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Sociopolitical Determinants of Parental Acceptance of Childhood Vaccination in Abuja, Nigeria

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2020

Abstract

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by

Lawrence Madu Ohammah

MPH, University of Benin, 2007

MBBS, University of Nigeria, 1984

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Despite the efficacy of vaccines, some parents still reject vaccination of their children, resulting in low vaccination coverage, a greater burden of vaccine-preventable diseases, and high infant mortality. The purpose of this study was to investigate the sociopolitical determinants of vaccination status among children, aged 0-24 months, and identify the factors that drive vaccine hesitancy. The social ecological model served as the theoretical framework. The study research design was a quantitative cross-sectional survey. An interviewer-administered questionnaire was used to collect primary data from parents and caregivers in 384 randomly selected households from 48 settlements in the Abuja Municipal Area Council. The dependent variable was the vaccination status of children, while the independent variables were tribe, religion, socioeconomic status, and parental trust in government. Data analysis with the chi-square test and binary logistic regression in SPSS showed statistically significant associations between tribe ($p = .005$), parental income ($p = .043$), educational attainment ($p = .003$), trust ($p < .001$) and immunization of children. Only tribe and trust positively predicted immunization of children at a statistically significant level in the regression model. This study has implications for positive social change: the determinants that drive vaccine hesitancy could be identified; health literacy programs, behavior change communication, and social mobilization strategies could enhance parental vaccine acceptance, improve vaccination coverage, and reduce child mortality.

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Dedication

To God Almighty who gave me strength to persevere through the course work and dissertation phases of this PhD program and to my dear wife, Mrs. Perpetua Ohammah who makes my life joyful and pleasant and to my lovely children Kelechi, Chioma, Chidubem, and Ebubechi who make me proud by their great strides.

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Finally, I thank Almighty God for His grace, strength and Devine provisions without which I could not have commenced and finished this program. His banner over my family is love!

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Chapter 1: Introduction to the Study

Introduction

The purpose of this study was to describe the sociopolitical factors that determine parental decisions about routine childhood immunization in Nigeria's Federal Capital Territory (FCT), Abuja. This chapter includes an introduction to the study, the background, problem statement, purpose, and nature of the study. I also describe the theoretical framework, research questions, scope, assumptions, limitations and significance of the study. A quantitative cross-sectional design was used for this study, with the social ecological model (SEM) as the theoretical framework. An interviewer-administered questionnaire was used to collect primary data from randomly selected participants in Abuja, Nigeria. The data were analyzed using binary logistic regression in SPSS.

Vaccines are biological preparations consisting of products of weakened or killed microorganisms that can be administered orally or parenterally to human beings and animals for the purpose of inducing immunity against specific diseases (World Health Organization, [WHO], n.d.). Vaccines have been acknowledged as one of the greatest public health achievements in human history, because they have been responsible for the prevention of many deadly contagious diseases that cause high mortality and morbidity of children (Barrows et al., 2015). Globally, it is estimated that every year, 1.7 million children die of vaccine-preventable diseases (VPDs; Ophori et al., 2018), while vaccines prevent about 2-3 million deaths among children under 5 years of age (CDC, 2014; Meleko, Geremew, & Birhanu, 2017). The efficacy of vaccination is further evident from the successful eradication of smallpox in 1980 due to global mass vaccination campaigns

spearheaded by WHO (Metzger, Köhler, & Mordmüller, 2015). The success of routine immunization (RI) programs depends not only on the availability or accessibility of quality vaccines and their effective, efficient and safe delivery to clients in conducive environments by qualified healthcare providers, they also depend on the demand and uptake of these services by eligible children for whom parents make vaccination decisions (Bedford et al., 2018).

Unfortunately, in spite of the efficacy of vaccination as a tool for the prevention of infectious diseases, some parents consider vaccines to be unsafe, risky, dangerous, and unnecessary (Dube, Vivon, & MacDonald, 2015) and are, therefore, hesitant in accepting this life-saving service for their children (Opel et al., 2013; Ophori et al., 2014; Williams et al., 2013). Parental decisions about childhood vaccination are important, both as determinants of RI coverage, and as the focus for interventions aimed at reducing the scourge of VPDs and improving child survival. Some factors that influence parental vaccination decisions have been identified as poor health literacy or educational attainment (Adeloye et al., 2017), negative attitude of service providers (Yaqub et al., 2014), complex belief systems such as belief in divine healing or protection by charms and ancestral spirits (Smith et al., 2011), and fears about vaccine safety (Adeloye et al., 2017). Vaccine refusals contribute to low immunization coverage, predispose children to VPDs, and increase mortality among infants and children under 5 years of age. (Gunnala et al., 2016; Ophori et al., 2014). Decrease in vaccination rates due to vaccine refusal has been established as a major cause of the upsurge in VPDs (Phadke, 2016).

Nigeria currently faces a crisis in childhood immunization, with a national RI coverage of 38% (Gunnala et al., 2016). The high number of unimmunized children in

Nigeria has given rise to a huge burden of VPDs, which is largely responsible for the country's high mortality rates among infants and children under 5 years of age (Gunnula et al., 2016). Previous studies have identified some causes of low immunization coverage including (a) challenges with supply and distribution of vaccines, (b) inadequate human and material resources for the administration of vaccines at immunization centers (Ghosh & Laxminarayan, 2017), (c) inadequate cold chain capacity for vaccine storage, and (d) inadequate social mobilization (Adedokun, Uthman, Adekanmbi, & Wiysonge, 2017). However, the determinants of parental vaccine decisions need to be fully explored. In particular, the socioeconomic, cultural, religious, and political factors that influence parental decisions to accept or reject immunization of their children need to be investigated in the context of Nigeria's diversity. Therefore, this study was needed to determine the relationship between parental education, socioeconomic status, religion, tribe or culture, and the vaccination status of their children. The results are expected to yield great positive social change because they will inform the development of interventions to improve vaccine coverage and reduce the current high infant and under-5 mortality rates in Nigeria.

Background of the Study

Nigeria is a very populous country, the 32nd largest country in the world (Naibbi, & Ibrahim, 2014), and the 4th largest country in Africa (Oku et al., 2017). Nigeria has an estimated total population of 180 million people (projected from the last 2006 census), and children under 5 years of age constitute 20% of the population. Nigeria's indices of health and development are suboptimal. The proportion of Nigeria's population with health insurance is less than 5% (Awosusi, Folaranmi, & Yates, 2015) while average life

expectancy is 55.2 years with a range from 54.7 years for men to 55.7 years for females (Adejumo, 2018). The maternal mortality ratio in Nigeria is 1,602 per 100,000 live births (Okonofua et al., 2017), while the current infant mortality ratio is 92 per 1000 live births (Kotsadam et al., 2018). VPDs are major contributors to high infant mortality and morbidity in Nigeria (Machingaidze, Wiysonge, & Hussey, 2013) because of the low national routine vaccination coverage. In2017, it was 34.4% (Adeloye et al., 2017). The unduly high and tragic number of deaths of children due to childhood infections is unfortunate and unacceptable because these deaths are preventable through the simple use of free and available vaccination services in Nigeria. Vaccine hesitancy or parental rejection of childhood vaccination constitutes a formidable obstacle to efforts to immunize all children and protect them from killer infectious diseases (Machingaidze, Wiysonge, & Hussey, 2013). It also greatly undermines Nigeria's potential to achieve the second target of the third sustainable development goal: to end preventable deaths of infants and children under 5 years of age as well as to reduce the infant mortality rate (IMR) to 12 per 1,000 live births, and the mortality rate of children under 5 years of age to 25 per 1,000 live births by 2030 (WHO, n.d.). According to Kriss et al. (2016), parental vaccine rejection and vaccine hesitancy are predicated on religious, economic, political, and sociocultural influences that affect the use of vaccination services.

The WHO launched the Expanded Program on Immunization (EPI) in 1974 as a global public health initiative to ensure access to recommended RI vaccines by all children worldwide (Machingaidze, Wiysonge, & Hussey, 2013). Nigeria commenced its implementation in 1976, and in order to enhance program ownership, later changed the name from EPI to National Program on Immunization (NPI). By WHO's standard, a

child is expected to complete RI before he/she reaches 1 year of age and should have received one dose of Bacillus Calmette Guerin (BCG), three doses of Pentavalent vaccine (consisting of diphtheria, pertussis, tetanus toxoid, hepatitis B and Haemophilus influenza type B antigens), three doses of oral polio vaccine (OPV), three doses of pneumococcal conjugate (PCV) vaccine, and one dose of measles vaccination (Machingaidze, Wiysonge, & Hussey, 2013). The current RI schedule in Nigeria is shown below.

Table 1

Approved Immunization Schedule for the National Immunization Program in Nigeria

Contacts	Minimum Target Age	Vaccines Due
1st	At birth (HepB & OPV-0 must be given within14 days of birth)	BCG, Hep B, OPV0
2nd	6 weeks	OPV1, Penta-1, PCV-1
3rd	10 weeks	OPV2, Penta-2, PCV-2
4th	14 weeks	OPV-3, PCV-3, IPV
5th	9 months	Measles, Yellow Fever

Source: National Primary Health Care Development Authority (NPHCDA), Nigeria

In an ongoing effort to improve child survival through RI strategy, Nigeria has keyed into other international interventions and strategies including the Global Alliance for Vaccines and Immunization, Millennium Development Goals, the Global Immunization Vision and Strategy, the Global Vaccine Action Plan, and Sustainable Development Goal, (Machingaidze, Wiysonge, & Hussey, 2013). Nigeria also demonstrated a commitment to improve vaccination coverage by adopting the Reaching Every Ward (REW) strategy with its five components: (a) planning and management of

resources, (b) improving access to immunization services through establishment of fixed, outreach, and mobile immunization services, (c) supportive supervision, (d) monitoring for action using data tools and feedback at regular meetings, and (e) community linkage to enhance participation of community members (Ali et al., 2016). These global and national interventions for immunizing all eligible children can succeed only in an environment of effective coordination or partnership, adequate funding, good governance, and peace and security (Kamadjeu, 2017).

There is evidence to show that the EPI program has made a significant impact in the improvement of immunization coverage. At the African regional level, RI coverage with DTP-3 increased from 5% in 1974 to 85% in 2010 (Machingaidze, Wiysonge, & Hussey, 2013). At the national level, DPT3 coverage improved from 36.3% in 2006 to 67.73% in 2010 – an increase of almost 95% (Ophori, Tula, Azih, Okojie, & Ikpo, 2014). However, over the past three years there has been a downturn in vaccination coverage due to challenges with program management, program ownership, funding gaps, political governance, and parental vaccine rejection or vaccine hesitancy. The high proportion of unimmunized children is worrisome because it is an obstacle to attaining Nigeria's target of reaching immunization coverage of 95% by end of 2020 (National Primary Health Care Development Agency, NPHCDA, 2015). This current study therefore comes at an opportune time; it can contribute to the search for strategies to address low vaccination coverage.

Nigeria partners with several international health agencies in the provision and financing of RI of children. These international agencies mainly provide technical support. However, EPI is financed mainly by the three levels of government, supported

by International Development Partners and the European Union. Uzochukwu, Chukwuogo, and Onwujekwe (2014) report that the proportions of total finances contributed by various sources for EPI and RI in Nigeria are (a) federal, state and local governments – 76%, (b) GAVI (Global Alliance for Vaccines and Immunizations) funded by the UN, Bill & Melinda Gates Foundations, etc. – 12%, (c) European Union – 4%, (d) WHO – 3%, (e) United Nations Children's Fund (UNICEF) – 3%.

Some other previous contributors to financing of EPI and RI in Nigeria were the World Bank, Bill & Melinda Gates Foundation, United States Agency for International Development (USAID), the British Department for International Development (DFID), and Rotary International. However, beyond financial contributions, WHO has consistently committed its vast and specialized human resources to offer solid and unquantifiable technical support for EPI and RI at the national, state and local government levels in the areas of advocacy, planning and coordination, training and capacity building, data management, supervision, monitoring and evaluation. Similarly, UNICEF also offers technical support in vaccine securities and logistics as well as communication and social mobilization.

Problem Statement

Vaccines are among the safest and most cost-effective medical interventions that can prevent infectious diseases and reduce childhood mortality and morbidity (Oku et al., 2017; Ophori, Tula, Azih, Okojie, & Ikpo, 2014; Pezzotti et al., 2018). Globally, it is estimated that every year, vaccination prevents about 2-3 million deaths frequently caused by VPDs among children less than 5 years of age (CDC, 2014; Meleko, Geremew, & Birhanu, 2017). In spite of the efficacy of vaccination as a tool for the

prevention of infectious diseases, some parents are hesitant to accept this life-saving service for their children due to different factors (Opel et al., 2013; Ophori et al., 2014; Williams et al., 2013). These factors include poor health literacy or educational attainment (Adeloye et al., 2017), negative attitude of service providers (Yaqub et al., 2014), complex belief systems (Smith et al., 2011), and fears about vaccine safety (Adeloye et al., 2017). Vaccine refusals by parents contribute to low immunization coverage, predispose children to VPDs, and increase infant and under-5 mortality rates (Gunnala et al., 2016; Ophori et al., 2014).

The National Immunization Coverage Survey, conducted in 2017, revealed that the national RI coverage in Nigeria was 34.4% (Adeloye et al., 2017). Among the programmatic challenges already identified as responsible for low vaccine coverage are faulty planning or scheduling of immunization sessions, poor access to immunization centers (proximity and poor road infrastructure), poor community participation (weak sensitization and mobilization to create demand for immunization services), irregular availability of vaccines at immunization centers (supply issues), and inadequate cold chain facility for vaccine storage (Adedokun, Uthman, Adekanmbi, & Wiysonge, 2017).

Internationally, other factors that have contributed to parental vaccine refusals include their lack of trust in government and safety concerns. Salmon et al. (2005) found that parental vaccination decisions and attitudes are correlated with their political beliefs and their level of trust in their government and its scientific institutions, especially those that manage public health and immunization. Findings from a recent study indicated that parents with conservative political beliefs are less likely to trust government and its scientific agencies, less likely to take risks, more likely to believe that vaccines are

unsafe, and therefore less likely to support or accept vaccination (Baumgaertner, Carlisle, & Justwan, 2018). However, the social, political, religious, cultural, and economic determinants of vaccine acceptance in the Nigerian context are poorly understood, and may be insufficiently explored (Abdulraheem, Onajole, Jimoh, & Oladipo, 2011). The Strategic Advisory Group of Experts (SAGE) Working Group on vaccine hesitancy created a matrix that includes all the factors mentioned. However, this was not an empirical study, but a definition and scope matrix that researchers and health policy experts can use (MacDonald, 2015). The current study sought to fill the research gap in identifying the determinants of vaccine acceptance by situating the sociopolitical determinants of vaccine acceptance in the Abuja Federal Capital Territory, which is the center of Nigeria's ethnic, political, cultural and religious diversity.

Purpose of the Study

The purpose of this quantitative study was to examine the association between parental religion, tribe, socioeconomic status, trust in government and vaccination status of their children, aged 0-24 months, in Abuja, Nigeria.

Research Questions and Hypotheses

This study sought to answer the following four research questions and associated hypotheses:

Research Question 1. Is there an association between parental tribe and vaccination status of children, aged 0-24 months?

H_01: There is no statistically significant association between parental tribe and vaccination status of children, aged 0-24 months.

H_A1: There is a statistically significant association between parental tribe and vaccination status of children, aged 0-24 months.

Research Question 2. Is there an association between parental religion and vaccination status of children, aged 0-24 months?

H_02: There is no statistically significant association between parental religion and vaccination status of children, aged 0-24 months.

H_A2: There is a statistically significant association between parental religion and vaccination status of children, aged 0-24 months.

Research Question 3. Is there an association between parental socioeconomic status and vaccination status of children, aged 0-24 months?

H_03: There is no statistically significant association between parental socioeconomic status and vaccination status of children, aged 0-24 months.

H_A3: There is a statistically significant association between parental socioeconomic status and vaccination status of children, aged 0-24 months.

Research Question 4. Is there an association between parental trust of political governance and vaccination status of children, aged 0-24 months?

H_04: There is no statistically significant association between parental trust of political governance and vaccination status of children, aged 0-24 months.

H_A4: There is a statistically significant association between parental trust of political governance and vaccination status of children, aged 0-24 months.

Theoretical Framework

This study was anchored on the theoretical framework of the SEM, which adopts an ecological approach in consideration of decision-making and situates the individual in the context of the environment (Kumar et al., 2012). The SEM is, therefore, useful as a framework to understand how factors within the individuals and the environment in which they live can influence or determine their behavior and decisions. It posits that the factors and pressures that influence peoples' decision-making process occur at five hierarchical levels (Nyambe, Hal, & Kampen, 2016): the individual (intrapersonal), interpersonal, institutional, community, and policy levels. The SEM recognizes that such factors as knowledge (education), income, cultural norms, local beliefs, economic and political situations can operate, sometimes, at multiple levels, and through several pathways, to influence individual behaviors and decisions outcomes especially those related to health and immunization (Wold & Mittelmark, 2018). The SEM is therefore well-aligned with this study, in which the independent variables—consisting of religion, tribe, socioeconomic status, and trust in government and its health authorities—are hypothesized to influence parental vaccine decision at individual, interpersonal, community, institutional, and policy levels.

Nature of the Study

This quantitative, cross-sectional study used a semi-structured questionnaire to survey every member of the target population. The questionnaire was self-reported, but with interviewer administration to ensure clarity and understanding for parents who may be at different levels of literacy. The dependent variable was the vaccination status of children (yes or no), which was binary. This variable was assessed by a combination of

parental, self-reported vaccination status of their children, and validated with child immunization card and BCG scar on the child's left upper arm. The independent variables in this study were tribe (categorical), religion (categorical variable), socioeconomic status (ordinal variable), and parental trust in government. The covariate in the study was the age of the child (in months). The operational measures for all study variables are described in detail in Chapter 3.

This questionnaire was used to generate mathematically coded data that described the participants' attributes, opinions, attitudes, and trends for statistical analysis (Creswell, 2014; Rudestam & Newton, 2015). Quantitative research is consistent with exploring and understanding the association between sociopolitical variables and parental acceptance of childhood vaccination, which is the main purpose of this dissertation. Furthermore, focusing on factors that influence parental decisions about acceptance of childhood vaccination is consistent with the SEM, which is used to explain the factors that influence people to adopt a particular health behavior at individual, interpersonal, community, institutional, and policy levels within an ecological background. Statistical analysis of the data will determine the statistical significance of any association between the sociopolitical factors and parental acceptance of vaccinations.

Definitions of Terms

Sociopolitical factors: Issues that have both social and political characteristics. For example, "trust" is a social issue, but can also be political if people's trust (or lack of it) in their government influences their judgement and behavior, or if their political ideologies influence their trust in government or its scientific agencies (Baumgaertner, Carlisle, & Justwan, 2018).

Vaccine: A biological product which when administered to an individual, can stimulate the person's immune system to build up biological defense system against a particular disease and protect the individual from infection by that disease agent.

Vaccination: The process by which vaccines are introduced into an individual's body for the purpose of inducing immunity against a particular disease. Vaccination can be administered orally, by injection, or by nasal spray.

Immunization: A process by which an individual becomes protected against a disease through the act of vaccination. While vaccination introduces the vaccine into a person's body, immunization enables the body to develop immunity, subsequently recognize the disease, and protect the person from future infections by that particular disease agent.

Immunity: The protection that a person has against an infectious disease. If somebody is immune to a disease, the individual will not get the infection even if the person is exposed to the agent of the disease.

Routine immunization: The process of delivering recommended vaccination to children under one year of age. It involves an efficient interaction between vaccines, the health workers who administer the vaccines, and the children who receive the vaccines, with the goal of fully immunizing all those who need to be protected against VPDs.

Immune system: A biological defense system (within a person's body) that protects the individual against diseases. It consists of some anatomical structures, proteins, and processes that work together to resist invasion by disease agents (e.g., bacteria, viruses, parasites) or their toxins and thereby provide protection against those diseases.

Vaccine-preventable diseases (VPD): Diseases that are prevented by vaccines. According to the CDC, 2016), there are 16 diseases that can be prevented through vaccination. However, the Nigerian program on immunization (NPI) which was adapted from WHO's Expanded Program on Immunization (EPI) has targeted 11 VPDs in the RI schedule, viz., tuberculosis, diphtheria, pertussis, measles, yellow fever, poliomyelitis, Hemophilus influenza B, hepatitis B, tetanus, and pneumococcal pneumonia (WHO, 2005).

Assumptions

In this study, I made some assumptions. (a) First, I assumed that this study is a cross-sectional survey of parents and caregivers and their children, aged 0-24 months in Abuja Municipal Area Council of FCT in Nigeria. (b) I assumed that the responses to the questionnaire were accurate. (c) I assumed that the BCG vaccination scar on the children, parental recall, and the records in the child immunization cards on which the vaccination status of children (dependent variable) was based, were authentic. (d) I assumed that the stratified random sampling technique used for recruitment of participants was correct and accurate. (e) I assumed that the participants recruited for this study were true representatives of the study population. (f) I assumed that variations exist in the religion, tribe, socioeconomic status, and political trust of parents and immunization status of their children, (g) I assumed that the calculated target population of 384 was adequate to detect statistically significant changes where they truly exist in the sample.

The research process and its outcome need to be objective by directly observing, measuring, and recording the predictor (independent) and outcome (dependent) variables in empirical terms, through assignment of numbers to the observations. (h) I assumed

that the questionnaire used to measure the sociopolitical factors that affect parental vaccine decisions, and the coding of the variables, accurately measured the intent and responses of the parents. All of these assumptions regarding the study design, sampling method, instruments for data collection, participants and target population were necessary in the context of this study because they contributed to how valid, reliable, credible, and generalizable were the research process and its outcomes.

Scope and Delimitations

This study was designed to examine only the relationship between four independent variables (parental religion, tribe, income or socioeconomic status, trust in government) and one dependent variable (vaccination status of children, aged 0-24 months). The goal was to determine if the vaccination status of children could be predicted based on their parents stated sociopolitical variables within the theoretical framework of the SEM. The sociopolitical focus of this study was chosen to determine if these parental variables may be related to the current low demand for and poor coverage in childhood vaccinations in Abuja. The study was delimited to a quantitative cross-sectional survey. It was also delimited to the geographical area of Abuja Municipal Area Council and to people who have children, aged 0-24 months. All nonresidents (e.g., visitors to families or households, and other populations outside Abuja Municipal Area Council) of the FCT of Nigeria at the time of the survey were excluded from the study. Therefore, the outcome of this study could be generalized only to the Abuja Municipal Area Council from which the sample was taken.

Limitations

Since this study was conducted with a quantitative cross-sectional survey design, the data on parental vaccine behaviors were collected only once as a snapshot. Therefore, it could not establish a sequential or time-based relationship between the independent and dependent variables or a trend of vaccine decision and behavior for each participant. In addition, recall bias could arise from the self-reported responses to the questionnaire and tend to distort the outcome of the research. One of the measures taken to address potential parental recall bias was to validate parental responses about the vaccination of their children by cross-checking with vaccination scar on the children or their immunization card usually issued to vaccinated children and kept by parents.

Significance of the Study

The burden of high mortality rates among infants and children under 5 years of age in Nigeria has been largely attributed to the scourge of VPDs (Gunnala et al., 2016). The attainment of high coverages for childhood vaccinations as a strategy for reducing the burden of VPDs, depends to a large extent, on parental acceptance of these services for their eligible children. Previous scholars have approached the challenges to childhood vaccination by analyzing the variables of supply and demand. However, the decision-making process by each parent regarding childhood vaccination is "complex and multi-dimensional" (Dube et al., 2013, p. 1770). The present study, which examines the broader context of political, socioeconomic and socio-cultural variables that influence parental decisions concerning childhood vaccination, is, therefore, unique and significant. An understanding of this perspective complements the findings of previous researchers and

gives a holistic picture of the challenges of vaccine acceptance and coverage for childhood immunizations.

This study has two implications for positive social change. (a) Makers of health policy will understand the local challenges to vaccination programs. This could inform the development of appropriate interventions to address contextual issues in low vaccination coverage areas and thus may help to reduce the current high infant mortality rates in Nigeria (Abdulraheem et al., 2011; Adeloye et al., 2017). This is consistent with WHO's guide to tailoring immunization programs (TIP), which seeks to identify vaccine-hesitant subgroups, diagnose the barriers and enablers to their access to immunization, and design evidence-based interventions that are appropriate to their contexts (Butler & MacDonald, 2015). (b) Improvement in immunization could also benefit society in terms of child survival, a healthy work force, improved productivity, and money saved from averted medical treatment (Doherty et al., 2016).

Summary and Transition

Vaccines have been proven to be effective in the control of various VPDs that are responsible for the high infant and under-5 morbidity and mortality. The efficacy of vaccines has been demonstrated by their ability to drastically reduce infectious diseases in developed countries, and by WHO's estimate that vaccines prevent 2-3 million deaths among children worldwide every year. An efficient RI system depends on the availability and accessibility of quality vaccines, on their delivery to clients in an effective and efficient manner, in conducive environments, by qualified healthcare providers; the system also depends on the effective mobilization of eligible clients for adequate uptake of the services. The current national RI coverage in Nigeria stands at a mere 38%.

Previous interventions to address the supply side of the challenges bedeviling RI in Nigeria have not yielded the desired result. It has been shown that one of the major causes of poor RI coverage is parental vaccine hesitancy. Previous studies have established some reasons for parental vaccine rejection, including fear of vaccine safety, lack of trust in government and health agencies, poor education or health literacy level, complex belief systems, and negative messaging from anti-vaccination propaganda.

It has become necessary, therefore, to explore the demand side of the RI system to improve vaccination coverage and reduce incidence and prevalence of VPDs. This study investigated the sociopolitical factors that affect parental acceptance of childhood vaccinations in the Federal Capital Territory, Abuja. The study was conducted as a quantitative cross-sectional survey to determine if it is possible to predict the vaccination status of children based on parental religion, ethnicity, socioeconomic status and political trust for government and its scientific agencies. An interviewer-administered questionnaire was used to collect data on parental sociopolitical variables and immunization status of their eligible children from 384 consenting participants. SPSS was used to analyze the data to determine the relationship between the independent and dependent variables.

In Chapter 2, I discuss in greater detail the theoretical framework on which the study is grounded and also thoroughly discuss literature review on the current state of knowledge of vaccine hesitancy and parental vaccine rejection.

Chapter 2: Literature Review

Introduction

The purpose of this study was to describe the sociopolitical factors that determine parental decisions about routine childhood immunization in Nigeria's FCT, Abuja. This chapter includes the literature search strategy, theoretical framework, background on vaccine hesitancy, and the literature on key variables and concepts in parental vaccine decisions and childhood vaccinations.

The current high infant and under-5 mortality rates in Nigeria have been largely attributed to the high burden of VPDs (Gunnula et al., 2016). The Nigeria National Primary Health Care Development Authority (NPHCDA) under partnership with WHO has set 95% as the target for RI coverage necessary to prevent outbreaks of childhood infectious diseases by 2020 (NPHCDA, 2015). With a current immunization coverage of 38% (Gunnala et al., 2016), Nigeria currently has a crisis in routine childhood immunization. Several previous studies have identified some causes of low immunization coverage to include supply side factors (Ghosh & Laxminarayan, 2017), inadequate cold chain capacity for vaccine storage, and inadequate social mobilization (Adedokun, Uthman, Adekanmbi, & Wiysonge, 2017). However, the demand side made up of eligible children and their caregivers who consume vaccination services are germane to the success of immunization program (Bedford et al., 2018). In particular, parental decisions about childhood vaccination are key components of community participation and have become major concerns because they are the common denominators for all interventions aimed at improving RI coverage. The socioeconomic, cultural, religious, and political factors that influence parental decisions to accept or reject immunization of their children

need to be investigated in the context of Nigerians' diversities. It has therefore become necessary to conduct this study to determine the relationship between parental education, socioeconomic status, religion, culture, and the vaccination status of their children. The results are expected to bring about positive social change by informing the development of targeted interventions that will improve vaccine coverage and reduce the current high infant and under-5 mortality rates in Nigeria.

Literature Search Strategy

The databases in which I searched for relevant articles and publications for this research were Medline with full text, Google, CINAHL, EBSCO, PubMed, Google Scholar, as well as the WHO and UNICEF websites. I also accessed some previous dissertations related to RI by searching through ProQuest and the Walden University Library. The reference sections of the articles and publications that I retrieved from the databases were searched to identify relevant articles. The key words used to search the databases were as follows: *vaccine rejection, vaccine hesitancy, vaccine refusals, non-compliance in routine immunization, parental vaccine decision-making, childhood vaccination, social ecological model, determinants of vaccine coverage, challenges with immunization in Nigeria, routine immunization coverage, multi-indicator cluster survey (MICS), expanded program on immunization, VPDs, immunization* and *life expectancy in Nigeria.*

During the search of the academic databases, I used filters to limit the publications. Articles published in the past 5 years (2014-2019)—accounting for 80% of total articles used—were included. However, some older articles that were essential or considered "classical" papers (20% of articles used) were also included. Furthermore,

only articles published in English and in peer-reviewed journals were included. Those unrelated to vaccination and other key variables in the study were excluded. The search was exhaustive; saturation was reached. The searches yielded 350 articles and dissertations. After applying the inclusion and exclusion criteria, only 135 papers were found to be relevant and were therefore included in the study.

Theoretical Framework

Theory is defined as "a set of interrelated concepts, definitions, and propositions that explain or predict events or situations by specifying relations among variables" (Glanz & Bishop, 2010, p. 401). Theories provide contexts and backgrounds for the explanation and understanding of the of situations, behaviors and events. In the particular context of public health, behavioral theories help to elucidate factors that motivate people to take certain decisions or engage in some behaviors that either put life at risk or prevent disease and promote health within their individual, cultural, social and environmental circumstances. Since most causes of disease, disability and death are largely related to peoples' decisions, behaviors, and lifestyle choices (Schmidt, 2016), it is necessary to use appropriate theoretical and behavioral models to analyze and understand the factors that influence or motivate the decision-making process or the adoption of certain behaviors. This understanding helps to determine the level at which interventions can be best applied to achieve positive change in behavior. According to the WHO (2002), the essential aim of most interventions in public health is to induce behavior change. On account of the foregoing, this study was based on the SEM.

The SEM is a theoretical framework that explains how factors within the individuals and the environment in which they live can interact with and influence their

behaviors and decisions (Kilanowski, 2017). In its original form, the SEM was first formulated by Bronfenbrenner in the1970s as ecological framework for understanding human development. He had conceptualized each individual as being at a center surrounded by multiple levels of what he called "systems" which interacted with and influenced the person's decisions at different levels (Bronfenbrenner, 1977). These systems were identified and segmented into five namely: microsystem (the individual), mesosystem (people who have direct contact with the individual at work, school, church etc.), exosystem (including community and social networks), macro-system (societal, religious and cultural influences), and chronosystem (time and historical elements including policies). Over the years, Bronfenbrenner's original Ecological framework has been modified by different scholars including Daniel Stokol and McLeroy in an attempt to clarify, identify and map out various levels at which different factors influence the individual's decision-making process (Nyambe, Van-Hal, & Kampen, 2016). These modifications have led to the development of what is now commonly known as the SEM as articulated by McLeroy, Bibeau, Stechler, and Glanz in 1988. The essential hypothesis of the SEM is the reciprocal interrelationship between an individuals and their environments (Moore, Buchanan, Fairley, & Smith, 2015)—that a person's behavior or decision shapes and is in turn shaped by multiple levels of environmental influence, and that an individual's behavior or decision-making process is influenced by factors that operate at 5 hierarchical levels. At the core of these spheres of influence is the individual (intrapersonal) level bounded by four other hierarchical concentric circles which signify the interpersonal (relationships), institutional (organizational), community and policy levels (Schölmerich, & Kawachi, 2016).

The SEM posits that the decisions made by an individual are influenced not only by the person's education, knowledge, perception, and attitudes, but also "by the wider environment in which people live and make choices, influenced by family, peers, local beliefs and values, cultural norms and practices and political and economic circumstances" (Busza et al., 2012, p. 173). A major emphasis of the SEM is that individuals and their environments are interconnected in a reciprocal relationship such that changes that occur in the components of the social environment comprising of groups, communities, organizations and policies, will elicit behavioral changes at the individual level while individuals can also induce changes in their environment (Lanning, Golman, & Crosslin, 2017). In addition to its applicability to decision-making process, the SEM also offers diverse multilevel platforms at which specific interventions can be targeted to achieve behavior change in the individual (Schölmerich, & Kawachi, 2016). A detailed description of the various constructs of the SEM is provided in Table 2.

Table 2

Description of various levels of the Social Ecological Model

SEM Level	Description
Individual	Characteristics of an individual that influence behavior change, including knowledge, attitudes, behavior, self-efficacy, developmental history, gender, age, religious identity, racial and ethnic origins, caste identity, sexual orientation, socioeconomic status, financial resources, values, goals, expectations, literacy, stigma, and others.
Interpersonal	Formal (and informal) social networks and social support systems that can influence individual behaviors, including family, friends, peers, co-workers, religious networks, customs or traditions.
Community	Relationships among organizations, institutions, and informational networks within defined boundaries, including the built environment (e.g., parks), village associations, community leaders, businesses, and transportation.
Organizational	Organizations or social institutions with rules and regulations for operations that affect how, or how well, for example, MNCHN services are provided to an individual or group; schools that include MNCHN in the curriculum.
Policy/enabling environment	Local, state, national and global laws and policies, including policies regarding the allocation of resources for maternal, newborn, and child health and access to healthcare services, restrictive policies (e.g., high fees or taxes for health services), or lack of policies that require childhood immunizations.

Note. From "Module 1: What are the Social Ecological Model (SEM), Communication for Development (C4D)?" Open source material by UNICEF (n.d.). available at: www.unicef.org/cbsc/files/Module_1_SEM-C4D.docx

The rationale for the use of the SEM to anchor this study is predicated on the type of variables and research questions. This dissertation seeks to explore the sociopolitical determinants of parental decisions about childhood vaccination. It has been shown that although vaccines and resources for their administration may be readily available, and provided by government at no cost to clients, the vaccination coverages in Nigeria are still very low, and vary widely across different states, religious persuasions, and cultural

groups in Nigeria (Gunnula et al., 2016). Parental rejection of vaccination (known locally in Nigeria as non-compliance) has been incriminated as one of the causes of low vaccine coverages in Nigeria (Adeloye et al., 2017). An understanding of the factors that influence parental acceptance or rejection of routine vaccination for their children at the various levels of decision-making process is an important step towards the development of effective multilevel public health strategies to increase vaccination coverage and stem the tide of preventable infectious diseases that kill children needlessly (Lanning, Golman, & Crosslin, 2017). The SEM offers a multifaceted and multilevel theoretical framework to understand the interactive effects of personal, community, social, political and economic factors in decision-making process (Kilanowski, 2017). It is therefore the appropriate theory for framing this study because its constructs of hierarchical influence on decision-making process through a reciprocal interaction between the individuals and their ecological (social, economic, political) environment is well aligned with this study in which the research questions seek to explore the relationship between parental religion, culture, educational attainment, income or socioeconomic status, political trust for government and parental decision to accept or reject vaccination of their children. The SEM is therefore very relevant to this study because it provides a platform for the integration of multiple levels of influence that determine an individual's decision or overall health behavior with regards to uptake of vaccines. This view is supported by the fact that "the SEM is advocated to be an effective model in determining vaccination screening and behavior" (Nyambe, Van-Hal, & Kampen, 2016, p. 7) because unlike some other theories (e.g., health belief model) that focus only at the individual level, the variables within different levels of the SEM construct provide a holistic view of both

individual and environmental influences in decision-making (Lanning, Golman, & Crosslin, 2017).

The SEM has been successfully applied and adapted by different scholars in different public health research scenarios involving decision-making or behavioral choices as well as in the application and evaluation of impact of interventions at multiple levels. Some of the most successful public health applications of SEM are in the areas of health promotion (Wold, & Mittelmark, 2018), cancer screening and control programs (Moore et al., 2015; CDC, n.d.), access to health care (Haper et al., 2018), violence (CDC, n.d.), and vaccination (Nyambe, Van-Hal, & Kampen, 2016; Kumar et al., 2012; Lanning, Golman, & Crosslin, 2017).

However, vaccination is a thematic area of research in which scholars have successfully applied the SEM. A few examples will suffice. Nyambe, Van-Hal, & Kampen, (2016) conducted a systematic literature review of screening and vaccination as determined by the SEM and concluded that the SEM is very effective in vaccination studies because it is flexible and differentiates the society according to levels of influence. Similarly, Kumar et al. (2012) used the SEM as a framework to assess the acceptance of influenza vaccine and found that all levels of the SEM – individual, interpersonal, institutional, community, and policy levels—were valid as determinants of vaccine uptake. They concluded that "variables at each level of the SEM were significant predictors of uptake as well as intent to get the vaccine" (p. 229). In addition, Kolff, Scott, & Stockwell, (2018) explored the use of technological innovations to promote vaccinations and affirmed that the SEM is a useful framework for both researchers and practitioners to understand the interactive influence of various levels of SEM on attitudes

and behavior to improve education, communication, data collection and vaccine coverage.

The SEM identifies the individuals as rooted within, and surrounded by multilayered larger ecological, cultural, economic, and social systems and recognizes that these environmental elements continuously interact with the individuals to influence their decisions and determine health outcomes (Golden, & Earp, 2012). The SEM also presupposes that these layers of influence on individual decision-making process – personal, interpersonal, institutional, community and policy layers – can be targeted independently or collectively with appropriate interventions as may be necessary to produce desired behavior change.

The SEM aligns with the sociopolitical determinants of parental vaccine decisions. Since children who are eligible for RI are minors, their parents usually make vaccinations decisions on their behalf. Some scholars have suggested that decision-making process about vaccination of children is greatly influenced by individual parental perceptions, attitudes, and behavior as well as environmental factors, social networks and media announcements or publications (Brunson, 2013; He et al., 2015; Allan, & Harden, 2014).The SEM appropriately therefore aligns with this dissertation because the study variables fit properly into the various SEM's levels of influence in the individual's decision-making process. A brief analysis of various SEM levels of influence and how they relate or align with parental vaccine decisions and the variables in this study is given below.

At the intrapersonal level, individual beliefs, attitudes and perception of risk about vaccine safety in relation to VPDs as enunciated by the SEM will influence parental

vaccine decisions. While overall positive perceptions will enhance acceptance, negative perceptions will serve as barrier. However, these perceptions can be modified by personal factors such as health literacy level or educational attainment which is a one of the study variables. At interpersonal level, pressures from friends, family, religious and traditional leaders as well as cultural norms within the tribal or social environment are likely to impact on parental decisions about childhood vaccinations (Kumar et al., 2012). Africans, and Nigerians in particular, have a communal lifestyle such that individuals identified as belonging to particular tribe usually adopt culturally-prescribed patterns of behavior that are believed to have been handed down by their ancestors. The significance of cultural and religious influences (as some of the study variables) in parental vaccine decisions was tested in this study. At institutional level, contact with immunization service providers or primary care physicians is capable of availing the individuals with adequate information about vaccine efficacy, safety, availability and immunization schedules to enable them make informed decisions about vaccination. There is a consensus among scholars that provider recommendation is one of the most important predictors of uptake of vaccines (Darden, & Jacobson, 2014) and that physician recommendation is critical to parental acceptance of vaccination and improvement of vaccine coverages (Anderson et al., 2017).

Community level provides opportunities for interaction between parents and community leaders in the local environment which can influence parental vaccine decisions either positively or negatively depending on prevailing social norms or patterns of behavior collectively agreed upon at town union meetings. In addition, the “collective social dynamics” or “social context of risk perception” – fear of infecting or being

infected by others – are important motivations or influences on parental vaccine decisions (Kumar et al., 2012). Finally, at policy level, government policies concerning access to health insurance and free availability to vaccination services are important drivers of parental vaccine decisions (Kumar et al., 2012). However, in the Nigerian context, provision of free immunization services has raised suspicion in Northern Nigeria where anti-vaccination propagandists claim that government (prompted by foreign powers) is providing vaccines free of charge because these vaccines have been mixed with anti-fertility chemicals to reduce the population (Anyene, 2014). Although this has been proven by WHO to be false, it is one of the reasons why some people still do not trust their government and its public health agencies that provide immunization services. Political trust for government is one of the independent variables in this study.

Descriptive Epidemiology of Vaccinations

The decision-making process about childhood vaccination is a very important public health phenomenon because it determines the rate of uptake of RI and the burden of VPDs. While some parents willingly accept vaccination of their infants, many others decide to either delay vaccinations, accept only a few or totally reject vaccinating their children (MacDonald, 2015; Damnjanovic´, 2018). Several factors act at different levels of the socioecological model to influence the decision-making process leading to a continuum of scenarios generically described as vaccine hesitancy. The SAGE Working Group on immunization, which was established by WHO, defines vaccines hesitancy as "a delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place

and vaccines. It is influenced by factors such as complacency, convenience and confidence" (MacDonald, 2015, p. 4163).

Vaccine hesitancy is a worldwide phenomenon, but its burden varies according to different regions and countries of the world. In Europe, vaccine rejection is estimated at 15.6% in Italy (Giambi et al., 2018). Similar results were obtained in the US where a study commissioned by the Association of State and Territorial Health Officials revealed that 16% of the study population rejected all vaccines while 13% delayed vaccination (Siddiqui, Salmon, & Omer, 2013). However, in a cross-sectional study using the 2010 Health Style Survey to examine the attitudes, beliefs, and behaviors of parents of children, aged 6 years and below in the US, it was found that 2% of the surveyed parents rejected all vaccines while 5% accepted some, but not all childhood vaccinations (Siddiqui, Salmon, & Omer, 2013). This is consistent with the findings in Gowda & Dempsey (2013) where 1-2% of parents in the United States were estimated to engage in vaccine hesitancy. In characterizing vaccine rejection in the United States, it has been shown that "unvaccinated infants were more likely to be male, White, with married mothers of age ≥ 30years, college educated, living in households with an annual income of ≥ $75,000 and with ≥ 4 children compared with vaccinated infants" (Siddiqui, Salmon, & Omer, 2013, p. 2644). A similar cross-sectional survey conducted in Quebec, Canada to assess the knowledge, attitude, and belief (KAB) among parents with children, aged 12 months to 17 years showed that 40 percent of the parents hesitated to have their children vaccinated (Dubé, Gagnon, Zhou, & Deceuninck, 2016). In most studies on parental vaccine decision-making, the major reason for vaccine rejection and hesitancy is concern about vaccine safety and efficacy (Harmsen et al., 2017).

In developed countries, the recent upsurge in measles infections has been blamed on vaccine rejection. For example, In France, 40 measles cases were reported in 2007, but this increased to 15,000 in 2013. Similarly, in the US, the number of measles outbreaks increased from 17 in 2011 to 58 in 2013—the largest measles outbreak in the US in 20 years (Bloom, Marcuse, & Mnookin, 2014). Nearly all the outbreaks were traced to someone who intentionally refused vaccination. This situation is confirmed by the result of analysis of the recent measles epidemics across the United States which showed that majority (70.6%) of the cases occurred among children whose parents refused vaccination (Phadke et al., 2016).

Vaccine hesitancy has a greater burden in developing countries due to strong influence of culture, religion, low education and health literacy level, political issues, poorly motivated healthcare providers, and the negative activities of anti-vaccination propaganda. In Nigeria, for example, a study conducted in Ibadan to examine factors that influence compliance with vaccination schedule among nursing mothers, showed that 37.2% of surveyed mothers did not comply fully with all the required childhood vaccinations while 19.6% of respondents rejected all vaccinations for their children (Rahji, & Ndikom, 2013). Among the reasons incriminated in vaccine hesitancy are fear of vaccine safety, complex religious and cultural belief systems, and poor educational or health literacy level (Russo et al., 2015),

One of the factors that contribute to the burden of vaccine rejection and hesitancy is vaccine exemption. In developed countries (including the United States), mandatory immunizations are provided to prevent outbreaks of VPDs among school children. However, some exemptions are allowed for medical, philosophical, personal beliefs, and

religious reasons (Siddiqui, Salmon, & Omer, 2013). Healthcare authorities are usually responsible for granting medical exemptions to those who are immunocompromised, allergic to either the vaccine or its components, and those with medical contraindications to vaccination. However, state authorities usually grant non-medical exemptions strictly based on individual choice due to religious, philosophical, or personal beliefs (Siddiqui, Salmon, & Omer, 2013). Exemptions to mandatory childhood immunization laws have the potential to reduce vaccination coverages and predispose children to VPDs.

Vaccine Hesitancy

Parental Decision-Making on Childhood Vaccination

Decisions about childhood vaccination refer to a specific type of proxy health-related decision which parents make for their children with the child's health and well-being as the expected outcome (Damjanovic, 2018; Goldenberg, 2016). Such important parental vaccination "decisions are not made in a vacuum" (Bolton, Memory, & McMillan, 2015, p. 16), but are products of several personal, social, economic, political, and environment forces that influence the decision-making process and determine the decision outcome at any particular time. The aim of this study is to explore the sociopolitical factors that influence the decision of parents to accept or reject RI for their children. The proof that any parent accepts or rejects childhood vaccination is a verified immunization history—the evidence that their children had previously received even one dose of the recommended RI. Such evidence is established by a confirmation that the child has immunization card showing a record of vaccines that the child received as well as the usual permanent vaccination scar at the child's left upper arm. Parental vaccination decisions are very fundamental not only because they have significant impact on the life

and wellbeing of the child but also because these decisions are made in proxy for children who cannot make the decisions for themselves (Damnjanovic et al., 2017). This decision-making process places a huge burden on parents. Accepting vaccination comes with the risk of potential adverse effects, while refusal carries the risk of contracting dangerous infectious diseases, social pressure, stigmatization, challenges in enrolling their unvaccinated children in schools, interference with herd immunity, and even prosecution (Damnjanovic et al., 2018). Such important parental vaccination "decisions are not made in a vacuum" (Bolton, Memory, & McMillan, 2015, p. 16), but are products of several personal, social, economic, political, and environment forces that influence the decision-making process and determine the decision outcome at any particular time.

Studies have shown that outcomes of parental vaccine decisions do not categorically fall into acceptance and rejection but are rather a continuum between the two extremes (Dubé, Vivion, & MacDonald, 2015). MacDonald (2015) and Belford et al. (2018) also agree that vaccine hesitancy takes place within a range of decisions starting from full and partial acceptance to total rejection. Apart from those who readily accept vaccination, parents who struggle with vaccine decisions are at different points of a decision continuum rather than in one single cohesive belief system (Ramandham et al., (2015). Researchers have identified three groups of such parents and have classified them according to their decision outcomes as vaccine rejecters, vaccine resistant parents and vaccine hesitant parents (Hagood & Herlihy, 2013). According to these authors, vaccine rejecting parents are resolute, obstinate, and inflexible about their negative perception and attitudes against vaccination (because they strongly believe the false conspiratorial theories about the harmful effect of vaccines) and are therefore not amenable to changing

their decision to reject vaccination irrespective of any type of education, incentives, or behavior change communication strategies. The second group – the vaccine-resistant parents on the other hand, are characterized by their good disposition to behavior change. They may have been rejecting vaccination due to vaccine scare arising from personal experience, false propaganda or misinformation, but are open to reason, discussion, and acceptance of vaccination through engagement with vaccine advocacy groups. Finally, Hagood, & Herlihy identified a third group called vaccine-hesitant parents who are just generally anxious about vaccine safety probably because of scheduling issues, multiple doses, or impact of needles on young infants, but not enthused by anti-vaccination propaganda, and therefore not committed to refusal. They may already be disposed to accepting some vaccinations and delaying others hoping to have their concerns and doubts addressed by vaccination service providers. According to Ramanadhan et al., 2015), the vaccination hesitant parents are driven by yearnings to be enlightened about vaccination to enable them to understand, accept and advocate for vaccination to ensure the good health of their families.

Segmentation of Vaccine-Hesitant Parents

Using a nationally representative sample of U.S. adults who did not receive the H1N1 vaccine (n = 1166), Ramanadhan et al. (2015) conducted an audience segmentation analysis and identified three distinct groups according to their attitude towards vaccination. The “Disengaged Skeptics” consisting of 67% were outright refusers who had no intension of vaccine acceptance and would not entertain any engagement; the “Informed Unconvinced” made up of 19% of the sample were urbane and educated people with good health literacy level who may be ready to try the vaccination if they get

convinced; and finally the "Open to Persuasion group (14%) who may lack information about vaccines and require engagement to enlighten them about vaccines generally, and encourage or persuade them to accept vaccination. An understanding of the position of each group of parents on the vaccine decision continuum enables health workers to tailor specific and appropriate interventions to each segment for maximum impact to maximize positive influence on parental vaccine decision-making process for the benefit of child health (Ramanadhan et al., 2015). This is consistent with WHO's tailoring of immunization programs (TIP) which advocates the segmentation of the society according to individual needs or peculiarities and the development of appropriate interventions tailored for each level or segment ((Butler & MacDonald, 2015; Dubé et al., 2018).

In spite of the sub-classification, the common denominator for all parents in the three different clusters of the decision continuum is their hesitation (? refusal) to accept vaccination at one point in time, resulting in non-vaccination of their children. Accordingly, this study classified all the three groups into one large vaccine- hesitant group. Therefore, this study adopted the WHO's SAGE definition of vaccine hesitancy which states that: "Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence" (MacDonald, 2015, p. 4163).

This definition has been criticized by some scholars who contend that vaccine hesitancy is not a behavior as is generally portrayed, but rather a psychological state in which peoples' doubts lead to a holding back or a delay and difficulty in decision-making (Bedford et al., 2018). They further argue that although the issues of confidence (do not

trust vaccine or provider) and complacency (no felt need or value for vaccines) are valid in vaccine hesitancy, the inclusion of the concept of convenience (access to vaccines) into the definition and SAGE report muddles up the concept of parental decision-making process with some individual and system-level factors such as physical, economic and programmatic barriers that determine access to immunization services (Bedford et al., 2018).

Different scholars have approached research into parental decision-making process in different ways. While some locate vaccine decision-making on parental concept of risk as enunciated by the health belief model (He et al., 2015), others predicate parental vaccine decisions on the context of social ecological framework (Lanning, Golman, & Crosslin, 2017), or social cognition and social identity (Attwell et al., 2017). It is therefore essential to critically evaluate and understand the dynamics of parental vaccination decisions as a guide to the development of appropriate interventions that can improve decision outcomes for the survival of children (Lipstein et al., 2016).

Safety Concern as a Factor in Parental Vaccine Decisions

Since the discovery of vaccines and vaccination through the ingenuous works of Drs. Edward Jenner and Luis Pasteur, vaccine rejection has been a recognized phenomenon. One of the major issues that influence parental decisions about childhood vaccination is vaccine safety since a major responsibility and concern of all parents is to keep their children safe (Allan & Harden, 2014). Unfortunately, controversies have dogged the path of manufacture and use of vaccines for disease prevention. Many of these controversies are hinged on parental concerns about vaccine safety which has taken on different dimensions. First, since vaccines are given to healthy people (especially

children), parental acceptance of vaccination is often hinged on a balance between perceived benefits of the vaccine and perceived risk and threats of the disease that the vaccines purport to prevent (Marti, de Cola, MacDonald, Dumolard, Duclos, 2017). The concern about vaccine safety has led to the decision by some parents to refuse vaccination of their children especially when the perceived risk or vulnerability to the disease is low (Anyene, 2014). Such parents prefer to take the chance of the probability that the child may not get the disease and relying on natural immunity for protection if the child does. Secondly, there is a temporal association between administration of certain vaccines and the development of some side effects (Clothier et al., 2014. Such adverse events following immunization (AEFI), for which the cause is often unknown, can range from mild fever to life threatening anaphylactic reactions, syncope, shock, or rarely death (Dreskin et al; 2016). Scenarios of AEFI especially the common fever that accompanies some vaccination in children who were otherwise healthy can frighten parents, while anecdotal stories of severe vaccine side-effects even without evidence may influence some parents to reject vaccination (Allan, 2014). Since parents are motivated in their decisions by the best interest of the child, safety concerns about vaccines and vaccination especially for parents with limited education and health literacy levels are legitimate and need appropriate communication strategies to address them.

Furthermore, the scientific evidence of the benefits of immunization which is hinged on risk/benefit analysis by vaccine advocates has generated a great deal of skepticism by some parents and caregivers. Some of them believe (rightly or wrongly) that scientists and researchers who provide scientific evidence of vaccine utility and safety through their research projects are paid agents of the pharmaceutical companies

that manufacture vaccines (Miller, 2015). These scientists are therefore perceived as mercenaries doing their masters' bidding and producing "false" research outputs either for their own personal economic gains or the commercial benefits of their sponsors. This view informed the study by Attwell et al. (2017) to explore the perception of vaccine hesitant parents in Australia concerning public health experts and governmental authorities who define the policies and practice of vaccination in the country. The authors found that all parents in the study (both those who rejected all vaccines and those who accepted some) perceived researchers, health officers and government officials who drive immunization programs as being under the malignant influence of pharmaceutical companies, which makes their real intent about vaccine recommendations suspicious. Salmon et al. (2015) concurs that "Trust in institutions is low, whether in the corporations that produce vaccines or the public health agencies that purchase and promote them" (p. D67).

A peculiar perspective of safety concern about vaccines is the perception and unfounded conspiracy theory in Northern Nigeria to the effect that vaccines are laden with antifertility chemicals that will make their children infertile at puberty with the ultimate aim of depopulating Muslims to the advantage of their adversaries (Anyene, 2014). Such fear, apprehension, and negative mindset, especially in the context of ardent religious followership in that region acts as negative influence on parental vaccine decisions. It must be emphasized that vaccination can only accomplish the intended objective of protecting those who are immunized if effective vaccines are efficiently delivered, and safely administered to a public that understands the need for vaccines and accepts their use for disease prevention (Black, 2016).

Effect of Socioeconomic Factors on Parental Vaccine Decisions

Vaccination is a very potent strategy to prevent childhood infections responsible for the high infant and under-5 mortalities in Nigeria. Unfortunately, some parents are known to reject the vaccination of their infants for different reasons. Such vaccine refusals result in low immunization coverage and make children (especially the under-fives) vulnerable to deadly VPDs. This low vaccination coverage has been demonstrated by the National Demographic Health Survey (DHS) conducted in Nigeria in 2013 which showed that average RI coverage at national level was 38% (Gunnala et al., 2016). One of the reasons responsible for low vaccination uptake is vaccine rejection, which is a product of different influences on parental decision-making process (Ophori et al., 2014).

Several studies have identified parental socioeconomic status as a major factor in parental decisions to access vaccination. Using secondary data from the 2013 Nigerian Demographic and Health Survey, Oleribe et al. (2017) explored individual and socioeconomic factors associated with childhood immunization in Nigeria and found that parental educational attainment and wealth index were significantly associated with uptake of vaccination services. Ilusanya, & Oladosun, (2016) affirm that children of parents with high socioeconomic status have a greater uptake of vaccination. Similar studies conducted in West Region of Cameroon also revealed that children of parents who are from poorest households and with low educational attainment had a lower vaccination uptake (Russo et al., 2015).

Indeed, education has been established as a factor that plays an important role in health behaviors and acceptance of childhood vaccination because access to higher education also enhances general health literacy including the importance of vaccination

in disease prevention (Glatman-Freedman, & Nichols, 2012). Several scholars have affirmed this. In a cross-sectional study conducted in Delhi to explore the determinants of uptake of childhood immunization, Kusuma, Kumari, Pandav, and Gupta, (2010) found that parental education was positively associated with immunization of children. Results of a similar study conducted in Pakistan to assess the uptake of measles vaccination indicated that parental education was associated with complete immunization of children (Andersen et al., 2009). Furthermore, results of a study by Feiring et al., (2015) to examine the association of parental education and income with initiation and completion of HPV vaccination revealed that high maternal and paternal education were significantly related with lower uptake of vaccination services.

There is evidence that indicates that low education impedes care-givers' decisions to accept vaccination in Nigeria. Ilusanya and Oladosun (2016) conducted a quantitative study to explore the role of socioeconomic factors in women behavior and immunization status of children in Nigeria and found a significant relationship between the educational status of mothers and the immunization status of their children – educated mothers were three times more likely to immunize their children than uneducated ones. Similarly, using secondary data from the 2016/2017 Multiple Indicator Cluster Survey (MICS) and National Immunization Coverage Survey (NICS), Yusuf et al. (2017) showed that parents and caregivers with tertiary education were twice as likely (43.8%) to have children vaccinated compared to children of those with primary education (22.5%). In their study on the socioeconomic inequalities in immunization coverage in Nigeria, Atugba, Ojo and Ichoku (2016) also found a strong link between mothers' educational level and immunization status of children, noting that regions with lower educational attainment

also had lower levels of immunization coverage. Similar findings have been made in Nigeria by Oleribe et al. (2017), in Burkina Faso by Kagone et al (2017), and in Angola by Oliveira et al. (2014) where a correlation between parental education and their acceptance of childhood vaccination was established. It has been postulated that "lack of education can potentially lead to misconceptions about vaccines" (Glatman-Freedman, & Nichols, 2012, p. 294) and lead to vaccine rejection. This suggests that improving parental education and health literacy level can improve their acceptance of immunization (Atugba, Ojo, & Ichoku, 2016). Studies by Choi et al. (2017) showed that specific educational interventions targeted at caregivers were very effective in enhancing parental decisions and increasing immunization coverages.

However, although some studies have established a correlation between educational attainment of parents and uptake of immunization services, the relationship between academic knowledge or educational level and parental vaccination decisions is not linear (Prusty et al., 2013). Some researchers have demonstrated that academic knowledge is not essential for parental acceptance of vaccination for their children. For example, in 2003, vaccination coverage among children of uneducated mothers reached 90% in Gambia (Leacha & Fairheadb, 2008; Favin et al., 2012). Rwanda had similar rates where parental education was not an important factor in vaccination coverage (Favin et al., 2012). Contradictory evidences were also reported from studies conducted in China, Lebanon, and Bangladesh where higher education was a potential barrier to acceptance of vaccination (Larson, Jarrett, Eckersberger, Smith, & Paterson, 2014). Indeed, results of a study by Feiring et al. (2015) on the association of parental education and income with

initiation and completion of vaccination revealed that higher maternal and paternal education were significantly related with lower uptake of vaccination services.

These findings of apparent inverse relationships between educational attainment and acceptance of vaccination are not surprising because Hak et al. (2005) had demonstrated that some highly educated parents are more critical about vaccination, a disposition that can negatively affect their acceptance of childhood vaccination. Other scholars argue that what matters in enhancing vaccine decision-making is not formal education and academic degrees, but rather, an effective communication system to improve the practical knowledge and perception of parents about vaccination services – that vaccines are good because they prevent deadly infectious diseases, and that the child needs to visit clearly designated and accessible immunization centers several times for different shots before she/he can get full protection (Flavin et al., 2012). This is consistent with the findings by Gunnula et al., (2016) where the greatest reason for unimmunized children was the dearth of information about vaccines and immunization services. Accordingly, Atugba, Ojo, and Ichoku (2016) advocated that apart from formal education, there is need to institute a health literacy system to enlighten parents on the importance of immunization for the survival of their children.

From the foregoing, it is apparent that there is some contradiction in the findings among different scholars regarding the impact of educational attainment on parental vaccination decisions. However, it is important to emphasize that many individual, interpersonal, social, cultural and religious factors act together at different levels of the SEM to influence parental decisions about vaccines, such that no single factor should be considered in isolation (Larsen et al., 2014).

Adverse Events Following Immunization

Vaccines used in childhood immunization programs are generally safe and effective. In spite of strict ethical and safety standards in their development and manufacture, vaccines carry risks, just as any other pharmaceutical product (Lopes et al., 2018). An AEFI has been defined as "any untoward medical occurrence which follows immunization, and which does not necessarily have a causal relationship with the usage of the vaccine." (Clothier et al., 2014, p. 3726). Such adverse event may manifest in the form of an unfavorable or unintended sign or unusual symptom or disease. The spectrum of AEFIs ranges from mild side-effects to more dramatic life-threatening anaphylactic reactions. The specific manifestation of AEFI depends on the particular vaccine administered, whether the vaccine is made of life-attenuated or killed organisms, and the type of medium in which the vaccine is prepared. In general, minor AEFIs include pain, redness, swelling at the site of injection, fever, and abscess hot spot or scar (as seen in BCG vaccination). Some of the major AEFIs include convulsions, cellulitis, traumatic neuritis, anaphylactic or hypersensitivity reactions and shock which can lead to death (Clothier et al., 2014). It is interesting to note that most of the reactions to vaccinations are minor and expected, while severe or major AEFIs are rare (Lopes et al., 2018). Furthermore, AEFI due to programmatic errors – proper screening of vaccines, technical competence of vaccinators, use of appropriate diluents in vaccine reconstitution, route and procedure for vaccine administration, and asepsis – are avoidable. However, some vaccine reactions due to the specific vaccine antigens or other constituents in their formulation constitute a formidable challenge. Suspected AEFI (whether minor or major) must be thoroughly investigated by experts to establish their causal relationship with the

vaccine. This is necessary to avoid false claims and attributions that may negatively affect parental vaccinations decisions.

One of such false attribution of vaccines with adverse effects is the infamous Wakefield publication. In 1998, Dr. Andrew Wakefield, a United Kingdom (UK) medical doctor and researcher conducted a study on children who were autistic. He published his findings in *The Lance* and issued press statements in which he falsely concluded that Measles, Mumps, and Rubella (MMR) vaccination was associated with autism in vaccinated children (Dupe, Vivion, & MacDonald, 2015; Jolley & Douglas, 2015). Wakefield's "findings" could not be replicated by other researchers who debunked his claims. This led to retraction of the article (as false), the revocation of his medical license, and the striking out of his name from the British medical register for professional misconduct and conflict of interest (Hussein et al., 2018; Tafuri et al., 2014; Jolley & Douglas, 2014). However, the damage done by the publication to vaccination uptake had already been done. The false attribution of autism to MMR vaccine had scared some parents, induced rejection of childhood vaccination, and caused a loss of confidence and trust in public health programs, leading to a decrease in vaccine uptake as demonstrated by the drop of vaccination coverage in Scotland from 95% in 1997 to 87% in 2001 (Allan & Harden, 2014) and in UK from 92% in 1996 to 84% in 2002 (Hussain et al., 2018). A systematic study to evaluate the impact of the Wakefield controversy revealed that the negative influence had persisted because there was insignificant change in parental vaccination decisions over time in spite of retraction of the article (Allan & Harden, 2014).

Since vaccines used in RI are usually administered to healthy children, the potential for occurrence of AEFIs can be a major determinant of parental decision to accept or reject the immunization of their children. The dilemma in this situation is that the parent who rejects vaccination and the health workers advocating for childhood vaccination are acting in the interest of the child – parents genuinely want to protect their children from harm occasioned by AEFI, while health workers want to protect the children from vaccine preventable diseases which are responsible for high infant and under-5 mortality. Therefore, health workers need to employ persuasive and proactive communication system with parents to maintain public confidence in immunization programs (Tafuri et al., 2014). This is where communication is of paramount importance. Parents need to understand that medical experts who manufacture or use vaccines are guided by ethical standards summed up in the dictum *"primum non nocere*" or "first do no harm," which imposes on them the responsibility to ensure that all vaccines undergo and pass all clinical trials for safety and efficacy before they are licensed or used (Crawford & Buttery, 2013). An unintended but necessary means towards protecting the child from infectious diseases, is the discomfort of AEFI which clients experience just like the discomfort of surgery to remove a tumor. All immunization systems should also have a surveillance system to detect, report, analyze and monitor all AEFIs to ensure vaccine safety.

Similarly, the safety concerns of parents need to be addressed to enable them to make a favorable decision towards immunizing their children. Nowak et al. (2015) discussed the utility of commercial and social marketing principles to address vaccine hesitancy. They explained that vaccine uptake can be improved by persuading hesitant

parents through “branding” of vaccines and the immunization process using the commercial and social marketing principles. By concentrating on the four marketing principles of products, price, place and promotions (the four “Ps”), parents can be convinced and swayed through attractive and appealing communication strategies and advertising techniques to accept vaccines and vaccination voluntarily and readily. Nowak et al. (2015) emphasize that commercial marketers are interested in how their products are supplied or distributed, and whether the distribution chain and the places where the product is obtainable satisfy the wishes and requirements of the population in question. In addition, social marketing is important in vaccination programs to identify and understand the physical, social, economic, and environmental factors that constitute barriers in vaccine uptake. By presenting vaccines as an attractive “brand” these barriers can be overcome resulting in improved patronage of the product and consequent improvement in vaccination coverage. Parents of eligible children can be segmented according to different social groups with communication strategies, advocacy, “advertising,” and service delivery tailored for each segment to make acceptance of vaccination more attractive and appealing in line with commercial and social marketing principles.

Religion as a Determinant of Parental Vaccination Decisions

Religious beliefs have been noted as a factor that influences parental decisions about childhood vaccination (Smith et al., 2011). This is consistent with the findings of Repalust, Šević, Rihtar, & Štulhofer, (2017) who conducted a population-based study of the determinants of refusal of childhood vaccination in Croatia and found that “religiosity” increased the odds of rejection of vaccines. Many Nigerians are deeply

religious and profess different faiths. Since many religious adherents tend to model their behaviors and lifestyle choices according to the teachings of their faith, religion and spirituality have permeated every facet of their lives, predisposing them to possible manipulation by religious leaders. The most popular religions that impact immunization in Nigeria are Islam, Christianity, and African traditional religion.

The impact of Islam on immunization services in Nigeria has been controversial, with some Muslims supporting or accepting vaccination while others reject it. Since there are no specific official Islamic instructions about vaccination from the *Qur'an*, the acceptance of vaccination in Nigeria has reflected the interpretation, teachings, and opinions of different Islamic scholars, and the political context in which Islam has emerged or is being practiced in Nigeria. In the medieval period between 15th and 17th centuries, disease prevention and treatment in Northern Nigeria were based on two systems. The materia medica consisted of plants and inorganic extracts used for medical treatment. *The Prophetic Medicine* (Al-Jawziyya, 2001) was a compilation of *Hadith* (sayings of the Prophet Muhammed) and some verses of *The Qur'an* related to sickness; it emphasized the power of prayer in the prevention and treatment of diseases. The use of prayer to prevent and treat diseases forms the basis of the practice *Sufism* – a form of healing and soul cleansing with mystical and esoteric incantations and recitation of some verses of the Holy Book (Piraino, 2016).

However, from the 19th century until present time, the attitude of Muslim parents towards vaccination in Nigeria has been influenced by the views and writings of three 19th century Islamic scholars. Mohammed Tukur, a prominent intellectual of the Islamic Jihad (holy struggle), stressed that prayer was the primary source of prevention and cure

(Abdalla, 1997), an opinion reinforced by *The Prophetic Medicine*. On the contrary, Abdullahi dan Fodio (brother to Sheikh Othman dan Fodio) insisted that "maintaining the health of the body itself was akin to a form of prayer" (Renne, n.d., p. 6). He recommended that knowledgeable physicians could be consulted provided their treatments do not contain substances such as alcohol which the Shari'a (Islamic law) forbids (Renne, n.d., p. 6). The third Islamic leader, Muhammad Bello (son of Sheikh Shehu dan Fodio) synthesized the views of the two previous scholars, insisting that Islamic medicine consisting of a combination of prophetic medicine (spiritual) and herbal or inorganic (material medical remedies) should be utilized. Some texts from the Qur'an and Hadith have been cited by different scholars to support their positions. For example, a chapter of the Qur'an, Sura 6, verse 140, states that "They are lost indeed who kill their children foolishly without knowledge and forbid what Allah has given to them forging a lie against Allah; they have indeed gone astray, and they are not the followers of the right course." This implies that Muslims should accept to immunize their children since Allah (God) has given mankind knowledge about how to use vaccines to prevent infectious diseases that kill children. In addition, the book by An-Nawawi's *40 Hadith* No. 11 enjoins Muslims to "Leave that which makes you doubt for that which does not make you doubt." This statement implies that Muslims should accept the message of vaccination which has empirical and incontrovertible evidence instead of the disinformation from anti-vaccination propaganda. International Islamic authorities (including the Council of Fatwa and Research) have given a judgement affirming that vaccination is acceptable in the prevention and treatment of diseases, and that rejection of immunization will lead to excessive harm (Ahmed et al., (2017)

For Islamic scholars on either side of acceptance and rejection of immunization, the point of departure has been whether prayer alone or a combination of prayer and vaccination fulfils religious obligations and best serves the interest of the people. For those who reject immunization, “prayer is not only sufficient, but is the only real protection against disease, which ultimately comes from God” (Renne, n.d). Those who reject vaccinations believe that vaccinations are unnecessary and may indeed be potentially hazardous for infants and children who do not have any existing health problems because from birth, Allah has given human beings natural immunity rather than artificial immunity derived from vaccines. Several studies have demonstrated that low immunization among Muslim populations is partly due to the respect they have for the opinion of their religious leaders, some of whom have actually cited vaccination as a sin against God (Glatman-Freedman, & Nochols, 2018). There are also a few Muslims who believe in fate, destiny, providence, which presupposes that anything (good or bad) that befalls somebody has already been predestined by God. Vaccination is therefore rejected because it seeks to alter God’s will which nobody should interfere with.

On the contrary, those who accept vaccination argue that it does not violate any section of the Qur’an, as long as the chemical content of vaccines or the process of vaccination are not expressly forbidden by Islamic Shari’a. This view is reinforced by the Prophetic Medicine which emphasizes that Allah the Great has sent a cure for each disease known to man and that each cure requires divine intervention (Rahman, 2015). This statement presupposes that when necessary both prayer and medicinal elements such as vaccines and medicines used for prevention and treatment of diseases are permissible. Furthermore, some Islamic scholars argue that even if anything is forbidden in Islam,

Muslims are permitted if the prevailing circumstances (such as impending harm or looming epidemic) warrant it (Renne, n.d.). This argument has been stretched to mean that parents are justified in vaccinating their children against diseases that constitute a threat to them, an opinion supported by Hadith 39, which states that "Allah has pardoned me my people for [their] mistakes and [their] forgetfulness and for what they have done under duress" (An-Nawawi, 1991). Hence, many Muslims readily accept immunization as an essential service to improve child health. For example, in a qualitative study conducted in 5 states of Nigeria (including Kano State, the center of Islamic scholarship in Nigeria), the authors found that religious leaders affirmed that Islam supports disease prevention and has imposed a duty on Muslims to immunize children in order to preserve their lives and prevent the spread of infectious diseases (Babalola & Aina, 2004).

Several studies have established that Islam is associated with low vaccination status of children. Antai (2009) conducted a quantitative study on the role of religion in child immunization in Nigeria and found that children of Muslims and adherents of traditional African religion had greater odds of being unvaccinated in comparison with children from Christian homes. Ahmed et al. (2017) identified the upsurge in refusal of childhood vaccination among Muslim parents as the major cause of the rise in VPDs in Malaysia, Afghanistan, and Pakistan. The authors recommended effective communication strategy to counter the spread of false and inaccurate information to parents by anti-vaccination activists as well as well ensuring that vaccines are not prepared with pig tissue which would make the vaccine *haram* (or forbidden) for adherents of Islam. Similarly, a study to assess the reasons for polio refusal in

predominantly Muslim Northern Nigeria and found that religious beliefs and poor perception of risk were the major reasons for vaccine rejection (Michael et al., 2014).

Similarly, adherents of the Christian religion are also divided along denominational lines on the issue of vaccine acceptance. The Catholic Church accepts and indeed advocates for vaccination as a means of disease prevention but prohibits the use of vaccines prepared with cell tissues extracted from a willfully aborted human fetus (Pelčić et al., 2016). Examples of such vaccines were listed to include cell lines WI-38 (Winstar Institute 38) and MRC-5 (Medical Research Council 5), some life-attenuated vaccines against rubella (Meruvax, Rudivax, MR-VAX), and hepatitis vaccines (A-VAQTA and HAVRIX), chicken pox (Varivax), smallpox (AC AM 1000), and poliomyelitis (Polivax) (20,21). Medical practitioners and families were enjoined to seek alternatives. However, the Academy affirms that vulnerable groups such as children and pregnant women could take the prohibited vaccines to avoid grave risk if no alternatives are available (The Pontifical Academy for Life, 2006; Sgreccia, 2005).

The protestant denomination (Anglican Communion) is more liberal on the issue of vaccine acceptance, leaving individual members to decide for themselves. Consequently, two groups have emerged. While minority Orthodox protestants refuse vaccines as undue human interference in God's plan for humanity, other mainstream protestants accept vaccination as God's gift for longevity (Pelčić et al., 2016). Some other Christian denominations such as Apostolic Faith, Faith Tabernacle, and Faith Assembly have theological and doctrinal objections to vaccination. Zimbabwe, where The Apostolic Church was founded in the 1930s before it spread to other countries, makes an interesting scenario. A study by Gerede et al. (2016) to assess immunization status of children in

three apostolic communities—Harare City, Manicaland and Matabeleland South—in Zimbabwe revealed that only 6% of eligible children were fully immunized (with documentary evidence from vaccination card). Another study in Zimbabwe also revealed that Apostolic children were twice as likely to be unvaccinated (AOR = 1.83, 95% CI: 1.22-2.77) than children from other denominations (Kriss et al., 2016). Parents of Apostolic Church extraction generally practice faith healing and rely only on prayers for disease prevention and treatment because they are fearful of sanctions for vaccinating or giving orthodox medicine to children under their care if they are reported to their religious leaders (Machekanyanga et al., 2017).

In Africa (including Nigeria), the attitude of typical rural people to health is not driven by biomedical concepts, but mainly by cultural and traditional belief systems, often buoyed by poor health literacy level regarding the cause of diseases (Sabuni, 2007). In general, traditional African religion perceives diseases and death as punishments of metaphysical origin arising from offence against or anger from the gods, spirits, witches, and ancestors (Sabuni, 2007). This belief system has given rise to widespread use of spiritual healing, sorcery and traditional sacrifices to appease the gods in order to receive protection and healing against diseases (Manguvo, & Mafuvadze, 2015). Some others combine the spiritual healing with drinking a concoction of herbs, roots and barks of trees suspected to have medicinal value. Although Christian and Islamic missions as well as formal education and orthodox medicines have changed some of these practices, about 80% of people in some African countries still patronize traditional healing (Oyebode, Kandala, Chilton, & Lilford, 2016). The traditional belief system tends to influence parental vaccine decision. Rather than vaccinate their children, some parents choose to

use the services of traditional priests to give children tattoos or hang some charms and cowrie shells on the waist, knee or wrist of children (and sometimes adults too) as traditional health insurance to ward off those spirits that cause disease and death. This calls for appropriate communication system to break the traditional barrier to childhood vaccination to improve vaccination coverage and child survival (Sabuni, 2007).

Political Factors in Childhood Vaccination

Beyond religious persuasions, parental decision-making processes about childhood vaccinations are also influenced by political considerations (Gopichandran, 2017). In a study to explore the willingness of U.S. population to take the Influenza-A vaccine, Mesch and Schwirian (2014) found that the reasons for resistance to taking the vaccine were conservative (Republican political ideologies) and distrust or lack of confidence in government. Results of several other studies affirm that people with conservative political ideologies are less likely to trust their government and or its public health experts (e.g., CDC), and are therefore less likely to accept vaccination (Baumgaertner, 2018). Hamilton, Hartter, and Saito (2015), corroborate this conservative political distrust in government and reluctance to accept vaccines, and attribute this pattern to "broader ideological divisions on acceptance of science, with higher liberal and lower conservative trust in scientists" (p. 10). It has been suggested that conservatives in the U.S. are skeptical about vaccines because of three reasons—government involvement, child safety and conspiracist ideation (Hamilton, Hartter, & Saito, 2015).

Resistance to childhood vaccination is also a major issue especially in northern Nigeria, and largely reflects distrust for government or its public health institutions. This lack of trust has arisen from long-standing skepticism of the Western World as well as

conspiracy theories. The political undertones to this deep distrust are complex and need some explanation. History teaches us that Africa was colonized by Europe while America was a major player in the inhuman activity called slave trade, with both activities leading to the exploitation of African peoples and their resources (Chen, 2004). This history of imperialism still evokes negative sentiments among some Africans and casts some doubt about the real motives behind the mission of Western countries in Africa. Distrust arises because Western aids, Western medicines, and Western humanitarian activities are viewed with suspicion as services through which these perceived "hostile" Western countries perpetuate their domination and exploitation (Chen, 2004). Therefore, the governments that patronize, protect, or promote these "Western values" may not be trusted to act in the interest of the people. This distrust is often expressed peacefully by some misguided people as vaccine rejection to demonstrate their repudiation of Western values, or even pursued violently by some extremists as an ideology that motivates terrorism as can be seen in the dreadful Islamic jihadist organization called Boko Haram – a Hausa phrase meaning "Western knowledge is evil."

Furthermore, many people especially in the predominantly Muslim northern Nigeria have imbibed the anti-vaccination propaganda which falsely teaches them that vaccines are unsafe, and that Europe and America are uncomfortable with the rising population of Muslims world-wide, and have therefore embarked on a grand design to checkmate this population growth with antifertility chemicals allegedly incorporated into vaccines and family planning commodities (Anyene, 2014). In particular, one Islamic leader, Dati Baba Ahmed, who is also a medical doctor wrote: "There were strong reasons to believe that the polio immunization vaccines were contaminated with anti-

fertility drugs, contaminated with certain viruses that cause HIV/AIDS, contaminated with Simian viruses that are likely to cause cancer" (Chen, 2004, p. 206). This propaganda prompted the governors in five states of Northern Nigeria (Kaduna, Bauchi, Kano, Niger and Zamfara) to totally ban the use of OPV resulting in mass parental boycott vaccinations in August 2003 (Obadare, 2005; Michael et al., 2014). A tripartite committee made up of officials from WHO, Islamic leaders, and officials of the Nigerian government conducted scientific investigations and found the allegations to be untrue (Obadere, 2005). However, the general consensus as echoed by John Campbell who was the U.S. ambassador to Nigeria, was that the whole saga was politically motivated to express the distrust and disaffection of the people of Northern Nigeria to the government of President Olusegun Obasanjo who hailed from the south outside the power base of Nigeria (Kaufmann, & Feldbaum, 2009).

This skepticism and distrust for government as well as the conspiracy theory about Western motives was reinforced by the disaster of Pfizer's Trovan drug trial in Kano, Nigeria. During a meningitis outbreak in Kano, Nigeria in 1996, Pfizer embarked on an unethical and illegal trial to test the efficacy of a new and unregistered antibiotic, trovafloxacin (Trovan) for the treatment of meningococcal meningitis (Okonta, 2014; Jegede, 2007). Of the 200 children recruited for the trial, Pfizer acknowledged that half of them received the new drug, Trovan, while the other half were given only one-third of the recommended dose of the gold standard treatment for meningococcal meningitis, ceftriazone, which the researchers used to comparison with Trovan (Lenzer, 2011). Unfortunately, 11 children in the study died—5 from the trial group, and 6 from the comparison group made up of sick children to whom Pfizer deliberately gave the

standard antibiotic treatment in subclinical doses (Lenzer, 2011). This gave rise to an uproar in which 30 families of the children who took part in the study sued Pfizer for ethical misconduct alleging that the children were used for medical experiments with untested and unlicensed drugs without obtaining informed consent (Okonta, 2014; Wise, 2001). The litigation for unethical conduct was later settled out of court, and Pfizer payed a total of $75 million as compensation to families in the study, to support healthcare initiatives in Kano, and to cover legal costs (Jegede, 2007). However, the use of children in Kano to test an unregistered drug under the watch of government and its regulatory agencies damaged peoples' trust and confidence in their leaders because government and its scientific or public health agencies were perceived as having colluded with Western powers to exploit the vastly illiterate and ignorant population by using vulnerable children as subjects in a most unethical medical experiment. The significance of this trust variable as a predictive factor in parental vaccination decisions is part of the objective of this study.

Culture as a Determinant of Parental Vaccinations Decisions

Culture generally refers to a peoples' way of life and can be specifically defined as "that complex whole which includes knowledge, belief, art, morals, law, customs and any other capabilities and habits acquired by man as a member of the society" (Ojua, Ishor & Ndom, 2013, p.178). Adherents of African tradition and culture believe that human beings are inextricably linked with, and controlled by the gods and ancestral spirits, such that people are healthy when there is harmony between man and these entities, while illness and misfortune are blamed on evil spirits and angry ancestors (Ojua, Ishor & Ndom, 2013). The central tenet of African mythology and metaphysics is

their belief that diseases arise when the social harmony or equilibrium put in place by the creator of the universe is disrupted due to peoples' misbehavior or disobedience of natural laws (Benedict, 2014). Accordingly, Aja (1999) identifies some elements of disease causation in African societies to include sorcery, breaching of taboos, intrusion by spirits, contaminated items, ghosts of the dead, and acts of the gods. Benedict (2014) affirms that in traditional African societies, illnesses are blamed on malevolent agents such as "sorcerers, witches, ghosts and ancestral spirits" (p. 52). Furthermore, the health-seeking behavior, expression of illness, and decision-making process on health in the African societies is socially determined in accordance with prevailing cultures.

From the forgoing, it can be understood why the processes of disease prevention and cure in traditional African cultures address both the physical and metaphysical dimensions (Ojua, Ishor & Ndom, 2013). Disease prevention therefore entails not only the little acts of personal and environmental hygiene, but also the elaborate "spiritual health insurance" involving sorcery, incantations, and the formal dedication of individuals (especially newborns) to the gods and ancestral spirits for protection. The traditional priests and diviners who preside over these ceremonies often give the children some herbal concoctions to drink or make permanent tribal marks and tattoos on different parts of the child's body (as culture permits), or design some charms, bracelets, or amulets for the children to wear on their neck, waist, or wrist as physical signs of identification and protection that can ward off any spiritual attacks that bring diseases (Idehen, 2007). For parents and caregivers of such children, vaccination is not only unnecessary, but also dangerous because, the vaccines can negatively react with the

herbal remedies, while the needle prick through which vaccines are administered is believed to neutralize the spiritual protection already conferred on the children.

However, the practice of these cultural beliefs differs according to specific locations. Nigeria is a large country made up of about 250 ethnic groups with Igbo, Yoruba and Hausa as the predominant groups (Ojua, Ishor & Ndom, 2013). These ethnic groups have distinct traditional, religious and cultural beliefs and practices that have withstood the pressures of Western orthodox medicine or civilization and still play significant roles in parental decision-making process about vaccination. Chidiebere, Uchenna, & Kenechi, (2014) indicate that the current wide variations in vaccination coverages in Nigeria are related to the cultural disparity in different geopolitical zones. Before the advent of Western civilization, Africans had a coherent system of healthcare delivery that is rooted on culture and traditional religious beliefs.

In summary, Nigeria is a large country made up of different tribal and cultural groups. These ethnic groups have distinct traditional, religious and cultural beliefs or practices, some of which have withstood the pressures of western civilization. Africans, and Nigeria in particular had their traditional methods of disease prevention and treatment. These practices which include the use of herbal remedies, tree roots and barks, charms, amulets and spiritual incantations. These traditional-medical and charms have endured the onslaught of Western education, religion and medicine, and play significant role in parental decision-making about vaccination.

Summary and Transition

Vaccine hesitancy is the delay or refusal in accepting vaccination in spite of availability of vaccination services. In this chapter, I reviewed relevant literature on

vaccine hesitancy, and the findings of different scholars. Previous studies in different settings have established that parental decisions to delay or reject vaccination for their children are influenced by parental education level, socioeconomic status, culture, religion and political trust. However, till date, there are no studies to demonstrate the relationship between these sociopolitical factors and the immunization status of children in the Abuja, Nigeria's FCT. This study seeks to fill this gap.

In Chapter 3, I will discuss in great detail the methodology for this study. I will also discuss the target population, sampling strategy, and the data analysis plan to test the research hypotheses.

Chapter 3: Methods

Introduction

The purpose of this study was to investigate the sociopolitical determinants of parental acceptance of childhood vaccination in Abuja, the FCT of Nigeria, and describe the association between sociopolitical variables such as tribe, religion, socioeconomic status (income level and educational attainment), trust in government or its public health agencies, and the vaccination status of children. Recent studies have revealed that the RI coverage in Nigeria is very low. This low RI coverage predisposes children to high incidence of VPDs, which, in turn, leads to high infant and under-5 mortality. Parental vaccine rejection has been identified as one of the factors responsible for the low uptake of RI in Nigeria. The aim of this study, therefore, was to explore and describe how the religion, culture, educational attainment, and political persuasion of parents in Abuja, Nigeria, relate to the vaccination status of their children. This study used a quantitative, cross-sectional survey, with an interviewer-administered questionnaire. The instrument collected information on parental, sociodemographic data and other independent variables of interest, as well as the vaccination status of their children—all of which are necessary to answer the research questions.

In this chapter, I cover the following topics: the research design and methodology; details of the study population and determination of sample size; the procedures for sampling, recruitment of participants, and the data collection process; instrumentation, operationalization of constructs, data analysis plan; the threats to validity, and ethical procedures. The chapter concludes with a description of the alignment of the study design and consistency among its various elements

Research Design and Approach

A quantitative, cross-sectional survey, with primary data collection, was appropriate for the current study because it involved taking a random sample of participants, which represented a cross-section of the study population, and measured the variables of interest by administering a questionnaire to every participant (Sedgwick, 2014). This is in contrast with a longitudinal study design, where participants are observed at multiple times to establish a trend. A quantitative, cross-sectional survey was also suitable for this this study because it provided the snapshot data that is required to address the research question: Is there a statistically significant relationship between the religion, tribe, income, educational attainment, political persuasions of parents and the immunization status of their children, aged 0-24 months. This research question is consistent with the understanding that cross-sectional studies are appropriate for estimating the behavior of people or the prevalence of a disease within a population (Sedgwick, 2014). In addition, since a quantitative cross-sectional survey entails any measurement or the administration of a questionnaire only once for each participant), such studies are fast, straightforward, inexpensive, and reliable (Choy, 2014). A cross-sectional survey design saved time and resources. But the large target population, the logistics of questionnaire administration, and the concern over low response rates are formidable challenges that also required time and resources. However, going personally to all households to administer the questionnaires without waiting for respondents to return them saved time and ensured very good response rate.

The choice of cross-sectional survey for this study was also informed by its utility as a research design for the advancement of knowledge in public health. Cross-sectional

surveys yield empirical measures that describe the association between and among different variables. When such data are analyzed through appropriate statistical procedures, it provides a measure for testing or formulating theories and hypotheses, which is of great necessity in the process of answering research questions and interpretation of data (Creswell, 2014). The whole purpose of survey research is to study a smaller representative sample of a population with the aim of generalizing the findings to the larger population from which the sample was drawn (Forthofer, Lee, & Hernandez, 2007). In the field of public health or social sciences, cross-sectional survey design particularly enables us to use the outcome of study on a sample or target population to make inferences about the characteristics, attitudes, or behaviors of the study population. However, survey research can only yield association between variables but not inferences about causation (Rutkowski, & Delandshere, 2016).

The independent variables in this study were religion, tribe, socioeconomic status (educational attainment and household income), and political trust for government and its scientific agencies. Since this study explored parental decisions about vaccination of their children, the dependent (outcome) variable was the immunization status of the children, aged 0-24 months, irrespective of whether the child has completed the immunization schedule or not. Hence parental self-report of their children as either “vaccinated” or “not vaccinated” was an indication of parental acceptance of rejection of vaccination respectively. This parental recall was validated by child immunization card and presence of immunization scar on the left upper arm of the children. Demographic data on age, gender and ethnicity of parents and their eligible children were also collected.

Methodology

Target Population

Target population has been defined as "the population about which one wishes to make an inference" (Daniel & Cross, 2013, p. 164). The target population selected for this study will be all parents and caregivers who have children, aged 0-24 months and reside in Abuja, Nigeria. The 2018 total population of Abuja Municipal Area Council (projected from the 2006 national census) is 2,263,278 with a RI target population (children less than 1 year of age i.e. 4% of total population) of 90,532. The study area consists of both urban and rural settlements. The urban areas are occupied by mixed group of civil servants, businessmen, and other professional groups of high socioeconomic status who can afford the very exorbitant house rent and lifestyle for which Abuja is known. While some of them are in the private sector, others work for the government of the Federal Republic of Nigeria. The rural and satellite settlements are occupied mainly by artisans, and many other people of the middle and lower income groups who commute to and from the city center to work and provide services for the people and government of the Federation. The indigenous people of Abuja are of Gbagyi tribe. However, the movement of Nigeria's capital to Abuja in 1986 attracted many people of other tribes to migrate and settle in Abuja for work, commerce and agriculture. These settlers who have thoroughly mixed with the original inhabitants come from the major tribes of Hausa/Fulani, Igbo, and Yoruba, among other smaller ethnic nationalities. The major religions practiced by people of Abuja are Christianity and Islam, but a few others are of the African traditional religion. Politically, Abuja Municipal Area Council is subdivided into 12 different wards for administrative convenience. The Council is

governed by an Executive Chairman and Legislative Council elected from different political parties and supervised by the Minister of FCT.

Sampling and Power Calculations

Abuja Municipal Area Council is thoroughly mixed in ethnicity, religion and other demographic and social characteristics, which has earned it the name of "Center of Unity." In this study, a stratified random sampling strategy was used to select the sample to ensure that it is truly representative of the target population (Frankfort-Nachmias, Nachmias, & DeWaard, 2015). The process was guided by the 2005 WHO (WHO) survey methodology (WHO, 2005). In the first stage, I randomly selected 8 wards from the 12 in AMAC using a table of random numbers. During the second stage, I also randomly select settlements from the "masterlist of settlements" regularly maintained by Abuja Municipal Area Council. In the third stage, the households and participants were selected from the previously selected settlements. Only parents with eligible children were recruited, while these parents were required to provide responses for only one eligible child per family to increase the geographic spread of the survey. The purpose of the research was explained to each participant to enable them give informed consent before responding to the survey questions. Participation was voluntary, and all those who declined to participate were dropped from the study.

Since this study was a cross-sectional design to test the association between variables, the information required to calculate the sample size were (1) the standard deviation (Z) for a two tailed test which is 1.96 for a 95% confidence, (2) the reported prevalence rate (P) of the outcome from previous published studies in the area, (3) the precision (d) i.e. the total percentage of error that we can tolerate, and (4) the effect size

which can be small, medium or large (Charan, & Biswas, 2013; Martínez-Mesa et al., 2014). In this study, the power was set at 80% (.8), precision was 5% (.05), effect size = 0.2 (small effect). According to Charan and Biswas (2013), and Hajian-Tilaki (2011), the sample size ("n") in a cross-sectional study can be calculated with the formula:

$$n = \frac{Z^2 \frac{\alpha}{2} \; P(1-P)}{d^2}$$

where Z = standard deviation - 5% type 1 error (p = .05) corresponding to 1.96 for a two-sided test; P = prevalence rate from previous publications or a pilot study; and d = the precision set a priori at 5% or 0.05. The entity P(1-P) estimates the variance (Charan, & Biswas, 2013; Hajian-Tilaki, 2011). From previous studies, the prevalence rate for immunization in Nigeria = 38% (0.38). Substituting the values,

sample size = 1.96^2 x 0.38(1-0.38)/0.05^2

= 3.8416 x 0.38 x 0.62/.0025 = 362

Allowing 5% (i.e. 18) of nonresponse rate, the total sample size required was 362 + 18 = 380.

Setting and Sample Size

This study was conducted in Abuja Municipal Area Council of Nigeria's FCT which has an estimated total population of 2,263,278 people. Nigeria is located in West Africa and has an estimated total population of 180 million people and a national growth rate of 3.2% per annum (Naibbi & Ibrahim, 2014). Nigeria is made up of about 250 different ethnic groups with Igbo, Hausa and Yoruba as the major tribes (Ojua, Ishor & Ndom, 2013). Constitutionally, Nigeria is subdivided into six geopolitical zones (namely North-West, North-East, North-Central, South-West, South-East, South-South), 36 states

and 776 local government areas while Abuja which serves as the administrative capital of the country is located in the North-central zone (Brown, 2013).

Nigeria's indices of health and development are not very good. The current infant mortality ratio in the country is 92 per 1000 live births (Kotsadam et al., 2018), while the maternal mortality ratio is 1,602 per 100,000 live births (Okonofua et al., 2017), The proportion of the country's population with health insurance cover is less than 5% (Awosusi, Folaranmi, & Yates, 2015). The 2016/2017 Multi-Indicator Cluster Survey/National Immunization Coverage Survey (MICS/NICS) revealed that the national routine vaccination coverage (using the third dose of DPT vaccine) was 34.4% (Adeloye et al., 2017). The current average life expectancy in Nigeria is 55.2 years with a range from 54.6 years for men to 55.7 years for females (Foreman et al., 2018).

The sample size for this study is 380 (as shown in the sample size calculation above). This sample size is considered appropriate and desirable because it is large and approximates more closely to the population mean and increases the chance of getting a significant finding in the study. This is important because statistical tests are aimed at detecting any significant differences where they exist between population groups. A small sample size is disadvantageous because it can produce an outcome that lacks the statistical power to detect a significant difference or outcome, such that the study produces a false negative result which may lead to type II error (Nayak, 2010). On the other hand, using an unduly large sample size in a study constitutes a waste of scarce resources (time and money) to conduct a study in which the outcome can be correctly determined with a smaller sample size (Nayak, 2010).

Instrumentation and Operationalization of Constructs

The instrument used for data collection in this study was a structured survey questionnaire which was interviewer-administered to 384 randomly selected participants from 48 settlements in Abuja Municipal Area Council. This survey instrument was adapted from the Parent Attitudes about Childhood Vaccines (PACV) survey instrument which was first developed by Opel et al. in 2011. The PACV tool, which has been validated by different scholars, is a short paper-survey for identifying vaccine-hesitant parents. In its original form, according to Opel et al. (2011), the PACV survey tool was structured to be understood at sixth grade level and consisted of only seventeen questions which assessed parental vaccine attitudes under four thematic areas namely: immunization behavior (six items), beliefs about vaccine safety and efficacy (four items), attitudes about vaccine mandates and exemption (three items), and trust (four items)

PACV is an open and free survey tool which the developer encourages other scholars to adapt to their own settings. This is because the original PACV survey tool was not guaranteed to contain all the questions required to answer every research question in all relevant settings. Therefore, I modified and adapted it for this study by adding other questions to assess parental age, parental education, ethnicity, household income, and other constructs of the social ecological model. Some researchers had similarly modified the PACV tool to align with their study designs. For example, Opel et al. (2013) conducted a validation study in which the PACV survey tool was modified and adapted for the study by the addition of eight questions on "parental age, parental educational level, marital status, race or ethnicity, relationship to child, number of children in the household, household income, and whether the child eligible for the study was the

firstborn" (p. 1066). Similarly, Robert et al., (2015) also modified the PACV for use in adolescent setting by including "several socio-demographic items, such as the relationship of the accompanying adult to the adolescent as well as the age, ethnicity, marital status and educational level of the accompanying adult" (p. 1749). The reliability of the PACV survey tool has been validated in previous studies. For example, Opel et al. (2013) investigated the relationship between parent attitudes about childhood vaccines and future child immunization status and found that the PACV tool had high reliability in predicting immunization status of children.

Data Collection

Primary data was collected in this study through the administration of a structured questionnaire. Since this is a quantitative cross-sectional study, participants were contacted and interviewed for data collection only once – as a snapshot – to obtain information on exposure and outcome at a single point in time (Szklo, & Nieto, 2014). All participants were recruited and interviewed in their homes. The procedure for recruiting participants was through stratified random sampling. First, eight wards were randomly selected from the twelve wards that make up Abuja Municipal Area Council. Then, using a table of random numbers, six settlements were randomly selected from the master-list of settlements of each of the eight selected wards, giving a total of forty-eight settlements. In the next stage, 8 households were randomly chosen from each of the forty-eight selected settlements, giving a total of 384 households from where one participant was recruited and interviewed in each household. Since most of the clusters of settlements are unplanned, the first household was randomly selected by tossing a pointed instrument (a biro) at the center of the settlement such that the household where the arrow

pointed to was chosen. Thereafter, subsequent households were selected by systematically moving to houses on the right side, skipping five houses before choosing the next one until eight households with eligible participants were selected in each settlement. In every household selected, the father (or mother or significant others if father was unavailable) was interviewed to provide responses to the questionnaire while only one child aged 0-24 months was assessed for immunization scar on the left upper arm. In households with multiple eligible children, only one child was randomly chosen for assessment. Any selected household or participant that did not have an eligible child was skipped, while the next household was checked. In all households visited, I politely explained the purpose of the study to parents or caregivers and gave them copies of the informed consent form. Participation was voluntary, and the questionnaire was administered to only consenting parents or caregivers. The process was continued until I got eight consenting parents with eligible children in each of the six chosen settlements in all the eight selected wards in Abuja Municipal Area Council. Follow-up visits were not necessary because all parents that declined to give immediate responses to the questions were instantly dropped from the study. This strategy was used because the master-list of settlements for Abuja Municipal Area Council had a high number of households and population in each settlement to guarantee that eight consenting participants could be easily recruited from each settlement in my first visit without the necessity for follow-up on any reluctant participant.

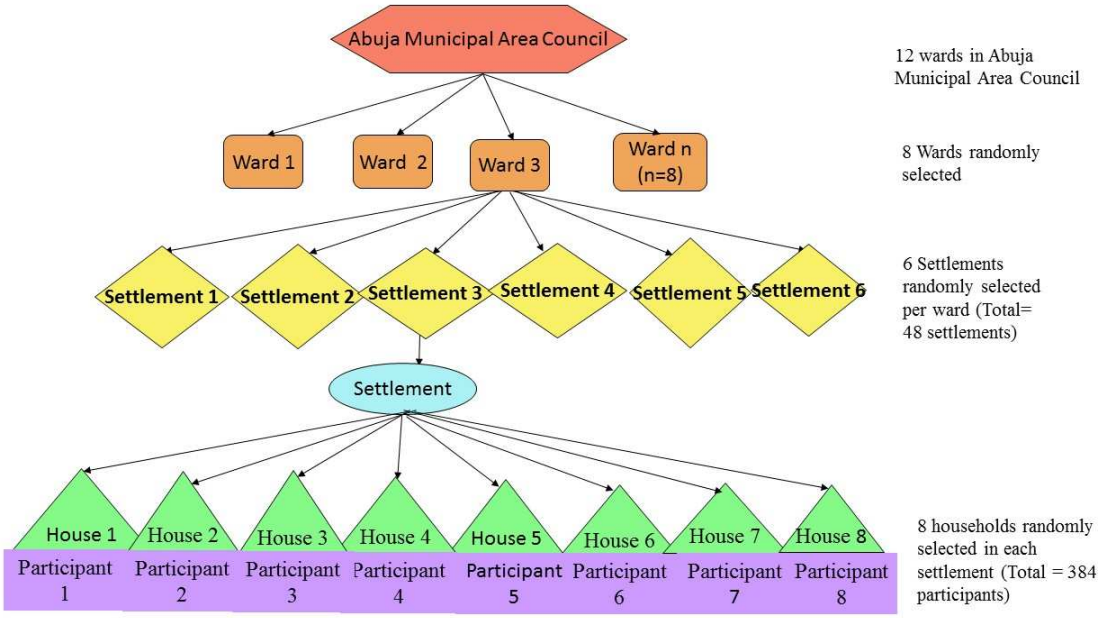

Figure 1. Process of stratified random sampling and selection of participants.

The data collected during the field work were: (a) Demographic variables relating to age, gender, and ethnicity of both parents and their eligible children, as well as the religion, educational status, and occupation of parents. (b) Parental acceptance of immunization for their children was assessed by history (parental recall), validated by the child's immunization card and the BCG scar that is usually present at the left upper arm of vaccinated children. This permanent and invariable scar for all ages is a valid indicator of parental acceptance of childhood vaccination because BCG is one of the first vaccines a child receives (usually at birth). For vaccinated children, their status as at the time of data collection was assessed by comparing the expected vaccinations for their age with the actual entries in their vaccination card. (c) Data on parental attitude about childhood vaccines was also collected in three domains – attitudes towards child vaccination,

sociopolitical influences on parental vaccine decisions, parental rust in government or immunization systems, and parental beliefs about vaccine safety and efficacy.

The questions in the survey tool were structured with clear and concise response options to accurately reflect the personal views of every parent regarding different variables in the study. The questionnaire was anonymous to maintain confidentiality of individual responses while sensitive questions were appropriately phrased to ensure that they did not violate participants' right to privacy. The questionnaire was interpreted into local Hausa language for indigenous parents who do not understand English language. The child immunization status which was binary or dichotomous (yes or "no) and other survey variables were appropriated coded with numbers and entered into the database of Statistical Package for Social Sciences (SPSS) version 25 for analysis and interpretation. The independent and dependent variables in this study and their levels of operational measurement are shown in Table 3.

Table 3

Operational Measures for Independent, Dependent, and Covariate Variables

Variables	Survey Questions	Data Code	Variable Type
Immunization Status	1. Immunization status of children	0 = Not Immunized 1 = Immunized	Binomial/ Outcome
Parental religion	2. What is your religion?	1 = Christianity 2 = Islam 3 = Traditional religion 4 = Other	Nominal/ Predictor
Parental tribe	3. What is your tribe?	1 = Gbagyi 2 = Hausa/Fulani 3 = Igbo 4 = Yoruba 5 = Others	Nominal/ Predictor
Educational attainment	4. What is your level of formal education?	1 = None 2 = Koranic/Primary school 3 = Secondary school 4 = Post- secondary	Ordinal/ Predictor
Socioeconomic status	5. Aggregate monthly income (converted from Nigerian Naira to US dollar at the rate of $1 = N360)	1 = Less than $100 2 = $101 – $200 3 = $201 – $300 4 = $301–$400 5 = $401–$500 6 = More than $500	Ordinal/ Predictor
Political leadership	6. To what extend do you trust government and the policy about mandatory routine immunization?	0 = I don't know 1 = Trust 2 = Do not trust	Nominal/ Predictor
Child's Age	7. Child's age in months	1 = 0-6 months 2 = 7-12 months 3 = 13-18 months 4 = 19-24 months	Interval/ Covariate
Child's gender	8. Child's gender	1 = male 2 = Female	Nominal/ Covariate
Gender	9. Parental gender	1 = Male 2 = Female	Nominal/ Covariate
Age	10. Parental age	1 = <30 years 2 = 31-40 years 3 = 41-50 years 4 = 51-60 years 5 = >60 years	Ordinal/ Covariate
Culture	11. Does your culture support vaccination of children?	0 = I don't know 1 = Yes 2 = No	Binomial/ Predictor

Statistical Analysis

Parents' vaccine hesitancy or acceptance of RI for their eligible children was assessed using the questionnaire adapted from the PACV survey tool. Demographic data and other information regarding parental age, education level, income, tribe are presented in frequency tables. Data from the survey was analyzed using SPSS version 25 to determine the strength of the association between each of the variables of the study. Bivariate analysis was first conducted using chi-square test (categorical variables) and cross-tabs with key variables in relation to the research questions to determine the level of significant relationships. Then, binary logistic regression was conducted to assess the relationship and the level of significant associations between each independent variable (religion, ethnicity, educational level, and political trust) the outcome variable (vaccination status of children). Statistically significant relationships in all regression analyses was set a priori at p-value of < 0.05. Adjusted and unadjusted odds ratios and p-values were reported.

Research Questions and Hypotheses

Research Question 1. Is there an association between parental tribe and vaccination status of children, aged 0-24 months?

H_01: There is no statistically significant association between parental tribe and vaccination status of children, aged 0-24 months.

H_A1: There is a statistically significant association between parental tribe and vaccination status of children, aged 0-24 months.

Research Question 2. Is there an association between parental religion and vaccination status of children, aged 0-24 months?

H_02: There is no statistically significant association between parental religion and vaccination status of children, aged 0-24 months.

H_A2: There is a statistically significant association between parental religion and vaccination status of children, aged 0-24 months.

Research Question 3. Is there an association between parental socioeconomic status and vaccination status of children, aged 0-24 months?

H_03: There is no statistically significant association between parental socioeconomic status and vaccination status of children, aged 0-24 months.

H_A3: There is a statistically significant association between parental socioeconomic status and vaccination status of children, aged 0-24 months.

Research Question 4. Is there an association between parental trust of political governance and vaccination status of children, aged 0-24 months?

H_04: There is no statistically significant association between parental trust of political governance and vaccination status of children, aged 0-24 months.

H_A4: There is a statistically significant association between parental trust of political governance and vaccination status of children, aged 0-24 months.

Protection of Human Participants

Ethical approval for the study was given by the Health Research Ethics Committee of the Health and Human Services Secretariat, Abuja FCT Administration with approval number FHREC/2019/01/44/02-05-19. After completing required

documentations, Walden University also gave concurrent ethical approval for the study. The Walden IRB approval number is 08-27-19-0567534.

No personal identifying information was recorded in the survey questionnaire. All information collected from participants as part of data collection was securely stored. Hard copies of the collected data were kept in a locked file cabinet in my private home library, while electronic copies were saved in my private pass-worded laptop. The cabinet keys and laptop password respectively are known and kept by only me. The data will be kept and for and destroyed after 5 years. Furthermore, participation in the study was voluntary. There was no coercion, inducement, or any reward for participation. All participants were contacted, recruited, and interviewed with the survey questionnaire in their private homes in the various wards and settlements in Abuja Municipal Area Council. Each participant was at liberty to decline or decide to participate in the study.

Threats to Validity

Validity in a research process is defined as the extent to which variables measure the constructs they are intended to measure (Crosby, 2013). In this quantitative cross-sectional survey, there are some factors that can compromise the internal validity of the study. In the first instance, if parents do not understand the questions in the questionnaire and provide inappropriate answers to them, it will affect the validity of the conclusions. It is also possible that parents may want to answer the questions in a socially desirable manner rather than give honest and objective responses. There is also a possibility that some parents could be outrightly dishonest in their responses. Furthermore, some participants may choose to decline answering the questions in the survey tool, which will result in a low response rate. The external validity which relates the generalizability of

the study and its outcome can be threatened if the sample of participants is not representative of the study population.

Cosby (2013) cautions that threats to validity should be put into perspective in the concept, design, and conduct of research. Accordingly, I built some mechanisms into the study to improve the validity. First, I used interviewer-administered survey questionnaire, such that any misunderstanding about the intent and meaning of every question was explained to the participants during data collection. This helped to reduce information bias. I also employed the services of language experts in the translation and back-translation of the questionnaire into Hausa language, the common language of people in Northern Nigeria (where Abuja is located) for participants of this region who may not understand English language. In addition, the survey did not ask for intimate or incriminating information from the participants. Furthermore, a 5% increase in sample size was built into the sample to make allowance for the possibility of those who may refuse to provide responses to the survey. To ensure that the sample is truly representative of the study population, I used a stratified random sampling strategy to select participants for the study. Before going into actual data collection for the study, I used a sample of ten randomly selected participants to test the utility of the survey questionnaire and to inform any adjustment where necessary.

Summary and Transition

In this chapter, I described the details of the research design and methodology. A quantitative, cross-sectional survey was used for the study because it enabled us to assess the relationship between variables and to generalize the results from a smaller to a larger population. I used a stratified random sampling strategy to select a sample of 384

participants on whom I applied an interviewer-administered survey questionnaire to collect data dependent and independent variables. The data were analyzed with chi-square test and binary logistic regression in SPSS version 25. Demographic data were presented in frequency tables while adjusted and unadjusted odds ratios and *p*-values were reported and used to assess the level of significant relationship between the independent and dependent variables.

In Chapter 4, I will present the results of data analysis and describe how they were used to answer the research questions.

Chapter 4: Results

Introduction

The purpose of this study was to investigate the sociopolitical determinants of parental acceptance of childhood vaccination in Abuja, the FCT of Nigeria, and to describe the association between sociopolitical variables such as tribe, religion, socioeconomic status (income level and educational attainment), trust for government and its public health agencies, and the vaccination status of children. Several researchers have shown that Nigeria currently has low RI coverage, a high burden of VPDs, and high mortality of infants and children under 5 years of age. Vaccine hesitancy has been identified as one of the factors responsible for the low RI coverage in Nigeria.

The research questions sought to examine whether there were statistically significant associations between parental religion, tribe, socioeconomic status, trust of the people in their government and or its public health agencies and the vaccination status of children. To answer the research questions, the study was conducted with a quantitative, interviewer-administered, cross-sectional questionnaire, in order to collect data on these parental independent variables and the vaccination status of their children. The vaccination status of children was measured as a binary (yes or no) variable through parental self-report, validated with a children's immunization card, usually issued to their parents, and the usual immunization scar on the children.

In this chapter, I cover the following topics: the data collection process, the outcome of the pilot study, the results of data analysis with regards to descriptive statistics, the chi-square test, and the logistic regression analysis. I also show how these

results were used to answer the research questions and evaluate the hypotheses. The organization of this chapter and the description of results are shown in Figure 2.

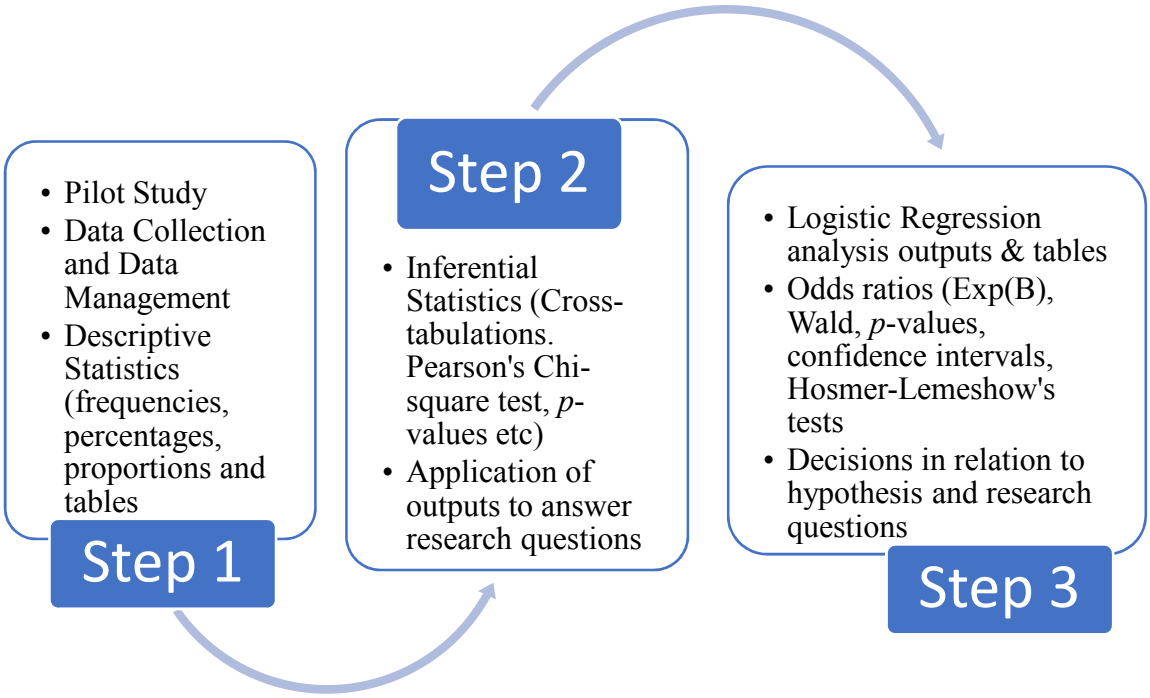

Figure 2. Outline of presentation and description of the results.

Pilot Study

Before the main data collection, I conducted a pilot study to pretest the questionnaire in one settlement, called Karsana, where eight households were randomly selected, eight participants were recruited, and data was collected ~~data~~ from them using the same method as ~~I~~ used during the full-sample data collection. The pilot study revealed some challenges (as listed below), and the need to make some adjustments in the questionnaire for the full sample data collection. First, 21 households were visited before getting the required eight eligible participants, with longer time spent than expected in one settlement. Although many parents were willing and enthusiastic to participate, those who did not have eligible children were excluded. However, after reading the informed

consent form, some parents declined. Some offered no reason for declining, a few expressed security concerns, some asked for financial benefits, which I could not offer. Yet others, especially the highly educated people and those in the upper strata of the society demanded to see the proof that a recognized authority approved the study and permitted me to come to their homes to administer the questionnaire as a non-commercial venture. For this later group, it became necessary to carry along with me not only the consent form but also the approval letter from Abuja Health Research Ethics Committee, and the Letter of Cooperation from the Executive secretary of FCT Primary Healthcare Board which permitted recruitment of participants and collection of data.

I also discovered from the pretest that two questions in the survey tool required revision. The household income which was expressed in U.S. dollars in Question 9 needed the naira (local currency) equivalent inserted against each range of options to enable participants to relate appropriately. I also discovered that Question 15 which asked of the evidence for child's immunization status, needed an additional option to capture all the three scenarios – parental recall, possession of card, and presence of scar on the child. Another important lesson learnt from the pilot study was the low comprehension level of a few participants and the current rainy season in Nigeria would contribute to slowing things down. The foregoing challenges notwithstanding, the pilot study revealed that the questions in the survey tool were clear, unambiguous, and elicited the responses that represented the honest attitudes of parents and caregivers that can be analyzed to answer the research questions. Therefore, no change was made in the data analysis plan. It is important to state that the validity and reliability of the PACV survey tool from which the questionnaire was adapted has been established by several authors (Opel et al., 2011;

Opel et al., 2013; Robert et al., 2015). For example, Opel et al. (2013) investigated the relationship between parent attitudes about childhood vaccines and future child immunization status and found that the PACV tool had high reliability and validity in predicting immunization status. Therefore, no further activity was necessary in this direction.

Data Collection and Management

The data collection was conducted in this study from August 31, 2019 to September 25, 2019. The recruitment of participants and data collection through stratified random sampling was executed as previously planned in the proposal. First, a table of random numbers was used to select eight wards from the twelve wards that constitute Abuja Municipal Area Council. Using a table of random numbers also, six settlements were selected from the master list of settlements in each of the eight selected wards, giving a total of 48 settlements. This then set the stage for the actual field work for participant recruitment and data collection. In each of the 48 settlements, eight households were randomly visited and their eligible parents (or responsible caregivers in the absence of parents) were recruited and interviewed with the survey questionnaire for data collection, giving a total of 384 participants as proposed in the calculated sample size. The data collection plan was implemented and the calculated sample size of 384 achieved more efficiently through sampling with replacement. Rather than spend time trying to convince a parent who declined, another household was selected. Households that did not have eligible children were also replaced. Sampling of other households and participants were on hold until the 8 participants needed in each settlement were interviewed. In order to recruit the required number of participants, it was necessary to

visit many more households in most of the settlements. The sample was truly representative of the study population due to the random sampling strategy and large sample size.

The questionnaires did not contain any identifying information while the participants were interviewed in a private section of their homes where no one else could hear the interview process. Every potential participant was made to understand the informed consent form to ensure that participation was voluntary. A few elites who demanded proof that the study was actually approved were also shown the IRB approval from Abuja Health Research Ethics Committee and Letter of Cooperation from the Executive Secretary of FCT Abuja Primary Health Care Board. Some of those who declined gave no reason. Yet some others cited security concerns, lack of financial rewards, and uncertainty about approval authority for the study. A log of details of households that I visited to get the desired sample is presented in Table 4.

Table 4

Log of Households Visited to get the Sample of 384 Participants

Serial Number	Name of Ward	Number of HHs visited	No. of people not eligible	No. of people who refused	No. of participants sampled	Household Numbers*
1	Gui	128	75	5	48	001-048
2	Orozo	131	80	3	48	049-096
3	Gwarinpa	130	82	0	48	097-144
4	Garki	149	101	0	48	145-192
5	Gwagwa	142	94	3	48	193-240
6	Kabusa	132	84	3	48	241-288
7	Karu City	132	84	0	48	289-336
8	City Center	139	92	0	48	337-384
	Total	1083	692	14	384	001-384

Note: * The numbers were ascribed only to selected households in the strata

The data collected were first entered into an excel sheet. Data cleaning was conducted by cross-checking the data for correctness and completeness of all responses and variables. A process of double data entry ensured data accuracy and eliminated all mistakes. Thereafter, appropriate coding and recoding of the variables was done and the data exported into SPSS, version 25, for data analysis.

Descriptive and Multivariate Results

Descriptive Statistics

Table 5 shows the demographic characteristics of the sample of 384 consenting parents and caregivers who were surveyed. The participants were mainly a young population, with half of the sample (51.8%) 30 years or younger. Four out of every five participants were mothers, while majority (93.2%) of the participants were married. Few of the participants (2.9%) were caregivers. Majority of the participants (41.7%) had a total monthly income of $100 or less while only 5.7%% earned $500 or more per month.

Table 5

Descriptive Analysis of Sample Demographic Characteristics

Characteristics of Sample	Frequency	Percent
Age of Participants		
30 years or younger	199	51.8
31 - 40 years	166	43.2
41 - 50 years	18	4.7
51 - 60 years	1	0.3
61 or older	0	0.0
Total	384	100
Sex of Participants		
Male	78	20.3
Female	306	79.7
Total	384	100
Relationship to Child		
Mother	298	77.6
Father	75	19.5
Caregiver	11	2.9
Total	384	100
Marital Status		
Married	358	93.2
Separated or Divorced	13	3.4
Widowed	5	1.3
Single parent	8	2.1
Total	384	100
Total monthly household income		
Less than $100 (<₦36000)	160	41.7
$101 - $200 (₦36360-₦72000)	112	29.2
$201 - $300 (₦72360-₦108000)	47	12.2
$301 - $400 (₦108360-₦144000)	22	5.7
$401 - $500 (₦144360-₦180000)	21	5.5
More than $500 (>₦ 180000)	22	5.7
Total	384	100

It was also observed from the descriptive statistics (Table 6) that a majority (48.4%) of the sample admitted that the culture of their tribe was in support of children's vaccination, while only a few (4.2%) said there was no such support.

Table 6

Does the Culture of the Tribe Support Immunization of Children?

Response variable	Frequency	Percent
Yes	186	48.4
No	16	4.2
Neither supports nor opposes	99	25.8
I don't know	83	21.6
Total	384	100

The sociopolitical characteristics include tribe, religion, education, occupation and trust in government and public health agencies. These are the characteristics related to the research questions of the study. The demographic data of the participants (Table 7) shows that 30.7% of them were of the Hausa/Fulani tribe, which accurately reflected the true situation in Northern Nigeria where Hausa/Fulani people constitute the majority in population. However, 20.6% of the participants comprised of people from Igbo tribe. Similarly, the participants were almost equally divided into Christians (51.3%) and Moslems (47.9%), and majority of these participants had received formal education at secondary (33.1%) and postsecondary (43.2%) levels. In addition, the major occupation of the survey population was trading (44.8%), followed by civil service (21.6%). Another important descriptive characteristic of the survey population was that majority (89.6%) of them had trust for government or its public health agencies.

Table 7

Sociopolitical Characteristics of Participants

Characteristics of sample	Frequency	Percent
Gbagyi	73	19.0
Hausa/Fulani	118	30.7
Igbo	79	20.6
Yoruba	55	14.3
Other tribe	59	15.4
Total	384	100
Christianity	197	51.3
Islam	184	47.9
Traditional religion	2	0.5
Other religion	1	0.3
Total	384	100
None	25	6.5
Koranic/Primary school	66	17.2
Secondary school	127	33.1
Postsecondary school	166	43.2
Total	384	100
Artisan	26	6.8
Trader	172	44.8
Businessman	71	18.5
Civil servant	83	21.6
Professional	32	8.3
Total	384	100
I don't know	26	6.8
Trust	344	89.6
Do not trust	14	3.6
Total	384	100

As shown in Figure 3, lack of funds was not a deterrent for children's immunization for majority (86%) of the participants; however, 13% of them affirmed that lack of funds had prevented them from vaccinating their children.

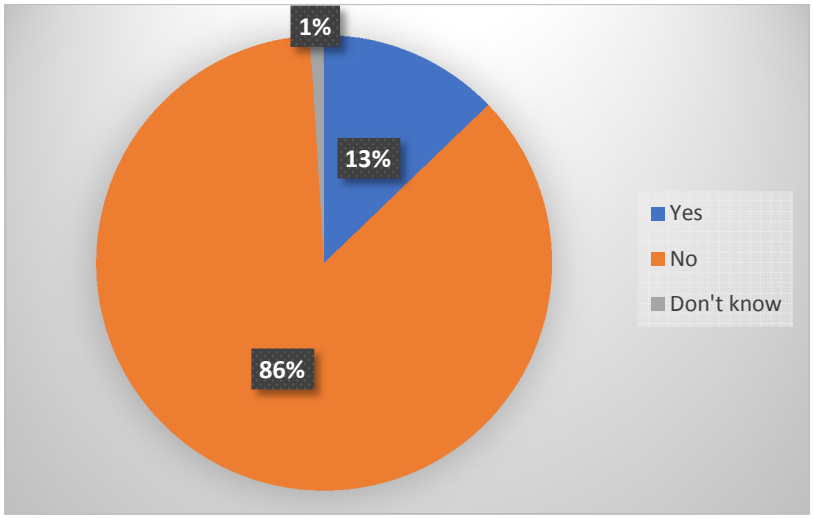

Figure 3. Responses about lack of funds as a barrier to vaccinating children.

Similarly, although majority of participants (87%) said that they were not influenced by anti-vaccination propaganda, 11% of them affirmed that they were actually influenced by such negative information about vaccination (Figure 4)

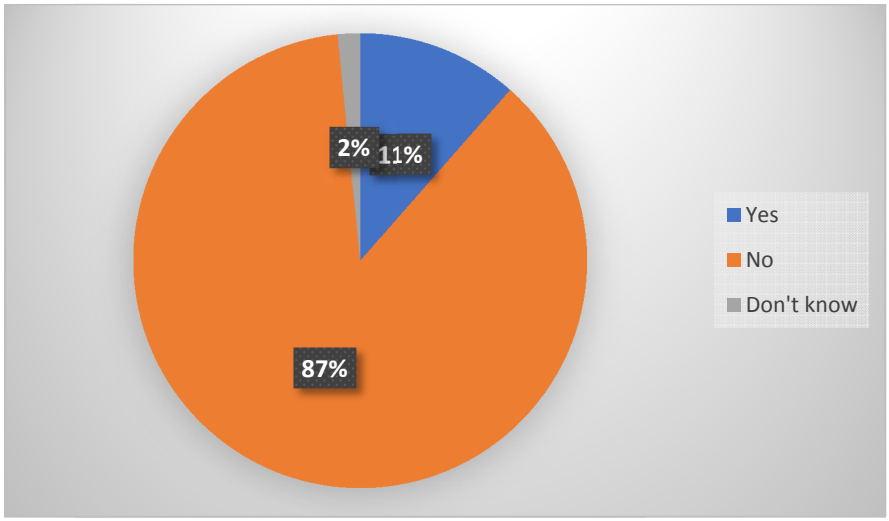

Figure 4. Anti-vaccination propaganda as an influence on accepting vaccination.

The descriptive statistics of the children as reported by their parents and caregivers showed that more than half of the children (55.5%) were females (Figure 5).

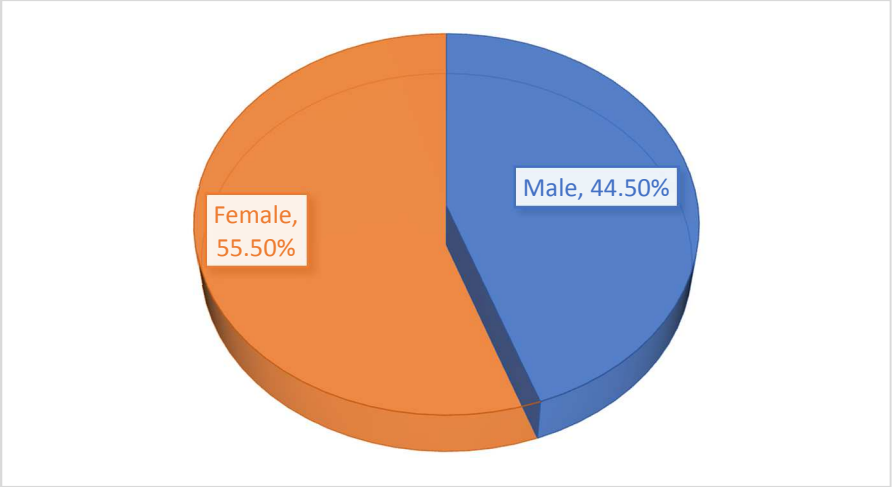

Figure 5. Gender distribution of children.

However, figure 6 shows that most of these children were within the age bracket of 7-12 months (31.8%) and 13-18 months (32.3%).

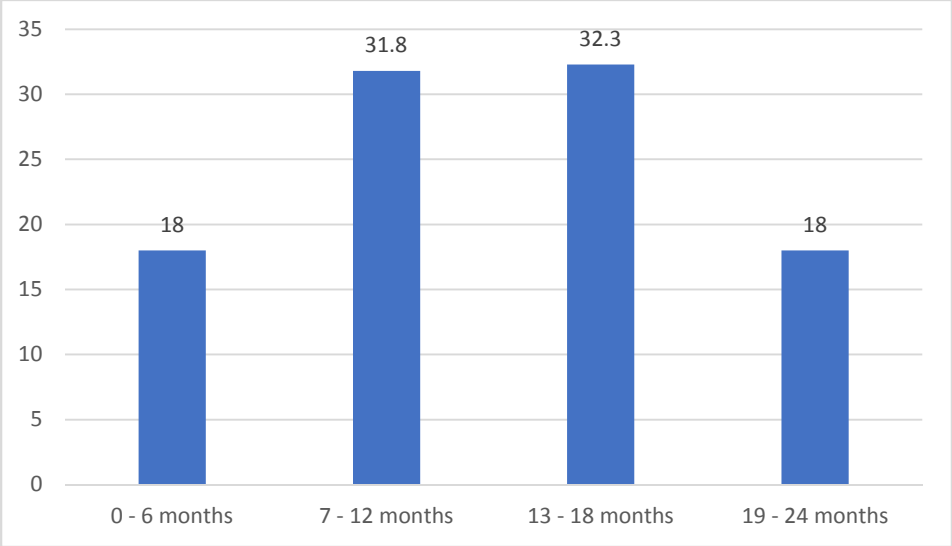

Figure 6. Age distribution of children as reported by parents.

Furthermore, a great majority (97.7%) of the children had received immunizations at some point (table 8). Among all the 384 children surveyed, over three-fourths (78.6%) were fully immunized (appropriate for age), 19% were partially immunized, while 2.3%

were never immunized (Table 8). Of all the children surveyed, the immunization of over half of them (50.5%) was confirmed through a combination of parental recall, immunization card and visible immunization scar on the child.

Table 8

Characteristics of Children as Reported by Parents

Characteristics of Sample	Frequency	Percent
Child Received any Immunization since Birth?		
No, child never received any immunization	8	2.1
Yes, child immunized	376	97.9
Total	384	100
Child's Current Immunization Status		
Never immunized	9	2.3
Partially immunized	73	19.0
Fully immunized	302	78.6
Total	384	100
Evidence of Child's Immunization Status		
Parental recall	20	5.2
Have immunization card	51	13.3
Child has immunization scar	6	1.6
Recall and immunization card	56	14.6
Recall and immunization scar	57	14.8
Recall, immunization card and scar	194	50.5
Total	384	100

Two types of data analyses – chi-square test and binary logistic regression were conducted to respectively answer the research questions and determine if the parental sociopolitical variables would significantly predict immunization of children. A test of association between the independent variables and the vaccination status of children was based on a chi-square test (binary outcomes) from two-way tables. In addition, the chi-

square test was used to determine which variables would be included in the logistic regression model. Significance levels were set at $p = <.05$.

Research Questions and Hypotheses

To answer the four research questions of this study, I conducted a series of chi-square tests of association (two-way tables) between the independent variables (religion, tribe, trust for government, household income, educational attainment) and the vaccination status of children (binary dependent variable). In these analyses, significance levels were set at $p = <.05$. Prior to conducting the chi-square tests, I verified and confirmed that the data satisfied the assumptions for the use of chi-square test. The types of variables of the study and their operational levels of measurement as previously described show that the variables are categorical. The 2 assumptions for the use of chi-square test of association are (1) the independent and dependent variables are measured at categorical (nominal or ordinal) levels and (2) the two variables should consist of 2 or more categorical independent groups. Table 3 shows that the data and variables satisfy these 2 assumptions.

Research Question 1. Is there an association between parental tribe and vaccination status of children, aged 0-24 months.

H_01: There is no statistically significant association between parental tribe and vaccination status of children, aged 0-24 months

H_A1: There is a statistically significant association between parental tribe and vaccination status of children, aged 0-24 months.

To answer this research question, I conducted a chi-square test of association (binary outcomes) based on two-way tables between parental tribes and vaccination

status of children. First, the vaccination status of children was entered into the rows as dependent variable having two categories of binary outcome – "vaccinated" and "not vaccinated." Then, parental tribe with its five different categories – Gbagyi, Hausa/Fulani, Igbo, Yoruba, and "other tribes" – was entered into the column as independent variable. The result of the chi-square test (table 9) indicates that there is a statistically significant association between parental tribe and vaccination status of children ($X^2 = 14.935$, $df = 4$, $p = .005$). Therefore, the null hypothesis which asserts that there is no statistically significant association between parental tribe and vaccination status of children, aged 0-24 months was rejected. This result is corroborated by the previously stated descriptive statistics in which a majority (48.4%) of participants affirmed that the culture of their tribe supported immunization of children. The conclusion from these results is that there is a positive statistically significant association between parental tribe and vaccination of children.

Table 9:

Chi-Square Test of Association Between Sociopolitical Factors and Vaccination Status

Independent Variables	Pearson Chi-square Statistic		
	Value	df	Asymptotic Significance (2-sided)
Tribe of Parents or Caregivers	14.935	4	.005[a]
Religion of Parents or Caregivers	0.730	3	.866
Household Monthly Income	11.438	5	.043[b]
Educational level	13.872	3	.003[c]
Trust for Government or its Public Health Agencies	32.168	2	.000[d]

Note. [a,b,c,d] indicate statistically significant test results ($p<0.05$)

Research Question 2. Is there association between parental religion and vaccination status of children, aged 0-24 months?

$H_0$2: There is no statistically significant association between parental religion and vaccination status of children, aged 0-24 months.

H_A2: There is a statistically significant association between parental religion and vaccination status of children, aged 0-24 months.

To answer this research question, I also conducted a chi-square test of association (two-way table) between parental religion and vaccination status of children as binary variable. First, the vaccination status of children was entered into the rows as dependent variable having two categories of the binary outcome as in the first test. Then, parental religion with its three categories – Christianity, Islam, "other religions" – was entered into the column as independent variable. The result of this test (table 9) showed that there was no statistically significant association between parental religion and the vaccination status of the children, aged 0-24 months ($X^2 = .730$, $df = 3$, $p = .886$). Therefore, the null hypothesis which states that there is no statistically significant association between parental religion and vaccination status of children of children, aged 0-24 months was not rejected. The conclusion is that there is no statistically significant association between parental religion and vaccination of children

Research Question 3. Is there association between parental socioeconomic status and vaccination status of children, aged 0-24 months?

H_03: There is no statistically significant association between parental socioeconomic status and vaccination status of children, aged 0-24 months.

H_A3: There is a statistically significant association between parental socioeconomic status and vaccination status of children, aged 0-24 months.

To answer this research question, I conducted two different chi-square tests of association (two-way tables) between two proxy indicators of socioeconomic status (household income, educational attainment) and the vaccination status of children. In the first step of the analyses, the vaccination status of children was entered into the rows as dependent variable having two categories of the binary outcome – "vaccinated" and "not vaccinated." Then, household monthly income was entered into the column as independent variable with six categories – < $100, $101—$200, $201—$300, $301—$400, $401—$500, and > $500. In the second test, vaccination status of children was also entered into the rows as dependent variable with two binary categories. Then educational attainment was entered into the column as independent variable with five categories – none, Koranic or primary school, secondary school, and postsecondary school. The results of these chi-square tests (table 9) showed that there was a statistically significant association between parental monthly household income and vaccination status of children ($X^2 = 11.438$, $df = 5$, $p = 0.043$). Similarly, there was also a statistically significant association between parental educational attainment and vaccination status of children ($X^2 = 13.872^a$, $df = 3$, $p = .003$). Therefore, the null hypothesis that there is no statistically significant association between parental tribe and vaccination status of children, aged 0-24 months was rejected with the conclusion that there is a statistically significant association between parental socioeconomic status and the vaccination of children.

Research Question 4. Is there association between parental trust of government or its public health agencies and vaccination status of children, aged 0-24 months?

H_04: There is no statistically significant association between parental trust of government or its public health agencies and vaccination status of children, aged 0-24 months.

H_A4: There is a statistically significant association between parental trust of government or its public health agencies and vaccination status of children, aged 0-24 months.

To answer this research question, I conducted a chi-square test of association (two-way table) between parental trust of government or its public health agencies and vaccination status of children. First, the vaccination status of children was entered into the rows as dependent variable having two categories of the binary outcome – "vaccinated" or nor "not vaccinated." Then, "trust" was entered into the column as independent variable with three categories – "I trust," "I do not trust," "I don't know." The result of this test showed that there was a statistically significant association between parental trust in government and vaccination status of children, aged 0-24 months ($X^2 = 32.168$, $df = 2$, $p < .001$). Therefore, the null hypothesis which states that there is no statistically significant association between parental trust of government or its public health agencies and vaccination status of children, aged 0-24 months was rejected. The conclusion is that there is a statistically significant association between trust in government or its public health agencies and vaccination of children. In addition to

89.6% of the population who trusted government, 90.1% of the sample also said that they trusted the information they received about vaccination of children.

Although the results of the chi-square tests answered the research questions regarding association between the independent and dependent variables, binary logistic regression analysis was needed to assess the strength or magnitude of this association, to generate odd ratios and make predictions which are within the scope of this study. Therefore, I proceeded to the second stage of the data analysis. Since the chi-square test is essentially a correlational test of association that does not generate odds ratio, this second analysis (binary logistic regression) was needed to assess the strength or magnitude of any association as well as make predictions. In this stage, therefore, I performed a binary logistic regression analysis with sample size of 384 to further determine if and which of the parental sociopolitical variables of the study would predict the immunization status children. Prior to the analysis I confirmed that the data met the assumptions for the use of binary logistic regression. First, I checked the variables of the study and their operational levels of measurement (Table 3) to confirm that they were categorical. Then I analyzed the data in SPSS for collinearity. From the coefficients output of this analysis (Table 10), the value of the Variance Inflation Factor (VIF) which is used to identify correlation between independent variables and also assess the strength of that correlation ranges from 1.025 (for trust) to maximum of 1.692 for level of education. This low range of VIFs shows that the variables are independent of each other and there is no significant multi-collinearity between the independent variables.

Table 10

Result of Analysis to Test for Collinearity between independent variable

Model	Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		β	Std. Error	β			Tolerance	VIF
1	(Constant)	-0.004	0.047		0.077	0.939		
	Religion	0.014	0.015	0.053	0.963	0.336	0.831	1.203
	Parent tribe	0.016	0.006	0.153	2.857	0.005	0.881	1.136
	Trust of government and public health agencies	0.026	0.023	0.059	1.157	0.248	0.975	1.025
	Level of education	-0.017	0.01	-0.107	1.638	0.102	0.591	1.692
	Household monthly income	-0.007	0.006	-0.074	1.188	0.236	0.659	1.518

I also analyzed the data using a box plot to check the distribution and determine if there are outliers. The box plots (Figure 7) show that the data were within the first and fourth quartiles. Since there were no values outside the whiskers, it was concluded that there were no outliers for the stated variables. From these evaluations, it was established that the data satisfied the assumptions of the binary logistic regression.

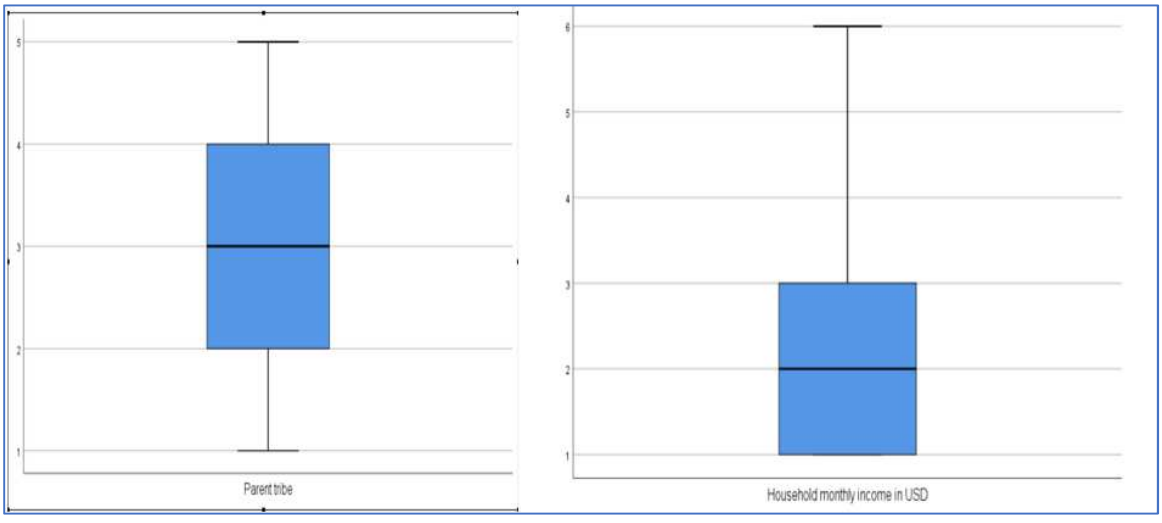

Figure 7: Box plot to check for outliers.

In the binary logistic regression analysis, the binary dependent variable was given two values: "1" if the child was vaccinated and "0" if the child was not vaccinated. The independent variables – tribe, religion, educational attainment, household monthly income, and trust in government or its public health agencies as well as covariates (age and sex) were dummy-coded. In the first step of the analysis, all the independent and dependent variables as well as the covariates were simultaneously included in the logistic regression model in SPSS version 25 to determine the predictive value of each variable.

The results indicated that block 1 model, which contained the independent variables of the study, yielded a statistically significant improvement over the beginning block 0 or constant-only model (X^2 (21) = 506.353, p = .001). Block 1 model is the section of the binary logistic regression analysis that tests the fit of the model as well as the contribution and statistical significance of all the variables entered into the regression model. The Hosmer and Lemeshow Test was not statistically significant, X^2 (8) = .147, p = 1.0, indicating that the model was a good fit for the data. The percentage of variance in the children's immunization status that could be explained by the model was 97.7% (Nagelkerke R^2 = .977). The overall prediction rate was 99.0%, with sensitivity of 99.7% and specificity of 62.5%.

Results of the analysis (table 11) showed that only tribe and trust in government predicted children's vaccination at statistically significant levels. With Gbagyi indigenous tribe as the reference for tribe, the result of logistic regression analysis showed that immunization status of children was predicted at statistically significant levels by only Hausa/Fulani (B = 3.79, df = 1, p = .036) and Igbo tribe (B = 3.933, df = 1, p = .023). The adjusted odds ratio (AOR) for Hausa/Fulani tribe was 44.3 (95% CI: .001, .777). The

AOR for Igbo tribe was 51.058 (95% CI: .001, .581). This shows that these two tribes were more likely to vaccinate their children than the Gbagyi indigenous tribe used as a reference. Similarly, the trust variable was predictive of the immunization status of children at a statistically significant level (B = -4.336, *df* = 1, *p* = .002). Specifically, parents who trusted government or its public health agencies were more likely to immunize their children (AOR = .013, 95% CI: .001, .217, *p* = .002). It was noted from the results of binary logistic regression analysis (Table 11) that religion, household monthly income as well as covariates of parental age and gender did not contribute to the regression model at a statistically significant level.

Table 11

Result of binary logistic regression for independent variables

Variables	β	S.E.	Wald	df	Sig.	Exp(β)	95% C.I. for Exp(β)	
							Lower	Upper
Parent tribe (reference)			6.707	4	0.152			
Parent tribe(1)	3.791	1.805	4.41	1	0.036	44.298	.001	.777
Parent tribe(2)	3.933	1.73	5.17	1	0.023	51.058	.001	.581
Parent tribe(3)	15.921	3532	0	1	0.996	8209837	0	.
Parent tribe(4)	17.083	3779.1	0	1	0.996	2.6E+07	0	.
Religion (reference)			0.763	3	0.858			
Religion(1)	21.512	7929.3	0	1	0.998	2.2E+09	0	.
Religion(2)	20.309	7929.3	0	1	0.998	6.6E+08	0	.
Religion(3)	3.677	25514	0	1	1	39.524	0	.
Level of education (reference)			1.375	3	0.711			
Trust government or public health agencies (reference)			9.173	2	0.01			
Trust government or public health agencies 1	2.872	2.171	1.749	1	0.186	17.668	.001	3.991
Trust government or public health agencies 2	4.336	1.433	9.159	1	0.002	76.406	.001	-217
Level of education (reference)			1.375	3	0.711			
Level of education(1)	3.927	7543.4	0	1	1	50.745	0	.
Level of education(2)	-15.596	2360	0	1	0.995	0	0	.
Level of education(3)	-14.153	2360	0	1	0.995	0	0	.
Household monthly income in USD (reference)			0	5	1			
Household monthly income in USD(1)	-11.018	3815.9	0	1	0.998	0	0	.
Household monthly income in USD(2)	38.127	5404.9	0	1	0.994	3.6E+16	0	.
Household monthly income in USD(3)	3.895	6120.4	0	1	0.999	49.152	0	.
Household monthly income in USD(4)	13.129	7902.6	0	1	0.999	503188	0	.
Household monthly income in USD(5)	13.168	9943.5	0	1	0.999	523570	0	.

Summary and Transition

In this chapter, I presented and described the results of data analysis for the quantitative cross-sectional survey to assess the sociopolitical determinants of parental

acceptance of childhood immunization in Abuja, Nigeria. A total of 384 participants were surveyed and the data analyzed with IBM SPSS version 25. Bivariate correlation analysis was conducted with chi-square test to assess the association between the independent and dependent variables in the first step. Then binary logistic regression software in SPSS was also conducted to determine if the immunization status of children could be predicted by their patents' tribe, religion, socioeconomic status, and trust for government or its public health agencies. Results of data analysis indicate that there was statistically significant relationship between immunization status of children and parental tribe (p = .005), trust (p = .001), household income (p = .043) and educational attainment p = .003). However, the results did not yield any significant association between parental religion and the immunization status of their children (p = .866). However, the immunization status of children was only predicted by parental tribe and trust for government.

In Chapter 5, I present interpretation and discussion of these findings in relation to relevant literature on similar topic. In addition, the implications of this study for positive social change are presented. Some recommendations for future research to improve the outcome of parental decisions on childhood immunization and reduce VPDs are also outlined while the implications for positive social change are described.

Chapter 5: Discussion, Conclusion and Recommendations

Introduction

The purpose of this study was to investigate the sociopolitical determinants of parental acceptance of childhood vaccination in Abuja, the FCT of Nigeria, and to describe the association between sociopolitical variables such as tribe, religion, socioeconomic status (income level and educational attainment), trust for government or its public health agencies, and the vaccination status of children. Nigeria's RI coverage has remained unacceptably low. The 2017 NICS/MICS survey revealed that Nigeria's national immunization coverage was only 36% (Gunnula et al., 2017). Based on Nigeria's total population of 180 million and RI target population of 7.2 million, the stated immunization coverage translates to approximately 4.6 million eligible children who are either partially immunized or not immunized at all. This partly explains the high burden of VPDs, which account for 22% of childhood deaths in Nigeria (Limaye et al., 2019).

Previous studies indicated that parental vaccine hesitancy is one of the causes of the current poor RI coverage in Nigeria (Adeloye et al., 2017). Since parental decisions about vaccination of their children are made within the context of their individual, social, and political circumstances, the aim of this study was to examine the association between immunization status of children and the sociopolitical variables of their parents, and to explore if we could predict the vaccination status of children based on parental tribe, religion, socioeconomic status and trust for government or its public health agencies. The study used a quantitative cross-sectional survey with a sample of 384 participants; the SEM was used as the theoretical framework.

Summary of Key Findings

This study addressed four research questions which considered the association between parental sociopolitical factors (independent variables) such as parental tribe, religion, socioeconomic status, trust in government and the vaccination status of children (dependent variable). In addition to the research questions, the study also considered whether the vaccination of children could be predicted based on the sociopolitical variables of parents.

The descriptive statistics of the sample revealed that the participants were mainly young (51.8% under 30 years, and 43.2% 30-40 years); a majority of them (78.7%) were mothers; and almost all (93.2%) were married. The predominant tribe was Hausa/Fulani and the sample was almost equally divided into two major religions – Christianity (51.3%) and Islam (47.9%). There was a statistically significant association between parental tribe, socioeconomic status, trust in government and the vaccination status of children, but only tribe and trust in government predicted children's vaccination at a statistically significant level. It was also observed that the majority of the children (97.9%) had been vaccinated at some point, while 78.6% were fully vaccinated for age.

Interpretation of Findings

The demographic characteristics found in this study reflected the structure of Nigeria. The predominantly young population was consistent with Nigeria's most recent census (2006), which showed that the majority of the country's population was young, with 70% under 30 years of age (Reed & Mberu, 2014). In addition, the mainly Muslim Hausa/Fulani tribe, which formed the majority in the sample, was also the majority tribe in Northern Nigeria, in which Abuja is situated. However, the migration of other mainly

Christian Southern tribes, such as the Igbos and Yorubas, into the capital city of Abuja has created a near parity in the population of Christians and Moslems. Furthermore, the predominance of mothers in this random sample could reflect the persistence of outdated and discredited African culture where only the man goes out to work for the family while the woman stays home and "be concerned about her family and children" (Ebila, 2015, p. 146). In addition, the 78.6% full immunization observed in this study compares favorably with the 63% found in the same city by Gunnuala et al. (2016).

Parental Tribe or Culture and Children's Vaccination

The first research question asked about the association between parental tribe and vaccination status of children, aged 0-24 months? Majority of the sample (48.4%) affirmed that their tribe or culture was in support of vaccination of children. In addition, results of data analysis using chi-square test showed that there was a statistically significant association between parental tribe and vaccination status of children (X^2 = 14.935, df = 4, p = .005). Furthermore, tribe was predictive of children's vaccination at a statistically significant level for Hausa/Fulani (B = 3.79, df = 1, p = .036) and Igbo tribe (B = 3.933, df = 1, p = .023). Therefore, the null hypothesis which states that there is no statistically significant association between parental tribe and vaccination status of children was rejected. This finding is consistent with the result of the study by Chidiebere, Uchenna, and Kenechi (2014) where the disparities in vaccination coverages among different states in Nigeria were found to be related to the cultural differences among various tribes. This has been corroborated in study by Sabuni (2007) where the author observed that the attitude of African people (especially those in rural areas) to health is driven mainly by cultural and traditional belief systems rather than scientific

biomedical concepts. The finding in this study of a statistically significant association between parental tribe and vaccination status of children is also in conformity with the notion that the health seeking behavior (including demand for vaccination services) of people in Africa is influenced by the customs, cultural norms, and belief systems of their tribes (Gunnula et al., 2016), while their perception about health, and the expression of illness is socially determined (Kahissay, Fenta, & Boon, 2017).

However, a detailed look at the regression model reveals that some categories of tribe contributed significantly to the regression model. For example, immunization status of children was predicted at statistically significant levels by Hausa/Fulani tribe (B = 3.79, df = 1, p = .036) and Igbo tribe (B = 3.933, df = 1, p = .023). For the Hausa/Fulani tribe, the odds ratio (Exp(B) = 44.3 (95% CI: .001, .777) showing that they were more likely to immunize their children than the reference Gbagy indigenous tribe. Similarly, the OR for Igbos was 51.058 (95% CI: .001, .581) showing that Igbos were more likely to immunize their children than Gbagy tribe.

Parental Religion and Children's Vaccination

The second research question was about the association between parental religion and vaccination status of children. The results of this study showed that the relationship between religion and the immunization status of children was not statistically significant (X^2 = .730, df = 3, p = 0.866), and that religion did not predict children's immunization at a statistically significant level. Therefore, the null hypothesis which states that there is no statistically significant relationship between parental religion and immunization status of children was not rejected. This finding is contrary to the outcome of similar study in India where Shrivastwa et al., (2015) found religion to be highly predictive of immunization of

children. The non-significant relationship between religion and immunization found in this study also contradicts the findings of both Ha et al., (2012) and Mukungwa (2015) who established strong association between religion and immunization of children in Zimbabwe. Furthermore, the results of this study also contradict Limaye et al., (2019) who found religion as an important driver for uptake of immunization services in Nigeria because of the trusted role of religious leaders within the communities.

Although religion can be an important factor in the acceptance of immunization services, this influence can be moderated or even neutralized by other factors such as health literacy and formal education. Therefore, the non-significant relationship between parental religion and immunization of children found in this study should be interpreted with caution as it may be related to the "elitist" standard of the study population of Abuja Municipal Area Council, 76.3% of whom had attained secondary and postsecondary levels of education (see table 4). This is particularly important in the context of the results of previous studies where researchers found a correlation between educational attainment and childhood immunization (Atugba, Ojo & Ichoku, 2016; Oleribe et al., 2017; Kagone et al., 2017). Several scholars agree that education improves general health literacy including the importance of vaccination in disease prevention and that parental education is positively associated with childhood vaccination (Glatman-Freedman, & Nichols, 2012; Kusuma, Kumari, Pandav, & Gupta, 2010; Feiring et al., 2015).

Parental Socioeconomic Status and Vaccination of Children

The third research question enquired about the association between parental socioeconomic status and the vaccination of their children, aged 0-24 months. In this study, household monthly income and educational attainment were used as proxies for

socioeconomic status. Result of data analysis revealed that there was a statistically significant association between both household monthly income and educational attainment and immunization status of children. This outcome is consistent with the findings of Oleribe et al. (2017) who used secondary data from the 2013 Nigerian Demographic Health Survey to demonstrate that parental educational attainment and wealth index were significantly associated with uptake of vaccination services. Similarly, Ilusanya, & Oladosun, (2016) also found from their study that children of parents with high socioeconomic status had a greater uptake of vaccination services. Furthermore, another study conducted in West Region of Cameroon also showed that children of parents who were from poorest households and with low educational attainment had a lower utilization of vaccination services (Russo et al., 2015). Similar results of positive association between socioeconomic status and vaccination of children have been found by other researchers in India (Kusuma, Kumari, Pandav, & Gupta, 2010), Pakistan (Andersen et al., 2009), and Norway (Feiring et al., 2015). It has been postulated that higher education enhances general health literacy, explains the importance of vaccination in disease prevention, and therefore improves acceptance of childhood vaccination (Glatman-Freedman, & Nichols, 2012).

Parental Trust in Government and Vaccination of Children

The fourth research question asked about the nature of the association between peoples' trust in government and the vaccination status of their children. In addition to the majority (89.6%) of the sample who affirmed that they trust government, results of this study showed that there was a statistically significant association between people's trust in government or its public health agencies and the immunization of children, and

that trust was predictive of children's vaccination. Therefore, the null hypothesis which asserts that there is no statistically significant association between trust and vaccination of children was rejected, with the conclusion that trust is associated with children's vaccination at a statistically significant level. The finding of a statistically significant association between trust and vaccination in this study is consistent with the results in a study by Ozawa et al. (2017) who demonstrated that trust and social norms were significant variables that influence the uptake of vaccines. The impact of trust variable in parental vaccine acceptance can be viewed from different perspectives. First, there is distrust arising from perceived Western exploitative and imperialist antecedents (Chen, 2004), as well as a false conspiracy theory which spins an illusory collusion by Western powers to lade vaccines with antifertility chemicals for the purpose of reducing the population of Muslims (Anyene, 2014). Furthermore, since government regulates and mandates vaccines for various infectious diseases, some people who feel that government's vaccine mandates have infringed upon their freedom of choice or personal liberties resist such perceived interference with their fundamental human rights and view government with suspicion and distrust. In addition, the profit-driven operations of pharmaceutical companies that manufacture vaccines provoke public concern about their real motives – whether it is primordial commercial enterprises or humanitarian services. In the specific context of Nigeria, Pfizer's fraudulent, unethical, and disastrous drug trial that resulted in the death of 11 innocent children in Kano in 2003 under the watch of government and its regulatory agencies was an incident that cast a long shadow on government's capacity to protect their citizens from being used as guinea pig for unscrupulous biomedical research. These issues could result in public distrust that may be

extended to vaccines or the systems and agencies that produce or deliver these services, with negative implications on parental vaccination decisions.

In addition to the finding of a significant association between trust variable and childhood vaccination, this study also demonstrated that trust was highly predictive of immunization of children. In particular, parents who trust government had higher odds of accepting to have their children immunized (AOR = 76.406, 95% CI: .001, .217, p = .002) than those who did not trust government. These findings are supported by previous scholars who also offered other explanations. In India, Gopichandran (2017) found that distrust of government due to political considerations was a major influence on parental decision-making about childhood vaccinations. Similarly, Justwan et al. (2019) also found that those who distrust government and medical experts were less likely to accept vaccination. It is important to state that the reasons for peoples' distrust in their government differ across different countries. Although these reasons are beyond the scope of this study, some drivers of distrust in Nigeria's specific context have been outlined above. However, some other researchers in the U.S. locate the reasons for distrust on the conservative republican ideology that engenders distrust in government and skepticism and lack of confidence in scientists which is often expressed as vaccine hesitancy (Baumgaertner, 2018; Hamilton, Hartter, & Saito, 2015).

Theoretical Applications of Findings

The theoretical framework on which this study is anchored is the SEM which defines how certain factors within the individuals and the environment where they live can interact and influence their behaviors and decisions (Kilanowski, 2017). It postulates that such reciprocal interactions occur at multiple hierarchical levels of influence –

individual, interpersonal, community, organizational and policy levels (Moore, Buchanan, Fairley, & Smith, 2015).

The finding of a statistically significant association between tribe and children's vaccination is supported by the social ecological framework. It is known that Africans generally adopt a communal lifestyle by which individuals who belong to particular tribe usually adopt culturally-prescribed patterns of behavior. Therefore, the influence of tribe and culture on parental vaccination decisions occurs at interpersonal and community levels. At interpersonal level, pressures from friends, family, traditional chiefs, and religious leaders impact greatly on parental decisions to accept or reject vaccination for their children (Kumar et al., 2012). At community level, social forces and structures (e.g., age grades, traditional cults, societies, town unions, priests, and local leaders) within the tribal, cultural, and religious environments are formidable pressure groups that have tremendous influence on parental decision about vaccination of their children. This view is consistent with the results of a recent study conducted in Ethiopia where it was found that both individual and community level factors were significant predictors of childhood immunization (Geremew, Gezie, & Abejie, 2019).

In the specific instance of vaccination services, decisions are commonly taken at community level, and compliance is enforced on residents with threats of severe consequences on potential deviants. It is therefore common to find "block" rejection or acceptance of immunization and other public health services simply because the community has met and decided that everybody would either accept or reject the services.

The SEM also supports the significant association found between socioeconomic status and vaccination of children. Educational attainment and monthly income which

were used to assess socioeconomic status in this study are personal achievements that motivate parents at individual level of SEM to accept or reject vaccination of their children. This is particularly important considering that in this study majority of participants were poor—41.7% had a monthly income of $100 or less while 12.8% admitted that lack of funds had prevented them from vaccinating their children.

The finding of a statistically significant association between trust variable and the vaccination status of children is also supported by the social ecological model. The feudal, traditional, and Islamic systems of administration that dominate Northern Nigeria (including Abuja) constitute powerful organizations in which the Emirs, Imams, and priests make policies and take important decisions for their subjects. The implication is that if these traditional and religious leaders trust government and accept their programs, the community members will be mobilized at organizational and policy levels of the social ecological framework to also accept these programs. This offers program officers in Nigeria great opportunity to partner with these leaders as community entry points for the success of their programs.

Limitations of the Study

The data for this study was based on parental self-reported responses to the questionnaire. Therefore, recall bias and social desirability responses from parents and caregivers may have arisen with capacity to distort the research outcome. However, the responses on children's immunization in particular was adjudged to be authentic because immunization status was validated with immunization cards and the immunization scars on the children. In addition, the PACV survey tool used for data collection is a validated instrument that makes the outcome of the study trustworthy and reliable. Furthermore, the

outcome of this study is only generalizable to the population of Abuja Municipal Area Council from which the sample was drawn. Any projection to the wider Nigerian society needs a different study with wider sample frame. In addition, the design of this study as a quantitative cross-sectional survey is a limitation that makes the conclusions valid only at the point of data collection, since it cannot establish a sequential relationship between the independent and dependent variables. The study outcome cannot account for parents and care givers who change their mind after the initial acceptance or rejection of vaccination as expressed at the time of data collection. A further limitation of this study as a cross-sectional survey is that it cannot establish a causal relationship between the dependent and independent variables.

Recommendations for Further Study

Findings from this study suggest that there is no association between religion and children's vaccination, and that parental gender, age and religion did not significantly predict vaccination status of children. These results are at variance with the findings of some other previous studies on the role of religion gender in children's vaccination. This is an area that requires further research. It is recommended that qualitative studies should be conducted for a more comprehensive understanding of the complex sociopolitical dynamics in Abuja and to gain insight into the personal experiences of parents in the RI program. In particular, focus group discussions and key informant interviews will be useful to recognize and appreciate the personal perspectives and lived experiences that drive vaccine hesitancy among individuals, groups and other stakeholders within the Abuja Federal Capital Territory. Such qualitative studies could unearth the specific local contextual issues within the culture and religion of different tribes that militate against

childhood vaccination. This understanding may inform the development of appropriate programs to improve decision outcome of parents and increase immunization coverage.

Furthermore, this study used a quantitative cross-sectional survey that assessed parental decisions as a snap-shot. There is need to conduct a cohort study to follow up those who rejected vaccination of their children to know how their initial decisions have evolved over time. Furthermore, considering the finding in this study that those who distrust government and its public health agencies had lower odds of immunizing their children, it is recommended that a qualitative study should be conducted to describe the specific issues that drive peoples' distrust for their government.

Implications for Positive Social Change

The principle of positive social change entails the application of our knowledge, skills, education, or research to develop or improve human and social situations to ensure a beneficial outcome for individuals and communities**.** Accordingly, this research and its outcome have tremendous implications for a positive social change especially against the background of prevailing low RI coverage which is largely responsible for the high burden of VPDs as well as the mortality and morbidity of infants and children under 5 years of age in Nigeria. First, there should be a coherent policy or legislation against vaccine hesitancy to improve population immunity against VPDs since a total of 22.9% of the survey population had previously either delayed or totally refused to immunize their children. The finding of positive association between immunization status of children and parental tribe and trust for government or its public health agencies provides evidence for policy makers to develop relevant guidelines and programs that are specifically relevant to the tribes and cultures in Abuja Municipal Area Council to

enhance parental decision outcomes for improved RI coverage. Such policies could use health literacy and enlightenment programs, behavior change communication, and social mobilization strategies. In particular, social and commercial marketing principles could be used to brand RI in an attractive and compelling manner to make it more appealing for acceptance by parents so that vaccine hesitancy can be reduced or eliminated.

The finding of this study that 12.8% of the survey population admitted that lack of funds was the reason for not immunizing their children is very instructive for policy makers who should ensure that RI is offered free of charge, and that logistics and infrastructural provisions are made to alleviate the challenges that prevent access to RI services. In addition, government and other organizations can develop a policy of offering incentives (either financial or material) to motivate parents to immunize their eligible children for a positive social change. Furthermore, the finding the 6.5% of the survey population were unable to discuss concerns about children's vaccination with their doctor or healthcare provider calls for a policy of mandatory training of all health workers on health information, education and communication skills to improve the efficiency of their interphase with clients. At individual and family levels, the implementation of the foregoing policies will enhance individual and herd immunity, lower disease burden, improve child survival and save costs on medical treatment. In addition, the reduction in mortality and morbidity of infants and children ensures that children live till adult life to realize their full potentials and support their families and communities to grow socially and economically for a positive social change.

Conclusion

This study explored the sociopolitical determinants of parental acceptance of childhood vaccination in Abuja, Nigeria. Vaccine hesitancy is a decision-making process and behavior choice which parents and caregivers make in the context of their culture, religion, and socioeconomic circumstances as well as their perceptions of risk to infections, vaccine safety, and exercise of individual rights to personal decisions. Vaccine hesitancy predisposes children to VPDs. Causes of vaccine hesitancy need to be addressed through research and appropriate programs tailored towards identified issues that drive parental decision-making. The social-ecological framework provided a good theoretical framework for this study because it enabled me to explore the factors that influence the decision making process of parents at individual, interpersonal, community, organizational and policy levels.

The study indicated that there is a statistically significant association between immunization status of children and parental tribe, trust for government, and socioeconomic status as assessed by household income and educational attainment. This study revealed that tribe and trust for government predicted childhood vaccination at a statistically significant level. Although household income and educational attainment showed a statistically significant association with children's immunization status during bivariate (chi-square) analysis, these indices of socioeconomic status along with religion did not make significant contributions to the logistic regression model. However, it has been shown from the SEM that factors at individual, interpersonal, community, organizational and policy levels are capable of influencing parental decisions about acceptance of vaccination services and significantly affect immunization coverage.

Accordingly, it will be of immense benefit if policy makers, program managers, and immunization service providers can consider factors at the various levels of the social economic model as well as parental socioeconomic variables in planning, policy formulation, and implementation of immunization services. This is in tandem with WHO's tailoring of immunization programs (TIP) which advocates for the segmentation of the society according to the needs of its individual constituents, and the development of appropriate interventions tailored for each segment. I believe that this strategy will ensure favorable parental decision outcomes, reduce vaccine hesitancy, improve immunization coverage and reduce the burden of VPDs and mortality or morbidity of children and infants under 5 years of age.

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Appendix A: FCT Abuja Health Research Ethics Committee Approval

FEDERAL CAPITAL TERRITORY

Health Research Ethics Committee

Research Unit, Room 10 Block A Annex, HHSS, FCTA Secretariat,
No. 1 Kapital Street 11, Garki, Abuja-Abuja.

Notice of Expedited Approval of Research
Approval Number: FHREC/2019/01/44/02-05-19

Full Study Title: **Socio - Political Determinants of Parental Acceptance of Childhood Vaccination in Abuja, Nigeria.**

Principal Investigator: **Dr. Lawrence M. Ohammah**

Address of Principal Investigator: WHO FCT Office, 3rd Floor, Rivers House Building -2, 83 Ralph Shodeinde Street, Central Business District, Abuja.

Date of receipt of valid application: 02/04/2019

The Federal Capital Territory (FCT, Nigeria) Health Research Ethics Committee (FCT HREC) has given expedited approval to the research described in the above stated protocol. The FCT HREC has determined that this research qualifies for expedited review pursuant to the National Code of Health Research Ethics; Section E (f – 1i);

- Study does not involve more than minimal risk.

This approval is valid from **02/05/2019** to **01/05/2020**.

Note that no activity related to this research may be conducted outside of these dates. Only the FCT HREC approved informed consent forms may be used when written informed consent is required. They must carry FCT HREC assigned protocol approval number and duration of approval of the study. The FCT HREC reserves the right to conduct compliance visit to your research site without prior notification.

The National Code of Health Research Ethics requires the investigator to comply with all institutional guidelines, rules and regulations regarding the conduct of health research, and with the tenets of the code.

Modifications: Subsequent changes are not permitted in this research without prior approval by the FCT HREC.

Problems: All adverse events or unexpected side effects arising from this project must be reported promptly to FCT HREC.

Renewal: This approval is valid until the expiration date. If this project is to proceed beyond the expiration date, an annual report should be submitted to FCT HREC early in order to request for a renewal of this approval.

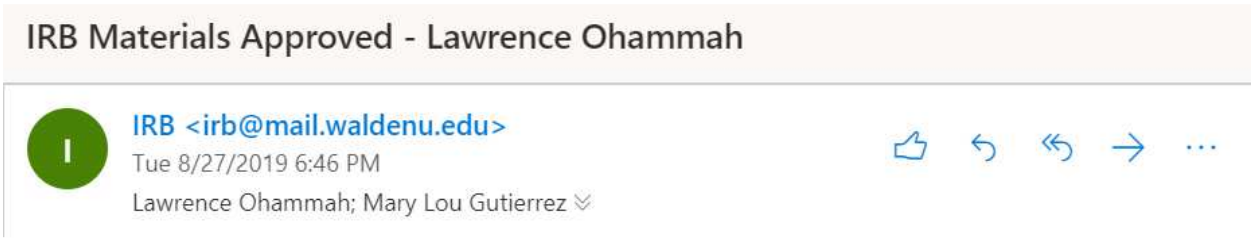
Closure of Study: At the end of the project, a copy of the final report of the research should be forwarded to FCT HREC for record purposes, and to enable us close the project.

For queries and further information contact FCT HREC office. I wish you best of luck with your research.

Desmond Emereonyeokwe
Secretary, FCT HREC
May 02, 2019.

ABUJA
The Heart of Nigeria

Appendix B: Walden IRB Approval



Dear Mr. Ohammah,

This email is to notify you that the Institutional Review Board (IRB) confirms that your study entitled, "Socio-Political Determinants of Parental Acceptance of Childhood Vaccination in Abuja, Nigeria," meets Walden University's ethical standards. Our records indicate that the site's IRB agreed to serve as the IRB of record for this data collection. Since this study will serve as a Walden doctoral capstone, the Walden IRB will oversee your capstone data analysis and results reporting. The IRB approval number for this study is 08-27-19-0567534.

This confirmation is contingent upon your adherence to the exact procedures described in the final version of the documents that have been submitted to IRB@mail.waldenu.edu as of this date. This includes maintaining your current status with the university and the oversight relationship is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, this is suspended.

If you need to make any changes to your research staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 1 week of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB materials, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained at the Documents & FAQs section of the Walden web site: http://academicguides.waldenu.edu/researchcenter/orec

Researchers are expected to keep detailed records of their research activities (i.e., participant log sheets, completed consent forms, etc.) for the same period of time they retain the original data. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

http://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUx43pZegKlmdiQ_3d_3d

Sincerely,
Libby Munson
Research Ethics Support Specialist
Office of Research Ethics and Compliance
Walden University
100 Washington Avenue South, Suite 900
Minneapolis, MN 55401
Email: irb@mail.waldenu.edu
Phone: (612) 312-1283
Fax: (626) 605-0472

Information about the Walden University Institutional Review Board, including instructions for application, may be found at this link: http://academicguides.waldenu.edu/researchcenter/orec

Appendix C: Informed Consent Form

INFORMED CONSENT FORM

Dear Sir/Madam,

You are invited to take part in a research study about childhood vaccination. The researcher is inviting parents who have children aged 0-24 months to participate in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Lawrence Ohammah who is a doctoral student of Public Health (Epidemiology track) at Walden University.

Background Information:
The purpose of this study is to investigate the factors that influence parental acceptance or rejection of routine immunization services for their children in Abuja.

Procedures:
If you agree to participate in this study, you will be asked to complete/respond to questions in a questionnaire which may take about 20 minutes of your time. The questionnaire will be completed only once. Here are examples of some questions you will be invited to answer in the questionnaire:

1. Has your child received any immunization since birth?
2. Have you ever refused to vaccinate your child for any reason?
3. Does the culture or custom of your tribe support immunization of children?

Voluntary Nature of the Study:
Participation in this study is voluntary. You are free to accept or turn down the invitation. No one at FCT Abuja Health and Human Services will treat you differently if you decide not to be in the study. If you decide to be in the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this study would not pose risk to your safety or wellbeing. The outcome of the study will help us to understand the factors that influence parental decisions to accept or reject vaccination of their children. This will be of immense benefit in developing strategies to prevent childhood infections that cause death and disability among our children, thus making them live longer and productive lives.

Privacy:
To protect your privacy, this questionnaire does not require your name or signature. Reports coming out of this study will not disclose the identities of individual participants The researcher will not use your personal information such as tribe, religion or location for any purpose outside of this research project. Data will be kept secure by storing hard copies in locked drawers and soft copies in passworded computer. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via phone (+234(0)8033102265) or e-mail (larryohammah@yahoo.com). This research has been approved by the Health Research Ethics Committee of the Federal Capital Territory Administration, Abuja, with approval number FHREC/2019/01/44/02-05-19. If you want to talk privately about your rights as a participant, you can contact the Research Participant Advocate, Desmond Emeronyeokwe, at FCT Abuja Health Research Ethics Committee or call +2348036011384.

If you understand the study well enough and agree to participate in it, please indicate your consent by completing or responding to the survey questionnaire. To protect your privacy, no consent signature is requested.

Please keep a copy of this consent form for your record.

Appendix D: Letter of Cooperation from Primary Health Care Board, Abuja

FEDERAL CAPITAL TERRITORY ADMINISTRATION
FCT PRIMARY HEALTH CARE BOARD
No. 9 Orlu Street, Block D, 2nd Floor, Area 3, Garki Abuja.

Our Ref: **FCT/PHCB/PHC/372**
Your Ref:

Date:
11 July, 2019

Letter of Cooperation

Lawrence Ohammah
3rd Floor, Rivers House Building
83 Ralph Shodeinde Street
Central Business District
Abuja
Nigeria

Dear Lawrence Ohammah,

Based on my review of your research proposal and the ethical approval granted by the Health Research Ethics Committee of FCT, Abuja, I give permission for you to conduct the study entitled *Socio-political Determinants of Parental Acceptance of Childhood Vaccination in Abuja,* within the Federal Capital Territory. As part of this study, I authorize you to inform potential participants about the study, disseminate surveys, and collect data from participants. Individuals' participation will be voluntary and at their own discretion.

2. We understand that our organization's responsibilities include: informing residents of the selected communities about the study, providing enabling environment and facilitating access to the population for you to conduct the study and address any concerns of participants in private. We reserve the right to withdraw from the study at any time if our circumstances change.
I confirm that I am authorized to approve research in this setting.

3. I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,

FCT Primary Health Care Dev Board
Office of the Executive Secretary
11 JUL 2019
Sign.....
Area 3, Garki - Abuja

DR. IWOT Ndaeyo.
Executive Secretary
e-mail: ndaeyo_iwot@yahoo.com
Phone: +2348023565730

ABUJA
THE HEART OF NIGERIA

All correspondence to Executive Secretary (FCTPHCB)
08023565730, 08033146164

Appendix E: Survey Questionnaire – English

Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

Survey Questionnaire

Socio-Political Determinants of Parental Acceptance of Childhood Vaccination in Abuja, Nigeria

Instructions: Circle the number that best represents your answer

Example: Is the child male or female? (2) =child is female

Section A: Parental Demographic Information		
1. What is the group that best represents your age today?		
	1	I am 30 years or younger
	2	I am 31 to 40 years old
	3	I am 41 to 50 years old
	4	I am 51to 60 years old
	5	I am 61 years or older
2. Are you a man or a woman?		
	1	I am a Man
	2	I am a Woman
3. Are you currently married or what is your marital status?		
	1	Married
	2	Separated/Divorced
	3	Widowed
	4	Single Parent
4. What is your relationship to the child?		
	1	Mother
	2	Father
	3	Caregiver
5. What is your Tribe?		
	1	Gbagyi
	2	Hausa/Fulani
	3	Igbo
	4	Yoruba
	5	If another please write down which one?
6. What is your Religion?		
	1	Christianity
	2	Islam
	3	Traditional Religion
	4	If another please write down which one?
7. What is the highest level of education that you completed?		
	1	None
	2	Koranic/Primary school
	3	Secondary school
	4	Post-secondary

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Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

8. What is your Occupation?		
	1	Artisan
	2	Trader
	3	Businessman
	4	Civil Servant
	5	Professional
9. What is the combined monthly Income in your household?		
	1	Less than $100 (less than N36,000)
	2	$101 – $200 (N36360-N72,000)
	3	$201 -- $300 (N72,360-N108,000)
	4	$301 -- $400 (N108,360-N144,000)
	5	$401 -- $500 (N144,360-N180,000)
	6	More than $500 (More than N180,000)
10. Where do you get your information about health or childhood vaccination?		
	1	Health Workers (Doctors/Nurses)
	2	Traditional leaders
	3	Religious leaders
	4	Town announcer
	5	Media (radio/TV)/Internet
Section B: Information about Child and their Immunization Status		
11. Is the child male or female?		
	1	Child is male
	2	Child is female
12. What is the age of the child?		
	1	Child is between 0--6 months
	2	Child is between 7--12 months
	3	Child is between 13--18 months
	4	Child is between 19-24 months
13. Has this child received any routine immunization since birth?		
	1	NO, the child has never received any immunization
	2	YES, the child was immunized
14. What is this child's current immunization status (check status appropriate for age)?		
	1	Never immunized
	2	Partially immunized
	3	Fully immunized
15. What is your evidence for the response in question 14 above?		
	1	I remember what immunizations the child was given
	2	I have the Immunization Card
	3	The child has the immunization scar
	4	I remember and I have the Immunization Card
	5	I remember and the child has immunization scar
	6	I remember, I have immunization card, & child has immunization scar

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Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

Section C: Parent Attitudes about Childhood Vaccines		
The next questions are about your attitudes about child vaccination		
16. Have you ever delayed having your child vaccinated for reasons other than illness or allergy?		
	1	Yes [0] I don't know
	2	No
17. Have you ever decided not to have your child vaccinated for reasons other than illness or allergy?		
	1	Yes [0] I don't know
	2	No
18. On a scale of 1-3, how sure are you that following the recommended immunization schedule is a good idea for your child?		
	1	Not Sure [0] I don't know
	2	Sure
The next questions are about sociopolitical influences on parental vaccine decisions		
19. Does your religion support your immunization of children?		
	1	Yes [0] I don't know
	2	No
	3	Neither supports nor opposes
20. Does the culture of your tribe support your immunization of children?		
	1	Yes [0] I don't know
	2	No
	3	Neither supports nor opposes
21. Has lack of funds ever prevented you from immunization of your children?		
	1	Yes [0] I don't know
	2	No
22. Is the message you hear/receive from anti-vaccination groups or propaganda influence you to reject vaccination of your children?		
	1	Yes [0] I don't know
	2	No
The next questions are about your trust in vaccinations		
23. Do you trust the information you receive about vaccination of your children?		
	1	Yes [0] I don't know
	2	No
24. All things considered, how much do you trust government and the public health agencies that manufacture vaccines, purchase vaccines or promote childhood vaccination?		
	1	Trust [0] I don't know
	2	Do not trust

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Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

25. Are you able to openly discuss your concerns about vaccination of your child with your doctor or healthcare provider?		
	1	Yes [0] I don't know
	2	No
	3	I have no concerns
The next questions are about parent's beliefs about vaccine safety and efficacy		
26. Children get more vaccinations than are good for them		
	1	Agree [0] I don't know
	2	Disagree
27. I believe that many of the illnesses that vaccinations prevent are severe		
	1	Agree [0] I don't know
	2	Disagree
28. It is better for my child to develop immunity by getting sick than to get a vaccination		
	1	Agree [0] I don't know
	2	Disagree
29. It is better for children to get fewer vaccines at the same time		
	1	Agree [0] I don't know
	2	Disagree
30. How concerned are you that your child might have a serious side effect from vaccination?		
	1	Not concerned [0] I don't know
	2	Concerned
31. How concerned are you that any one of the childhood vaccinations might not be safe?		
	1	Not concerned [0] I don't know
	2	Concerned
32. How concerned are you that a vaccination might not prevent the disease?		
	1	Not concerned [0] I don't know
	2	Concerned

End of the Questionnaire on Child Immunizations

Thank you very much for taking the time to provide very important information

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Appendix F: Survey Questionnaire – Hausa Translation

Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

Survey Questionnaire

Socio-Political Determinants of Parental Acceptance of Childhood Vaccination in Abuja, Nigeria

Instructions: Circle the number that best represents your answer

Example: Is the child male or female? (2) =child is female

Sashen A: Bayanai akan alkalumar Iyaye		
1. Wani rukunine yayi daidai da misalign shekarunka / ki a yau?		
	1	Ina shekara 30 ko kasa da haka
	2	Shekara 31 zuwa 40
	3	Shekara 41 zuwa 50
	4	Shekara 51 zuwa 60
	5	Shekara 61 ko fiye da haka
2. Kai / Ke namijine ko tamace?		
	1	Ni namijine
	2	Ni mace ce
3. Da aura ko menene matsayin?		
	1	Da aura
	2	An kasha auren / an rabu
	3	Bazaawara
	4	
4. Menene dangantakarka /ki da yaron / yarinya?		
	1	Mahai fiya / uwa
	2	Mahaifi / uba
	3	Mai reno
5. Menene yaren ka / ki?		
	1	Gbagyi
	2	Hausa/Fulani
	3	Igbo
	4	Yoruba
	5	Idan wanine, arubuta don Allah?_____
6. Menene addinin ka / ki?		
	1	Krista
	2	Musulmi / ma
	3	Addinin gargajiya
	4	Idan wanine, arubuta wannenc?_____
7. Wani matakin karatu ka/kin gaina?		
	1	Babu
	2	Islamiya / Firamari
	3	Sakandari
	4	Gaba da sakandari

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Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

8. Menene Sana'arka / ki?		
	1	Mai zane ko kira
	2	Dan kasuwa
	3	Dan / yar kasuwa / ciniki
	4	Ma' aikacin gwamnati
	5	Gwani / Kwararre
9. Menene ribra ka / ki in an hada a wata agidanka / ki?		
	1	Kasa da Dala 100 (kasa da ₦36,000)
	2	Dala 101 zuwa Dala 200 (₦36360 zuwa ₦72,000)
	3	Dala 202 zuwa dala 300 (₦72,360 zuwa ₦108,00)
	4	Dala 301 zuwa dala 400 (₦108,360 zuwa ₦144,000)
	5	Dala 401 zuwa dala 500 (₦144,360 zuwa ₦180,000)
	6	Fiye da Dala 500 (fiye da ₦180,000)
10. A ina kake / kike samun labara akan kiwon lafiya ko riga kafin yara?		
	1	Ma'aikatan lafya (likitoci / masu kula da marasa lafiya)
	2	Sarakunan gargajiya
	3	Malaman Addini
	4	Mai Sanarwa a gari
	5	Kafafun yada labarai
Sashen B: Bayani akan yaro da matsayin rigakafin yara		
11. Yaron mace ce ko namiji?		
	1	Na miji
	2	Ta mace
12. Menene shekarin / watannin yaron?		
	1	Yaron daga wata 0 – 6
	2	Yaron daga wata 7 – 12
	3	Yaron daga wata 13 – 18
	4	Yaron daga wata 19 – 24
13. Wannan yaro / yarinya ya / ta taba karbar cikakkiyar allyrar rigakafin yara?		
	1	A'a bai / bata taba karba ba
	2	E yaron / yarinyar tayi
14. Menene matsayin yanayin allurer rigakafin (check status appropriate for age)?		
	1	Ba'a taba yiba
	2	Anyi kadan
	3	Anyi dukka
15. Mece ce shedar amsar lamba 14?		
	1	Na tuna rigakafin yaron / yarinya
	2	Ina da katin rigakafin
	3	Yaron nada tambarin allurer rigakafin
	4	Ns tuna kuma inada katin
	5	Na tuna yaron nada tambarin allurer
	6	Na tuna yaron nada tembarin allurar kuma yanada katin rigakafin

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Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

Sashen C: Halayyar iyaye garine da rigakafin yara		
Tambaya ta gaba akan halayyar ka / ki ne akan rigakafin yara.		
16. Ka / Kin taba jinkirta rigakafin yaro idan ba rashin lafiyaba ko alergi?		
	1	E [0] Ban saniba
	2	A'a
17. Ka / Kin taba yanke shawarar rigakin yaro / yarinya in banda ciwo ko rashinlafya?		
	1	E [0] Ban saniba
	2	A'a
18. A bias sikeli / ma'auni 1 – 3, Ka / ki nada tabbacin cewa yin rigakafin yaro daki – daki nada kyau ga yawn?		
	1	Ban tabbatarba [0] Ban saniba
	2	Na tabbata
The next questions are about sociopolitical influences on parental vaccine decisions		
19. Addinin ka / ki ya bada goyon bayan rigakafin yara?		
	1	E [0] Ban saniba
	2	A'a
	3	Bai bayarba kuma bai hanabar
20. Shin al'adun yaren ka / ki ya badagoyon bayan rigakafin yara?		
	1	E [0] Ban saniba
	2	A'a
	3	Bai bayarba kuma bai hanabar
21. Shin rashin kudi / tallafi ya hana ka / ki yima yara rigakafin?		
	1	E [0] Ban saniba
	2	A'a
22. Shi ko sakonnin da kaji a wajen sashin da basayin rigakafin ya hana ka / ki yima yara rigakafin?		
	1	E [0] Ban saniba
	2	A'a
Tambaya nag aba akan yardarm ka / ki akan allurer rigakafinne.		
23. Ka / kin yarda da bayanen da ka / kika ji akan allurer rigakafinyaran ka / ki?		
	1	E [0] Ban saniba
	2	A'a
24. A bias la'akari da abubuwa da dama, yaya yardarm ka / ki da gwamnati da hukumomin kula da lafiya da suke yin magungunan ke sayan magungunan ko yada rigakafin yara?		
	1	Na yarda [0] Ban saniba
	2	Ban yarda ba

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Principal Investigator: Lawrence Ohammah, MBBS, MPH Date: [___][___]-[___][___]-[___][___]
Study ID: Ward [__-___]- Settlement [___-___]-HH No. [_____]-Form No. [____]-[____]-[____]

25. Shin kana / kina iya bayani kai tsaye da likitoci ko masu kula da lafiya akan rigakafin yaro?		
	1	E [0] Ban saniba
	2	A'a
	3	Ban damuba
Tambaya tagaba akan amincewar iyaye game da tsaro da ingancin rigakafin.		
26. Yara suns samun rigakafin fiye da kima?		
	1	Na yarda [0] Ban saniba
	2	Ban yardaba
27. Na amince cewa rigakafi na kare mafi yawancin cututtukan yara		
	1	Na yarda [0] Ban saniba
	2	Ban yardaba
28. Gara yarona ya yi ciwo akan yin rigakafin		
	1	Na yarda [0] Ban saniba
	2	Ban yardaba
29. Gara allurer rigakafin kar yayi yawa		
	1	Na yarda [0] Ban saniba
	2	Ban yardaba
30. Yaya damuwarka game da cewa yaron ka / ki zai iya samun wasu damumma / illa daga yin rigakafin?		
	1	Ban Damuba [0] Ban saniba
	2	Na damu
31. Yaya damuwar ka / ki na cewa rigakafin yaro bashi da tsaro?		
	1	Ban damuba / ba damuwa [0] Ban saniba
	2	Da damuwa / na damu
32. Yaya damuwar ka / ki cewa yin rigakafin ba lallai ya hana kamuwa da ciwo ba?		
	1	Ban damuwar / ba damuwa [0] Ban saniba
	2	Na damu / da damuwa

End of the Questionnaire on Child Immunizations

Thank you very much for taking the time to provide very important information

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