the degree of education was not established. Higher maternal education was linked to better coverage, in addition to the positive effects of maternal education on complete vaccination. A systematic review and meta-analysis revealed that children whose mothers had completed at least secondary school had 2.3 times higher odds of receiving complete vaccination than children whose mothers had only completed primary school[73].

According to a study conducted in southern Nigeria, the likelihood that a child will be fully immunized increased for moms with at least secondary school education. Mothers were more comfortable accepting immunizations because they were better knowledgeable about their benefits and safety. Improved immunization coverage is correlated with higher wealth indices. Data from the Uganda Demographic and Health Survey indicates that the wealthiest groups had the greatest likelihood of achieving full immunisation. In Kerala, India, it was observed that although the rates of complete immunisation were similar between the lower and middle/upper socioeconomic groups, there was a significantly higher percentage of partially immunised children within the lower socioeconomic groups. Nonetheless, no statistically significant difference exists. Almost

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50% of children in the highest income group received complete vaccinations, while approximately 23% of those in the lowest income group were fully vaccinated, based on findings from a study utilising data from a nationally representative survey[74].

The unavailability of vaccinations adversely impacts immunization coverage. This effect is demonstrated in a study. The unavailability of vaccines results in missed opportunities for eligible children to receive vaccinations due to failures within health systems. Likewise, inadequate understanding of vaccination was demonstrated to diminish immunization coverage. Conversely, possessing adequate knowledge of vaccines was substantially associated with an increased rate of immunization completion[43].

The vaccination coverage rate in Ethiopia indicates that the probability of a child receiving complete immunisation increases with the age of the mother. Similar findings were noted in Ethiopia; however, in the subsequent study, the increase in immunisation coverage linked to older maternal age did not reach statistical significance. A specific maternal age group in the United States was found to have the highest rates of immunisation completion, while the youngest age group showed the lowest coverage levels[44].

2.3.3.1 Individual Factor

In Nigeria, immunization is influenced by individual-level factors that are directly related to the infant's parents or caretakers. Usually, these factors were divided into three categories: sociodemographic, socioeconomic, and sociocultural. Ignorance, discrimination, and misconceptions about vaccinations are the main causes of Nigeria's poor immunization rates. Maternal education has been found in numerous studies to be a key factor influencing an infant's likelihood of finishing the entire vaccination regimen[18,22,27]. A thorough examination of the

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existing literature indicated that a greater proportion of vaccination completion correlated with an elevated level of maternal education. It was observed that, in comparison to children of mothers with higher educational attainment, those born to mothers with minimal or no education exhibited a greater likelihood of being incompletely vaccinated [22]. Higher education significantly enhances the likelihood of a child receiving full vaccinations, increasing the chances by as much as eightfold [29]. Moreover, an additional analysis revealed a connection between advanced education and job opportunities [27]. It argued that these mothers or carers demonstrate a greater inclination to ensure their children are fully vaccinated, as they understand the significance of vaccines.

The connection between illiteracy and a lack of understanding regarding vaccines was also observed. A number of studies indicate a lack of awareness regarding vaccines, including the necessity for vaccination, insufficient knowledge about the vaccination schedule, and unawareness of the requirement for subsequent doses. [17,23-24,26,30-33]. In a survey, fewer than 20% of mothers and carers were able to accurately describe immunization and identify six vaccine-preventable diseases[31]. The absence of understanding of the immunization schedule was the most commonly cited reason for the low vaccine uptake in multiple studies[22-24,27,29-33]. A number of parents were not fully informed about the importance of vaccinations, stemming from a gap in their understanding [26].

According to recent data, the average literacy rate in Nigeria's northern areas is significantly lower than that of the southern regions[34]. The poor vaccination uptake rate in the North was thought to be caused by illiteracy. The two cultural zones of the nation, the north and the south, have comparable levels of education and immunization rates[18]. Comparing the vaccination uptake rates of the six distinct geopolitical zones reveals a significant discrepancy. The immunization uptake rate in southern regions is, on average, three times higher than that in northern geopolitical zones[17].

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Furthermore, organizations like Boko-Haram pose a significant threat of Islamic terrorism in the North, which has significantly hindered the advancement of immunization campaigns.

The influence of religion is another factor contributing to the vaccination disparity observed between the North and the South. The northern regions predominantly practise Islam, whereas the southern regions are characterised by Christianity. These differing beliefs have been demonstrated to affect their inclination towards vaccinating their children. The vaccination uptake rate in the southeast was approximately 44.6%, but it was 6% in the northwest. Religion had such an effect on education and vaccination rates that, even in a state in a southern region heavily influenced by Islam, illiteracy rates were high and vaccination rates were low[18]. Parents' reluctance to get vaccines has also been directly connected by other studies to their religious convictions. Some women were compelled to stay at home for cultural and religious reasons, which prevented them from taking their children to immunization appointments, according to Babalola et al[24]. Vaccination uptake was also constrained by cultural views. According to some parents, vaccinations could result in birth defects or even death23. Certain individuals adopted an ethnocentric position, claiming that vaccines are a white man's tool for population control23. They felt that immunizations were not nearly as effective as their traditional/alternative medicine methods in curing diseases like measles. Additionally, a number of studies highlighted how the degree of vaccine hesitancy in Nigeria is influenced by rumors concerning vaccines. Positive parental attitudes towards vaccines were associated with up to two times the likelihood of vaccination uptake[17, 29, 31]. Some parents and carers believed that “one shot kills all,” that is, that a baby is protected against all diseases just by receiving the first polio vaccine shot, as a result of these rumors and their lack of knowledge about vaccines [17,22]. Furthermore, this ideology has a dual impact on the rate of vaccination uptake. When parents or carers decline follow-up doses and

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their children fall ill, they subsequently sway other parents or carers to avoid vaccinations altogether [17]. Some parents held the belief that vaccines posed risks to infants, leading them to question the decision to vaccinate their children [23,24,26]. Previous experiences also played a role in their choices to maintain immunisation [23]. The apprehension regarding negative outcomes after vaccination was identified as a contributing factor to the decline in confidence and trust in vaccines [23]. A significant portion of that apprehension arose from the observation that infants tend to cry following vaccinations, and occasionally, they experience swelling in their arms as a consequence [23]. Consequently, the parents and carers perceived that the vaccines were causing harm to the infants, leading them to ultimately halt the vaccination process. Nonetheless, some of this doubt stemmed from their limited experience in the roles of mothers or carers.

Research indicates that mothers in the age group of 15-24 are the least likely to ensure their children receive complete vaccinations [22]. A direct relationship was observed between the mother's age and the uptake of complete vaccination [22]. This could be attributed to their limited experience in childcare. A study indicates that mothers with more experience tend to recognise the significance of vaccinations in disease prevention for children, having faced the challenges of caring for a sick child. The relationship between maternal age and maternal education was also evident. This is due to the fact that older mothers tend to have attained higher levels of education, which enables them to comprehend and value the positive effects of vaccines [17].

In numerous instances, mothers and carers indicated that their children were unwell, which consequently prevented them from obtaining vaccinations during their visits to health centres [25,26,27.] Additional mothers and carers indicated that they were unwell. This was a primary factor contributing to the incomplete vaccination efforts [27]. Frequently, the carer was just too occupied to escort the child to the vaccination centre, as noted in the reports. Some expressed that they

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could not bring their children to the vaccination centres due to the time required away from their income-generating activities, such as farming.

While studies indicated that children born to mothers or carers in stable employment were generally more likely to have completed their immunisation schedules, it was unexpected to discover that this was not universally true. Even with a solid understanding of vaccines and recognising their significance and effectiveness, some women might find themselves too occupied to bring their children to vaccination centres [27]. Some individuals might believe that there is still ample time to vaccinate their children if the child has not yet reached one year of age. This frequently causes delays that could ultimately lead to vaccinations being incomplete.

The socioeconomic status of the child's family was considered a factor in influencing the likelihood of completing the child's vaccination [22,29,31]. Individuals experiencing poverty often exhibit low health-seeking behaviours due to the inability to afford healthcare services [22]. Studies indicated that children from low-income families were less likely to have received the complete immunisation protocol [22]. Furthermore, this financial deficiency had a twofold impact on the health of these children. The absence of quality foods hindered their natural development of a robust immune system, compounded by their families' inability to afford vaccinations. Parents indicated that the significant expense associated with childhood immunisation in Nigeria was a key factor in their decision not to complete their child's vaccination [29,34]. Several individuals expressed that they found healthcare services to be prohibitively expensive, making it impossible for them to afford the necessary care. In a particular investigation, individuals indicated that they covered as much as 70% of their healthcare service expenses out of pocket, with some resorting to selling personal items, seeking assistance from religious groups, or acquiring loans to manage costs [13]. In a similar vein, the significant expense associated with antenatal care discouraged numerous

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parents from pursuing such services. Furthermore, the utilisation of antenatal care has been identified as a significant factor influencing the full vaccination status of children [22]. Research indicates that children whose mothers received prenatal care are more likely to be fully vaccinated [22,26]. This is due to the fact that prenatal physician visits equipped mothers with sufficient information regarding vaccines. Prenatal visits promote the importance of ensuring that mothers pursue comprehensive vaccinations for their children. Furthermore, this argument is reinforced by the observation that the utilisation of health services significantly impacts vaccine uptake [17,25,26].

2.3.3.2. Health System Factor

Some factors, nonetheless, were not directly associated with the parents' or caregivers' failure to ensure their children received full vaccinations. The identified factors stem from a deficient and failing healthcare system in Nigeria. The most commonly reported factor among these was the shortage or lack of availability of vaccines [18, 23-26,28-33]. The presence of vaccines is fundamental to any immunisation initiative, and consequently, shortages in vaccine supply hinder efforts to mitigate vaccine hesitancy in Nigeria. Vaccine supply shortages can foster distrust within target communities, as they reflect a perception of unpreparedness and the gravity of the vaccination initiative [31]. Several factors contributing to vaccine shortages encompass insufficient funding, escalating expenses associated with vaccine development, challenges in vaccine licensing, and production issues [31]. Nigeria remains a developing nation, facing challenges in the provision of essential resources for vaccination initiatives, including vaccines, cold chain equipment, and logistics. Ophori et al. noted that in 2001, despite the approval of necessary funds for vaccine

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purchases by the National Programme on Immunisation (NPI), only 61% of the allocated amount was actually disbursed [18]. Upon the eventual release of funds, vaccines were procured at significantly elevated prices in the cash market. Additionally, the funds for the upcoming year had not been allocated, and as of March 2003, the 2003 funding cycle remained in the budget approval phase [18]. This represents just one of the numerous factors contributing to the vaccine shortage in Nigeria. One aspect that frequently goes unnoticed is the influence of capitalism on the vaccine industry. Pharmaceutical companies frequently choose not to manufacture vaccines for diseases that have been eliminated in developed nations, yet continue to devastate developing countries, primarily due to the diminished financial incentives [31].

While there is an association between hospital delivery and increased vaccine uptake, various health policies impose restrictions that affect vaccine coverage and uptake. In specific health facilities, vaccination personnel are not available on weekends and public holidays [25]. Consequently, infants born on a Friday evening, over the weekend, or during a public holiday or general strike must wait past their first day before they can receive vaccinations, until a working day arrives [25,33]. Parents and carers might frequently extend this delay because of exhaustion, lack of availability, forgetfulness, or simple oversight [25].

Research projects indicated that parents and carers were often discouraged by the scheduling of vaccination appointments [25,26,28,31,33]. A significant number expressed concerns regarding the time required for transporting their children to vaccination appointments, as well as the waiting periods involved [28]. The prolonged waiting periods are exacerbated by the intermittent availability of vaccinations, resulting in a growing number of families eager to have their children vaccinated. As a result, these parents and carers might hesitate to participate in future vaccination events, as

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they perceive little value in waiting for extended periods for a vaccine that may ultimately not be accessible. At times, vaccination appointments were scheduled in the morning, coinciding with the work commitments of parents and carers, which rendered attendance nearly impossible [31]. The limited vaccination coverage can be attributed to the insufficient staffing at vaccination centres. Reports indicated that the number of vaccinators was either insufficient to satisfy the vaccination demands at the centres, or that they were simply unavailable [1,26-27]. The staff's inability to meet demands was exacerbated by the reality that the limited personnel available were overwhelmed with work [23]. The shortage of staff could be attributed to Nigeria's significant population, as it stands as the most populous nation in Africa. In addition to the shortage of vaccinators, numerous women expressed concerns regarding the negative attitudes exhibited by the vaccinating staff, which ultimately dissuaded them from ensuring their children received complete vaccinations [31]. Furthermore, there was a concern regarding the timely dissemination of reminders by the vaccination staff about upcoming vaccination appointments and outreach days contributions of cold chain equipment to Nigeria, attributed to its developing economy and inadequate infrastructure, the management of these assets was severely lacking, leading to many being rendered irreparable. The study indicated that fewer than 50% of the refrigeration units at the health centres assessed were operating effectively [18]. Furthermore, certain health centres faced

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[1] .

Furthermore, the condition of infrastructure in Nigeria has resulted in numerous health care facilities lacking sufficient cold chain equipment necessary for maintaining vaccine supply, leading to shortages [18,24,29,30]. A recent investigation highlighted that, despite significant

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challenges in obtaining sufficient vaccines because they lacked the capability to properly preserve them [23]. This results from the inconsistent electricity supply in Nigeria. Consequently, these health centres refrain from bulk purchasing to avoid stock loss during power outages [23]. The inadequate management of vaccination campaigns adversely affected vaccine availability due to the deteriorated state of cold chain equipment [24]. In certain instances, the findings indicated that the vaccination centres were excessively distant, making it challenging for mothers and carers to consistently bring their children for vaccination appointments [27,28]. Several individuals also pointed out the absence of health care facilities in their surroundings due to their residence in hardto-access regions [23,32]. Even with their distance from health care facilities, certain women successfully attended vaccination appointments. They recognised their growing fatigue from visiting immunisation centres, only to be informed repeatedly that there were no vaccines available for their children. They expressed that while they understood their children needed several vaccination doses, they found no reason to visit the centres that were devoid of vaccines. Furthermore, the likelihood of a child completing the full vaccination schedule was significantly affected by the child's place of residence [17,22,36]. A number of studies have emphasised the differences between urban and rural regions, along with their varying rates of vaccination uptake [17,29,30]. Children whose parents reside in urban areas exhibited a greater likelihood of being fully vaccinated [17]. A different study indicated that urban children had a twofold higher likelihood of being fully vaccinated compared to their rural counterparts [29]. The concentration of health care centres and facilities in urban areas, along with the challenges of accessing rural regions in Nigeria, contributes to this situation.

The inadequate availability of these scarce health care facilities in rural regions intensifies this inequality. The challenging terrain of certain rural regions limits their accessibility; some villages

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are located in riverine, sandy, or mountainous areas that are inherently difficult to access. A study indicates that approximately 1 in 5 infant deaths in the Niger Delta, one of Nigeria's most isolated regions, was due to vaccine-preventable diseases [36]. The findings indicated that children in the Niger Delta faced significant barriers to achieving full vaccination, primarily due to inaccessibility, insufficient health facilities, and the pervasive poverty in the area [36].

2.3.3 Political Factor

The influence of politics on vaccination hesitancy is considerable, especially given the involvement of political leaders in Nigeria. The 2003 boycott of Polio vaccines in North-Western Nigeria was attributed to a lack of adequate government commitment and the excessively centralised leadership of the Expanded Programme on Immunisation (EPI) [18]. Due to public pressure exerted by Islamic and political leaders, the administrations of these northern states implemented a ban on the polio vaccinations that were funded by the Nigerian federal government [34]. The strain was exacerbated by the tensions between Christians and Muslims in Nigeria, coupled with a lack of comprehension surrounding the intensive polio vaccination campaigns during that period [24]. Furthermore, the previously mentioned pressure stemmed from evidence suggesting that the polio vaccines were tainted with substances intended for the sterilisation of Muslim women. Consequently, the imposition of the ban led to a polio outbreak that affected twenty countries across three continents [37]. Nonetheless, polio has been eliminated from Nigeria [15].

Furthermore, the concern of favouritism in appointments to health organisations persists. Corruption is pervasive in Nigeria, leading to political appointments and frequent changes in leadership [18]. The appointment of new officials is often influenced by political favours and

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financial transactions, resulting in the selection of highly incompetent officers. Appointments are also shaped by favouritism and personal ties, which impact the calibre of the officeholder.

Nonetheless, a significant portion of the responsibility rests with the failure of governmental bodies at the federal, state, and local levels to effectively execute a robust strategy aimed at enhancing both vaccine uptake and coverage. Health awareness programs in Nigeria are facing significant challenges, particularly those that emphasise the importance of health-seeking behaviour and the use of health services, such as prenatal care [22]. In light of existing immunisation policies, their effectiveness has proven to be lacking. The outcome reflects the excessive politicisation of these health organisations, coupled with a lack of adequate public collaboration. Furthermore, the absence of government commitment is apparent in the lack of long-term strategies to guarantee a steady stock and supply of vaccines.

2.3.4 Challenges of Routine Immunization in Nigeria

Mass rejection of health interventions may occur from a lack of trust in them. Religious leaders in several Northern Nigerian states called for a boycott of the polio vaccination program in 2003, demonstrating how political and religious factors can contribute to this lack of trust. Western nations viewed such a vaccination effort as a conspiracy to forcibly reduce the local people's population. The WHO's Global Polio Eradication Initiative's polio eradication efforts were severely hindered by the boycott, which also made Nigeria one of the world's remaining polioendemic nations. Parental attitudes, knowledge, and health services have been highlighted as contributing factors. Factors like parental knowledge of vaccines, health care professionals' attitudes and practices, fear of side effects, and access to health services were mentioned in a

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review conducted in cooperation with the WHO. Conflicting parental priorities and attitudes were also identified, as was a lack of trust in the vaccines, as it was believed that a single vaccine would confer immunity against all childhood diseases [38]. Strikes by health workers are common and protracted in Nigeria and other African countries, and they have been seen as a barrier to longterm access to healthcare. Despite the variety of financing sources for vaccinations, vaccine availability remains a major obstacle. In 2010, 425 mothers and carers were chosen by a systematic sample procedure and participated in a cross-sectional study conducted in Primary Health Care institutions in Calabar, Nigeria. 105 (26.1%) of the mothers expressed great satisfaction with the treatment they received from the medical professionals, whereas 50 (12.4%) clients expressed great satisfaction, 102 (25.4%) expressed satisfaction, and 250 (62.2%) expressed dissatisfaction with the staff's approach. Of the clients, 204 (18.4%) expressed great satisfaction with the waiting time, 123 (30.6%) expressed satisfaction, and 205 (51%), expressed dissatisfaction. The number of clients who expressed satisfaction with the amount of time the health care professional spent with their child during service delivery was 252 (62.7%), 143 (35.6%), and seven (1.7%).

In 2012, a study was conducted in Nnewi, Anambra State, Nigeria, involving 310 mothers and carers selected using a simple random sampling technique. The aim of the study was to assess the satisfaction levels of mothers and carers regarding children's vaccination programs. A total of 65 carers, representing 20.9%, did not utilise the nearest health facilities for immunisation services. Several reasons were cited, including dissatisfaction with the health staff (18.5%), the perception of insufficient immunisation service days by 126 (41.3%) clients, the availability of medications and vaccines (115 or 37.0%), the facility's cleanliness (109 or 35.7%), the explanations provided (104 or 34.1%), the staff's attitude (102 or 33.4%), and the hours of service (95 or 31.1%). More

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than 80.0% reported being satisfied with the child health and vaccination services offered by the health clinics [41].

In another study, conducted among 400 mothers in rural and urban areas of Enugu State, Nigeria, were asked how satisfied they were with the vaccination treatments they received[67]. The results showed that the proportion difference was statistically significant ($p<0.001$) and that most mothers who used the immunization services in the urban and rural health centers were satisfied with the services they received (87.0% and 95.0%, respectively). Urban respondents were most dissatisfied with the long wait time (75.0%), whereas rural respondents were most dissatisfied with the uncomfortable waiting environment (65.0%)[13,39]. The majority of health facilities lack supervision, and 35.7% of PHCs experience a shortage of one or more vaccines, according to studies that also show shortcomings in health care facilities' readiness for routine immunization[27]. These could lead to problems in the RI program, a lack of qualified healthcare workers, poor primary healthcare, and subpar treatment in hospitals. Most Nigerian states face comparable challenges to the RI system, which mostly involves logistical and structural issues. Insufficient transportation, a poor cold chain, families, and financial barriers are the primary issues in every state. One of the other issues is a lack of accountability. Too much decentralization of allotted funds between states and LGAs, problems with fund distribution, and a lack of political will to promote RI. General concerns concerning the structure and governance of healthcare organizations affect the delivery of supplies and services at every level. This could lead to vaccine shortages in healthcare institutions, more missed youth vaccination opportunities, and an increase in VPD-related pediatric disorders.

tertiary teaching hospital in Lithuania, a study was carried out on the attitudes and knowledge of postpartum mothers towards the vaccinations of their children. The design of the survey was

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crosssectional. The questionnaire was distributed to 300 postpartum mothers using a simple random sample technique. The data were examined using chi-square analysis. The analysis found that most respondents (63%) had a higher level of education. The child was the first for 49.7% of the moms. According to the women, their doctor, the media, and the Internet were the main places they looked for information about childhood vaccinations. Although the majority of respondents (87.3%) thought that vaccine-preventable diseases were dangerous, only 57.3% knew that vaccines provided effective protection. 75.3% of respondents indicated that the benefits of vaccines outweighed the risks, despite only 57% believing that they were safe. Of mothers, 22.3% knew very little, 41.3% knew a little, and 36.3% knew a lot. 72.7% of respondents were concerned about possible side effects following vaccination, even though the majority of respondents (81.3%) planned to vaccinate their child in the future using all of the vaccinations covered by the national immunization program. Of the mothers with enough knowledge, 74.8% had never asked for or objected to their child's vaccination (= 0.198, $p < 0.001$). Furthermore, mothers with greater knowledge were less likely to be anxious (=0.211, $p<0.001$)[42]. Additionally, some researchers investigated mothers' opinions and knowledge of adverse events following immunization in Enugu, South-East Nigeria, using a cross-sectional survey approach[43]. A questionnaire was distributed to 235 moms who were selected using a simple random procedure. The data was analyzed using percentages and chi-square. According to the findings, 39.6% and 9.4% of women had finished their primary and secondary education, while 0.9% had no formal education. The majority of women (50.1%) had finished their higher education. Five respondents did not understand why children were vaccinated, whereas nine believed that vaccinations were intended to treat illnesses, 33 believed that they were intended to prevent all diseases, and 188 knew that they were intended to prevent major killer diseases. Understanding the rationale behind

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vaccinations was significantly linked with maternal education (p=0.000). The majority (89.8%) also acknowledged that most vaccines were composed of chemicals and other substances that could help avoid fatal diseases. 1.3% of respondents believed that vaccines contained harmful ingredients, whereas 8.9% of respondents were ignorant of their contents. This was strongly correlated with maternal education (p=0.001). The majority of respondents (34%) were unable to recollect any negative experiences, while 31.6% only named one. While 23.8% mentioned two AEFIs, 10.6% mentioned three or more. 80% of parents said they would continue if their children had bad experiences, 6% said they wouldn't, 13.6% said they weren't sure, and 0.4% didn't respond. Furthermore, the study discovered that 48% of the mothers had finished college, 42% had finished high school, 9% had finished elementary school, and 1% had no formal education[44]. Of those surveyed, 82% knew that vaccinations are intended to prevent major diseases, whereas just 14% and 3.4%, respectively, believed that they are intended to treat illnesses and prevent all diseases. Most mothers brought their children to the doctor for regular vaccinations (95.2%) and accepted vaccination on the days of the immunization campaign (75.4%). 23.6% of parents had never vaccinated their children, despite campaigns to the contrary. Nonetheless, 13% (27) of women had expressly refused vaccination during the campaign, while 85% of women (177) had never done so. The remaining 2% did not receive the immunization aside from rejection. A much greater proportion of women declined campaign immunization than those who did not receive routine vaccines (p=0.000)[44].

A multiregional study conducted in Malawi, Ethiopia, India, Bangladesh, and the Philippines found that there was a serious need for improved vaccination services in general and that patientprovider communication within the Expanded Programme on Immunization (EPI) was breaking down. A strong sense of vulnerability to serious illness and/or understanding that

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vaccines are beneficial for children were the main factors driving the desire for immunization. An alternative viewpoint holds that the perceived quality of immunization services is the main factor influencing vaccination uptake. This scenario will probably be impacted by the surroundings[45].

Understanding of immunisation among parents is lacking, and the information they possess is largely inaccurate. It is evident that when parents decline to have their children vaccinated, their intention is to safeguard their children from potential harm. In 2003, leaders in three Nigerian states, both political and religious, rejected a polio vaccination campaign initiated by the WHO, claiming that the vaccine led to infertility and AIDS. Additionally, certain groups in India, including specific Hindu and Muslim communities, have held the belief that vaccination serves as a covert means of family planning, with a primary focus on Muslims. The higher rate of immunisation observed among Javanese transmigrants compared to Acehnese villagers in the same region was linked to the cultural perspectives of the former regarding health. Both groups exhibited a comparable lack of comprehension regarding vaccination and health overall. Additionally, individuals from the Aga Khan community in Pakistan demonstrated an interest in biomedical or western medicine and reasoning, despite a significant level of illiteracy and limited understanding of immunisation. The influence of elevated knowledge on later attitudes regarding immunisation remains unclear [46].

Regarding the elements influencing comprehensive child immunisation among 12-23-month-olds in Nigeria, earlier investigations have notably concentrated on particular aspects, such as regions, states, or localities. A thorough investigation into whole-child immunisation that is relevant to the entire nation has yet to be conducted. The research showed a number of things, including the child's age in months, the mother's present age, marital status, job, religion, level of education,

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number of children, whether or not the child kept their immunization card, where they got their vaccinations, their gender, and their knowledge score[76].

The descriptive reports of the 1990, 1999, 2003, and 2008 NDHS, along with the findings of more recent systematic assessments, are the only nationwide studies that have addressed the topic of childhood vaccination in Nigeria. Reports from the nation's four NDHS rounds showed wide regional differences in the uptake of childhood vaccinations by factors such women's educational attainment, child sex, domicile, and availability to healthcare facilities[46].

A professional used multi-state survey data from 2004 to look into the factors that affect the full administration of the diphtheria–pertussis–tetanus vaccine (DPT3) to children aged 12 to 35 months in Northern Nigeria. Still, the study didn't include traits that are particularly looked at at the community level, which is a frequent strategy in the literature. The fixed effects that were linked to the child's traits were not linked to the mother's traits in a statistically significant way. The odds ratio shows that maternal variables are important as a whole in predicting childhood immunization. The study found that the mother's age was the only socio-demographic factor that had a big effect on the results. On the other hand, all of the psychological factors in this model turned out to be important [48].

The characteristics of mothers are recognised as significant determinants of child immunisation. A study conducted in the southern district of Nigeria indicated that mothers with minimal education and unemployed women were less likely to ensure their child's immunisation was completed. Education enables a woman to obtain essential health services, communicate effectively, and understand information regarding prenatal care, childhood immunisations, and nutritional requirements. A study indicated that maternal education plays a crucial role in

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determining child health, with no other factor exerting such a profound influence. It was noted that maternal education emerged as the most significant independent factor in safeguarding against childhood mortality [49]. The study carried out in Ghana by Daniel Buor revealed a clear correlation between children's vaccination patterns and the educational attainment of their mothers. A study revealed that mothers who achieved at least a primary level of education were 1.7 times more likely to ensure their children received full immunisation compared to those without any education. Findings suggested that children with mothers under the age of 30 were 2.26 times more likely to achieve full immunisation. The socio-economic status of individuals, especially in terms of education and wealth, significantly influences individual behaviour, which in turn affects healthseeking behaviour and ultimately impacts child survival. Moreover, individuals with a higher socio-economic status tend to experience improved health outcomes [50].

In 2008, the NDHS data indicated that approximately 53% of children from the wealthiest households were immunised, compared to just 5% from the poorest households. Research indicates that family socioeconomic status plays a significant role in vaccination compliance, with a correlation observed between higher socioeconomic status and increased vaccination uptake. In Bangladesh, children from more affluent households had an 80% greater likelihood of being fully immunised compared to those from economically disadvantaged backgrounds. This could be attributed to the challenges faced by children from low-income households in accessing health services, as their parents may experience obstacles in reaching health facilities when compared to those from more affluent socio-economic backgrounds. Additional investigations have revealed no variation in vaccination rates related to socio-economic status [51,52].

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Differences in immunisation coverage between rural and urban regions are clearly linked to supply-related challenges, including access to vaccination sites and the presence of paediatric immunisation initiatives, as well as demand-related influences, such as maternal awareness and perspectives. About 38% of children in urban areas indicated that they were more than twice as likely to be fully vaccinated in comparison to their rural counterparts, who stood at 16%. The population of Nigeria largely resides in rural areas, and the geographical isolation of numerous rural regions impacts the accessibility and effectiveness of immunisation campaigns across the country. The NDHS reveals differences in immunisation rates across urban and rural regions in Nigeria. Vaccination rates among young individuals in rural regions are significantly lower compared to those in urban areas. The main factor can be linked to the lack of facilities in rural areas. According to the 2008 NDHS, 38% of children in urban areas received complete immunisation, in contrast to just 16.2% of children in rural areas. The investigation carried out in Malawi indicated that the proportion of fully vaccinated children in urban areas exceeded that of their rural counterparts. This is probably linked to the difficulties encountered in accessing healthcare facilities in rural regions as opposed to urban areas in Malawi [43].

A study indicated that children residing in urban Bangladesh have a higher likelihood of completing the immunisation schedule compared to their counterparts in rural areas. The disparity in immunisation coverage for children between urban and rural areas is evident, with rates standing at 66 percent for urban regions and 54 percent for rural regions in Bangladesh. Additionally, research carried out in Nigeria and Niger revealed disparities in vaccination coverage between urban and rural areas. In Niger, only 10% of rural children have completed the full schedule of eight immunisations, in contrast to 50% of their urban counterparts. Although vaccination coverage in rural areas is significantly lower than in urban areas, these populations have still

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received BCG and measles vaccinations. Furthermore, the dropout rates from the healthcare system in rural regions of Niger are significantly higher, resulting in coverage levels for the third dosage of DPT and polio being less than one-quarter of those found in urban areas. In Nigeria, the differences in immunisation coverage between rural and urban areas, although notable, are not as stark as those seen in Niger. In the case of BCG and measles vaccines, the coverage rates in rural areas are approximately two-thirds compared to those in urban settings. In Eastern Turkey, the rates of measles immunisation were higher in urban areas than in suburban and rural regions [34,45,57].

Research done in China backs up what has already been written on the subject. It shows that household affluence, maternal education, and residing in a city are all linked to getting immunizations, but opportunity costs make it harder to get them. But the child's gender doesn't matter much in the combined cross-sectional model, and the results don't show any differences in the impacts of gender between urban and rural locations [58].

The availability of healthcare services, including antenatal care and delivery facilities, is another factor associated with children's immunisation status. Studies indicate that mothers who engage in antenatal care and give birth in healthcare facilities are more likely to ensure their children receive vaccinations, as antenatal clinics provide an opportunity for women to learn about the immunisation program. A study carried out in Nigeria revealed that a significant portion of mothers surveyed (65.7%) gained their understanding of immunisation through antenatal clinics. This study aligns with the investigation carried out in Colombia concerning the factors influencing the uptake, behaviour, and attitudes towards hepatitis B immunisation in infants, revealing a significant relationship between immunisation rates and the advice provided by healthcare

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professionals. A study carried out in the Niger Delta region of Nigeria revealed a connection between the place of delivery and the immunisation status of a child. A child born in a healthcare facility was significantly more likely to have received the BCG vaccine right after birth and to be up to date with their vaccinations compared to a child born at home [60].

In countries where men and women are not equal, the child's gender may be a sign of their immunization status. For example, in Bangladesh, girls are 0.84 times less likely than boys to get all of their vaccinations. But research done in Nigeria in 2009 found no strong link between sex and being fully immunized. The 2006 survey of the Ethiopian Expanded Programme Immunisation showed that there was no statistically significant difference in the immunization status of boys and girls. The investigations done in North India and Nepal showed that boys were twice as likely as girls to have gotten immunizations. Even though immunization services are widely available, there is still a big difference in how many female children in rural areas of Bangladesh get all of their shots. There was no significant link between immunization coverage and a child's sex. Female children were 30% less likely to be found [61].

More research is needed on the link between birth order and vaccination coverage. The NDHS 2008 shows that vaccination rates go down as birth order goes up. For example, just 27% of firstborn children get all of their vaccinations, but only 14% of infants born sixth or later do. Religion has a big part in the overall rates of childhood immunization in Nigeria. In 2003, authorities in Kano, Zamfara, and Kaduna States in northern Nigeria tried to stop the immunization program by convincing parents not to vaccinate their kids. They think this is a plan by people who don't like Islam to lower the number of Muslims by giving them better vaccines. They also thought it was a novel way to spread HIV, which could lower the number of Muslims. In 2003, this caused fewer people in Northern Nigeria to get vaccinated. [62].

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A big reason that parents or caregivers in Nigeria said their kids didn't get all of their vaccines could be how far away healthcare facilities are. In Kenya in 2006, the distance to the health post, which was another way to measure accessibility, was found to have an effect on immunization coverage. In Egypt and Pakistan, the farther away from vaccination clinics people lived, the less likely they were to get vaccinated. On the other hand, the closer they were to the clinic, the more likely they were to get vaccinated. One possible reason for this is because the clinic's prominence grabs a parent's attention and/or reminds them of their child's vaccination status [63].

2.3.5 **Attitude towards Immunization and Vaccine**

To learn more about public attitudes, worries, and opinions around vaccinations, numerous studies have been conducted. Parents have a significant influence on how the general public expresses its opinions in society. Focus groups and one-on-one interviews were used in a study to examine parental acceptance of HPV vaccination[77]. Twenty-five parents were selected for six focus groups and one-on-one interviews from a suburban private pediatric practice and an urban academic adolescent clinic. Before each session, the parents were given open-ended questions and information regarding the quadrivalent HPV vaccine, its benefits, the prevalence of HPV, and the complications of HPV infection. Transcripts were used to obtain codes and themes. Five themes were identified by the authors from the codes: the availability of vaccines, the hazards of contracting HPV, the age at which the HPV vaccine should be administered, the unfamiliarity with HPV, and the administration of HPV vaccines to both boys and girls. Parents are supportive of the present immunization practices and the vaccines that are now accessible. Despite these concerns, parents felt that, considering the infrequent incidence of vaccine side effects, the advantages of immunization outweighed the dangers. Parental opinions were substantially influenced by

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physician recommendations. This theme included parents who were not familiar with HPV. Parents who were more receptive to HPV vaccinations were aware of the risks of HPV infection because they thought their kids would eventually come into contact with it. It was revealed that parents differed greatly in the age at which their children received the HPV vaccine. Parents responded favorably to the immunization of both girls and boys. Dempsey et al.'s study aimed to identify the variables linked to parents' acceptance of HPV vaccinations[72]. Their goals are to ascertain the general level of acceptance among parents of preadolescent children, assess the impact of written instruction on parents' acceptance of HPV vaccines, and identify personal factors of parental acceptance of HPV vaccines. The results of a cross-sectional survey served as the basis for the investigation. A self-administered survey on knowledge, attitudes, and opinions regarding HPV and the HPV vaccine was mailed to 1600 parents between the ages of 8 and 12. A comprehensive 2-page "HPV Information Sheet" was given to half of the participants in a randomized sample to examine the impact of educating parents on the sequelae of HPV infection. Along with sociodemographic traits including age, gender, and religion, the 67-item survey examined opinions regarding vaccinations, knowledge, and experiences around HPV and STIs[102]. Based on three questions in the survey, the outcome measure for overall parental acceptance of the HPV vaccine was assessed on an 11-point scale, with 0 denoting "would not allow" and 10 denoting "would allow." While questions about experience with HPV-associated illness were scored on a 4-point scale, the knowledge access score was calculated using a 7-item True-False scale of 67-item surveys by counting the number of right answers within the total replies. Five psychological constructs served as the basis for the questions about attitudes towards vaccines: perceived illness severity, perceived vulnerability, perceived advantages of the HPV vaccine, perceived obstacles to the vaccine, and normative beliefs surrounding the HPV vaccine. A 5-point Likert scale was used

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to report responses for these constructs. Individual questions from these five domains were used in a multivariate linear regression model to predict parental approval of HPV vaccinations. The results were divided into two groups: the control group, which received only the survey, and the "HPV Information sheet," which was given alongside the survey. According to the study's findings, parents who received the "HPV Information sheet" performed better on average than the control group on the knowledge 19 test[78]. However, since there was no statistically significant difference between the two groups, this did not affect vaccine acceptability. According to multivariate regression analysis, vaccination acceptance was significantly influenced by the perceived advantages of the HPV vaccine. Alongside this, elements including peer pressure, doctor recommendations, perceived vulnerability to STIs and HPV, and individual experiences were taken into account in order to forecast the outcome of vaccination acceptability. Another study by A study asked 356 parents of children aged 10 to 12 a survey consisting of closed-ended questions about their awareness of HPV and cervical cancer as well as their acceptance of the HPV vaccine for their kids[103]. In addition to sociodemographic enquiries, the interview covered topics such as understanding of cervical cancer risk factors, HPV transmission, the connection between HPV and cervical cancer, the creation of the HPV vaccination, and its uptake. In general, 87.9% of parents surveyed expressed acceptance of the HPV vaccine following government approval, however, some expressed a desire to wait a few years to experience the benefits of the vaccine due to concerns about side effects. Both boys and girls had the same percentage of parents who were willing to vaccinate them. The inclusion of the HPV vaccination in the National Vaccination Program was approved by 19% of the parents. It was shown that the only significant factor influencing acceptance of HPV vaccinations was whether or not the parents had given their kids all of the generally advised vaccinations. The majority of respondents were female and had

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participated in a cervical screening program, despite the survey's gender bias. However, most were not aware of the connection between HPV and cervical cancer. Additionally, a survey study conducted, found that the main reasons why parents of sixth-grade girls agreed to have an HPV vaccine were the vaccine's efficacy, medical advice, and worries about their daughter's health[74]. Concerns about the HPV vaccine's safety, a desire to hold off until their daughters were old enough to receive it, and a lack of knowledge to make an informed choice were the main reasons they opposed the vaccination. Changing the study's focus from parental approval of the HPV vaccine to young adults, 600 participants were enrolled in a cross-sectional survey for persons between the ages of 18 and 25 from two university departments and one non-university technical college. Demographics, sexual activity, cervical cancer, Pap screenings, and acceptability of HPV 16 and 18 vaccinations were all included in this self-administered study. Gender differences were tested using Fisher's exact test, and the ability of covariates to differentiate between participants who accepted and rejected the HPV vaccine was investigated using univariate logistic regression. Multivariate logistic regression using the forward selection method was used to determine the factors that individually contributed to the likelihood of receiving HPV vaccine[79]. The gender distribution in the area was reflected in the two-thirds of participants being female. Most individuals were aware of HPV's connection to cervical cancer, but only a tiny percentage were aware of the virus itself. Even though over 50% of participants expressed a desire to get vaccinated against HPV, men and older participants were less likely to agree[80].

The study found that while medical education, knowledge of HPV, cervical cancer, and the cervical screening program had no obvious effect on vaccination acceptance, individuals who were younger and female had a high percentage of vaccine acceptance. Even though vaccines are the best defense against a lot of serious illnesses, many people still reject them, which leads to

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outbreaks. To understand the reasoning behind this trait, careful thought has been provided. One, focuses on the causes of vaccine skepticism and the factors that influence it. A telephone interview with the parent or guardian was conducted after 3924 respondents to the National Immunization Survey (NIS) 2003–2004 provided data[75]. With the parents' permission, a report on the child's immunization history was obtained from the records. A randomly selected group of parents who completed the NIS survey were invited to respond to an additional survey module linked to the original survey, aimed at gathering national estimates regarding parental concerns about vaccinations. Parents were surveyed regarding their concerns about vaccinations, a specific vaccine that prompts enquiries, the rationale behind their hesitations, and the factors that led some parents to delay or decline vaccinating their children. The parents were divided into three groups by the authors: those who received vaccinations for their children despite having doubts about them were labelled as "unsure," those who postponed vaccinations for their children were labelled as "delayed," and those who chose not to vaccinate their children were labelled as "refused." Demographic traits and a 4-point scale from "very concerned" to "not concerned at all" were used as outcome predictors for two vaccine-related concerns: that the vaccine may not be safe or exhibit significant side effects, and that the vaccine does not prevent the disease. For each group, logistic regression was used to examine the importance of each predictor. Over 25% of parents said they had concerns about vaccinations. In contrast to 13.4% of parents who reported delayed vaccination and 6% who refused to vaccinate their children, 8.9% of parents reported embracing vaccination, but falling into the unsure category. Maternal age, maternal ethnicity, child age, geographic region, and worry about the vaccine's safety were all strongly correlated with the "uncertain" category. The child's age, the number of children living in the home, the mother's marital status, and worries about the safety of vaccines were all substantially correlated with the delayed group. Refusal was

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significantly predicted by factors like the age of the child (22), the ethnicity of the mother, and worries about the safety of vaccines. When identifying which vaccines caused parents to be skeptical, it was found that, of the parents who were unsure and refused, the majority of them expressed doubt about the varicella vaccine, and the second-largest percentage chose "not a specific shot" as the vaccine that caused their doubts, along with the vaccine's safety or side effects as the reason for their doubts. The group that was delayed cited "not a specific shot" as the primary reason for their skepticism, followed by the varicella and MMR vaccines, and "the child was ill." One of the main reasons given by many parents for postponing or refusing a vaccination was "lack of information and assurance from healthcare providers." A study conducted to see whether children who contracted pertussis had a higher chance of parental rejection than children who did not[106]. A case-control study was carried out by the authors on Kaiser Permanente Colorado (KPCO) health plan participants who were between the ages of two months and eighteen years. Without knowing a child's immunization history, potential pediatric cases of pertussis were gathered using the KPCO medical database. If the medical record confirmed a positive culture of B pertussis or a positive polymerase chain reaction (PCR) test, the case was considered confirmed pertussis. For the primary analysis, each case was assigned an index date, which was the day pertussis was diagnosed. These cases were then matched to four randomly chosen controls based on their age, gender, and length of KPCO enrolment on the index date. Children who were enrolled in the KPCO healthcare plan and had no history of pertussis before the index date were chosen as the controls. Unaware of the case status, a medical abstractor examined the children's vaccination records and marked them as "vaccine acceptors" if, on the index date, they had received 23 doses of the pertussis vaccine at the right age. Children who had a partial pertussis vaccination on the index date were given the same label. Refusing vaccination was not the goal of avoiding getting

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vaccinated. If the medical record clearly stated that the children's lack of vaccination was because of parental rejection, they were classified as "vaccine refusers." To ascertain the status of pertussis cases, conditional logistic regression was utilized, with "vaccine acceptor" or "vaccine refuser" serving as the predictor. The percentage of risk attributable to vaccine refusal and the general population was calculated using the matched odds from the conditional logistic regression model. Certain cases did not enroll in KPCO healthcare throughout their initial four-dose pertussis series. Additionally, given the behavior of vaccination acceptors and refusers in response to their children's severe illnesses, the study would be biased. Compared to vaccination rejectors, vaccine acceptors are more likely to seek medical attention for their children in the event of an infection. Additionally, the child's immunization history may have an impact on the doctor's choice to conduct certain tests. Doctors tend to overestimate the link between vaccination refusal and pertussis infection because they are more likely to evaluate children who are not immunized during sickness. Secondary analysis for children aged 2 to 20 months was carried out and compared to 10 randomly selected control cases in order to mitigate any potential bias. Patients having a high suspicion of pertussis and those with laboratory-confirmed infections were not included in the study. The probabilities of visiting a clinic for a URI and getting a pertussis lab test at a clinic related to URI were computed for vaccine acceptors and refusers. The KPCO database yielded a total of 439 patients who were diagnosed with pertussis for primary analysis; 41% of these patients had a positive PCR or culture for pertussis. Parents of 11% of the confirmed cases declined all pertussis vaccinations. The 595 children in the control group were in the same age range as the cases and were either unvaccinated or only partially vaccinated against pertussis. Children whose parents denied one or more pertussis vaccinations made up about 0.5% of the control group's population. 748 children were consistently enrolled in the KPCO healthcare plan between the ages

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of two and twenty months, according to the secondary studies. In this cohort, 13% of the parents of the cases and 0.7% of the control group declined to administer pertussis vaccinations to their children. The analysis revealed that pertussis infection constituted a notable segment, with further estimations indicating that 11% of these infections were associated with vaccine refusal. The primary case-control study revealed a significant association between vaccine refusal and laboratory-confirmed pertussis. The investigation revealed a distinct correlation between parental refusal of vaccines and the likelihood of children contracting pertussis, indicating that those who refuse vaccines face a 23-fold higher risk of acquiring the illness in comparison to those who accept vaccines. A further investigation sought to identify specific characteristics linked to vaccine hesitancy across the globe [77]. They defined "vaccine hesitancy" as the reluctance or delay in accepting a vaccine even when it is available. The WHO Strategic Advisory Group of Experts (SAGE) conducted semi-structured interviews with three economic groups of low, middle, and high-income countries in six WHO regions: Africa, the Americas, the Eastern Mediterranean, Europe, South-East Asia, and the Western Pacific. Thirteen Immunization Managers (IM) participated in the interviews, which lasted roughly half an hour each. Questions were used to analyses the data, which were then mapped against a matrix of determinants. IMs were educated on their knowledge of vaccine hesitancy and how it affects vaccination programs in various nations in terms of vaccine safety, acceptability, and refusal. Four IMs stated that vaccination complacency was a problem in their nation, while according to four IMs, vaccination was given top priority. Nine IMs identified convenience and accessibility to immunization as a significant factor[25].

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Factors contributing to vaccine hesitation included:

i. Contextual factors such as religion, culture, gender, social status, prominent figures, and pro- or anti-vaccination campaigns, geographical limitations, and the media and communication environment, ii. Individual and collective factors including perceptions of risk or safety, degree of faith in the healthcare system and medical professionals, and ignorance, iii. Vaccines and vaccine-specific concerns, including the launch of a new vaccine, the structure of a vaccination program, the source and dependability of vaccines, the function of medical professionals, the cost of vaccinations, and their advantages and disadvantages. The study found that IMs' differing interpretations of the word "vaccine hesitancy" suggested a lack of comprehension. Due mostly to their misinterpretation of language, some IMs claimed that vaccine hesitancy's effect on the immunization campaign was a small issue. IMs found it difficult to provide a percentage of persons who lacked confidence. The majority of IMs acknowledged that vaccine hesitancy affects people from various socioeconomic backgrounds and is not unique to any one community. Two IMs pointed out that the health professionals themselves were hesitant to get the vaccine, raising concerns that their personal vaccination uptake, their recommendations to patients, and their patients' vaccination uptakes have all been found to be significantly influenced by their knowledge and attitude. In summary, the SAGE group's determinants were a good fit for the vaccine hesitancy determinants matrix. Subsequent research revealed that vaccine reluctance is context-specific, changing with time, location, and vaccine type, and is primarily impacted by characteristics

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including complacency, convenience, and confidence[79]. In another study, the authors look at the possible reasons and determinants of the apparent rise in vaccination hesitancy worldwide while attempting to define vaccine hesitancy[109].

The study also examines the factors that influence people's ability to make vaccination decisions based on predetermined, significant criteria. Three areas of factors that interact and cause vaccine hesitancy at the individual level were included in the conceptual model that the study framed. Sociodemographic architecture makes it difficult to define vaccination hesitancy. The main causes of vaccination reluctance in people are historical information, such as prior experiences, family history, and political and sociocultural background, including debates. People's ability to advocate for vaccination is greatly influenced by public health, vaccine policy, and the role of medical experts, who are typically a reliable source of information for patients. Knowledge of vaccines, prior experiences with vaccination services, the importance of vaccination for preserving health, the use of complementary and alternative medicines (CAM) and the advice of medical professionals, risk perception, trust in health officials and policies, subjective norms, social pressure, social responsibility, and moral or religious convictions were found to be psychological factors influencing vaccine acceptance at the individual level. To precisely measure parental vaccine reluctance [80]. The poll was created by looking over earlier research and pre-made questionnaires on parents' vaccination-related health attitudes. Focus groups and pediatricians' creation of a draft of the suggested survey produced additional themes. Six immunization specialists evaluated the poll, selecting items with the lowest third of the rankings and evaluating them from lower to higher on a scale of 1 to 5 for importance in predicting parents who are unwilling to get vaccinated. Four categories were the focus of the planned survey: vaccination behavior, attitudes towards vaccine mandates and exemptions, trust, and views regarding the safety

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and effectiveness of vaccines. There were seventeen items in the original survey and 10 more from the focus group interviews, for a total of twenty-seven items. Nine of these were removed during revisions, leaving the survey with eighteen items. The validity, usefulness, and item understandability of the 27 resulting surveys were tested with 25 parents, and the authors found that they were successful in measuring attitudes towards vaccination.

2.3.6 Different Emotions Revolving Around the Vaccine

Following a comprehensive analysis of popular attitudes towards vaccines, researchers mapped different attitudes towards vaccination acceptance, rejection, and hesitancy to particular emotional states. Following the announcement that MMR was connected to autism, 111 parents who accepted MMR and parents who refused it participated in a survey to find out how much they agreed with the medical authorities regarding trust. The authors prepared a survey that asked the child's year of birth, whether they had received the MMR vaccine or a single dose of the measles, mumps, and rubella vaccine, and how much the parents agreed with 20 statements on vaccination. It also looked at how people used and were satisfied with different sources of information, as well as their age, gender, job, level of education, and number of children. Eighty-seven parents filled out this questionnaire. When parents were asked to "take a stand," a 4-level Likert scale was used, with options ranging from strongly disagree to strongly agree. This made it possible to find out how many parents agreed or disagreed with each statement. We asked parents questions about MMR in both a good and bad way to see what they thought. Children who were born between October 2000 and September 2002 and were registered with the Primary Care Trust were able to fill out the questionnaire. The study looked at parental education, occupational class, the link between education and class, parental age, and the number of children in connection to MMR

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acceptance using logistic regression. The only thing that predicted MMR acceptance was the number of children. Only 3.1% of the children had not had either vaccine. A lot of parents who chose to vaccinate said they weren't sure how safe it was, but it seems that those who didn't get the MMR vaccine were less likely to agree with scientific claims about how safe it was. Parents made a distinction between "doctors" and "my doctor," which suggests that a trusted relationship is much better than medical authorities at making patients feel more confident in the information they are given. A different study found a link between people's general feelings about vaccines, their trust in doctors, their past experiences with vaccines, and how acceptable they found the HPV vaccine [81]. The authors gave a survey to mothers who had at least one daughter between the ages of 8 and 14. The survey questions were changed from those used in past research that looked at people's opinions toward vaccination and their trust in their doctors. They employ a 4-point Likert scale from strongly disagree to strongly agree. We asked people about their past vaccination experiences, like if they had to wait for a vaccine, refused it, had side effects or bad responses, or regretted immunizing any of their children. They may answer "yes" or "no." Mothers were asked if they planned to vaccinate their children soon after they got a sheet of information on HPV and how it is linked to cervical cancer. After that, they were asked to rate how likely they were on a scale of 1 to 5. Mothers who agreed to get the HPV vaccine were called vaccine acceptors, whereas those who did not were called vaccine non-acceptors. Binary Logistic Regression was used to assess each factor's contribution to predicting intention to accept the HPV vaccine. According to the findings, 75% of mothers had a favorable reaction to immunizing their daughters against HPV. The adoption of vaccines was greatly influenced by prior experiences and confidence in medical professionals. The study also shows that parents' acceptance may be increased by informing them of the vaccine's overall significance and assuring them of its safety. Those who have negative

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feelings about vaccines cited worries about vaccine safety, side effects, and religious views as their motivating factors, whereas those who trust vaccines have attributed medical concerns to their doctor. One study looks at the effect that regret and anxiety have in getting one of the most common vaccines, the flu shot[82]. Three questionnaires given to teachers and staff at two New Jersey institutions that provided free flu vaccines between the fall of 2001 and the fall of 2002 provided the writers with the data. The surveys asked participants whether they had received a flu shot, whether they planned to get one in the fall, how likely they thought they were to get the flu with or without a shot, how severe they thought the flu would be without a shot, and whether they expected to feel regret or anxiety about getting the flu. A 5-point Likert scale was used to capture survey responses. According to the study's findings, lowering expected worry and regret was strongly predicted by perceived risk likelihood decrease and perceived risk severity. To determine whether a person who received a flu shot in the fall of 2001 is likely to get vaccinated against the flu in the fall of 2002, the results showed that participants' intention to get vaccinated again was increased by higher perceived risk severity and a greater decrease in risk likelihood, worry, or regret as a result of vaccination[83]. Finding a correlation between expected and experienced emotion for the flu shot, the results showed a difference between the two, further confirming that vaccinators felt less regret and more worry than they had expected, while nonvaccinators felt the same amount of regret and worry as they had expected. The participant's decision to get vaccinated the next year was not influenced by this difference between expected and experienced emotions. According to a hypothesis based on an analysis of public sentiment around fear and anxiety, resistance to vaccination generally indicates a person's dedication to risk culture in a risk society[84]. In order to illustrate this, it views arguments against vaccination in general as "unfounded fear" and against the H1N1 vaccine as "legitimate concerns." People between the ages of 15 and 79

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were surveyed by the authors over the phone. The authors used sociodemographic and socioeconomic factors, including gender, age, income, household composition, and education level, to choose interview subjects[85]. Between October 2009 and June 2010, a total of 9480 respondents took part in the poll. A question about vaccination attitudes, vaccine preferences, and seasonal influenza and Hepatitis B vaccination status was posed to the participants[86]. The findings revealed that while opinions regarding H1N1 and vaccinations in general varied greatly throughout the study, they were highly associated within a month's sample. While those between the ages of 35 and 49, who were female, had intermediate incomes, and were between the ages of 50 and 64, opposed all vaccines in general, those with low incomes and education levels opposed the H1N1 vaccination. Multivariate analysis of the variables revealed that resistance to both types of vaccination is reciprocal, meaning that resistance to the H1N1 vaccine and vaccination in general is a predictor of itself[87].

2.4 Conceptual Framework

PRECEDE stands for Predisposing, Reinforcing, and Enabling Constructs in Educational Environmental Diagnosis and Evaluation. This theory demonstrates the causal factors influencing particular public health behaviours. The following are the definitions of the three major concepts within this paradigm: Factors that predispose individuals are elements that promote or rationalise behaviour; they include information, attitudes, cultural beliefs, perceived needs and abilities, as well as the readiness for change[88,90,91,92,93,94,95,96]. The elements that facilitate action are those that empower individuals to pursue their inclinations; they include available resources, accessibility, financial means, time, supportive policies, assistance, and services[97,98].

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Reinforcing factors: These are elements that impact behaviour after it has begun. They encourage the continuation or repetition of behaviours by providing consistent rewards or incentives, including social support systems (family, peers), healthcare professionals, law enforcement agencies, and the media[88,89,90,99].

2.4.1 Application of The Model

The beneficial effects of the PRECEDE model on the efficacy of health promotion initiatives have been proven by numerous studies. This paradigm is used in this study to explain how people perceive and understand routine childhood vaccinations.

It will be applied to the current study in the following ways using the different model constructs:

i. Predisposing factor: The different things that drive the people who are answering. Knowledge, financial level, religion, beliefs, personality, and attitudes are all included in this.

ii. Facilitating factors: These are the things that allow the respondents to follow their inclinations. These will include a sufficient supply of water and the resources that are now available.

iii. Reinforcing factors: These are the things that motivate responders to consistently and persistently practice preventive measures. They consist of the media and social support (peers, family).

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Conceptual Framework and Its Application to the Study

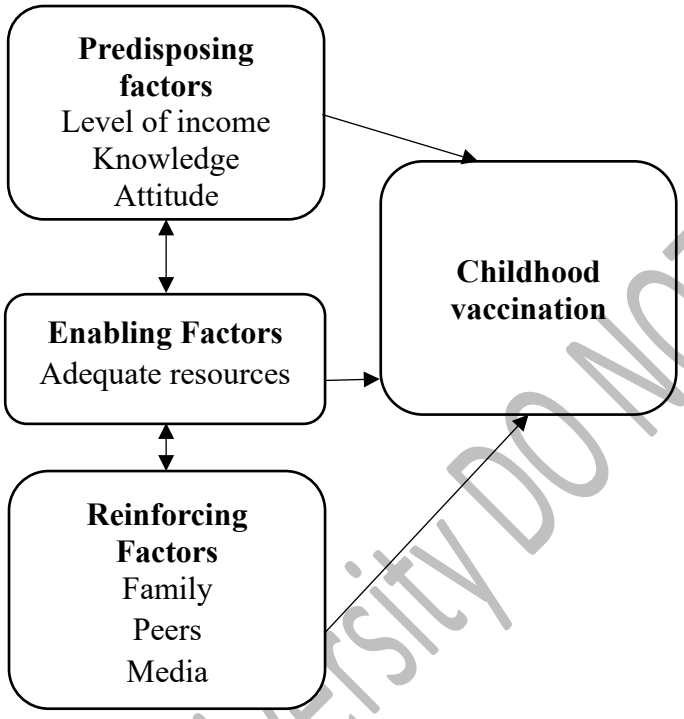


Fig 2.6: Social Determinants and Significance of Health Promotion on Childhood Immunization Programme Conceptual framework

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2.5 Summary of Gaps in Literature

There is insufficient emphasis on particular social determinants. The current literature may inadequately examine the intricate impact of elements such as cultural beliefs, community norms, and healthcare accessibility on childhood immunization rates among carers in South-West Nigeria. Additional investigation is required to examine these facets comprehensively. Although health promotion tactics are acknowledged as successful in enhancing child immunization rates, there is a deficiency in comprehending their efficacy in South-West Nigeria. Future research could evaluate the effects of various health promotion strategies on carer behavior and vaccination rates in the area.

There is insufficient analysis of contextual factors unique to South-West Nigeria that affect immunization coverage. This covers issues such as local healthcare infrastructure, government policies, and community engagement. Investigating these contextual elements may yield significant insights for enhancing immunization campaigns in the region.

Additionally, it is essential to investigate the enduring effects of health promotion efforts on childhood immunization rates in South-West Nigeria. Current research may be insufficiently evaluating the long-term impacts of these activities on vaccination rates, which could guide the creation of more effective and sustainable treatments.

There exists a deficiency in the research concerning the incorporation of behavioral models, such as the Health Belief Model, in comprehending carer views and experiences associated with childhood immunization uptake in South-West Nigeria. Future research may investigate the

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utilization of theoretical frameworks to improve our comprehension of vaccination decision making process.

By correcting these deficiencies, subsequent research can enhance the understanding of the determinants affecting kid immunization rates and the efficacy of health promotion measures among carers in South-West Nigeria.

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Chapter Three

Research Methodology

This section outlines the methodologies employed in this study. The discussion encompassed the study design, the sampling frame, the study population, the sample size, the procedures for sampling techniques, the study location, the research instrument employed, the analytical methods utilised, and the ethical considerations pertinent to this study.

3.1 **Study Design**

This study employed a cross-sectional survey. This study used a mixed-method design, combining quantitative and qualitative data collection methods. The study was conducted in Ogun and Oyo States, Nigeria which involved caregivers of children aged 0-5 years.

Quantitative Component:

The quantitative component of the study consisted of a cross-sectional survey. The cross-sectional survey was used to collect baseline data on the social determinants, knowledge, attitudes, and practices of caregivers towards childhood immunization programs.

Qualitative Component:

The qualitative component of the study consisted of Focus Group Discussion among various stakeholders.

3.2 **Description of the Study Area**

The study was conducted in Ogun and Oyo states, which are located in the southwestern part of Nigeria.

Ogun State is located between longitude 2°45’ and 4°15’ east of the Greenwich Meridian and latitude 6°20’ and 7°45’ north of the equator. It has a population of approximately 4.6 million people, according to the National Population Commission's 2006 Census[1]. The state divided into 20 local government areas (LGAs) and home to a diverse population, with different cultural and socio-economic backgrounds[2].

Oyo State is located between longitude 2°15’ and 4°30’ east of the Greenwich Meridian and latitude 7°38’ and 9°00’ north of the equator. It has a population of approximately 5.5 million people, according to the National Population Commission's 2006 Census[1]. The state is divided into

33 LGAs and has a diverse population, with different cultural and socio-economic backgrounds[3].

You must describe where in these two states because you did not cover the entire state.

3.3 Study Population

The study populations for this study were caregivers of children aged 0-59 months who reside in the selected LGAs of Ogun and Oyo States in southwestern Nigeria.

The inclusion criteria for participants were:

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- Caregivers of children aged 0-59 months who are residents of the selected LGAs in Ogun and Oyo States.
- Caregivers who have given informed consent to participate in the study.

The exclusion criteria for participants were:

- Caregivers who are unable to communicate in English or Yoruba (the local language spoken in the study area).
- Caregivers who have participated in any immunization-related health promotion activities in the last six months.

3.4 Sample Size Determination

For the quantitative component of the study, Leslie Fisher's Simple Sampling Technique was used in getting the sample size for each states of the study.

The formulas are:

$$n = \frac{z^2 p q}{d^2}$$

$z = 1.96$

$P = 0.503$

$q = (1-P) = 0.497$

$d = 0.05$

Therefore

$$n = \frac{(1.96)^2 \times 0.503 \times 0.497}{(0.05)^2} = \frac{3.8416 \times 0.503 \times 0.497}{0.0025} = \frac{0.960}{0.0025} = \mathbf{384}$$

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Correcting for a possible non-response rate of 10%, the final calculation was 384/0.9 = **400**

400 care-givers were engaged in each state of the study(Ogun & Oyo State).

A total of 800 caregivers were engaged for this study.

Fourteen (14) copies of the questionnaire were excluded from analysis due to incomplete information during data cleaning. Therefore 786 copies of the questionnaire were analyzed.

For the qualitative component of the study, the sample size was determined using purposive sampling. Thirty-seven (37) participants were randomly selected for the focus group discussions. This allowed for sufficient variation in participants characteristics and experiences, while ensuring data saturation.

These include: 25 caregivers from the selected Local Governments

6 health care providers from the State

6 community leaders from the State

The Focus Group Discussion was in 4 sessions of Nineteen (19) participants from Oyo state in clusters of ten (10) and nine (9) participants respectively, and eighteen (18) participants from Ogun state in two (2) clusters of Nine (9) participants each.

3.5 **Sampling Techniques**

A multistage sampling technique was used to select the study participants

5 Local Governments were selected through multistage random sampling for the selection of the caregivers from each state.

Stratified Four (4) stage cluster design random sampling technique was used.

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Stage 1: Five (5) Local Governments i.e., (2 Urban, 1 semi-urban, and 2 Rural), were selected randomly from the twenty (20) LGAs in Ogun state and thirty-three LGAs in Oyo state.

Stage 2: Two (2) Political Wards were selected from each of the Local Governments.

Stage 3: Four (4) Communities were selected randomly in each Local Government

Stage 4: Ten (10) caregiver clusters were selected in each Community.

A purposive sampling technique was used in the selection of eligible caregivers.

Table 3.1: Selected Local Government Areas

Oyo State	**Ogun State**
Ona- Ara	Ado-Odo/Ota
Ido	Ijebu North East
Ibadan South West	Remo North
Akinyele	Obafemi Owode
Oluyole	Abeokuta South

Five (5) Research Assistants were engaged (a Local Government) per State. Making a total of 5 research assistants per state.

The study involved conducting a house-to-house survey in which mothers and caregivers in the community were interviewed. A proper self-introduction was made to the community leaders, who provided informed consent and assisted in identifying participants within the community.

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3.6 **Instrument for Data Collection**

For this research study, the instruments for data collection were a semi-structured questionnaire and a focus group discussion guide. The questionnaire was divided into two (2) sections, i.e., (A and B section).

Section A collected data on socio-demographic characteristics, while Section B collected data on selected variables based on the objectives of the research study.

Focus Group Discussion (FGD) Guide: An FGD guide was developed for exploring the social determinants that influence childhood immunization uptake among caregivers in the United States. The Focus Group Discussion guide included open-ended questions that were related to the research questions and objectives of the study.

3.6.1 **Validity and Reliability of Research Instrument**

On validity and reliability of the questionnaire, the instruments were validated and corrected by some experts, including the research project supervisor.

Though the questionnaire was made in English Language -thorough explanation was made to the respondents by researchers and research assistants in their local languages when required and needed.

Also, the research instrument (questionnaire) for this study was validated by conducting a pretest for necessary formation and restructuring before finally being administered to the respondents. The pretest was conducted in Odeda Local Government in Ogun State, which was chosen through simple random sampling (balloting) among the 20 Local Governments in Ogun State. The pretest aimed to ensure the reliability of the questionnaire by identifying and addressing any issues related to question clarity, consistency in responses, and overall instrument effectiveness. Through this

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pretest, the internal consistency of the questionnaire was assessed using Cronbach's Alpha, which resulted in a score of 0.85. This high Cronbach's Alpha score indicates that the questionnaire has a good level of internal consistency, making it a reliable tool for the study.

3.7 Data Collection Procedure

Questionnaire administration was conducted with the assistance of research assistants who were deployed to the study area for data collection. Four research assistants were recruited and trained in administering the questionnaire alongside the researchers. The research assistant has at least a B.Sc., has a good knowledge of research, and is conversant with the study area. The research assistants were trained to familiarize themselves with the research questions, sampling techniques, and data collection.

The study utilised a mixed-methods approach for data collection, integrating both qualitative and quantitative methods. The qualitative data were gathered via a Focus Group Discussion with carers, whereas the quantitative data were obtained through a structured survey questionnaire. The survey questionnaire was conducted in person by trained assistants and gathered data on the sociodemographic characteristics of the carers, their knowledge and attitudes regarding childhood immunisation, and their implementation of health promotion strategies.

A focus group discussion with a purposive sample of 37 stakeholders was conducted, and gained an in-depth insight into the social determinants affecting childhood immunization uptake and the effectiveness of health promotion strategies and services.

Data on the immunization status of respondents' last child was collected and verified by requesting to see the child's immunization card.

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3.8 Data Management and Analysis

All data collected during the study were recorded on paper forms and then transferred onto a secure digital platform for storage and analysis. The digital data stored in a password-protected database and backed up regularly to ensure data security.

All paper forms were stored in a secure location and only accessible by the research team. All data collected during the study were treated as confidential and stored in a secure location. Access to the data limited to the research team and secured with passwords. Any personal information collected during the study was de-identified to protect the confidentiality of the participants. The digital data stored in a secure database, regularly backed up to ensure data security. At the conclusion of the study, all paper forms were, and the digital data securely deleted.

Qualitative data collected through Focus Group Discussion were analyzed using thematic analysis to identify recurring themes and patterns in the data.

All completed copies of the questionnaire and other data collected were analyzed with the use of the Statistical Package for Social Sciences **(SPSS) 27.0 version.**

Chi-square tables were used to test the significance of the relationship between the set hypotheses and the findings obtained from the field data at a 95% confidence interval and a p-value of less than 0.05 ($P < 0.05$).

3.8.1 Thematic analysis

The study utilized thematic analysis to look at the qualitative data we got from the focus group talks and in-depth interviews. This method includes finding and studying patterns or themes in

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the data. There were various steps in the process, such as getting to know the data, coding it, coming up with themes, and refining those themes.

3.8.2 Integration of Quantitative and Qualitative Data

The results of the quantitative and qualitative analyses were integrated to provide a comprehensive understanding of the social determinants that influence childhood immunization uptake and the effect of health promotion interventions. The quantitative and qualitative findings were triangulated to provide a more complete picture of the research questions and objectives.

3.9 Ethical Consideration

For this research study, the project design did not cause any harm or embarrassment to the respondents.

Ethical approvals were obtained from

1. Ogun State Primary Health Care Board Research Ethics Committee.
2. Ogun State Ministry of Health Research and Ethics Committee.
3. Oyo State Ministry of Health Research and Ethics Committee
4. Lead City University Health Research and Ethics Committee.

Written and verbal consents of study population were sought before administrations of the research instruments. The interview and information in the questionnaire were explained to them in their Local language and well understood with a proof of acceptance (signed informed consent).

All information obtained was treated with utmost confidentiality.

The respondents were not given any gratification and also had the right to withdraw from the research work without any negative consequences.

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All participants were not given any form of incentives.

All participation in this study was voluntary.

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Endnotes

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Chapter Four

Results and Discussion of Findings

A total of 800 caregivers consented to be interviewed, and it was observed during the data cleaning process that 14 copies of the questionnaire were incompletely filled out. Thus, the 14 copies of the questionnaire were excluded, leaving a total of 786 copies of the questionnaire used for the analysis.

4.1 Demographic Data Analysis

Socio-Demographic Characteristics of Respondents

The study on social determinants and the significance of health promotion on childhood immunization among caregivers in Nigeria reveals a diverse demographic profile. The average age of the participants is 33.53± 9.14years. The majority fall within the age categories of 25-34 (45.3%) and 35-49 (31.6%) years. In terms of religion, the sample predominantly consists of Christians (60.4%) and Muslims (37.9%), with a small percentage identifying with other religions

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(1.7%). Marital status distribution shows a significant number of married participants (79.9%), followed by singles (14.5%). Among married individuals, monogamous marriages are prevalent (69.6%). The majority have 2 children (52.5%) and possess varying levels of education, with tertiary education being the most common (52.8%). Occupationally, caregivers are engaged in diverse roles, with trading and civil service being prominent. Family income varies, with 49.2% falling within the N30,000-N100,000 income range. The average age of the children is 37.94 ± 5.98 months, indicating a broad age range and considerable variability within the dataset. In terms of gender distribution, the study encompasses both male and female children. Specifically, 355 (45.2%) are males and 431 (54.8%) are females.

Table 4.1: **Socio-Demographic Characteristics of Respondents**

Variables	**Frequency**	**Percent (%)**
Age (years)		
Mean ± S.D	**33.53** ± 9.14	
<24	132	16.8
25-34	356	45.3
35-49	248	31.6
>49	50	6.4
Religion		
Christianity	475	60.4
Islam	298	37.9
Others	13	1.7
Marital Status		
Single	114	14.5
Married	628	79.9
Divorced	23	2.9
Widow	21	2.7
Type of Marriage		
Monogamy	437	69.6
Polygamy	160	25.5
Others	31	4.9
Number of Children		
1	108	13.7
2	413	52.5
3-4	222	28.2
Above 4	43	5.5

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Level of Education		
None	22	2.8
Primary	86	10.9
Secondary	263	33.5
Tertiary	415	52.8
Occupation		
Civil Servant	291	37
Trading	292	37.2
Artisan	136	17.3
House Wife	67	6.5
Family Income		
<30,000	168	21.4
30,000-100,000	387	49.2
>100,000	231	29.4
Age of Child		
Mean ± S.D	37.94 ± 5.98	
Sex of Child		
Male	355	45.2
Female	431	54.8

4.2: Presentation of Data

Antenatal Care and Birth Practices among Caregivers

Table 4.2 below shows antenatal care and birth practices among respondents whereby most (90.7%) respondents received antenatal care during pregnancy. Among those who received antenatal care, the primary locations were health centers (64.4%) and general hospitals (28.1%), with smaller percentages utilizing chemists/pharmacies, home-based care, or other sources. Regarding tetanus toxoid (TT) injections during pregnancy, 43.5% received 2 doses and 32.4% received 3 doses. The place of childbirth varied, with 51.1% occurring in health centers, followed by 25.8%. in general hospitals. Traditional Birth Attendants (TBAs) and other locations also contributed to childbirth settings. Lastly, a high awareness level of childhood immunization is evident, as 96.9% of respondents acknowledged familiarity with the concept, while only 3.1% reported no awareness.

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Variables	Frequency	Percent (%)
Receive ante-natal care when pregnant for the child		
No	73	9.3
Yes	713	90.7
Place of ANC (n=713)		
Health centre	459	64.4
General hospital	200	28.1
Chemist/ pharmacy	8	1.1
Home	32	4.5
Others	14	2.0
Doses of tetanus toxoid (TT) injection received during the pregnancy		
None	47	6.6
1	125	17.5
2	310	43.5
3	231	32.4
Where index child was delivered		
House	73	9.3
Health centre	402	51.1
General hospital	203	25.8
TBA	64	8.1
Others	44	5.6

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Ever Heard About Childhood Immunization Before		
No	24	3.1
Yes	762	96.9

Table 4.2: **Antenatal Care and Birth Practices among Caregivers**

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Objective One: The Immunization Status of Children in Nigeria

Table 4.3a shows the data on child immunization status indicates that 483 respondents (61.5%) reported that their child's immunization is complete, while 303 respondents (38.5%) indicated that it is incomplete. This information provides an overview of the immunization coverage status among the surveyed individuals, with a majority reporting completion of their child's immunization. The data suggests that there is a significant portion of the population with incomplete immunization, and understanding the reasons behind this could be valuable for targeted interventions to improve overall immunization rates.

Table 4.3a: Immunization Status of Children in Nigeria

Immunization Status	Frequency	Percent

Complete	483	61.5
Incomplete	303	38.5

Level of immunization coverage

Table 4.3b shows the immunization coverage for various antigens among the respondents is summarized as follows. For BCG, 87.5% of the respondents received the vaccine on the scheduled date, 9.2% on another date, and 3.3% did not receive it. Similar patterns are observed for OPV (Oral Polio Vaccine), OPV1, OPV2, OPV3, IPV (Inactivated Polio Vaccine), PENTA 1, PENTA 2, PENTA 3, Pneumococcal 1, Pneumococcal 2, Pneumococcal 3, Measles 1, Measles 2, Yellow Fever, Men A, Rotavirus 1, Rotavirus 2, and Vitamin A. The majority of respondents received these vaccines on the scheduled date, with varying percentages, while a smaller percentage received them on other dates. The percentages of respondents who did not receive each vaccine are relatively low.

Table 4.3b: Level of Immunization Coverage

Antigen	**None**	**Scheduled Date**	**Other Date**
BCG	26(3.3)	688(87.5)	72(9.2)
OPV	26(3.3)	688(87.5)	72(9.2)
OPV1	28(3.6)	676(86)	82(10.4)
OPV2	45(5.7)	658(83.7)	83(10.6)
OPV3	66(8.4)	651(82.8)	69(8.8)
IPV	66(8.4)	651(82.8)	69(8.8)
PENTA 1	28(3.6)	676(86)	82(10.4)

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PENTA 2	45(5.7)	658(83.7)	83(10.6)
PENTA 3	66(8.4)	651(82.8)	69(8.8)
Pneumococcal 1	28(3.6)	676(86)	82(10.4)
Pneumococcal 2	45(5.7)	658(83.7)	83(10.6)
Pneumococcal 3	66(8.4)	651(82.8)	69(8.8)
Measles 1	53(6.7)	631(80.3)	102(13)
Measles 2	75(9.5)	640(81.4)	71(9)
Yellow fever	66(8.4)	657(83.6)	63(8)
Men A	110(14)	550(70)	126(16)
Rotavirus 1	28(3.6)	676(86)	82(10.4)
Rotavirus 2	45(5.7)	658(83.7)	83(10.6)
Vitamin A	58(7.4)	629(80)	99(12.6)

Objective Two: The factors that influence childhood immunization uptake among mothers/caregivers in Nigeria

Table 4.4 shows the analysis of various demographic factors regarding childhood immunization uptake among mothers/caregivers in Nigeria revealed significant associations with caregivers age with a significant p-value ($p = 0.014$) indicating age as a significant factor in immunization completion. Similarly, religious affiliation marital status, type of marriage, number of children, education level, occupation, and family income demonstrated notable correlations with immunization completion rates, all supported by significant p-values ($p < 0.05$). However, the sex of the child did not show a significant association with immunization completion, as indicated by a non-significant p-value ($p = 0.508$).

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Table 4.4: Factors that Influence Childhood Immunization Uptake among Mothers/Caregivers in Nigeria

Variables	Immunization Complete (%)	Immunization Incomplete (%)	P value
Age			0.014
<24	73(15.1)	59(19.5)	
25-34	229(47.4)	127(41.9)	
35-49	159(32.9)	89(29.4)	
>49	22(4.6)	28(9.2)	

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Religion			0.000
Christianity	319(66)	156(51.5)	
Islam	155(32.1)	143(47.2)	
Others	9(1.9)	4(1.3)	
Mothers' Marital Status			0.000
Single	75(15.5)	39(12.9)	
Married	396(82)	232(76.6)	
Divorced	4(0.8)	19(6.3)	
Widow	8(1.7)	13(4.3)	
Type of Marriage			0.000
Monogamy	261(66)	138(59.4)	
Polygamy	70(17.6)	75(32.3)	
Others	65(16.4)	19(8.3)	
Number of Children had			0.023
1	71(14.7)	37(12.2)	
2	233(48.2)	180(59.4)	
3-4	151(31.3)	71(23.4)	
Above 4	28(5.8)	15(5)	

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Mothers' Level of Education			0.000
Nonformal	12(2.5)	10(3.3)	
Primary	60(12.4)	26(8.6)	
Secondary	127(26.3)	136(44.9)	
Tertiary	284(58.8)	131(43.2)	
Occupation			0.002
Civil Servant	177(36.6)	114(37.6)	
Trading	212(43.9)	80(26.4)	
Artisan	61(12.6)	75(24.8)	
House Wife	33(6.8)	34(11.2)	
Family Income			0.011
<30,000	117(24.2)	51(16.8)	
30,000-100,000	219(45.3)	168(55.4)	
>100,000	147(30.4)	84(27.7)	
Sex of Index Child			0.508
Male	207(42.9)	148(48.8)	
Female	276(57.1)	155(51.2)	

Objective Three: Barriers and Motivating Factors for Completing Their Child's Immunization

Motivating Factors for Completing Their Child's Immunization

Table 4.5a below shows respondent's reasons for completing their child's immunization. The majority cited factors such as easy access to immunization centers (94.6%), education from mass media (80.1%), advice from family, partners, or friends (79.1%), well-coordinated immunization

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services (89.4%), fear of their child contracting infectious diseases and death (69.5%), free immunization services (89.2%), the belief that every parent is immunizing their child (66.3%), and encouragement from healthcare providers (94%) as key influencers. These insights highlight the multifaceted nature of motivations for immunization completion, ranging from accessibility and information dissemination to social influences and healthcare provider support.

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Table 4.5a: **Motivating Factors for Completing their Child's Immunization**

Motivating Factors for Completing Child's Immunization	**Yes**	**No**
Access to immunization centre	457(94.6)	26(5.4)
Education from the mass media	387(80.1)	96(19.9)
Advice from family, partner, or friends	382(79.1)	101(20.9)
Well-coordinated immunization services	432(89.4)	51(10.6)
Fear of my child contracting infectious diseases and death	338(69.5)	145(30)

Free immunization services	431(89.2)	52(10.8)
Every parent is immunizing their child	320(66.3)	163(33.7)
Encouragements from health care providers	454(94)	29(6)

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Barriers for not Completing Their Child's Immunization

Table 4.5b below presents the reasons cited by respondents for not completing their child's immunization. The majority reported challenges such as a busy work schedule (59.4%), long waiting times at the immunization center (70.6%), child illness or admission to the hospital (43.6%), side effects experienced by the child after the last visit (40.9%), the child being too small to be taken out (41.6%), financial constraints preventing transportation to the center (45.5%), not knowing the next schedule date or forgetting it (55.1%), traveling out of town (36%), and a decision based on a previous negative experience where an older child had side effects for a specific vaccine, leading to a decision not to immunize any of their children against that vaccine (32.3%).

Table 4.5b: Barriers for not completing their child's immunization

Barriers For Not Completing a Child's Immunization	Yes	No
Busy work schedule	180(59.4)	123(40.6)
Long waiting in the queue at the immunization centre	214(70.6)	89(29.4)
The child was sick or on admission	132(43.6)	171(56.4)
The child developed side effects after the last visit	124(40.9)	179(59.1)
The child was too small to be taken out	126(41.6)	177(58.4)
Had no money to transport myself to the centre	138(45.5)	165(54.5)
Did not know the next scheduled date or forgot the date	167(55.1)	136(44.9)
Travelled out of town	109(36)	194(64)
The older child had side effects from a particular vaccine, so I have decided not to immunize any of my children against that vaccine	98(32.3)	205(67.7)

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Barriers and Motivating Factors of Immunization Uptake

Table 4.5c below shows notable findings include concerns about the distance to vaccination centers, with a significant portion expressing agreement (23.8% SA, 25.2% A). Financial instability was identified as a major barrier (10.9% SA, 18.8% A), as well as skepticism about vaccine side effects (11.1% SA, 26.6% A). Access to health facilities due to bad roads (8.9% SA, 34.2% A) and lack of transportation (13% SA, 15.3% A) were also mentioned. Additionally, religious beliefs (7.8% SA, 14.5% A) and cultural factors (6.2% SA, 14.1% A) played a role, while concerns about vaccine efficacy were evident (7.1% SA, 15% A).

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Table 4.5c: Barriers and motivating factors of immunization uptake

Barriers and Facilitating Variable	SA	A	U	D	SD
The distance to cover to vaccinate is a barrier to me	187(23.8)	198(25.2)	62(7.9)	190(24.2)	149(19)
If I am asked to pay for immunization/vaccination, I will not	177(22.5)	210(26.7)	115(14.6)	159(20.2)	125(15.9)
Time factor inadequacy is to be considered for the child vaccination	202(25.7)	271(34.8)	118(15)	124(15.8)	69(8.8)
I hate going to health centres for vaccination purposes only	74(9.4)	158(20.1)	132(16.8)	260(33.1)	162(20.6)
Lack of transportation is a challenge for me to vaccinate this child	102(13)	120(15.3)	98(12.5)	325(41.3)	141(17.9)

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I am a bit sceptical about the side effects of the vaccines	87(11.1)	209(26.6)	114(14.5)	248(31.6)	128(16.3)
The behaviours of the health provider does not allow me to go for my child's Immunization	72(9.2)	209(26.6)	109(13.9)	269(34.2)	127(16.2)
Access to the health facilities due to bad roads is a barrier to me	70(8.9)	269(34.2)	79(10.1)	242(30.8)	126(16)
I heard almost no information or jingles about the immunization	68(8.7)	156(19.8)	121(15.4)	228(29)	213(27.1)
My financial instability is a major barrier for me to consider my child's vaccination	86(10.9)	148(18.8)	133(16.9)	272(34.6)	147(18.7)
Most of the time I come to the health facility, they usually do not have vaccine, so I don't go anymore	70(8.9)	131(16.7)	101(12.8)	257(32.7)	227(28.9)
My religion discourages vaccination	61(7.8)	114(14.5)	82(10.4)	246(31.3)	283(36)
I do not believe in the efficacy of the vaccines	56(7.1)	118(15)	100(12.7)	275(35)	237(30.2)

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My traditional belief is an influence to my decision to immunization.	67(8.5)	142(18.1)	154(19.6)	249(31.7)	174(22.1)
My culture don't encourages orthodox medicine and immunization	49(6.2)	111(14.1)	109(13.9)	279(35.4)	239(30.4)
My spouse discourages me from vaccinating my child	46(5.9)	117(14.9)	126(16)	272(34.6)	225(28.6)
I am too busy to bring my child for vaccination	32(4.1)	114(14.5)	132(16.8)	256(32.6)	252(32.1)

Source of Information on Childhood Immunization

Table 4.5d presents the sources of information on childhood immunization among respondents. Health workers emerge as the predominant source, with a frequency of 359 (47.1%) and a corresponding percentage of 47.1%. Media follows as another influential channel, with a frequency of 162 (21.3%) and a matching percentage of 21.3%. Word of mouth and poster/leaflet sources contribute equally, each representing a frequency of 86 (11.3%) and a percentage of 11.3%. Billboard information is reported by 51 respondents (6.7%), while religious settings and community settings are less common, each constituting 1.6% (12) and 0.8% (6), respectively.

Table 4.5d: **Source of Information on Childhood Immunization**

Sources of Information	**Frequency**	**Percent (%)**

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Health Worker	359	47.1
Media	162	21.3
Word of Mouth	86	11.3
Poster/leaflet	86	11.3
Bill Board	51	6.7
Religious settings	12	1.6
Community settings	6	0.8

Objective Four: Knowledge and Attitudes of caregivers towards immunization

Table 4.6a below shows respondents' opinions about knowledge of immunization, regarding the recommended completion age, 44.4% believe it should be before one year, 48.2% think it should be greater than or equal to one year, and 7.5% are unsure. In terms of the purpose of immunization, 61.4% associate it with disease prevention, 27.8% believe it prolongs life, 6% think it makes a child brilliant, 2.9% believe it makes a child grow fast, and 1.9% are unsure. When asked about alternative ways to prevent vaccine-preventable diseases, 60.4% deny the existence of alternatives, while 39.6% believe there are other methods. Regarding awareness of childhood immunization services, 83.1% of respondents are aware of services in their area, while 16.9% are not.

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Table 4.6a: **Knowledge of caregivers about immunization**

Knowledge Variables	**Frequency**	**Percent (%)**
The age at which a child should complete immunization		
Before one year	338	44.4
Greater than or equal to one year	367	48.2
I don't know	57	7.5

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Purpose of immunization		
Makes a child brilliant.	46	6
Prolongs life	212	27.8
Prevents disease	468	61.4
Makes a child grow fast	22	2.9
I don't know	14	1.9
Is there an alternative way to prevent vaccine-preventable diseases other than immunization		
No	460	60.4
Yes	302	39.6
Know of any childhood immunization services existing in your area		
No	129	16.9
Yes	633	83.1

Knowledge on Immunization-Related Diseases Among Caregivers Table 4.6b below shows respondents' knowledge of immunization-related diseases among caregivers. Across various diseases, the percentages of correct responses vary. Notably, high correct percentages are observed for measles (85.3%), yellow fever (85.6%), and diphtheria (73.5%). Conversely, lower correct percentages are noted for diseases like malaria (45.3%) and typhoid fever (44.1%). The data indicates a range of awareness levels, suggesting that while many caregivers correctly identify certain diseases covered by immunization, there are gaps in knowledge for others.

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Table 4.6b: Knowledge on Immunization-Related Diseases among Caregivers

Knowledge on Immunization-Related Diseases Among Caregivers	Correct (%)	Incorrect (%)
Diarrhoea	297(39)	465(61)
Diphtheria	560(73.5)	202(26.5)
Hepatitis	571(74.9)	191(25.1)
Haemophilia Influenza	463(60.8)	299(39.2)

Malaria	345(45.3)	417(54.7)
Measles	650(85.3)	112(14.7)
Pertussis	482(63.3)	280(36.7)
Pneumonia	475(62.3)	287(37.7)
Poliomyethelis	549(72)	213(28)
Tuberculosis	546(71.7)	216(28.3)
Typhoid Fever	336(44.1)	426(55.9)
Yellow Fever	652(85.6)	110(14.4)
Cancer	536(70.3)	225(29.7)

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Attitudes of Caregivers towards Immunization

Table 4.6c below shows respondents' attitudes towards childhood immunization. Findings include a high level of confidence in the safety of routinely received childhood immunizations (58.5% SA, 37.9% A). The majority perceive immunizations as essential for keeping children healthy (54.3% SA, 39.9% A), and trust the vaccine advice provided by their child's main health care provider (37.5% SA, 52.5% A). Confidence in the healthcare provider's communication abilities is also

notable (38% SA, 45.4% A). There is a divided opinion on parents being allowed exemption from vaccination on religious grounds, with 17% strongly agreeing and 23.5% strongly disagreeing. Concerns about the potential overload of a child's immune system with multiple shots in one visit are present (25.1% SA, 33.3% A). The majority agree that outreach efforts contribute to increased immunization coverage (49.7% SA, 38% A). Views on the sufficiency of routine immunization to reach all children are varied (39.3% SA, 43.9% A). The importance of the mother's education in increasing immunization usage is acknowledged by a significant portion (48.1% SA, 32.1% A). Concerns about the cost of immunization are evident, with 38.8% strongly disagreeing that it is too expensive.

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Attitudinal Statements	**SA (%)**	**A (%)**	**U (%)**	**(%)**	**SD (%)**
am confident in the safety of routinely received childhood immunizations	460(58.5)	298(37.9)	12(1.5)	8(1)	8(1)

think immunizations are for keeping children healthy	427(54.3)	314(39.9)	19(2.4)	10(1.3)	16(2)
trust the vaccine advice my child's main health care provider gives me	295(37.5)	413(52.5)	59(7.5)	13(1.7)	6(0.8)
My child's main healthcare provider is easy to talk with	298(38)	257(45.4)	55(7)	64(8.1)	12(1.5)
Parents should be allowed to get exemption from vaccination for their child on religious ground even if it were clear that it will increase the risk of disease for the child and everyone else	134(17)	217(27.6)	90(11.5)	185(23.5)	160(20.4)
Getting multiple shots in one visit can overload a child's immune system	197(25.1)	262(33.3)	82(10.4)	172(21.9)	73(9.3)
The use of outreach is helping to increase coverage for immunization	391(49.7)	299(38)	49(6.2)	23(2.9)	24(3.1)

Table 4.6c: **Attitudes of Caregivers towards Immunization**

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Routine immunization is sufficient to reach all children	309(39.3)	345(43.9)	52(6.6)	46(5.9)	34(4.3)
The level of education of the mother is important in increasing the use of immunization services	378(48.1)	252(32.1)	51(6.5)	81(10.3)	24(3.1)
Immunization is too expensive for me	79(10.1)	99(12.6)	114(14.5)	189(24)	305(38.8)

Note: SA (Strongly Agree); A(Agree); U(Undecided); D(Disagree); SD (Strongly Disagree) **Level of Attitudes of Caregivers towards Immunization**

Table 4.6d shows that most respondents in the study exhibit a positive attitude toward childhood immunization, with 671 individuals (85.4%) expressing a favorable perception (Good).

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Table 4.6d: Level of Attitudes of Caregivers towards Immunization

Attitudinal Level	Frequency	Percent (%)
Good	671	85.4
Poor	115	14.5

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Objective Five: Significance of Health Promotion Campaigns on Childhood Immunization Uptake among Mothers/Caregivers in Nigeria

Table 4.7 below shows the significance of health promotion campaigns on childhood immunization uptake among respondents. The respondents were asked about the influence of health promotion messages or campaigns on their decision to vaccinate their child. The majority, 716 individuals (91.1%), stated that these messages or campaigns did influence their decision positively, while 40 (5.1%) said no, and 30 (3.8%) were unsure. In assessing the perceived effectiveness of health promotion messages or campaigns in increasing childhood immunization rates in Nigeria, 539 respondents (68.6%) considered them very effective, 98 (12.5%) somewhat effective, 65 (8.3%) not very effective, 27 (3.4%) not at all effective, and 57 (7.3%) were unsure. When asked about the types of health promotion activities deemed most effective, respondents favored TV/radio advertisements (50.1%), community meetings (30.7%), printing materials (17.7%), and one-on-one counseling with healthcare providers (43.8%). The majority, 768 respondents (97.7%), expressed a desire to receive more information about childhood immunization and/or related health promotion activities, with 18 (2.3%) indicating otherwise. Regarding the preferred channels for information reception, respondents favored TV/radio

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advertisements (43.5%), community meetings (15.9%), healthcare providers (35.4%), and printed materials (5.2%).

Table 4.7: Significance of Health Promotion Campaigns on Childhood Immunization Uptake among Mothers/Caregivers in Nigeria

Questions	Frequency	Percent (%)
Health promotion messages or campaigns influence the decision to vaccinate your child		
No	40	5.1
Yes	716	91.1
I am not sure	30	3.8
Effectiveness of health promotion messages or campaigns in increasing childhood immunization rates in Nigeria		
Very effective	539	68.6
Somewhat effective	98	12.5
Not very effective	65	8.3
Not at all effective	27	3.4
I am not sure	57	7.3

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Types of health promotion activities most effective in increasing childhood immunization rates in Nigeria		
Tv/ radio advertisements		
Community meetings	394	50.1
Printing materials	241	30.7
One on one counselling with healthcare providers	139	17.7
	344	43.8
Would like to receive more information about childhood immunization and/or health promotion activities related to childhood immunization in Nigeria		
Yes	768	97.7
No	18	2.3
How would like to receive the information		
Tv/radio advertisements	334	43.5
Community meetings	122	15.9
Healthcare providers	272	35.4
Print materials	40	5.2

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Qualitative Thematic Analysis

Focus Group Discussion

Objective Six: Caregiver Perceptions and Experiences Related to Childhood Immunization Using the Health Belief Model

Socio-Demographic of Focus Group Discussion Participants

Table 4.8 below shows the socio-demographic profile of focus group discussion participants. In the focus group discussion, participants spanned a range of ages, with an average age of 35.54 ± 12.21 years. Marital status among participants was predominantly married (81.1%), with smaller percentages identifying as divorced (8.1%), single (5.4%), and widowed (5.4%). In terms of educational attainment, a significant portion of participants had tertiary education (54.1%), while others had completed secondary education (40.5%) or primary education (5.4%). Regarding family income, participants' financial situations varied: 18.9% reported incomes below ₦30,000, 56.8% fell within the ₦30,000-₦100,000 range, and 24.3% reported incomes exceeding ₦100,000.

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Table 4.8: Socio-Demographic of Focus Group Discussion Participants

Variables	Frequency	Percent (%)
Age		
Mean ± S.D	**35.54** ± 12.21	
Marital Status		
Single	2	5.4
Married	30	81.1
Divorced	3	8.1
Widow	2	5.4
Level of Education		
Primary	2	5.4
Secondary	15	40.5
Tertiary	20	54.1
Family Income		
<30,000	7	18.9
30,000-100,000	21	56.8
>100,000	9	24.3

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Perceived Susceptibility

Participants express significant concerns about childhood diseases, emphasizing the perceived severity and potential risks associated with vaccine-preventable illnesses. The prevailing sentiment is a strong belief in the importance of child vaccination, driven by a sense of responsibility towards their child's well-being and the broader community. Factors influencing risk perceptions include considerations of disease prevalence in the community, information obtained from healthcare providers, and the impact of social determinants of health, such as poverty, education, and access to healthcare, on the child's vulnerability to vaccine-preventable diseases.

"Well, as a parent, my top priority is my child's well-being. I do have significant concerns about childhood diseases, especially considering their potential severity. It's not just about my child but also the broader community. I believe in the importance of vaccination – it's like a shield of protection. It's our responsibility as parents to ensure our kids are safe, and getting them vaccinated is a crucial part of that."-OG 4

"Absolutely, I take into account various factors. Disease prevalence in the community is a concern – I wish to protect my child from what's out there. I relied more on information from healthcare providers; their guidance is crucial."-OY 9

"It can be overwhelming with so much information out there. I try to rely on trustworthy sources like my child's doctor or official health organizations."- OY 2

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Perceived severity

Participants express heightened concerns about the perceived severity of vaccine-preventable diseases, particularly focusing on the potential consequences for their children. There is a notable apprehension regarding diseases like polio and measles, with caregivers acknowledging the severe health implications if their child were to contract these illnesses. The perception of severity is influenced by the caregivers' understanding of the debilitating effects and potential complications associated with these diseases. Additionally, social determinants of health, such as poverty, education, and healthcare access, play a role in shaping perceptions of disease severity, as these factors can impact the ability to seek timely and adequate medical care in case of an illness. "Oh, absolutely. The severity is a big factor for me. Especially diseases like polio and measles – I've heard about the devastating impact they can have on a child's health. It's not just about getting sick; it's about the potential long-term consequences. As a parent, I can't help but worry about what could happen if my child contracts one of these diseases. That's why I felt it's so important to take preventive measures like vaccination of my children very seriously." OG 1

> "Definitely. Diseases like polio and measles are my concern. The health implications are severe, and it's not something I want my child to go through. I've read about the potential complications, and it's frightening. As a caregiver, 1 felt a strong sense of responsibility to protect my children from anything that could affect them, especially now that I understood the severity of these diseases. "OY 7

> "It's all about understanding the impact. The potential consequences of diseases like polio and measles are not something I can take lightly. As a parent, I want to shield my child

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from anything that could be debilitating. Knowing the potential complications and longterm effects makes me more inclined to prioritize vaccination. It's not just about preventing the illness itself; it's about preventing the severe consequences that can follow." OG 5

"For instance, if I don't have easy access to healthcare or if I'm struggling financially, the severity of a disease takes on a whole new meaning. It's not just about the illness; it's about the ability to get timely and adequate medical care."-OG 7

Perceived Barriers

Caregivers commonly cite challenges related to the accessibility of vaccination services, including concerns about the distance to health centers or clinics, waiting times, and the availability of vaccines during their visits. Financial constraints and the cost of immunization, albeit relatively low, are also acknowledged as potential barriers. Additionally, the lack of awareness and information about the benefits of childhood immunization, coupled with doubts about the efficacy and safety of vaccines, contributes to perceived barriers. Social determinants of health, such as poverty and educational disparities, play a role in shaping these barriers. While caregivers generally recognize the importance of childhood immunization, these identified barriers often hinder their ability to ensure timely and consistent vaccination for their children.

Accessibility is a big issue for me. Sometimes, the health center or clinic is quite a distance away, and getting there is a real challenge, especially if I don't have reliable transportation.

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It's not just about the distance; it's also about the time it takes to travel. These factors can make it difficult to ensure that my child receives vaccinations on time. -"OY 4

"Even though the cost of immunization is relatively low, it still adds up, especially with my multiple children. Financial constraints are real for many families. Every expense matters, and sometimes I have to make tough choices. While the cost may not be exorbitant, it still contributes to the overall financial burden, making it a potential barrier to consistent and timely vaccination for my child." OG 10

"Honestly, awareness is a big challenge for me. Sometimes, I'm not sure about the benefits of each vaccine or why they're necessary. Lack of clear information created doubts. If I had more awareness about the positive impact of childhood immunization, it would make it easier for me to overcome any reservations or uncertainties I might have." OG 3

"I do have some doubts, especially about the safety of vaccines. There's a lot of information out there, and it can be confusing. If I had more confidence in the safety and efficacy of vaccines, it would be easier to overcome these doubts. Clear and trustworthy information about the science behind immunization could make a significant difference for parents like me." OG 6

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Perceived Benefits

Caregivers universally acknowledge the crucial protection provided by childhood immunization against a spectrum of severe and potentially life-threatening diseases. They emphasize the preventive nature of

vaccines, underscoring their role in safeguarding the overall health of their children. Recognizing the positive impact on long-term health, caregivers stress the importance of vaccines in building immunity and reducing the risk of severe health complications, thereby reinforcing the significance of routine vaccinations. Moreover, caregivers perceive social determinants of health, such as poverty, education, and access to healthcare, as influential factors shaping the overall benefits of childhood immunization. Improved access to healthcare and education is identified as essential for enhancing the effectiveness of immunization programs. While challenges in accessing vaccination services, financial constraints, and misinformation pose hurdles, proactive measures, community outreach initiatives, and health education campaigns serve as effective resolutions, ensuring equitable access to immunization services for all children.

> "Immunization is crucial for safeguarding my child's health. The preventive nature of vaccines is what stands out to me. They provide a shield against severe diseases that could be life-threatening. It's not just about treating an illness after it happens; it's about preventing it altogether. Vaccines play a fundamental role in ensuring the overall health and well-being of my children." OG 9

> "I strongly believe in the positive impact of vaccines on long-term health. They help build immunity, making sure that my child is better protected against serious complications. It's not just about the immediate protection; it's about reducing the risk of severe health issues down the line. Vaccines are like a foundation for a healthier future for my children." - OY 1

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Self-efficacy

Caregivers exhibit varying levels of confidence in their ability to ensure timely vaccination for their children. Factors contributing to their confidence include awareness of vaccination schedules, reliable access to healthcare services, and a belief in the effectiveness of immunization. While some caregivers have faced difficulties, proactive measures, including improved healthcare infrastructure and awareness campaigns, have facilitated overcoming these challenges. Caregivers consider healthcare providers, particularly nurses and doctors, as credible sources of advice on vaccination. To prevent polio, caregivers express a commitment to vaccination and maintaining proper hygiene. Awareness of vaccination due dates is often facilitated through immunization cards, though some caregivers may face challenges in regularly checking them. In rare cases, traditional healers are consulted due to cultural beliefs, emphasizing the importance of culturally sensitive health education to address misconceptions and promote vaccination acceptance.

> "I try to stay on top of due dates with immunization cards, but it's a challenge for me to check them regularly. Sometimes life gets busy. On cultural beliefs, I've seen cases where traditional healers are consulted due to cultural practices. It highlights the need for culturally sensitive health education to address misconceptions and ensure that everyone understands the importance of vaccination." OY 7

> "My confidence is quite high, mainly because I'm aware of the vaccination schedules and have reliable access to healthcare services. Understanding the effectiveness of immunization also plays a crucial role. It's not just a routine; it's a proactive step I can take

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for my child's well-being. Being informed and having the resources needed contribute to my confidence in ensuring timely vaccinations." OG 2

"Yes, there have been challenges, but proactive measures have been a game-changer. Improved healthcare infrastructure means better access, and awareness campaigns have made information more accessible. Knowing where to go and when has become easier. These measures have helped me overcome difficulties and ensure that my child receives vaccinations on time." OG 11

Cue to action

Caregivers employ various prompts and reminders to ensure timely vaccination for their children, including setting alarms, relying on healthcare providers' notifications, and marking dates on calendars. Additional helpful prompts could include mobile text messages or community outreach programs that provide vaccination information. Suggestions for healthcare providers and the government to enhance prompts include utilizing community health workers for personalized reminders and implementing SMS alerts. Motivations for child vaccination are often influenced by awareness campaigns, recommendations from healthcare professionals, and community leaders endorsing immunization. These positive influences highlight the importance of targeted health promotion efforts and community engagement in promoting childhood immunization.

"I relied on setting alarms on my phone. It's a simple yet effective way to make sure I don't miss vaccination dates. I also appreciate the notifications I get from healthcare providers.

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These reminders help keep everything on track, and it's reassuring to have that extra nudge to ensure timely vaccinations." OY 8

"Absolutely. Mobile text messages with vaccination information would be great. It's a quick and direct way to receive updates. Also, community outreach programs that provide information on vaccination schedules and benefits are valuable. Sometimes, hearing it from the community adds an extra layer of trust and makes the information more accessible." OG 9

"I think utilizing community health workers for personalized reminders would be fantastic. They understand the community's needs and can provide more targeted assistance. Also, SMS alerts from healthcare providers or the government would be helpful. Simple, timely messages about upcoming vaccinations could go a long way in ensuring that every child gets the care they need." OY 6

"Awareness campaigns have a big impact on my motivation. When I see information about the benefits of vaccination, it reinforces my commitment. Recommendations from healthcare professionals and community leaders endorsing immunization also play a role. Positive influences from trusted sources make me more confident in my decision to prioritize my child's health through vaccination. "OG 3

"They are incredibly important. I targeted health promotion efforts to break down information in an easily understandable way. When our community is engaged, it creates a supportive

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environment. Knowing that healthcare professionals, community leaders, and neighbors are all on the same page reinforces the importance of childhood immunization.

It's a collective effort that makes a significant impact on the well-being of our children. "OG 8

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4.3 Discussion of Findings

The high percentage of caregivers receiving antenatal care during pregnancy aligns with the World Health Organization's recommendation for early and regular antenatal visits. Antenatal visits provide opportunity to deliver interventions essential for the health and well-being of pregnant women and their infants. The WHO advises a minimum of four prenatal visits, informed by an evaluation of the efficacy of various antenatal care approaches[1]. This finding is consistent with previous studies emphasizing the importance of antenatal care in promoting maternal and child health outcomes. However, the 9.3% who did not receive antenatal care highlight a potential gap in access or awareness, warranting further investigation and targeted interventions and also the primary locations for antenatal care being health centers and general hospitals reflect the common settings for maternal healthcare services in low- and middle-income countries and a proportion which was similar to 74.3% recorded in a study in North-West Ethiopia but lower than a similar study conducted in Nigeria which recorded 34.9%[2,3]. This distribution underscores the role of primary healthcare facilities in delivering essential maternal and child health services. The utilization of chemists/pharmacies and home-based care suggests potential alternative sources of care, indicating the need for comprehensive healthcare delivery strategies.

The varied locations for childbirth, including health centers (51.1%), general hospitals (25.8%), Traditional Birth Attendants (TBAs), and other sources, indicate diverse birthing practices among caregivers. While health facilities remain preferred settings for childbirth due to skilled attendance and emergency care capabilities, the presence of TBAs highlights the persistence of traditional birthing practices in some communities this is supported by a study conducted in Nigeria where the results showed that the prevalence of health facility deliveries was 41% in Nigeria and

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Tanzania where proportion of women in the study population that uses health facility for delivery was still low when compared to the national target[4,5]. The high level of awareness of childhood immunization among respondents signifies a positive attitude towards vaccination and preventive healthcare. This finding is consistent with studies emphasizing the role of awareness campaigns in increasing immunization coverage and reducing vaccine-preventable diseases. The low percentage (3.1%) of caregivers reporting no awareness highlights the need for sustained health education efforts to reach marginalized populations and address misconceptions about immunization [6].

Findings highlighting health workers as the predominant source of information on childhood immunization align with previous studies emphasizing the crucial role of healthcare providers in promoting vaccination. Health workers are trusted sources of information and play a key role in educating caregivers about the importance of immunization, addressing concerns, and providing guidance on vaccination schedules. Their direct interaction with caregivers during antenatal care, postnatal visits, and child wellness checks positions them as influential advocates for immunization. The significant percentage of respondents obtaining information on childhood immunization through media channels, such as television, radio, and print materials, underscores the reach and impact of mass communication campaigns. Media campaigns have been shown to effectively raise awareness about vaccination, address misconceptions, and promote positive health behaviors. By leveraging mass media platforms, public health authorities can disseminate accurate information, combat vaccine hesitancy, and encourage immunization uptake among diverse populations. The equal contribution of word of mouth and poster/leaflet sources highlights the importance of interpersonal communication and community-based health promotion efforts. Word of mouth recommendations from family members, friends, and community leaders can influence caregivers' attitudes towards immunization and serve as a powerful motivator for

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vaccination. Similarly, posters and leaflets distributed in healthcare facilities, community centers, and public spaces play a role in raising awareness and providing educational materials on vaccination. These grassroots approaches complement formal healthcare messaging and contribute to a holistic communication strategy. The lower percentages of respondents receiving information on childhood immunization through billboards, religious settings, and community settings suggest the varying effectiveness of these communication channels in reaching caregivers. While billboards can serve as visual reminders and reach a broad audience, their impact may be limited compared to more interactive or personalized communication methods. Religious and community settings, although less common sources of information, can still play a role in promoting immunization through targeted outreach programs, faith-based initiatives, and community engagement activities. This is consistent with a study conducted in Italy[7].

Furthermore, the presence of 16.9% of respondents who are not aware of these services highlights the need for targeted outreach efforts, community engagement, and improved communication strategies to ensure that all caregivers have access to essential immunization services. Enhancing awareness and knowledge about vaccination schedules, clinic locations, and the importance of timely immunization can help bridge gaps in service utilization and improve vaccination coverage rates[8].

A considerable number of participants demonstrated strong confidence in the safety of routinely administered childhood vaccinations. This study aligns with research conducted in Malawi, indicating that confidence in vaccine safety emerged as the most significant predictor of routine childhood immunisation, with everyday stress constraints following closely behind. Carers exhibited diminished confidence in the safety and efficacy of vaccines when influenced by rumours and misinformation, particularly in the context of unemployment. Individuals exhibited

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greater confidence when they possessed a higher level of trust in healthcare professionals. Factors such as age, gender, religion, education, employment status, belief in rumours, and trust in healthcare professionals were examined as potential predictors of vaccination intention. A husband's optimistic outlook enhanced the intention to vaccinate during childhood. Vaccination intentions for human papillomavirus were found to be greater among individuals with lower education levels, increased trust in healthcare professionals, reduced complacency, and a diminished inclination to weigh the benefits and risks associated with vaccination. Understanding of human papillomavirus did not enhance the intention to vaccinate; however, the desire to gain a husband's approval did influence it. The experience of being a young adult without employment heightened susceptibility to rumours, whereas confidence in healthcare professionals diminished this belief.

Findings show that the majority of respondents received various vaccines according to the recommended schedule. While most vaccines were administered on time, a small percentage of respondents received them on other dates. The findings highlight the importance of adherence to vaccination schedules and the need for continued efforts to promote and maintain high immunization rates to achieve optimal public health outcomes. This study aligns with research conducted in the U.S.A, where most children's patterns were categorised as "recommended" (63%), while 23% and 14% followed alternate or unknown/unclassifiable patterns, respectively. Additionally, 58% of children were up-to-date with all ACIP-recommended immunisations by the age of 19 to 35 months. The lack of current information was linked to alternate patterns (prevalence ratio = 4.2, 95% confidence interval: 3.9–4.5) as well as unknown or unclassifiable patterns (prevalence ratio = 2.4, 95% confidence interval: 2.2–2.7) [10].

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The majority of respondents reported complete immunization for their children, but the presence of incomplete immunization rates among a substantial proportion underscores the need to address barriers and challenges to improve overall immunization coverage. In southwestern Ethiopia, where this study took place, 322 mothers and caregivers were questioned. According to the vaccination card and what the mothers and caregivers remembered, 295 (91.6%) of the kids got at least one dose of the vaccine. There were 27 children (8.4%) who had not been vaccinated at all, 159 (49.4%) who had only been partially vaccinated, and 136 (42.2%) who had been fully vaccinated [11].

The multifaceted motivations for completing child immunization, including accessibility, social influences, fear of diseases, and healthcare provider support, underscore the complex interplay of factors that influence vaccination decisions and practical barriers, health concerns, financial constraints, and negative experiences cited by respondents for incomplete child immunization underscore the complex challenges that influence vaccination decisions. This aligns with a review carried out in Sub-Saharan Africa, highlighting that barriers faced by parents and caretakers included insufficient knowledge about immunisation, distance to access points, financial constraints, lack of partner support, and scepticism towards vaccines and immunisation programs. Additional factors linked to low vaccine rates encompassed the number of children, lifestyle choices, migration patterns, occupation, as well as parents' forgetfulness, inconvenient timing, and language barriers [12].

The majority of respondents stated that health promotion messages or campaigns positively influenced their decision to vaccinate their child, indicating the importance of communication and awareness-raising efforts in promoting immunization uptake. This is consistent with current literature highlighting the influence of health promotion strategies on vaccination choices and enhancing vaccine acceptance within communities. For instance, a study carried out in Anambra,

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Nigeria, revealed that a significant portion, 216 (67.50%) of the participants, primarily received essential immunisation messages during campaigns. The channel of delivery that was most favoured was via religious groups, with 273 (85.3%) indicating this preference. Town announcers were followed by 270 individuals, accounting for 84.4%. A total of 175 individuals, representing 54.7%, responded positively to the messages conveyed during the immunisation campaigns. A significant majority concurred that immunisation messages are more effectively reinforced when both parents are addressed, 309 (98.6%) [13]. When assessing the perceived effectiveness of health promotion messages or campaigns in increasing childhood immunization rates, a significant portion of respondents (68.6%) considered them very effective, with additional respondents rating them as somewhat effective (12.5%). These findings highlight the positive perception of health promotion initiatives in driving immunization uptake and suggest that targeted communication strategies can play a crucial role in improving vaccination coverage rates. This investigation corroborates a previous analysis that assessed a social marketing initiative aimed at enhancing awareness among urban low-income children, with more than 85% of community members remembering the "Take Control! Immunize" message. A significant portion of individuals exposed to the immunisation message reported that it inspired them to take action, such as ensuring their children received vaccinations or reaching out to their healthcare provider to check on their children's immunisation status. Every participant expressed the significance of immunisations for children and indicated a strong likelihood of vaccinating their children. Participants who indicated that the "Take Control!" messages inspired them to take action in the initial intercept survey were notably more inclined than those in the subsequent intercept to express a likelihood or strong likelihood of immunising their children [14].

Respondents identified TV/radio advertisements, community meetings, printing materials, and one-on-one counseling with healthcare providers as the most effective health promotion activities for increasing

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childhood immunization rates. This aligns with recommendations from literature that emphasize the importance of diverse communication channels, community engagement, and personalized interactions in promoting vaccine acceptance and addressing vaccine hesitancy[15]. The majority of respondents (97.7%) expressed a desire to receive more information about childhood immunization and related health promotion activities, underscoring the importance of ongoing education and communication efforts to support vaccination decisions. This highlights the need for continuous engagement with communities, provision of accurate information, and addressing concerns to enhance vaccine acceptance and coverage rates.

Findings from the study show that participants express significant concerns about childhood diseases, emphasizing the perceived severity and barriers, and potential risks associated with vaccine-preventable illnesses. The dominant perspective emphasises the critical role of child vaccination, fuelled by a commitment to ensuring both the child's health and the welfare of the wider community. Elements that shape risk perceptions encompass the prevalence of diseases within the community, insights gathered from healthcare professionals, and the effects of social determinants of health like poverty, education, and healthcare accesson a child's susceptibility to diseases that can be prevented by vaccines. A review was conducted in Sub-Saharan African countries, identifying 2652 items, of which 48 met the inclusion criteria. The most commonly examined subjects were parents or caretakers. Nine articles demonstrated moderate methodological quality, while 39 exhibited high methodological quality. Nine studies examined secondary data; 36 utilised cross-sectional designs, and three applied the case-control method. Thirty studies documented the national immunisation coverage for essential vaccines administered to children under one year of age, while eighteen studies did not provide this information. National immunisation coverage for childhood vaccines has been observed to be low when reported.

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Barriers faced by parents and caretakers encompassed insufficient knowledge regarding immunisation, challenges related to distance from access points, financial constraints, absence of partner support, and scepticism towards vaccines and immunisation initiatives. Additional factors linked to low vaccine rates comprised the number of children, lifestyle choices, migration patterns, occupation, as well as parents' forgetfulness, inconvenient timing, and language barriers. Healthcare providers identified obstacles within the health system, such as insufficient human resources and inadequate infrastructure necessary for maintaining the cold chain and ensuring a sufficient supply of vaccines [12].

Also, participants express heightened concerns about the perceived severity of vaccine-preventable diseases, particularly focusing on the potential consequences for their children. There is a notable apprehension regarding diseases like polio and measles, with caregivers acknowledging the severe health implications if their child were to contract these illnesses. The perception of severity is influenced by the caregivers' understanding of the debilitating effects and potential complications associated with these diseases. Furthermore, factors such as poverty, education, and access to healthcare significantly influence how individuals perceive the severity of diseases, as these elements can affect their capacity to obtain timely and appropriate medical attention when faced with illness. This aligns with a review indicating that parents' beliefs and practices regarding vaccination may be shaped by their overall perspectives on health and illness, particularly concerning their children, as well as their views on the significance of vaccination in this framework. Furthermore, the vaccination beliefs and practices of many parents were shaped by the vaccination beliefs and practices of their social circles. Concurrently, the exchange of vaccination concepts and methods facilitated the formation of social connections among certain parents, thereby reinforcing their beliefs and practices regarding vaccination. Moreover, the

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beliefs and behaviours of parents regarding vaccination may be shaped by broader political factors and concerns, especially their levels of trust (or mistrust) in those involved in the vaccination initiative. Ultimately, the concepts and practices surrounding vaccination among parents can be shaped by their accessibility to vaccination services and their interactions with frontline healthcare professionals [16].

Findings from the study show that caregivers universally acknowledge the crucial protection provided by childhood immunization against a spectrum of severe and potentially life-threatening diseases. They emphasize the preventive nature of vaccines, underscoring their role in safeguarding the overall health of their children. Recognizing the positive impact on long-term health, caregivers stress the importance of vaccines in building immunity and reducing the risk of severe health complications, thereby reinforcing the significance of routine vaccinations. Moreover, caregivers perceive social determinants of health, such as poverty, education, and access to healthcare, as influential factors shaping the overall benefits of childhood immunization. Improved access to healthcare and education is identified as essential for enhancing the effectiveness of immunization programs. While challenges in accessing vaccination services, financial constraints, and misinformation pose hurdles, proactive measures, community outreach initiatives, and health education campaigns serve as effective resolutions, ensuring equitable access to immunization services for all children. The results align with earlier studies indicating that perceived advantages and barriers to vaccination significantly influence the intention to pursue COVID-19 vaccination and mammography [17,18]. Studies show that messages related to vaccination campaigns need to tackle and reduce obstacles to getting vaccinated. The results suggest that a targeted intervention program has the potential to mitigate negative views surrounding the vaccine by addressing conspiracy theories and beliefs that it is ineffective or in conflict with religious

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doctrines. The spread of COVID-19 has led to the proliferation of conspiracy theories, which have significantly impacted individuals' willingness to adopt preventive measures, such as vaccination. Caregivers exhibit varying levels of confidence in their ability to ensure timely vaccination for their children. Factors contributing to their confidence include awareness of vaccination schedules, reliable access to healthcare services, and a belief in the effectiveness of immunization. While some caregivers have faced difficulties, proactive measures, including improved healthcare infrastructure and awareness campaigns, have facilitated overcoming these challenges. Caregivers consider healthcare providers, particularly nurses and doctors, as credible sources of advice on vaccination. To prevent polio, caregivers express a commitment to vaccination and maintaining proper hygiene. Understanding vaccination due dates is commonly supported by immunisation cards; however, some carers may encounter difficulties in consistently monitoring them. In certain instances, traditional healers are sought after because of cultural beliefs, highlighting the necessity for culturally sensitive health education to correct misconceptions and encourage vaccination acceptance. This corresponds with a qualitative study in which carers received information about vaccination activities from three primary sources: health facilities (during health education sessions held at antenatal or immunisation clinics), media outlets, and announcements (in churches/mosques, communities, and markets). Carers indicated that the information provided was highly beneficial. The sources of information they favoured encompassed phone text messages, town announcers, media outlets, and announcements from churches and mosques. Certain carers identified the clinic atmosphere, extended waiting periods, and the demeanour of health workers as obstacles to obtaining vaccination information. In the context of implementing communication interventions, health workers reported challenges related to inadequate

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communication skills, lack of motivation, and the attitudes of community members, which included resistance to vaccination [19].

Finally, the study shows that caregivers employ various prompts and reminders to ensure timely vaccination for their children, including setting alarms, relying on healthcare providers' notifications, and marking dates on calendars. This is supported by a study conducted in Nigeria, where the study demonstrated that SMS reminders in local languages could improve vaccination demand and uptake in resource-constrained settings due to their perceived importance and impact[20].

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Chapter Five

Conclusion

5.1. Summary of Findings

The study examined the impact of social determinants and the significance of health promotion strategies on childhood immunization uptake among caregivers in Nigeria. A mixed-method study was conducted, incorporating both qualitative and quantitative data collection and analysis methods. Qualitative data was collected through focus group discussions with caregivers, while quantitative data was collected through a structured survey questionnaire. Quantitative data were collected from 786 caregivers in randomly selected communities in Nigeria, and 37 persons, comprising caregivers, health care providers, and community leaders, participated in the focus group discussion.

Most caregivers received antenatal care, yet a small percentage did not, suggesting a potential gap in access or awareness. Primary locations for antenatal care were health centers and general hospitals, and diverse birthing practices were observed, with varied locations for childbirth. The study identified caregiver's age, religion, monthly income, marital status, occupation, number of children, and educational level as socio-determinants associated with immunization uptake. High awareness of childhood immunization was also noted, indicating a high positive attitude towards vaccination, although there were misconceptions. Healthcare providers were identified as influential in promoting vaccination. The multifaceted motivations for completing child immunization were highlighted, along with barriers to be addressed.

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The study provides valuable insights into caregiver perceptions and behaviors regarding childhood immunization, emphasizing the importance of comprehensive health promotion strategies.

5.2 **Conclusion**

In conclusion, the study provides valuable insights into the challenges and perceptions surrounding childhood immunization among caregivers. It emphasizes the importance of addressing financial constraints, improving awareness, and enhancing access to healthcare services to ensure equitable immunization coverage for all children. The study underscores the role of community engagement, diverse communication channels, and personalized interactions in promoting vaccine acceptance and addressing vaccine hesitancy.

Furthermore, the study highlights the significance of continuous education, accurate information provision, and proactive measures in supporting vaccination decisions and enhancing vaccine coverage rates. It stresses the need for tailored interventions to address caregivers' concerns, promote vaccine acceptance, and mitigate barriers to immunization.

5.3 **Recommendation**

In light of the study's findings regarding social determinants and the importance of health promotion in childhood immunisation programs among mothers and carers in Nigeria, the following recommendations have been proposed:

1. **Tailored Educational Initiatives**: It is essential to create focused educational initiatives that tackle particular issues and misunderstandings surrounding childhood immunisation. It is essential for these campaigns to employ a variety of communication channels, such as

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healthcare providers, mass media, and community influencers, to effectively share accurate information and encourage vaccine acceptance.

2. **Community Engagement**: Implementation of community engagement initiatives that involve caregivers, community leaders, and local organizations in promoting the importance of immunization. Encourage dialogue, address cultural beliefs, and provide culturally sensitive information to increase vaccine uptake among diverse populations.
3. **Healthcare Provider Training**: Provision of ongoing training for healthcare providers on effective communication strategies, addressing vaccine hesitancy, and building trust with caregivers. Healthcare workers play a crucial role in educating parents and caregivers about the benefits of immunization.
4. **Financial Support**: Addressing financial barriers by exploring options for subsidizing vaccination costs, providing incentives for timely immunization, and ensuring that cost is not a hindrance to accessing vaccines for all children.
5. **Health System Strengthening**: There should be proper investments in improving healthcare infrastructure, ensuring reliable access to vaccination services, and enhancing the quality of care provided during antenatal, postnatal, and child wellness visits. Strengthening the health system can facilitate increased immunization coverage and support caregivers in ensuring timely vaccination for their children.
6. **Continuous Monitoring and Evaluation:** Implementing strong monitoring and evaluation systems to assess immunisation coverage rates, pinpoint service delivery gaps, and evaluate the effectiveness of interventions. Ongoing evaluation of vaccination initiatives will guide focused approaches to enhance vaccine uptake and distribution.

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5.4 **Contribution to Knowledge**

The study delves into the diverse viewpoints, concerns, and barriers faced by caregivers, thereby enriching our comprehension of the factors influencing vaccine acceptance and uptake among this demographic.

The study identified the importance of communication strategies in promoting vaccine acceptance. It emphasizes the utilization of various communication channels, community engagement initiatives, and tailored education campaigns. This emphasis highlights the crucial role of effective communication in addressing vaccine hesitancy and promoting immunization, thus adding to our knowledge on the significance of communication strategies in public health interventions.

Additionally, the recognition of financial constraints as a significant barrier to immunization contributes to our understanding of the impact of affordability issues on vaccination coverage. By acknowledging the importance of addressing financial barriers to ensure equitable access to vaccines, the document emphasizes the need for interventions that address economic disparities to improve immunization rates.

Lastly, the emphasis on community engagement and involving local stakeholders in promoting immunization contributes to our understanding of the role of community partnerships in public health initiatives. It underscores the importance of engaging communities to increase vaccine acceptance and coverage, thereby advancing knowledge on the effectiveness of community-based approaches in public health interventions.

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5.5 Suggested Area for Further Research

The following areas are suggested for further research to advance knowledge and strategies related to childhood immunization and caregiver perceptions:

Long-Term Impact of Education Campaigns: Investigating the long-term effectiveness and impact of tailored education campaigns on caregiver knowledge, attitudes, and behaviors towards childhood immunization.

Cultural Influences on Vaccine Acceptance: Exploring the cultural factors and beliefs that influence caregiver perceptions of immunization. Researching how cultural norms, traditions, and values shape attitudes towards vaccination and developing culturally sensitive interventions to address these influences.

Impact of Socioeconomic Factors: Investigating the impact of socioeconomic factors, such as income level, education, and access to healthcare, on childhood immunization coverage. Examine how social determinants of health influence vaccine uptake and develop targeted interventions to address disparities in vaccination rates.

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Dissertation

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Appendices Informed Consent

Social Determinants and Significance of Health Promotion on Childhood Immunization Programme among the Care-Givers in South-West, Nigeria

Principal Investigator
Bankole Adenola Augustine
Public Health Department, Lead City University LeadCity University, Toll Gate, Ibadan.
+2348038449025
bankole301@gmail.com

Purpose of Study

My name is Adenola Augustine BANKOLE, a Doctor of Philosophy public health student at the Faculty of public health, Lead City University, Ibadan. I am conducting a study on the Social Determinants and Significance of Health Promotion on Childhood Immunization Programme among the Care-Givers in South-West, Nigeria

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Research Procedure

By consenting to participate in this study, you will be required to respond to enquiries regarding your personal information, your understanding of immunization, your perspectives on immunization, and additional questions pertinent to the immunization of your ward. The enquiries will be conducted with a standardized questionnaire. Completing the questionnaire will require approximately 5 to 10 minutes of your time.

Risks and Benefits

There is minimum or no risks if you take part in this study. There are also no incentives but the information you provide will help you improve on your health and that of your loved ones.

Compensation

There is no monetary compensation or incentive for this study. Participation is voluntary.

Confidentiality

Your comments will not remain anonymous, as previously indicated. The researcher will use every effort to maintain your confidentiality. Access to the completed questionnaires will be restricted solely to the research team. Confidentiality and privacy will be preserved by securing all materials in a locked facility. Your name will remain unrecorded.

Contact Information

If you have questions at any time about this study as the result of participating in this study, you may contact

Lead City University DO NOT COPY

Bankole Adenola Augustine
Public Health Department,
Leadcity University, Toll Gate, Ibadan.
+2348038449025
bankole301@gmail.com

Voluntary Participation

You can choose whether or not to take part in this study. If you want to take part in this study, you will need to sign a consent form. You can back out at any time after signing the authorization form without having to explain why. If you leave this study, it won't change your relationship with the researcher, if you have one. If you drop out of the study before the data collection is over, your data will either be sent back to you or erased.

Consent

I have read the material you gave me and understand it. I also got the chance to ask questions. I know that I can leave at any time, for any reason, and without paying anything. I know that I will get a copy of this permission form. I accept to take part in this study of my own free will.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

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Questionnaire

Factors Influencing and Significance of Health Promotion on Childhood Immunization Programme among the Caregivers in South-West ,Nigeria.

Dear Respondent,

I am a Postgraduate student of Department Public Health, Lead City University, Ibadan

This questionnaire is to generate information on Factors Influencing and significance of health promotion on childhood immunization programme among caregivers in South-west, Nigeria.

The information shall be used only for academic purposes and maintained confidentiality.

Your verbal consent and appropriate responses are highly appreciated with thanks.

SECTION A: SOCIAL DEMOGRAPHIC DATA

Please, provide correct responses to the following:

1. Age as at last Birthday (years):

2. Religion (a) Christianity (b) Islam (c) Others (Specify)

3. Marital Status (a) Single (b) Married (c) Divorced (d) Widow

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4. If Married, the type of marriage: (a) Monogamy (b) Polygamy (c) Others (Specify)

5. Number of children you have (a) Awaiting the child (b) 1-2 (c) 3-4 (d)Above 4

6. Your Level of education: (a) Non-formal Education (b) Primary (c) Secondary (d) Tertiary

7. Your Occupation (a) Civil Servant (b) Trading (c) Artisan (d) House wife

8. Family income (a)<30,000 (b) 30,000-100,000 (c) >100,000

(g) Sex of last child: Male [ ] Female [ ]

(h) Age of last child (Months):_____

(i) Position of the last child: _____

SECTION B:

(j) Did you receive ante-natal care when pregnant for the child? Yes [ ] No [ ]

a. If yes, where did you receive it? Health centre[ ] General Hospital [ ] Chemist/Pharmacy [ ] Traditional Home [ ] Home [ ] Others:_____

(k) How many doses of tetanus toxoid (TT) injection did you received during the pregnancy of this child who is 12-23months? (a) None [ ] (b) One [ ] (c) Two [ ] (d) Three [ ]

(l) Where did you give birth to the child in question? (a) House [ ] (b) Health centre [ ] (c) General Hospital [ ] (d) Traditional Birth Attendant's home [ ] (e) others (specify)……

(m) Have you ever heard about childhood immunization? Yes [ ] No [ ]

15a. If yes, what were your sources of information? Media [ ] Word of mouth [ ] Bill Board [ ] Poster/Leaflet [ ] Health worker [ ] Religious settings [ ] Others:_____

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16. At what age should a child complete immunization? Before one year [ ] Greater or equal to one year [ ] I don't know

17.What is the purpose of immunization? Makes child brilliant [ ] prolongs life [ ] prevents disease [ ] makes child grow fast [ ] others specify:_____

18. Is there an alternative way to prevent vaccine preventable diseases other than immunization? Yes [ ] No [ ]

19. Do you know of any childhood immunization services existence in your Area? Yes [ ] No [ ]

20. What disease is/are your child/children immunized against?

Diseases	Yes	No
Diarrhoea		
Diphtheria		
Hepatitis		
Haemophilia Influenza		
Malaria		
Measles		
Pertussis		
Pneunomia		
Poliomyethelis		
Tuberculosis		
Typhoid Fever		

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Yellow Fever		
Cancer		

Other, please specify_____

Kindly respond to the following as the extent to which you agree or disagree with them. Response are SA -Strongly Agree, A - Agree, U - Undecided, D -Disagree, SD - Strongly Disagree

	SA	A	U	D	SD
• How confident are you in the safety of routinely received childhood immunizations?					
• Do you think immunizations are for keeping children healthy?					
• I trust the vaccine advice my child‘s main health care provider gives me.					
• My child‘s main healthcare provider is easy to talk with.					
• Parents should be allowed to get exemption from vaccination for their child on religious ground even if it were clear that it will increased the risk of disease for the child and everyone else					

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• Getting multiple shots in one visit can overload a child's immune system					
• The use of outreach is helping to increase coverage for immunization					
• Routine immunization is sufficient to reach all children					
• The level of education of the mother is important in increasing the use of immunization services					
• Immunization is too expensive for me					

31 Was the following immunization taken by child on the scheduled date or other date?

Antigen	**Scheduled Date**	**Other**	**Non**
BCG			
OPV			
OPV1			
OPV2			
OPV3			
IPV			
PENTA 1			
PENTA 2			
PENTA 3			
Pneumococcal 1			
Pneumococcal 2			

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Pneumococcal 3			
Measles 1			
Measles 2			
Yellow fever			
Men A			
Rotavirus 1			
Rotavirus 2			
Vitamin A			

Kindly respond to the following questions using the following keys; SD - Strongly Disagree, D - Disagree, U - Undecided, D- Disagree, SD - Strongly Disagree

SN	Questions	SA	A	U	D	SD
32	The distance to cover in order to vaccinate is a barrier to me					
33	If I am asked to pay for immunization/vaccination, I will not					
34	Time factor inadequacy isto be considered for the child vaccination					
35	I hate going to health centres for vaccination purposes only					
36	Lack of transportation is a challenge for me to vaccinate this child					
37	I am a bit sceptical about the side effects of the vaccines					
38	The behaviours of the health provider does not allow me to go for my child's Immunization					
39	Access to the health facilities due to bad roads is a barrier to me					
40	I heard almost no information or gingles about the immunization					

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41	My financial instability is a major barrier for me to consider my child's vaccination					
42	Most of the time I come to the health facility, they usually do not have vaccine, so I don't go anymore					
43	My religion discourages vaccination					
44	I do not believe in the efficacy of the vaccines					
45	My traditional belief is an influence to my decision to immunization.					
46	My culture don't encourages orthodox medicine and immunization					
47	My spouse discourages me from vaccinating my child					
48	I am too busy to bring my child for vaccination					

49 Verify immunization status from immunization card.

Complete / up-to-date with immunization schedule	
Incomplete / missed immunization schedule	

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50 Please mark (**X**) against **one** reason that **greatly** influences your decision to complete immunization schedules for your child.

	Yes	No
Easy access to immunization centre		
Education from the mass media		
Advice from family, partner or friends		
Well co-ordinated immunization services		
Fear of my child contracting infectious diseases and death		
Free immunization services		

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Every parent is immunizing the child		
Encouragements from health care providers		

51 This part of the section should be answered by **ONLY** those with incomplete/ missed immunization schedule.

	Yes	No
Busy work schedule		
Long waiting in queue at the immunization centre		
Child was sick or on admission		
Child developed side effect after the last visit		
Child was too small to be taken out		
Had no money to transport myself to centre		
Did not know the next schedule date or forgot the date		
Travelled out of time		
Older child had side effect for a particular vaccine so have decided not to immunize any of my children against that vaccine		

52 Have you ever received any health promotion messages or campaigns related to childhood immunization?

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- Yes • No

53 How did you receive these health promotion messages or campaigns?

- Through TV/radio advertisements
- Through community meetings
- Through healthcare providers
- Through print materials (brochures, posters, etc.)
- Other (please specify)

53 Did these health promotion messages or campaigns influence your decision to vaccinate your child?

- Yes
- No
- I am not sure

54 How effective do you think health promotion messages or campaigns are in increasing childhood immunization rates in Nigeria?

A. Very effective
B. Somewhat effective
C. Not very effective
D. Not at all effective
E. I am not sure

55 Have you ever encountered any barriers or challenges when it comes to accessing childhood immunization services in Nigeria?

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- Yes • No

56 What are some of the reasons that have prevented you from vaccinating your child?

Lack of knowledge or information about vaccines

Fear of side effects or negative reactions to vaccines

Cost of vaccines or transportation to vaccine sites

Lack of access to vaccination services

Religious or cultural beliefs

Other (please specify)

58. In your opinion, what types of health promotion activities would be most effective in increasing childhood immunization rates in Nigeria?

- TV/radio advertisements
- Community meetings
- Print materials (brochures, posters, etc.)
- One-on-one counseling with healthcare providers
- Other (please specify)

59How can healthcare providers and the government better promote childhood immunization in Nigeria?_____

60 In your opinion, what role can parents and caregivers play in promoting childhood immunization in their communities?_____

61Would you like to receive more information about childhood immunization and/or health promotion activities related to childhood immunization in Nigeria?

- Yes
- No

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62If yes, how would you like to receive this information?

Through TV/radio advertisements
Through community meetings

Through healthcare providers

Through print materials (brochures, posters, etc.)

Other (please specify)

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Focus Group Discussion Guide

The focus group discussion guide is structured to address different components of the health belief model including perceived susceptibility, perceived severity, perceived barriers, perceived benefits, self-efficacy, and cues to action among caregivers exploring their perceptions toward immunization of their children in Nigeria.

Demographic Background 1.

Caregiver Number

2. Education Level:
3. Age:
4. Marital Status:
5. Income per month:

Interview Questions

Perceived Susceptibility:

- Are you concerned about childhood diseases?
- Do you think your child should be vaccinated? If so, why or why not?
- What factors do you feel contribute to your perceptions of the risk of vaccine-preventable diseases?
- How do you think social determinants of health, such as poverty, education, and access to healthcare, impact your child's risk of vaccine-preventable diseases?

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Perceived Severity

- Are you concerned about your child getting polio? Why, why not?
- What do you think will happen to your child if she or he gets vaccine-preventable any disease?
- What factors contribute to your perceptions of the severity of these diseases?
- How do you think social determinants of health, such as poverty, education, and access to healthcare, impact the severity of vaccine-preventable diseases?

Perceived Barriers:

7. What are the perceived benefits of childhood immunization?

8. What benefits do you think your child gains from being vaccinated?

9. How do you think social determinants of health, such as poverty, education, and access to healthcare, impact the perceived benefits of childhood immunization?

10. If you want your children vaccinated, have you experienced any problems? Ifso, please describe the problem(s). Was the problem solved?

Probes

· Does the distance to the health center or health clinic pose a problem?

· When you visited the health, were the vaccines available?

· While at health center were any of the nurses or health workers available to vaccinate your children?

· How long did you wait to see a nurse or health worker?

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· Did you pay any fees to get your children vaccinated?

Perceived Benefits:

- What are the perceived barriers to childhood immunization in Nigeria?
- What factors contribute to these perceived barriers?
- How do you think social determinants of health, such as poverty, education, and access to healthcare, impact these perceived barriers?
- Do you think there is anything you can do to prevent your child from being infected with polio or measles?
- Do you think vaccinating your child will make your child not get polio?

Self Efficacy

- How confident do you feel in your ability to get your child vaccinated on time?
- What factors contribute to your confidence in your ability to get your child vaccinated on time?
- Have you ever experienced difficulties in getting your child vaccinated? How did you overcome these difficulties?
- Who do you think could advise you about vaccinating your child?
- What canyou do so your child will not get infected with polio?
- How do you know when your children's vaccination is due?

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- Do you have an immunization card?
- How often do you check your children's immunization card? Have your taken your child to traditional healers?
- Tell me the reasons you see the traditional healers

Cues to Actions

- What prompts or reminders do you use to ensure your child receives vaccinations on time?
- What other prompts or reminders would be helpful for you in ensuring your child receives vaccinations on time?
- How do you think healthcare providers and the government can provide effective prompts or reminders to increase childhood immunization rates in Nigeria?
- If you had your child vaccinated, were there specific people or events that motivated you to do this? Please describe what they were.
- **Health Promotion**:
- In your opinion, what types of health promotion messages or campaigns would be most effective in increasing childhood immunization rates in Nigeria?
- What channels or mediums do you think would be most effective in delivering health promotion messages or campaigns related to childhood immunization in Nigeria?
- Have you ever participated in any health promotion activities or campaigns before? If yes, can you describe your experience?
- What do you think are the benefits of health promotion activities in general?

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- In your opinion, what role do health promotion activities play in improving childhood immunization rates in Nigeria?
- What types of health promotion activities do you think would be most effective in increasing childhood immunization rates in Nigeria?
- How do you think health promotion activities can be tailored to meet the needs of different communities in Nigeria?
- Have you ever encountered any challenges or barriers when it comes to accessing health promotion activities? If yes, can you describe them?
- How can healthcare providers and the government better promote health promotion activities related to childhood immunization in Nigeria?
- How can parents and caregivers be involved in health promotion activities related to childhood immunization?
- What resources or information do you think parents and caregivers need to be more engaged in health promotion activities related to childhood immunization?
- How can parents and caregivers be empowered to take an active role in promoting childhood immunization in their communities?

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Lead City University (LCU)

Motto: Knowledge for Self-reliance

Lagos - Ibadan Expressway, Toll Gate Area, Ibadan, Oyo State, Nigeria
Email: lcu.hrec@lcu.edu.ng

NHREC

University Research Ethics Committee

PROJECT TITLE: SOCIAL DETERMINANTS AND EFFECT OF HEALTH PROMOTION ON CHILDHOOD IMMUNIZATION PROGRAMME AMONG THE CAREGIVERS IN OGUN STATE NIGERIA

PROJECT NUMBER: LCU-REC/23/288

APPROVAL LETTER

The above-named proposal has been adequately reviewed; the protocol and safety guidelines satisfy the conditions of *LCU-REC* policies regarding experiments that use human subjects. Therefore, the study under its reviewed state is hereby approved by the LCU-Research Ethics Committee.

Prof. Olusola Ladokun .....

Name of LCU-REC Chairman

Dr. Folahanmi Akinsolu .....

Name of LCU-REC Secretary

This approval is given with the investigator's Declaration as stated below;

By signing below I agree/certify that:

1. I have reviewed this protocol submission in its entirety and that I am fully cognizant of, and in agreement with all submitted statements.

2. I will conduct this research study in strict accordance with all submitted statements except where a change may be necessary to eliminate apparent immediate hazard to a given research subject.
   - I will notify the LCU-REC promptly of any change in research procedures necessitated in the interest of the safety of a given research subject.
   - I will request and obtain LCU-REC approval of any proposed modification to the research protocol or informed consent document(s) prior to implementing such modifications.

TELEGRAMS..... TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/479/318

Date 6th MARCH, 2023

NAME OF PRINCIPAL INVESTIGATOR: BANKOLE ADENOLA

TITLE OF STUDY: SOCIAL DETERMINANTS AND EFFECT OF HEALTH PROMOTION ON CHILDHOOD IMMUNIZATION PROGRAMME AMONG THE CAREGIVERS IN NIGERIA.

RESEARCH INSTITUTION: OYO STATE MINISTRY OF HEALTH, IBADAN

NREC ASSIGNED NUMBER: NHREC/OYOSHRIEC/10/11/22

DATE OF RECEIPT OF VALID APPLICATION: 27/02/2023

NOTIFICATION OF EXECUTIVE APPROVAL OF PROTOCOL

This is to notify you that the Oyo State Ministry of Health Research Ethics Committee (HREC) has concluded to give executive approval to your research proposal after necessary reviews and corrections under the regulations guiding experiment in human subjects.

2. This approval is for a period of (1) one year from 3rd March, 2023 to 3rd March, 2024. If there is hindrance in starting this research, please inform the Oyo State HREC so that dates of approval can be adjusted accordingly. Note that no activity related to this research may be conducted outside these dates. No changes are permitted in the research without prior approval by Oyo State HREC.

3. All forms and questionnaires used in this study must carry the HREC assigned number and the duration of HREC approval. You are to note further that the National Code of Health Research Ethics requires you to comply with all Institutional guidelines, rules and regulation of the codes. Please ensure that any adverse effect from your study is quickly reported to the HREC Oyo State Ministry of Health, Ibadan.

4. You are expected to submit a **report** to this committee every three (3) months from the date of this Approval. The Oyo State HREC reserves the right to conduct compliance visit on you research sites without previous notification.

5. I thank you.

OYO STATE RESEARCH ETHICAL REVIEW COMMITTEE
Signature & Date
MINISTRY OF HEALTH, IBADAN

Dr. Abbas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State Research Ethics Review Committee

OGUN STATE HEALTH RESEARCH ETHICS COMMITTEE

MINISTRY OF HEALTH, BLOCK A, ROOM A131, OKE-MOSAN, ABEOKUTA.
e.mail: ogunstatehrecdeskofficer@gmail.com, ogunstatehrecchairman@gmail.com.

OUR REF. NO: NHREC/25/01/OGSHREC/23A
YOUR REF. NO: OGHREC/467/05

Date: 24/01/2023

Re: 'SOCIAL DETERMINANTS AND EFFECT OF HEALTH PROMOTION ON CHILDHOOD IMMUNIZATION PROGRAMME AMONG THE MOTHERS/ CARE-GIVERS IN OGUN STATE, NIGERIA'

Name of Principal Investigator: Mr Bankole Adenola Augustine
Email:bankole301@gmail.com
Tel: 08038449025

NOTICE OF ETHICAL APPROVAL.

This is to inform you that the Ogun State Health Research Ethics Committee has approved your research protocol and other attached materials after the necessary review and corrections.

The National Code for Health Research Ethics requires that you comply with all institutional guidelines, rules and regulations and with the tenets of the code. All informed consent forms and questionnaire must carry the assigned OGHREC number. Changes to the research are not permitted without the prior approval by the Committee.

Kindly note that the committee reserves the right to monitor the research study without prior notice. All data collection must be completed within twelve calendar months (one year) from the date stated in this approval. If there is delay in starting the research, please inform the HREC so that the date of approval can be adjusted accordingly. You are to give progress report of the investigation and submit an abstract of the research to the committee via ogunstatehrecdeskofficer@gmail.com and ogunstatehrecchairman@gmail.com

This approval is with effect from 24/01/2023

Thank you,

Dr. Adekunle Alabi
Chairman, Ogun State Health Research Ethics Committee.
Phone no: 08034468258

All correspondence should be addressed to the
Chairman, Ogun State, Health Research Ethics Committee,
Office of the Permanent Secretary

Ogun State Primary Health Care Development Board
(OGPHECADEB)

Block D, Second Floor, Wing A, New Secretariat Complex,
Oke - Mosan, Abeokuta, Ogun State Nigeria.

Ref. No: PHCB/01/05/015 ogunhecadeb@ogunstate.gov.ng Date: 21st December, 2022

OGPHECADEB EC Registration Number: OGPHC/021/010

NOTICE OF EXPEDITED COMMITTEE REVIEW AND APPROVAL

Re: SOCIAL DETERMINANTS AND EFFECT OF HEALTH PROMOTION ON CHILDHOOD IMMUNIZATION PROGRAMME AMONG THE CAREGIVERS IN OGUN STATE. NIGERIA

OGPHECADEB Ethics Committee assigned number: 21/12/22/015

Name of Principal Investigator: **Bankole, A. Augustine**

Address of Principal Investigator: Department of Community Health
Lead City University
Ibadan, Oyo State.

Date on application: **19th September, 2022**
Date of meeting when the final determination of ethical approval was made: **21st December, 2022**

This is to inform you that the research described in the submitted protocol and other participant information materials have been reviewed and given expedited approval by OGPHECADEB Ethics committee.

This approval dates from **21/12/2022** to **22/12/2023**. If there is a delay in starting the research, please inform the OGPHECADEB Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participants' accrual or activity related to this research may be conducted outside these dates. All informed consent forms used in this study must carry the OGPHECADEB EC assigned number and the duration of the EC approval of the study. It is expected that you share the report of your findings with the Board as we will be interested in knowing the outcome of your research, to better inform our policy. You are also required to submit a request for the project renewal to the OGPHECADEB EC early to obtain renewal of your approval to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulation and with tenets of the Code including ensuring that all adverse events are reported promptly to the OGPHECADEB EC. No changes are permitted in the research without prior approval by the OGPHECADEB EC except in circumstances outlined in the Code. The OGPHECADEB EC reserves the right to conduct compliance visit to your research site without previous notification.

Dr. K.B Fashola
Director, Planning, Research and Statistics
For Chairman Ethics Committee

1

BIO-DATA

A. Personal Data

Name:	Augustine Adenola BANKOLE
Date of Birth:	1st September, 1967
Marital Status:	Married
State of Origin:	Ogun
Local Government:	Ijebu East
Nationality:	Nigerian
Religion:	Christianity
Discipline:	Health Promotion & Education
Number of Children:	Four
Address:	Ore Ofe Estate,Gbonogun-Obantoko,Abeokuta
Telephone:	+2348038449025
Email:	bankole301@gmail.com

B. Educational institutions Attended with Dates

Lead City University, Ibadan.	2020-2024
University of Washington, Washington-DC, USA	2019-2020
Ladoke Akintola University of Technology,Ogbomoso	2016-2019
Pastoral Institute of Catholic Diocese of Abeokuta.	2006-2009
University of Ibadan , Ibadan.	2001-2002

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University of Nigeria,Nsukka.	1993-1998
Ogun State College of Health Technology,Ilese-Ijebu	1988-1991
St.Anthony's Grammar School Esure Ijebu-Imusin,Ogun State.	1984-1986
Nazareth Grammar/Commercial College,Ibonwon-Epe , Lagos	1979-1984
Roman Catholic Mission Primary School,Orimedu,Ibeju-Lekki, Lagos	1972-1979

C. Educational Qualifications with Dates

Doctor of Philosophy (PhD) Degree in Public Health	(in view)
Certificate in Global Health Epidemiology.	2020
Certificate in Leadership and Health Management.	2019
Master's of Public Health (MPH) Degree	2019
Higher Diploma in Cathechesis for the Catechists.	2009
Post graduate Diploma in Health Education	2002
Bachelor of Science(B.Sc) Degree in Health Education	1998
Higher National Diploma(HND) in Public Health(Environmental Health)	1991
West Africa School Certificate	1986
Primary School Leaving Certificate	1979

D. Working Experience

Ogun State Local Government Service Commission, Abeokuta	
(Principal Environmental Health Officer)	1992-2000
Ogun State Local Government Service Commission,Abeokuta	
(Deputy Director, Health Promotion and Education)	2001-2023
Ogun State Primary Health Care Board, Abeokuta	

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(Deputy Director,Health Promotion and Education). 2024-Date

E. Awards and Honours

Award of Excellence - Gbonagun Landlord Associations, Abeokuta Ogun State. 2020.

Fellowship Award - African institute of Public Health Professionals (FAIPH) . 2023.

Meritorious Award - Catholic Men Organization of Nigeria , Abeokuta. 2024

F. Professional Membership and Fellowship

Professional Member - Health Education Practitioners of Nigeria (RHEPN)

Fellow - African Institute of Public Health Professionals (FAIPH).

G. Publications

Dolapo D.C,Ogunsola E.A,Bankole Adenola.A.,et al- Adolesecent Reproductive Health Strategic Frame-work(2018)Ogun State Government, Nigeria.

H. Major Scientific Health Conferences Attended with Dates

1st international scientific Conference on Neglected Tropical Diseases (NTDs) @ Federal University of Agriculture, Abeokuta, Nigeria between 26th-29th June 2019

24th Annual National Conference of Health Education Practitioners of Nigeria @ University of Portharcourt, Rivers State, Nigeria between 3rd-6th July 2019.

3rd Annual Scientific Conference @ Adeleke University,Ede,Osun State between 17th19th May,2023.

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5th Annual international Public Health Conference of African institute of Public Health Professionals @ Kigali-Rwanda, between 22nd- 24th November,2023.

I. Referees

Dr.Elijah A.Ogunsola

Executive Secretary

Ogun State Primary Health Care Board,Oke-mosan- Abeokuta.

Comrade Francis Balogun Head

Community Health Department

Lead City University, Ibadan .

Dr.Wale Famiyesi

Zonal Consultant World Health Organization

WHO South-West Nigeria Office, Ibadan.

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Signature Date

The University Compliance Certification

This is to certify that this thesis by Augustine Adenola BANKOLE with Matric No. LCU/PG/001633 in the Department of Public Health, Faculty of Basic Medical and Health Sciences, Lead City University, Ibadan is in full compliance with the approved University format.

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Signature **Date**

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