

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY-

KUMASI

COLLEGE OF HEALTH SCIENCES

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF POPULATION, FAMILY AND REPRODUCTIVE

HEALTH



**FACTORS INFLUENCING IMMUNIZATION COVERAGE AMONG
CHILDREN UNDER FIVE IN THE JIRAPA DISTRICT OF THE UPPER
WEST REGION GHANA**

BY:

DESMOND BAYOR

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JUNE, 2019

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WEST REGION GHANA**

**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES,
KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY IN
PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF
THE DEGREE OF MASTER OF PUBLIC HEALTH (MPH) IN POPULATION
AND REPRODUCTIVE HEALTH**

BY:

DESMOND BAYOR

JUNE, 2019

DECLARATION

I, Desmond Bayor hereby declare that the thesis presented here is the result of my own field investigation, and that except where specific references are made which have been duly acknowledged, this thesis has never been submitted for any other degree in this university or elsewhere. I am therefore responsible for views expressed, factual accuracy of the content and any other blemishes that this report might contain.

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(Head of Department)

DEDICATION

To the almighty god for his guidance and direction and to my family especially my wife
Comfort Tuorong, for her care and support.

KNUST



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DEFINITIONS OF TERMS

The following operational definitions of terms were used in this study.

Immunization: Immunization, according to WHO (2017) is the process whereby a child is made immune or resistant to an infectious disease, typically by the administration of a vaccine.

Vaccination: Vaccination as defined by Centres for Disease Control [CDC] (2016) is a process of introducing vaccine into the human body to stimulate the person's immune system to produce immunity against a specific disease, protecting the person from that disease.

Fully immunized: refers to child who received one dose of Bacillus Calmette-Guérin (BCG), three doses each of Oral Polio Vaccine (OPV), Diphtheria, Pertussis (whooping cough), and Tetanus (DPT), (now Pentavalent vaccine: Diphtheria, Tetanus, Pertussis, Hepatitis B and Haemophilus influenzae type b [DTP-HepB-Hib]) and one dose of Measles vaccine before reaching one year of age (WHO and UNICEF, 2017)

Partial immunization is the situation where the child missed at least one of the recommended vaccines.

Positive perception in this study refers to mothers' good opinion about attitude and practice of staff toward immunization activities.

Attitude in this study refers to the approach toward immunization of under five children

Knowledge of vaccination talks about mothers' knowledge in relation to the number of vaccinations recommended, benefits of vaccinating their child and vaccination schedules.

Occupational status defined as non-paid and paid mothers who were engaged in the areas of professional, technical, farming and trading as their job.

LIST OF ABBREVIATIONS AND ACRONYMS

BCG:	Bacillus Calmette-Guérin
CDC:	Centres for Disease Control
CHPS:	Community Based Health Planning and Services
CHRPE:	Committee on Human Research, Publications and Ethics
CWC:	Child Welfare Clinic
DHMT:	District Health Management Team
DPT:	Diphtheria, Pertussis (whooping cough), and Tetanus
DTP-HepB-Hib:	Diphtheria, Tetanus, Pertussis, Hepatitis B and Haemophilus influenzae type b
EPI:	Expanded Program on Immunization
GDHS:	Ghana Demographic and Health Survey
GES:	Ghana Education Service
GHC:	Ghana Cedis
GHS:	Ghana Health Service
GSS:	Ghana Statistical Service
MMR:	Measles-Mumps-Rubella
MOH:	Ministry Of Health
MR:	Measles-Rubella
NIP:	National Immunization Programme
OPV:	Oral Polio Vaccine
UN:	United Nations
UNICEF:	United Nations Children Education Fund
UWR:	Upper West Region
WHO:	World Health Organization

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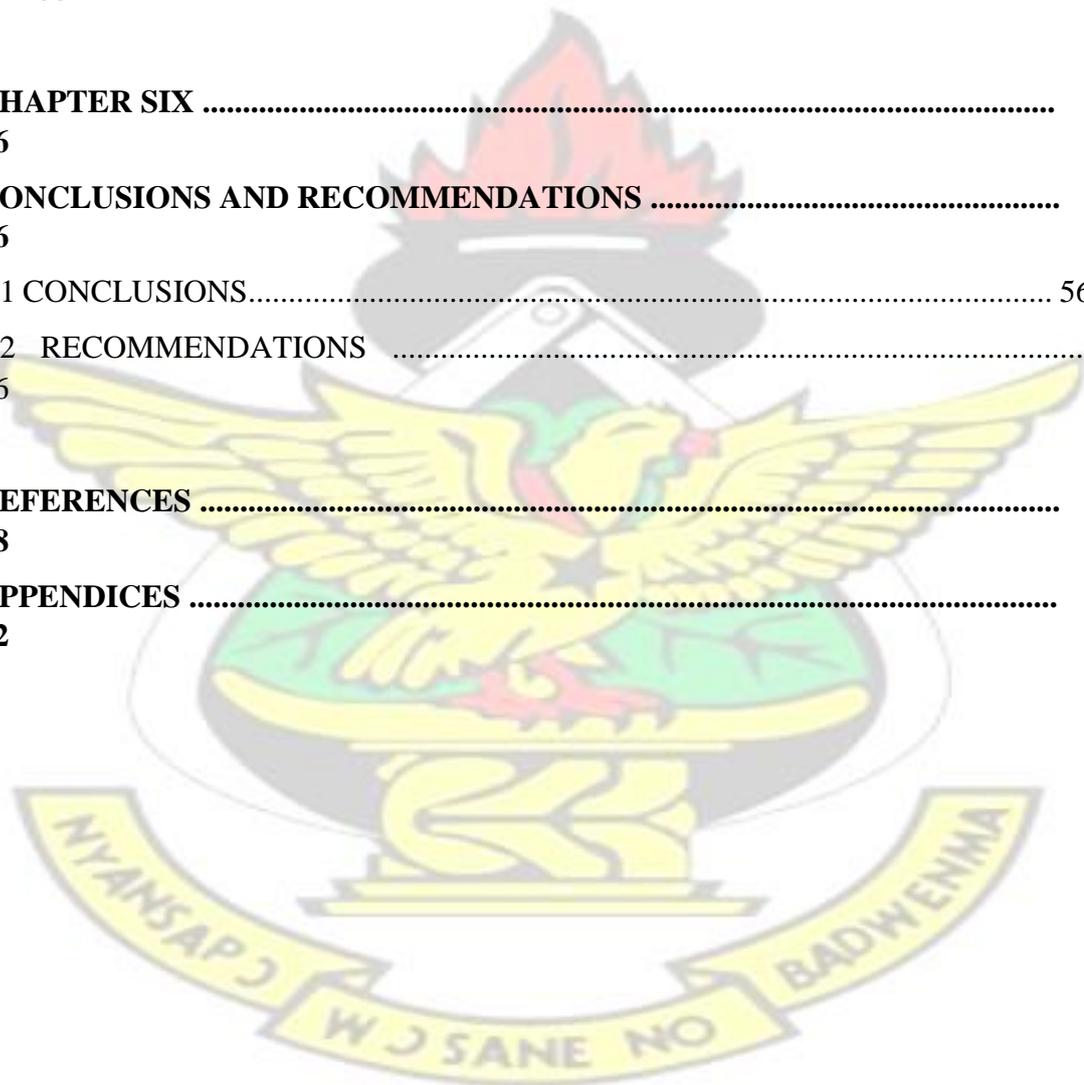
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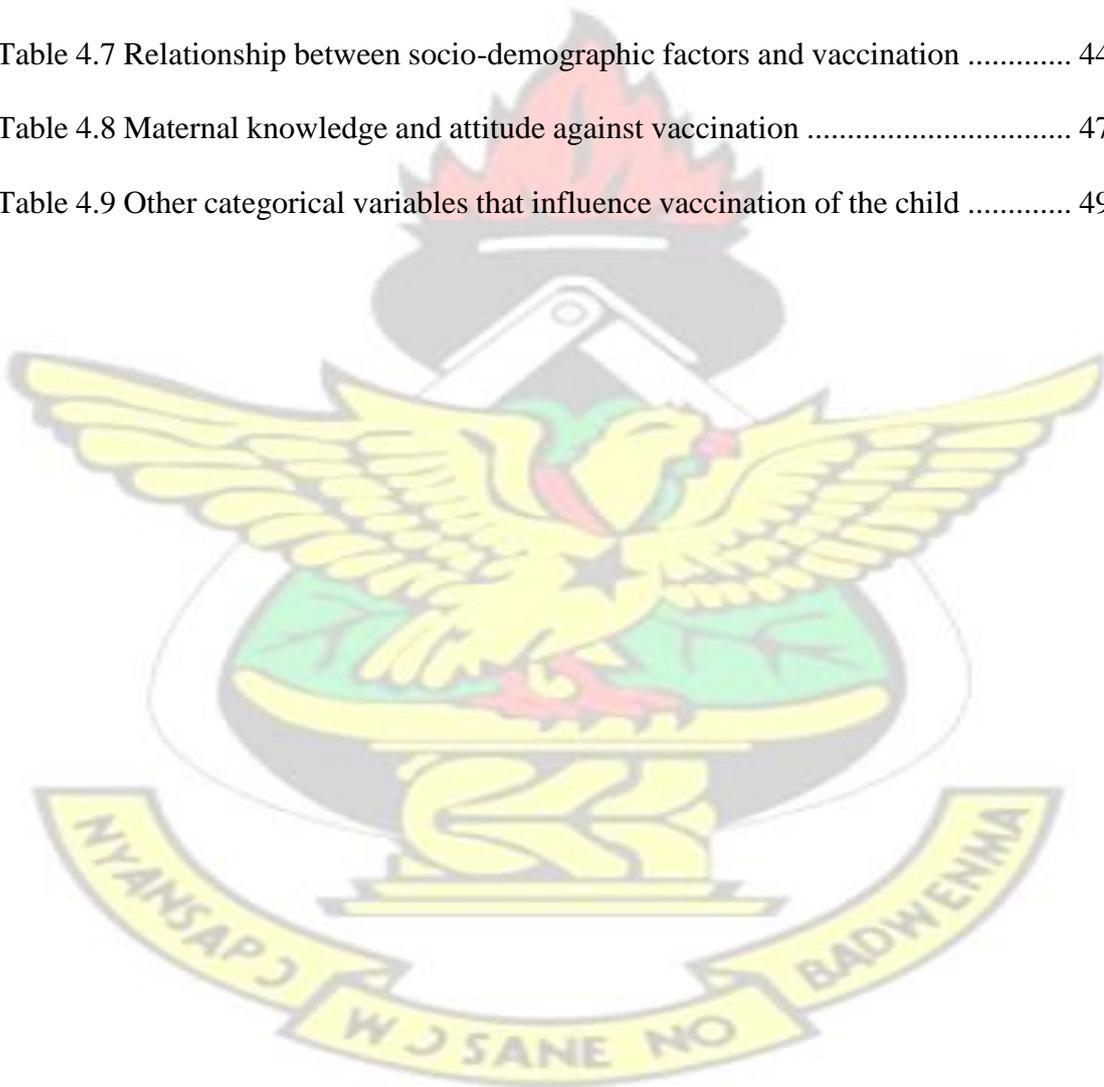
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ABSTRACT

Immunization is one of the most essential public health interventions to reduce child morbidity and mortality in Ghana and the world at large. However, many children still died from causes which could have been prevented through extensive immunization coverage. The main objective of this study was to identify factors influencing immunization coverage among children under-five years of age (0-59 months) in the Jirapa District of the Upper West Region.

A total number of 370 mothers of children under-five were chosen for this study and structured questionnaires were administered by visiting the households of under-five nursing mothers. Twenty (20) out of 137 communities were selected by simple random sampling and 5% (was calculated as a ratio based on the 2010 total number of under five children in that community) of mothers of children 0-59 months were chosen as respondents from each of the twenty communities.

Descriptive statistics were used to describe demographic characteristics and knowledge level of mothers/caregivers and other independent variables, while the associations between these factors were determined using logistic regression.

The study found out that the immunization coverage in the Jirapa District was remarkable high with majority (87.03%) of the children being vaccinated and good client satisfaction. It was also realized that some maternal and community characteristics such as education, occupation and age of the mother contributed significantly to child's vaccination status. This study also found strong connection between mothers' knowledge in child immunization and their level of education. Mothers who had attained Senior high school (SHS) education and above were almost twice more likely to have good knowledge of vaccination and were also more likely to vaccinate their children up-to-date. This means that support for women education to SHS and above as a long term measure will increase immunization coverage. In the study, it was found out that many mothers had positive attitude towards immunization and positive perception on the attitudes and practices of health workers to immunization activities and those that had positive attitude toward immunization were 3 times more likely to vaccinate their children up-to-date.

It is recommended that regular quality refresher training of health workers especially the volunteers to improve their knowledge and practice on immunization services should be organized.

Vaccination of child should be made a compulsory requirement during enrolment of children to school.

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND OF THE STUDY

Globally, immunization one of the cost effective public health interventions for reducing child morbidity and mortality. About 2.5 million children deaths are prevented annually worldwide through immunization (Riedmann (2010)). Also, child mortality has reduced significantly worldwide from 12.6 million in 1990 to 6.3 million in 2013 through immunization (Bustreo et al., 2015). Again, according to World Health Organization (WHO) facts sheet (2018), each year about 3 million lives of children are saved and about 750 000 children are saved from disabilities through immunization (WHO, 2018).

With the aim of protecting children under five, the WHO launched Expanded Program on Immunization (EPI) in 1974 as global effort to prevent vaccine preventable morbidity, mortality and disabilities among children (Ilusanya and Oladosun, 2016).

In the African Region Immunization has contributed immensely to public health. These immunizations led to the elimination, eradication, and control of some vaccine preventable diseases. Africa Regional immunization coverage has increased from 52% in 2000 to 76% in 2015 (Mihigo *et al.*, 2017). Despite many successes achieved by immunization coverage in Africa is still below the WHO expected target of 80% coverage and has stagnated around 70% for long.

In some countries, especially in the sub-Saharan Africa, up to 70% of children do not received full set of vaccines and over 40% of children are not immunized against measles (the major cause of infant mortality) in Africa as a whole (WHO, 2018).

The general goal of the health sector in Ghana is to improve the health status of Ghanaians and every person living in Ghana through reducing the incident and prevalence of vaccine preventable diseases and death among children (Ghana Health Service [GHS], 2015).

The Expanded Immunization programme was launched in June 1978 in Ghana in respond to national strategies to reduce maternal and infant morbidity and death from vaccine preventable diseases. Immunization is one of the most important public health interventions to reduce child morbidity and mortality in Ghana. Some of the vaccines preventable diseases include tuberculosis (TB), Measles, Diphtheria, Tetanus, Pertussis, Hepatitis B and Haemophilus influenza type b (WHO and UNICEF, 2017).

Though Ghana has made tremendous progress over the years in immunization service coverage from a low of 47% in 1988 to 77% 2014 using DPT as proxy, and has increased the number of vaccines from six in 1978 to 12 in 2013, however, the 2014 Ghana Demographic and Health Survey (GDHS) indicates that there is a challenge with full immunization coverage among children aged 0-59 months in Ghana. This is because the 2014 GDHS full immunization coverage (77%) is slightly lower than that reported in the 2008 GDHS (79%) (Ghana Statistical Service [GSS], 2015).

Also, Yawson *et al.*, (2017)indicated that only 40% of districts in Ghana have communities with functional fixed or outreach service delivery point. Furthermore, over 70% of the districts in Ghana have challenges with full immunization coverage of infants aged 0-11 months. Meanwhile one of the important interventions to achieving the Sustainable Development Goals (SDGs) especially the goal three targets two (3.2) is immunization i.e. to reduce deaths among children under five years old.

(United Nations [UN], 2017).

Though there is no agreed and standard definition of “fully immunized child” and it is also well noted that “vaccinated” does not necessarily mean “immunized”; however, the two words are used interchangeably in many documents (World Health Organization [WHO] and United Nations Children Education Fund [UNICEF], 2014).

The term Immunization, according to WHO (2017) is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccine as defined by Centres for Disease Control [CDC] (2016) is a product that stimulates a person’s immune system to produce immunity against a specific disease, protecting the person from that disease.

Fully immunized children (full immunization coverage) in this study (adopted from World Health Organisation [WHO] and UNICEF guidelines for vaccinating children) refers to infants who received one dose of Bacillus Calmette-Guérin (BCG), three doses each of Oral Polio Vaccine (OPV), Diphtheria, Pertussis (whooping cough), and Tetanus (DPT), (now Pentavalent vaccine: Diphtheria, Tetanus, Pertussis, Hepatitis B and Haemophilus influenzae type b [DTP-HepB-Hib]) and one dose of Measles vaccine before reaching one year of age (WHO and UNICEF, 2017). Partial immunization according to Negussie *et al.*, (2015) is the situation where the child missed at least one of the recommended vaccines.

Immunization does not only save children lives and protects future generations but it also protects other children who might not be able to receive vaccinations, against vaccine preventable diseases, for some reasons and save parents and families time and money (CDC, 2013)

Factors contributing to the low coverage of immunization have been poorly understood (GSS, 2015). This study therefore focused on determining the factors influencing

immunization coverage among children under-five (0-59 months) in the Jirapa District of Upper West Region.

1.1 PROBLEM STATEMENT

Ghana has made great progress in vaccination coverage from 47% in 1988 to 79% in 2008 using the third dose of the pentavalent vaccine as a proxy. The percentage of children age 12-23 months who are fully immunized has increased over the past twenty-five years, from 47% in 1988 to 77% in 2014. There is however a challenge on how to sustain the gains made as there is an indication of stagnation of the national vaccination coverage, the percentage of children fully immunized has declined slightly between 2008 and 2014 from 79% to 77% (GSS, 2015).

According to the 2014 GDHS survey, percentages of under-five children who were fully immunized in the Upper West Region stood at 78.2% and that of the Jirapa District was 61%. The district annual reports key indicators from 2013-2015 shows a slight downward trend with most of the sub-districts unable to meet their targets.

The inability to meet immunization targets over the years could assume to be the result of the following:

- Attitude of health workers involve in immunization
- Schedule and time for immunization
- Accessibility in terms of health service/Geographical
- Mother's knowledge on immunization
- Mother's age and educational level
- Socio-economic status of mothers
- Inadequate number of health workers involved in the immunization activities in the district.

This study seeks to identify the factors influencing the ability to meet immunization targets in the Jirapa District in the Upper West Region.

1.2 RATIONALE OF STUDY

Many districts in Ghana have made substantial efforts to increase immunization coverage, however, it is difficult for most to attain the 80% coverage as targeted nationwide (GHS , 2015)

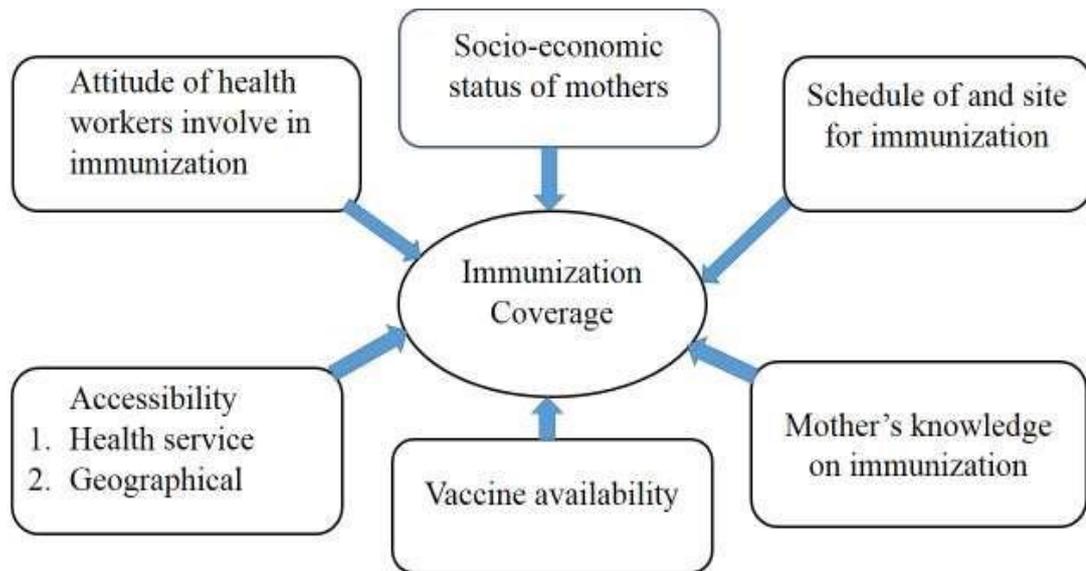
The District Health Management Team [DHMT] of Jirapa district has been receiving immunization logistics from the Regional Health Administration. However, statistics from the district about immunization show that coverage targets are not being met though the district has the desire of achieving high coverage levels of child immunization. Therefore, this study seeks to determine the factors influencing its inability to achieve the set targets over the years.

The information that was gathered from this study, on factors influencing immunization coverage, will help broaden the horizons of managers, health agencies and health workers of the Jirapa district to find innovative approaches that will improve immunization Coverage.

1.3 CONCEPTUAL FRAMEWORK

It was anticipated based on available reviewed literature from related areas of study that certain factors (independent variables) maybe negatively influencing immunization coverage (dependent variable).

This Conceptual Framework was illustrated as follows:



Authors construct, 2018

Immunization coverage is influenced by many factors such availability of health workers, attitude of health workers toward nursing mothers during immunization activities, attitude of mothers toward immunization, mother's age and educational level, schedule and site of immunization and Socio-economic status of mothers (Chris-Otubor *et al.*, 2015, Ibnouf, Borne and Maarse, 2007). Also, logistics such child health record book/card, functional fixed or outreach service delivery point and vaccine availability are important determinants of immunization status and coverage (Riedmann, 2010). Therefore, availability and attitude of health workers, availability of logistics (items) such as vaccine, mother's age, Socio-economic status and educational level of mothers are key determinants of immunization coverage (Anand and Bärnighausen, 2016, Andersen, 1995).

1.4 RESEARCH QUESTIONS

The following research questions were used to guide and focus the direction of the study:

1. What is the mother's knowledge on child immunization?

2. What are the perceptions or knowledge of mothers on the attitudes and practices of health workers to immunization activities?
3. What maternal and community factors influence child immunization?

1.5 MAIN OBJECTIVE

The main objective of this study was to identify factors influencing immunization coverage among children under-five years of age (0-59 months) in the Jirapa District of the Upper West Region.

1.6 SPECIFIC OBJECTIVES

The following were the specific objectives:

1. To determine mother's knowledge on child immunization
2. To determine the knowledge and perceptions of mothers on the attitudes and practices of health workers to immunization activities.
3. To assess maternal and community factors that influence child immunization

1.7. PROFILE OF STUDY AREA

Jirapa District is one of the eleven (11) districts in the Upper West Region of Ghana with a total land area of 1,667 square kilometers. This constitutes about nine per cent (9%) of the Region's area of 18,476 square kilometers. The district shares boundaries to the South with Nadowli District, to the East with Sissala District, to the West with Lawra District and to the North with Lambussie Karni District.

The population of the District is 88,402 of which 41,548 (47%) are males and 46,853 (53%) females. Out of the total population, persons between the ages of 0-4 years constituted 12,414 (14.%) of the population (GSS, 2015).

More than 85% of the populations of the district are Dagaaba in term of ethnic grouping though there are other minor ethnic groups such as Waala, Sisaala, Brifo and Akan.

1.7.1. Religion

Christians constitute about 90% of the population in the district. The rest of the people practice traditional religion and Islam

1.7.2. Major Economic Activities

Agriculture is the major economic activity in the district. Majority of the people are into small scale farming and petty trading as means of their livelihood.

1.7.3. Health Infrastructure

The District has 39 health facilities; thus 29 CHPS compounds, 8 Health centers, one polyclinic and one Mission Hospital which serve as the District hospital

1.8. SCOPE OF THE STUDY

The study was conducted in Jirapa District in the Upper West Region of Ghana. The study population included mothers of children within 0-59 months that reside within the district at the time of the study.

1.9. ORGANIZATION OF THE STUDY

The study has been organized into six chapters where chapter one talked about background information, problem statement, rational of the study, conceptual framework, research questions, general and specific objectives, profile of the study area and the scope of the study.

Chapter two looked at the literature review, chapter three considered the research methodology, data collection techniques and tool, study population, study variables,

sampling, pre-test, data handling, data analysis, ethical consideration, limitation of the study and assumptions.

Chapter four examined the background information and presented results based on key study variables. The discussion and conclusion were done in chapter five and six respectively.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter examines relevant literature on the key areas the study covers. The review presents a summary of literature sources which has bearing on the topic immunization coverage. The chapter reviews related and contemporary factors associated with immunization coverage such as mother's knowledge and attitude toward child immunization, perceptions of mothers on the attitudes and practices of health workers toward immunization activities and maternal and community factors that influence child immunization documented by other researchers.

2.1 BRIEF OVERVIEW OF IMMUNIZATION OF CHILDREN UNDER 5 YEARS

2.1.1 Immunization of children under 5 years globally

Globally, one of the most effective public health interventions for reducing child morbidity, mortality and disability is immunization. Riedmann (2010) estimated that 2.5 million children deaths are prevented annually worldwide through immunization. Also, through immunization, child mortality has reduced significantly worldwide from 12.6 million in 1990 to 6.3 million in 2013 (Bustreo et al., 2015). Again, according to WHO (2018), each year about 3 million lives of children are saved and about 750 000 children are saved from disabilities through immunization (WHO, 2018). However, according to statistics, access to immunization varies greatly across the world. Bocquet et al., (2016) further explained that, globally, about 70 million children will die from vaccine preventable diseases between 2016 and 2030, before reaching their fifth birthdays, and that Sub-Saharan Africa's children are 10 times more likely to die

than the developed countries if the world inequities gap is not tackle now. With the vision of reducing under five morbidity, mortality and disability, the World Health Organization launched Expanded Program on Immunization (EPI) in 1974 as global effort to use vaccination as a public health intervention to prevent vaccine preventable morbidity and mortality among children (Ilusanya and Oladosun, 2016). The WHO established the EPI to ensure that all children access vaccines at the right age. For all children to benefit from the full direct and indirect effects of Immunization, the World Health Assembly endorsed the Global Vaccine Action Plan in 2012 which stresses on countries to achieve 90% national coverage for all antigens and at least 80% coverage in all antigens in 80% of districts by the year 2020 (WHO, 2013).

2.1.2 Immunization of children under 5 years in Africa

Immunization has contributed immensely to public health in the African Region. These immunizations led to the elimination, eradication and control of some vaccine preventable diseases in the African Region. Africa Regional immunization coverage has increased from 52% in 2000 to 76% in 2015 (Mihigo *et al.*, 2017). For instance, DPT3 and Measles-containing-vaccine (CV1) coverage in the African Region has raised from 52% to 76% and 53% to 74% respectively between 2000 and 2015 with considerable differences among countries especially the lower middle-income and the upper middle-income countries (Casey *et al.*, 2017).

Despite many successes achieved by immunization in Africa and the world as a whole, immunization coverage in Africa is still below the WHO expected target of 80% coverage and has stagnated around 70% for long. Maximizing the benefits of immunization and achieving higher immunization coverage in Africa has met with a lot of challenges, including unsustainable funding, resources for immunization, vaccine stock-outs, and logistics challenges (Mihigo *et al.*, 2017).

Studies indicated that morbidity and mortality caused by vaccine preventable diseases are still very high in Africa and many developing countries across the world. According WHO (2018), a child in a developing country is ten times more likely to die of a vaccine preventable disease than a child from developed country. In some countries, especially in the sub-Saharan Africa, up to 70% of children do not received full set of vaccines and over 40% of children are not immunized against measles (the major cause of infant mortality) in Africa as a whole (WHO, 2018). Also, mother's age, according to Negussie et al., (2015), is another important factor that affects immunization coverage in Africa. The study reported that, in Ethiopia, incomplete immunization status of children was associated with young mothers and children being born fifth or later in the family.

Again, Burton *et al.*, (2009) and UNICEF reports on the state of world children (2001) estimated that, 15% of deaths among children less than five years of age are attributed to these vaccine preventable diseases though under five mortality has reduced significantly through immunization.

2.1.3 Immunization of children under 5 years in Ghana

The general goal of the health sector in Ghana is to improve the health status of Ghanaians and every person living in Ghana. This can be achieved through reducing the incident and prevalence of vaccine preventable diseases and death among children (Ghana Health Service [GHS], 2014).

The Expanded programme on Immunization was launched in June 1978 in Ghana, with six antigens which have been increased over the years to twelve. The launch was in respond to national strategies to reduce maternal and infant morbidity and death from vaccine preventable diseases. Full immunization forms a key public health goal at the

global and national levels. Ministry of Health (Ghana) recommends that all children should receive full immunization by the age of two years to boost their immunity (GHS, 2017).

The Ministry Of Health (MOH) of Ghana has adopted the World Health Organization (WHO) and UNICEF guidelines for vaccinating children which stated that, a child is considered fully vaccinated when he/she receives one dose of Bacillus Calmette-Guerin (BCG) and Measles, three doses of polio vaccine and three doses of DPT-HibHepB (WHO and UNICEF, 2017).

In addition, in Ghana, vaccine against yellow fever is recommended for children. Yellow fever vaccine was actually added to the national immunization programme (NIP) by the government of Ghana in 1992, that is, fourteen years after the launch of EPI (Ghana Health Service, 2014). BCG, which protects the child against tuberculosis, should be given at birth or at first clinical contact. DPT protects against diphtheria, pertussis (whooping cough) and tetanus. Polio vaccine is given at birth (polio 0) or within 13 days of birth. DPT and polio recommendations required three vaccinations each at approximately 6, 10, and 14 weeks of age. The measles and yellow fever vaccines are given at nine months (Yawson *et al.*, 2017, GHS, 2015).

Currently, the pentavalent vaccine, (DPT-HepB-Hib) introduced in 2002, has replaced the DPT vaccine. This vaccine contains, in addition to DPT, the hepatitis B vaccine and Haemophilus Influenza type B vaccine.

In 2012, the MOH introduced two new vaccines, the pneumococcal and rotavirus vaccines. These protect children from pneumococcal diseases (particularly pneumonia and other invasive pneumococcal diseases) and diarrhea, respectively (GHS, 2014).

In 2013, the MOH replaced the measles-only vaccine at nine months with measles-containing rubella vaccine [Measles-Rubella (MR) vaccine] which are also given at 9 months. Ghana follows a schedule for all basic childhood vaccines administration. BCG is given just after birth; Oral polio vaccine is given at birth and at approximately age 6, 10, and 14 weeks. Pentavalent vaccine is also given at approximately age 6, 10, and 14 weeks. Measles-rubella and yellow fever vaccines are given at or soon after the child reach 9 calendar months (39 weeks). The rotavirus vaccine is given at age 6 and 10 weeks. The pneumococcal vaccine is administered as an injection to infants in three doses at age 6, 10, and 14 weeks. The measles-only dose offered to children at 18 months is primarily a booster dose. It is recommended that all vaccinations be recorded on a card that is given to the parents or guardians (Ghana Statistical Service, 2015).

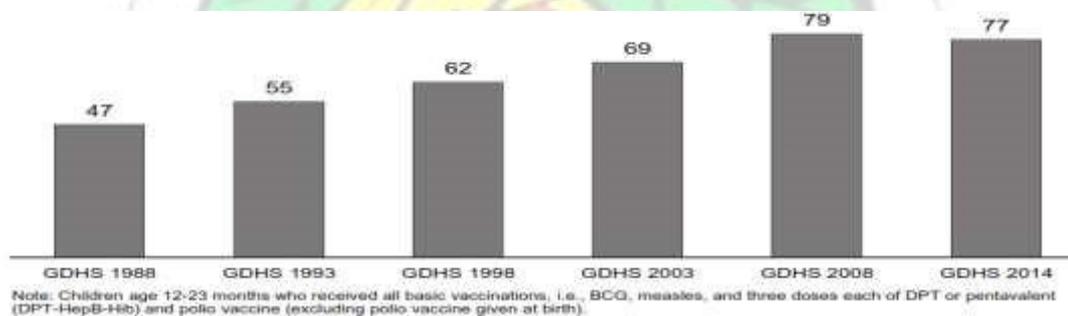
Though Ghana has made marvelous progress over the years in immunization service coverage from a low of 47% in 1988 to 77% 2014, and has increased the number of vaccines from six in 1978 to 12 in 2013, however, the 2014 Ghana Demographic and Health Survey (GDHS) indicates that there is a challenge with sustaining full immunization coverage among children under five. This is because the 2014 GDHS over all immunization coverage (77%) is slightly lower than that reported in the 2008 GDHS (79%) however immunization coverage in Ghana with respect to the individual vaccine using penta (DPT-HepB-Hib) three (89%) as a proxy is close to the WHO goal of 90% national coverage (Asuman et al., 2018 and G.S.S., 2015).

With regard to immunization success, Ghana has maintained a polio-free position since 2008 up to date. Maternal and neonatal tetanus status has remained at zero since 2011 and child mortality from measles has also stayed at zero since the past fifteen years (2003) through the effort and use of vaccination/immunization (GHS, 2015).

In Ghana, the immunization program is organized according to the organizational structure of the Ghana Health Delivery System; that's from the national level, regional, district and sub-district to the community level based on the recommendations of the world Health Organization.

Each of these levels provides static and outreach immunization service as well as other child health intervention such as child growth monitoring and counseling of mothers and caretakers.

Though tremendous progress in immunization service coverage has been made, from a low of 47% in 1988 to 77% in 2014 using penta (DPT-HepB-Hib) three as a proxy, however Ghana is yet to reach the WHO immunization coverage goal because only 69% of districts achieved the 80% and above immunization coverage for the third dose of pentavalent vaccine which is below the 80% of districts target (GHS UWR, 2017). Over the past twenty-five years, the proportion of fully immunized children age 12-23 months has increased despite the slight decline between 2008 and 2014 from 79% to 77% respectively as shown below.



Source: GDHS, 2014

2.2 MOTHER'S KNOWLEDGE AND ATTITUDE ON CHILD IMMUNIZATION

Notwithstanding the fact that Ghana, Africa and the world as the whole has made remarkable progress in immunization coverage, the full potential of immunization is

yet to reach due to the fact that many children remain unvaccinated and undervaccinated. Available data about immunization indicate that Africa vaccine coverage is around 76% using DPT3 coverage as a proxy and there is a huge number of partly vaccinated children in the region (Mihigo *et al.*, 2017)

Chris-Otubor *et al.*, (2015) stated that, lack of knowledge of mothers on immunization is a huge barrier and detrimental to immunization coverage. Therefore, in order to achieve high immunization coverage, mothers should be properly educated with regard to the diseases their children are expected to be immunized against and the age specific vaccine to be taken for them to appreciate the necessity of child immunization.

Angadi *et al.*, (2013) and Mahalingam *et al.*, (2014) concluded that, many mothers know the importance of immunization among children but have little or no knowledge on the schedule and the diseases the vaccine prevent and this make mothers reluctant to attending immunization session which lead to large proportion of children being partially or not immunized. The studies further recommended that health workers (nurses) should fine a comprehensive strategy to enforce effective changes in the attitude of mothers regarding immunization of children.

Also, Jheeta and Newell, (2008) explained that, parents resist vaccination for their children because of inadequate knowledge on the vaccines effects. Therefore, when parents understand the importance and the role vaccine play in disease prevention, they will cooperate and complete their child immunization at age specific.

Most of the factors influencing immunization coverage according to Mohamed *et al.* (2016) can be influenced by several other variables such as age, religion, marital status, education level, maternal knowledge and awareness of immunization service, average income, parity and birth intervals and perceptions and attitude of mothers.

Again, mother's education (knowledge) and place of resident is another crucial factor influencing under-five immunization as reported by Mahalingam *et al.*, (2014). They stated in their study that there is a wide gap in knowledge regarding child immunization among rural and urban mothers due to the fact that urban women have high literacy rate. However, Asuman *et al.*, (2018) in their study stated that mothers in rural areas are more likely to complete their children vaccination than their urban counterparts. This urban immunization disadvantage may be as a results of large population in Slum and informal settlements and demographic and health system development. This is because in countries such as Ghana, emphases is placed on expanding basic health service in rural areas through the community-based Health Planning and Service (CHPS) to the neglect of the underserve population in the slum and informal settings.

Mohamed *et al.*, (2016) explained that, for mother to send children for immunization services continuously, she needs to know that the benefit of such service outweigh the consequences of none or under-immunization. In this factor, mothers/caregivers should be educated against all myths about immunization and encourage them to tolerate long distance, long queuing time and provider's attitude and focus on the benefit of immunizing their children

2.3 PERCEPTIONS OR KNOWLEDGE OF MOTHERS ABOUT THE ATTITUDES AND PRACTICES OF HEALTH WORKERS TO IMMUNIZATION ACTIVITIES

Acceptance of any immunization program among under-five is highly dependent on parental attitude toward immunization. Many articles (WHO, 2013, and Bernsen *et al.*, 2011, Bärnighausen, 2016) indicated that acceptance of immunization program is highly dependent on both mothers/caregivers (parental) and staff attitudes towards immunization. This, to large extend, is due to ignorance and fear of adverse effects of

vaccine on the part of mothers, which has high negative impact on immunization coverage. For example, the assumed link of Measles-Mumps-Rubella (MMR) to Autism has reduced MMR immunization in some areas in Scotland significantly (WHO, 2013, and Bernsen et al., 2011). According to Anand and Bärnighausen (2016), Vaccinations of children are given as a result of interaction between the vaccinators and mothers therefore any fear, perception or knowledge deficit on the part of mothers or inappropriate attitude of vaccinators will result in incomplete immunization coverage. Also, Al-moukhtar (2011) stated that, impolite behavior of vaccinators towards mothers, (especially those who arrive late for immunization session, defaulted or have forgotten of a vaccination card) can discourage them from listening to health education messages given by the vaccinators and may not complete their children immunization fully.

Again, although there is unclear evidence, the general belief is that, strengthening advocacy, communication and proper health education to improve the knowledge of mothers and dispel any myths surrounding health workers attitude will enhance mothers' willingness to participate in vaccination programme. The study further indicated that many mothers always give excuses such as being busy with work to the neglect of immunizing their children. That is as a result of low knowledge in the importance of child immunization; mothers mostly place high value on their work and other family problems than immunizing their children at the right time or age (ChrisOtubor et al., 2015).

Regarding the attitude of health workers/service providers a number of studies revealed that most health workers/vaccinators are friendly and good. Also, Taiwo *et al.*, (2017) indicated that some mothers whose children were partially or not vaccinated at all felt

that the distance to the service delivery point was too far and also perceived (believe) that immunization would not protect their children from vaccinepreventable- diseases.

It is also clear from many studies that service provider related factors are very significant to immunization coverage especially the relationship between health care providers and mothers. The studies explained that, higher density of vaccinator increase the availability of vaccination services over time, making it more likely that many children will be vaccinated however some children are partially vaccinated or not vaccinated at all due to the attitude of some health workers (WHO and UNICEF, 2017, Feldstein, *et al.*, 2017, Anand and Bärnighausen, 2016, Tagbo & Uleanya, 2015).

Again, Oku et al., (2017) explained that the immunization status of a child is significantly connected to the mother's perception about the child's susceptibility to childhood vaccine-preventable diseases. The study further reveal that the opinion of partners and families (mother-in-laws) about child immunization is highly important to the extent that when one partner or mother-in-law disapprove taken the child to immunization service then the child will not receive all the age specific vaccinations and which also suggest that children's immunization status is significantly associated with partners' and families' (especial mother-in-law's) perception about vaccinators and immunization.

Also, in studies conducted by Taiwo et al., (2017) and Mohammed et al., (2016), indicated that, some mothers feel that going for immunization is a waste of time and that immunization is for sick children. Some mothers also perceive that receiving multiple injections in one visit can overload the child system and cause severe disability or make the child falls sick or even died. The studies further explained that mothers perceive that vaccination causes infertility later in adult life, therefore some mothers

refused to vaccinate or complete all the age specific vaccinations. Furthermore, upon all the health educations on the importance of immunization, some mothers have no conviction that immunization will protect their children from such diseases called vaccine preventable diseases.

Again, according to Bernsen et al., (2011), elderly mothers in some areas are less likely to have good attitude toward immunization irrespective of their educational background or number of children due to persimetic traditional view that destiny is the cause of disease and therefore perceive that immunization is not necessary. Thus, some elderly women (mother-in-laws) always say they raised their children without immunizations and they grew up healthy; hence, taking children for immunization was not important. The study further explained that women with this blief and behavior may be as a result of lack of knowledge on the seriousness of the diseases prevented by immunization.

Many mothers, according to Mohammed et al., (2016) perceived that most care providers/vaccinators are not supportive in terms of encouraging mothers to continuous to access immunization service. Furthermore, mothers' beliefs and perception about myths surrounding immunization have significant impact on child's immunization status. Some mothers have the perception that an immunization is a way of family planning and so are not ready to access immunization service. Also providers' unfriendly approach in many ways discouraged some mothers from taken their children to immunization service to complete their immunization schedule.

Zehner et al. (2017) explained that, mothers trust in health workers and their knowledge in immunization have important influence and may play an important role in completing the full set of immunizations therefore when mothers develop bad perception about the vaccinators attitude may go a long way to affect immunization coverage.

2.4 MATERNAL AND COMMUNITY FACTORS INFLUENCING CHILD IMMUNIZATION

Immunization is an important means for controlling 12 vaccine-preventable diseases among children under five, namely, Tuberculosis, Diphtheria, Whooping cough, Tetanus, hepatitis B, haemophilus influenza type b, Poliomyelitis, yellow fever, pneumonia, diarrhea, Measles and Rubella. Although immunization coverage (among children under five) has improved considerably over the years, about one-fifth of the world children are still not received full doses of the standard antigens and majority of these children are from Africa (Mohamed et al., 2016)

In Ghana, only 69% of districts achieved 80% and above for the third dose of penta and about 31% of the districts could not reach the 80% immunization coverage target in 2014 (GHS, 2015).

Available data identified a number of critical Maternal and community factors influencing immunization coverage among children under five in some settings within the range of socio-economic and cultural contexts. These factors as identified by many studies include the following: maternal age; some young mothers do not know the importance or feel shy mingling with their mothers' age mates to access immunization service, while some experience (old) mothers may also downplay the importance of immunization service to children. Again, place of resident (urban/rural) is highlighted by many findings as one of the most important community factors affecting immunization coverage. Mothers of under-five children at the hard to reach communities are likely not to send their children for immunization due to the fact that immunization service and service providers go there periodically. Also, place of delivery (home or health facility), maternal education (knowledge), geographical accessibility, distance from the house to the health facility or immunization center,

availabilities of immunization service and service providers at the community affect immunization coverage. Further, quality of service provided, motivation of service providers and poor attitude of staff toward mothers are outlined as some of the essential factors impeding child immunization in many communities (Yawson et al., 2017, Taiwo et al., 2017, Mohamed et al, 2016, G.S.S., 2015, Lakew, et al., 2015, and Mohamud et al., 2014).

Some of the impediments of the under-five immunization coverage, as recommended by many studies, can be addressed at the various levels of immunization service (thus from the national to the community level) by identifying areas specific impeding factors, blockages and bottle necks affecting reaching every child with vaccines (Yawson et al., 2017, Mohamed et al, 2016). Environmental/community factors such as frequent change of resident, according to Mohamed et al., (2016) also have significant effect on children immunization status since some communities are hard to reach areas. The study found that children of mothers who do not change their place resident/community have higher chance of been vaccinated. Therefore mothers of children less than 23 months of age should be encouraged to minimize change of residents more than once a year. Further, Mohamud et al, (2014) and Holipah, M. A. and Kuroda, Y. (2018) highlighted maternal age and literacy, place of resident (urban/rural) and place of delivery as the most important predictors of immunization coverage. The study therefore recommended that immunization service providers should pay regularly visit to household with children between 12 and 23 months in order to improve immunization coverage.

A bottle neck analysis tool, according to Yawson et al. (2017), should be used to identify the gaps and health service coverage challenge in immunization and develop individual

planning for each region, district and sub-district using their own data instead of developing sub-national planning from a common template.

Again, supporting the district, sub-district and the community level system with equipment, in-service training and some basic logistics and strengthen coordination function in all levels of the health system is very important to improving immunization coverage among children under five

Furthermore, Anand and Bärnighausen (2016) recommend in their study that increase in health workers (nurses/vaccinators) density in a community will lead to increases in vaccination coverage, therefore the situation where there is higher constrain of health workers (nurses) in a particular community, especially some hard to reach communities, immunization coverage can be increased by training the unskilled community volunteers on the administrations of certain vaccines such as oral polio.

Another community factor influencing immunization coverage is close working relationship between the health sector (workers) and the administrative structures of the community. These two groups, according to Lofand et al., (2018) should jointly planned service, defined strategies, and raised awareness using the local communication channels and review performance to improve immunization coverage through the use of community volunteers. Therefore, the instances where this close working relationship between the health sector (workers) and the community is broken, immunization coverage is likely to low.

Also Mohamed *et al.*, (2016) concluded that immunization coverage is influence by factors at different levels including the individual, household, community and health facility level which can best be addressed by a close working relationship between the health sector, development partiners and the community. Therefore provision of more

information on childhood vaccination aiming at mothers of all ages (individual), families and the community leaders is necessary. The study further explained that maternal age and experience has huge influence on immunization coverage. Older mothers with many children and pessimistic traditional view are less likely to attend immunization session throughout for their children to get the full set of age specific vaccines.

According to Mohamud et al., (2014), maternal education play an important role in children immunization. This may be due to the fact that well educated mothers have better knowledge and understanding of childhood diseases that can be prevented by vaccine and recognize the importance of vaccination.

Many mothers might not fully immunized their children possible due to low educational status, inadequate knowledge on child health, low utilization of health service and this lead to high defaulter rate among nursing mothers. Further, the study explained that, mothers with low educational status might not be aware of the need or importance of child immunization, might fear the side effects of vaccine or had wrong ideas about immunization cotraindications and so will not get time to send their children for vaccination.

Though many studies explain that there is an association between mothers education level (knowledge) and immunization uptake, however, Jheeta and Newell (2008) on the other hand stated that knowing little about vaccination does not necessarily translate into negative attitude toward it, but that factors such as trust in health care providers and culture of the community may be more influential. They further recommended that parents must be encouraged and empowered to express their fears and change their attitude toward childhood vaccination.

CHAPTER THREE

METHODOLOGY

3.1 RESEARCH METHOD

The quantitative method of inquiry used for this study was survey.

3.2 STUDY DESIGN

A cross-sectional study design was used.

3.3 DATA COLLECTION TECHNIQUES AND TOOLS

Quantitative data were collected using structured questionnaire. The research assistants moved from house to house of the selected communities to give the questionnaires to under-five children mothers/caregivers. The questionnaire was selfadministered however, respondents that cannot read and write English language, it was read and translated to the language the respondents understands for her to answer.

3.4 STUDY POPULATION

The study population involved mothers/caregivers of children within 0-59 months that reside within the Jirapa district during the time of study. Therefore respondents were mothers/caregivers of children under five years from households in both urban and rural areas in the Jirapa District of the Upper West Region of Ghana.

3.4.1 Inclusion criteria

A mother/caregiver was eligible to participate in the study if she resides within the district at the time of the study and has or care for under-five (0 -59 months).

3.4.2 Exclusion criteria:

Mothers whose ages were outside the reproductive age (15 – 49) and were not care givers and those whose ages are within the reproductive age bracket but has no child

under-five (0 -59 months) were excluded. Also, a mother within the reproductive age, has a child under five, but is sick or travel out of the district at the time of the study was excluded.

3.5 STUDY VARIABLES

This study consists of independent and dependent variables.

3.5.1 Dependent variable

This was the outcome of immunization coverage. That is, whether the child has received all the recommended age specific vaccines or not (vaccinated up-to-date).

3.5.2 Independent variables:

These were variables believed to affect the immunization coverage (dependent variable). They included but not limited to: functional fixed or outreach service delivery point, attitude of health workers involve in immunization, and accessibility of immunization site. They also included mother's knowledge on immunization, mother's age and educational level, and availability Vaccine. These variables were measured by using questionnaire with close ended questions.

Variables	Operational definition	Scale of measurement
Age of mother	Age of respondent in complete years	Continuous
Ethnicity	Ethnic group of parents/child	Nominal
Marital status	Marital Status of respondent	Nominal
Educational level	Highest Educational Level Attained of mother	Ordinal
Religion	Faith Practice by respondent	Nominal
Occupation	Types of work respondent does	Nominal
Number of children	The total number of children of the mother	Discrete
Age of child	Age of child in completed months/years	Continuous

Sex of child	Sex of the child i.e. Male or female	Binary
Place of birth of the child	Where the child was born (hospital, home etc.)	Nominal
Birth order of child	Order in which the child was born	Ordinal
Functional fixed or outreach service delivery point	Where immunization activities take place	Binary
Attitude of health workers	Behavior of health workers during immunization activities	Nominal
Adequacy of health workers	Average number of health workers at each immunization session	Discrete
Accessibility of health service	Geographical and Health service accessibility of immunization activities	Binary
Vaccine availability	Availability of Vaccine for immunization activities	Binary
Knowledge about immunization	Does mother know the schedule, benefits, side effect and the types of vaccine/immunization	Binary
Immunization coverage	Immunization status of a child	Binary
Location/place of resident	The type of community ie. urban or rural	Binary
Monthly income (in GHC)	Average family monthly income in GHC	Ordinal

3.6 SAMPLING TECHNIQUE

The district has 137 communities and out of this 20 were selected by simple random sampling. These were done by writing down the names of all the 137 communities in the district on pieces of papers and fold them. The pieces of papers were placed in a container, shake them well and randomly picked. The selection was done with replacement. That is, after writing the name of the community, the paper is placed back into the container before the next community is selected.

For each of the selected communities, 5% of mothers of children 0-59 months were the respondents. This was calculated as a ratio based on the 2010 total number of under five children in that community to the total population of the community.

In each of the selected communities, a central point was identified and from there a pen was used to give the direction by spinning. Systematic sampling techniques was used. Every 4th house along the direction of the tip of the pen was entered and questionnaires administered to all mothers with children under-five. In case where the same respondent has two or more under-fives, or twins under-five, one of them was selected for the study by tossing a coin (for twins) or tossing a dial (for triples or more). The child who chooses the winning side (eg. face) of the coin/dial shown after tossing it was selected for the study. Research assistants returned to the central point where the pen was tossed after the last household at the direction of the pen and moved towards the opposite direction until the required number of respondents was obtained.

3.7 ASSESSMENT OF VARIABLE OUTCOMES

Respondent's knowledge on immunization was determine using a four-point set of knowledge questions (Scheduling of child's vaccination; Number of vaccinations required to complete the schedule; Benefits of vaccination and Side effects of vaccinations). Participants were awarded marks (scale of 0-7) for each response given. Participants who scored below 3 marks were considered to have poor knowledge on immunization, above 3 marks were considered good knowledge and those who scored exactly 3 marks were viewed to have a fair knowledge about immunization.

3.8 SAMPLE SIZE CALCULATION

In all, a maximum of three hundred and seventy (370) participants were selected from the entire district.

The total population of children under-five in the Jirapa district as indicated in the 2010 population and housing census stood at 12,414 (14 % of the population of the district).

The sample size was calculated using Charan and Biswas (2013) formula.

That is $n = Z^2 * p (1-p) * deff / d^2$

OR $n = Z^2 * p * q * deff / d^2$ where q

$= 1-p$

Where n = Sample size, $z = Z$ score which is a standard = 1.96, this is for a statistical certainty of 95% level of confidence,

P = expected proportion in the population base on the 2010 census (ratio of children under five years of age in the district to the total population of the district), which is 14% (0.14), $q = 1-p$, $deff$ = design effect $(1.5-2) \approx 2$ and d = the marginal error (degree of precision) desired (or margin of error allowed) which is 5% (0.05) and the statistical certainty 95% level of confidence.

Hence the sample size (n) = $Z^2 * p (1-p) * deff / d^2$ but

$z = 1.96$, $p = 14\%$ or 0.14, $q = 100-14 = 86\%$ or $1-0.14=0.86$, $deff = 2$ and $d = 5\%$ or

0.05. Putting these into the formula gives $n = 1.96^2 * 0.14 (1 - 0.14) * 2 / 0.05^2$. This

imply that $n = 3.8416 * 0.14(0.86) * 2 / 0.0025 = 370.022 \approx \underline{\underline{370}}$

A sample size of 370 participants (mothers of children under-five) was used.

3.9 TRAINING OF RESEARCH ASSISTANTS

Research assistants were trained on data collection and translating the instrument into the local languages spoken in the district for those that may not understand English language. A total number of two newly trained Community Health Nurses from the Community Health Nursing Training College, Jirapa, who were currently awaiting their postings and were resident in Jirapa and understand the local dialects of the people of Jirapa district, were trained as research assistants.

3.10 PRE-TESTING

The study was pre-tested among mothers of children under five in Daffiama Bussie Issa District which has similar characteristics as the study area to determine reliability and validity of the instrument or tool. This enabled us to identify common ambiguities in the questionnaire and made the necessary corrections and also gave further training to the research assistants according to the stated objectives.

3.11 DATA HANDLING

Research assistants were trained on data collection and handling. At the end of each day, questionnaires were checked to ensure accuracy. The data were verified regularly by checking inconsistencies with the research assistants. All data were entered into a computer for analysis after all inconsistencies were corrected.

3.12 DATA ANALYSIS

The data were analyzed using both descriptive and inferential statistics. This was done based on the stated objectives using STATA (version 14). The data were entered into Microsoft excel and imported into STATA for analysis. The analyzed results were presented in Frequencies, Percentage. Logistic regression was used to determine the associations between the dependent variable and the independent variables.

3.13 ETHICAL CONSIDERATION

The proposal and other relevant documents of the study were presented for ethical clearance ahead of study initiation to the Committee on Human Research, Publications and Ethics (CHRPE) of the Kwame Nkrumah University of Science and Technology, Kumasi and Ghana Health Service Ethical Committee Kumasi. Also, an informed assent [for those below 18 years of age] and consent was sought from participants. For respondents below 18 years of age, the consent of a parent or legal

representative was sought after their assenting to the study. Mothers and caretakers were also given the opportunity to ask questions for clarity and decision making with regards to the study. Information obtained from and about participants was used solely for the purpose of the study and treated with utmost confidentiality.

3.14 LIMITATION OF THE STUDY

There was limitation of language barrier since translation may interfere with the actual meaning or intention because when a respondent cannot read the English language, the questionnaire was read and translated into language she can understand.

Again, this study covered only mothers/caregivers of children within 0-59 months that reside within the district at the time of the study therefore; generalization of the findings is limited.

3.15 DELIMITATION

This study only covered mothers of children within 0-59 months that reside within the district at the time of the study and is within her reproductive age (15 – 49 years) and has under-five (0 -59 months).

3.16 ASSUMPTIONS

It was assumed that all mothers with babies within 0-59 months received full coverage of the vaccine.

Also, it was assumed that irrespective of distance and attitude of health personnel these mothers will access child welfare clinic (CWC) services.

It was again assumed that the respondents would understand the questions that were asked and gave truthful responses.

CHAPTER FOUR

RESULTS

4.1. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

A total of 370 under-five nursing mothers meeting the inclusive criteria from 20 communities in the Jirapa district was contacted for the study. None of them declined and data for all variables were collected yielding a response rate of 100%. The age of participants ranged from 19-42 with a mean age 24.12 (Standard deviation [SD] 1.35) and the modal age group was 20-24 years representing 29.46%. This was not surprising as that represents the reproductive peak of every woman. A good proportion of the participants have had some form of formal education 253 (68.38%).

An overwhelming majority of the participants accounting for 91.08% were married.

Dagaabas seems to be the predominant settlers in the areas as found in the study (85.95% Dagaao) with the least ethnic group (0.27% Akan). Three out of five (61.62%) of the women reside in rural areas. More Christians participated in the study (78.92%) compared to other religious denominations. Based on the data collected, the main occupation of respondents was farming (42.97%) and majority of the participants earned 250ghc or less per month as indicated in table 4.1 below.

Table 4.1 Socio-demographic characteristics

Socio-Demographic characteristics (n=370)			
Variable	Category	Frequency	Percentage %
Age of Mother	15-19	31	8.38
	20-24	109	29.46
	25-29	97	26.22
	30-34	73	19.73
	35-39	40	10.81
	40-44	14	3.78
	45-49	6	1.62
Ethnicity	Dagaao	318	85.95
	Waala	29	7.84

	Brifo	6	1.62
	Akan	1	0.27
	Others	16	4.32
Religion	Christians	292	78.92
	Islam	73	19.73
	Traditional	2	0.54
	None Believer	3	0.81
Residence	Urban	142	38.38
	Rural	228	61.62
Education	No formal education	117	31.62
	Primary school	85	22.97
	JHS	118	31.89
	SHS	31	8.38
	Tertiary	19	5.14
Marital status	Single	16	4.32
	Married	337	91.08
	Divorce	2	0.54
	Widow	4	1.08
	Cohabiting	11	2.97
Mother's occupation	House wife	72	19.46
	Civil servant	36	9.73
	Trader/business woman	103	27.84
	Farming	159	42.97
Father's occupation	Artisan	33	8.92
	Civil servant	58	15.68
	Trader/business man	48	12.97
	Farming	231	62.43
Family monthly income	≤ GHC 250 per month	252	68.11
	GHC 251 – GHC 500 per month	57	15.41
	GHC 501 – GHC 750 per month	41	11.08
	≥ GHC750 per month	20	5.41

Source: field survey 2018

4.2. MOTHER'S KNOWLEDGE ON IMMUNIZATION

4.2.1. Mothers' knowledge on immunization

As shown on table 4.2, one out of three (31.35%) mothers sampled had some knowledge about the schedule for their child vaccination; however, the vast majority (92.16%) did not know the date for the next schedule immunization. It was therefore not surprising to observe that majority of them (60.27%) did not know the number of vaccinations required to complete the immunization schedule. It was however good to note that,

overwhelming majority 357 (96.49%) of the study participants had some knowledge that vaccination protects their children from diseases. About ten (2.70%) said vaccination helps to unmasked hidden diseases for early treatment. Two hundred and twenty-nine (61.89%) agreed that high body temperature is the common side effect of vaccination though about eleven (2.97%) indicated that vaccination cause low body temperature. Some other side effects of vaccination mentioned by respondents included cough, diarrhea and refusal to feed.

About one hundred and seventy-nine (48.38%) had poor knowledge about time of vaccination (schedule for next immunization) and number of vaccinations required to complete the immunization schedule. Only twenty-one (5.68%) of the three hundred and seventy women contacted had good knowledge about immunization in terms of benefits of vaccination, frequency of vaccination, side effects of vaccinations and number of vaccines required to complete the immunization schedule. The remaining one hundred and seventy (45.95%) had fair knowledge as displayed on table 4.2 below.

Table 4.2 Maternal knowledge on vaccination

Knowledge categorical variables	Frequency (n=370)	Percentage (100%)
Schedule of Child's Vaccination		
At birth	116	31.35
6 weeks	96	25.95
10 weeks	11	2.97
14 weeks	6	1.62
9 months	9	2.43
18 months	20	5.41
I don't know	111	30.00
Schedule for Child next immunization		
Yes	29	7.84
No	341	92.16

Number of vaccinations required to complete the schedule		
Two	23	6.22
Four	35	9.46
Six	52	14.05
Eight	16	4.32
Twelve	21	5.68
I don't know	223	60.27
Some Benefits of Vaccination		
Protect against diseases	357	96.49
Cure diseases	2	0.54
Unmask hidden diseases	10	2.70
Don't Know	1	0.27
Side effects of Vaccination		
High body temperature	229	61.89
low body temperature	11	2.97
Others	130	35.14
Knowledge of vaccination among Participants		
Good Knowledge	21	5.68
Fair Knowledge	170	45.95
Poor Knowledge	179	48.38

Source: field survey 2018

4.2.2 Scheduling of child immunization

The age of three hundred and seventy (370) under-five children that were involved in the study ranged from 0 to 59 months of age with the mean age been 1.55 (SD 0.685). Males (53.24%)—were a little higher than their female counterparts (46.76%). Of the three hundred and seventy (370) under-five children, three hundred twenty-two representing 87.03% were fully immunized (up-to-date). Only forty-eight (12.97%) of the children were not fully vaccinated up-to-date.

To ensure validity of responses on their child's immunization status (up-to-date or not), investigators were required to be verified through the child's immunization card. Two hundred and seventy-nine (75.41%) had their children's immunization cards seen. Sixteen (4.32%) mothers said they had their children's immunization cards but were not seen. Only seventy-five (20.27%) women did not have immunization cards for their children because they were never provided to them as shown in table 4.3 below.

Table 4.3: Scheduling of child's immunization

Categorical Variables	Frequency	Percentage %
Child Age		
0-11 months	206	55.68
12-23 months	123	33.33
25-59 months	41	11.11
Sex of the Child		
Male	197	53.24
Female	173	46.76
Number of Children of the mother		
1-3 children	269	72.70
4-7 children	98	26.49
More than 7 children	3	0.81
Vaccinated up-to-date (fully immunized)		
Yes	322	87.03
No	48	12.97
Have child's immunization card		
Yes, and Seen	279	75.41
Yes, but not seen	16	4.32
No	75	20.27

Source: field survey 2018

4.2.3 Attitude of mother's towards vaccination

The results from this study reveal that, mothers have positive attitude towards vaccination (about ninety-four percent (94.12%) of respondents). About three hundred and fifty-five (96.12%) of the respondents agree to vaccinate their child up-to-date.

Only fifteen (3.92%) of the respondents didn't see the importance of vaccinating the child up-to-date. Majority of the mothers 355/370 (96.12%) believe vaccination protects children against childhood killer diseases. Only 15/370 (3.92%) disagree with this assertion. About three hundred and forty-eight (94.12%) of the respondents agree that vaccination increases child's survival. Only twenty-two (5.88%) disagree with the statement and seven (1.96%) were undecided.

Some recommendations from respondents on improving vaccination among mothers included; client education on vaccination at child welfare clinic, 355/370 (96.12%); children should present their immunization cards before being admitted into public and private schools to compel mothers to complete their children immunization, 283/370 (76.47%) and quality refresher training of health workers especially the volunteers to improve their knowledge and practice on immunization services 319/370 (86.27%) as shown in table 4.4 below.

Table 4.4: Attitudinal statements and responses

Attitudinal Statements	Agree	Disagree	Undecided
Vaccination protects children against childhood killer diseases	355 (96.12%)	15 (3.92%)	0 (0%)
Vaccination increases child survival	348 (94.12%)	22 (5.88%)	0 (0%)
Vaccination protect the child from other disease	348 (94.12%)	15 (3.92%)	7 (1.96%)

Source: Field findings, 2018

4.3 MOTHER’S KNOWLEDGE OR PERCEPTION ABOUT THE ATTITUDE AND PRACTICE OF HEALTH WORKERS INVOLVED IN IMMUNIZATION

Three hundred and twenty-eight women (88.65%) knew that outreach service delivery points in the community were functional and 66.76% women were of the view that there were enough health workers to provide immunization services in the community. A large percentage (92.97%) or 344 of women were also of the view that health workers provide health education at health facility/service center during immunization session. Two hundred and sixty women (70.27%) testify to the fact that they have never been returned home by staff because vaccines were not available. An overwhelming majority (341) 92.16% of the women describe the attitude of health workers during immunization activities as positive and good.

Table 4.5 Mother’s knowledge or perception about attitude and practice of health workers involved in immunization

Mother’s knowledge or perception	Frequency (n=370)	Percentage (n=100)
Functional outreach services delivery point in the community		
Yes	328	88.65
No	28	7.84
I don’t Know	13	3.51
Enough health workers to provide immunization services		
Yes	247	66.76
No	123	33.24
Health workers provide health education at CWC session		
Yes	344	92.97
No	26	7.03
Ever returned home for vaccines unavailability		

Yes	110	29.73
No	260	70.27
Perception on Health worker attitude		
Poor/Negative	29	7.84
Good/Positive	341	92.16

Source: field survey 2018

4.4 MATERNAL AND COMMUNITY FACTORS INFLUENCING CHILD IMMUNIZATION

All the three hundred and seventy 370 (100%) women indicated that, their culture and religion permit child immunization. One other community factor that influence child's vaccination is the distance to the service delivery point. About one hundred and sixty-nine (45.68%) of the respondents walk more than 30 minutes to the facility for their child to be vaccinated as shown in table 4.6 below.

Table 4.6: Maternal and community factors that influence child Immunization

Maternal and Community factors (Categorical Variables)	Frequency (n=370)	Percentage (n=100%)
Does your culture permit child immunization		
Yes	370	100
No	0	0
Does your religion permit child immunization		
Yes	370	100
No	0	0
Distance from delivery Point		
Less than 30 minutes" walk	201	54.32
More than 30 minutes" walk	169	45.68

Source: field survey 2018

4.5 ASSOCIATIONS BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND VACCINATION

Adjusted logistic regression results of socio-demographic factors show that maternal age, level of education, and mother's occupation were found statistically significantly associated with up-to-date vaccination of the child ($p < 0.05$). Mothers who were 40-44 and 45-49 years were less likely to fully vaccinate their child (up-to-date) (aOR 0.08 95% CI 0.01-0.955 & aOR 0.05 95% CI 0.00-0.68 respectively) than mothers in their active reproductive age (25-34 years) though was not significant. Mother's with primary level of education and a trader as their occupation were also less likely to vaccinate their child up-to-date (aOR 0.00 95% CI 0.00-0.73 & 0.17 95% CI 0.01-0.54 respectively). Other socio-demographic variables such as religion, ethnicity and place of residence of the mother were not found statistically significance with up-to-date vaccination of the child ($p > 0.05$). Table 4.5 shows socio-demographic factors against up-to-date vaccination.

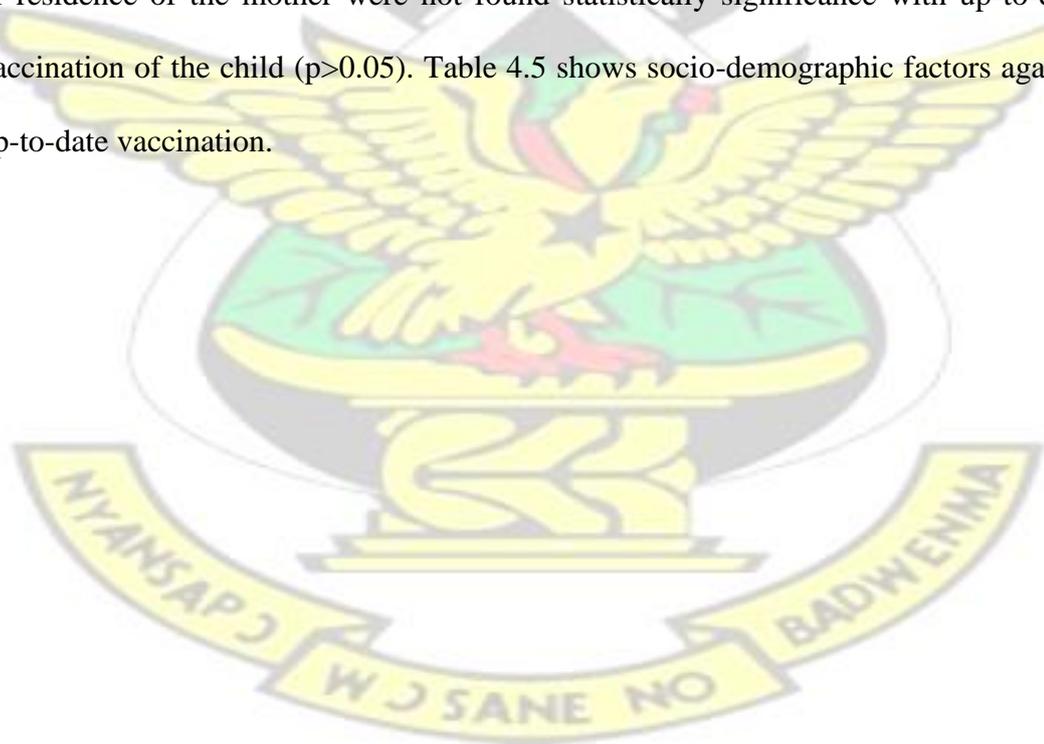


Table 4.7 Relationship between socio-demographic factors and vaccination

Socio-demographic Factors	Vaccination (up-to-date) N (%)	Vaccination (Not up-to-date) N (%)	Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
Mother's Age						
15-19	30 (8.11)	1 (0.27)	1		1	
20-24	92 (24.87)	17 (4.59)	0.18 (0.02-1.413)	0.10	0.18 (0.23-1.50)	0.11
25-29	86 (23.25)	11 (2.97)	0.26 (0.03-2.105)	0.21	0.24 (0.03-2.04)	0.19
30-34	68 (18.38)	5 (1.35)	0.45 (0.05-4.05)	0.48	0.48 (0.52-4.60)	0.53
35-39	33 (8.92)	7 (1.89)	0.15 (0.02-1.35)	0.09	0.18 (0.02-1.72)	0.14
40-44	10 (2.70)	4 (1.08)	0.08 (0.01-0.84)	0.04*	0.08 (0.01-0.96)	0.05*
45-49	3 (0.81)	3 (0.81)	0.03 (0.00-0.43)	0.01*	0.05 (0.00-0.68)	0.02*
Place of Residence						
Urban	129 (34.87)	13 (3.51)	1		1	
Rural	193 (52.16)	35 (9.46)	0.56 (0.28-1.09)	0.09	0.86 (0.39-1.90)	0.71
Level of Education						
No formal Education	105 (28.38)	12 (3.24)	1		1	
Primary	66 (17.84)	19 (5.13)	0.39 (0.18-0.87)	0.21	0.30 (0.12-0.73)	0.01*
JHS	103 (27.84)	15 (4.05)	0.78 (0.35-1.76)	0.56	0.42 (0.165-1.08)	0.07
SHS	31 (8.38)	0 (0)	1		1	
Tertiary	19 (4.59)	2 (0.54)	0.97 (0.199-4.73)	0.97	0.63 (0.12-3.42)	0.59
Mother's Occupation						
House-wife	68 (18.38)	4 (1.08)	1		1	
Artisan/Self employed	36 (9.73)	0 (0)	1		1	
Civil Servant	94 (25.40)	9 (2.43)	0.61 (0.18-2.08)	0.43	0.90 (0.24-3.35)	0.88

Trader/Business woman	124 (33.51)	35 (9.46)	0.21 (0.07-0.61)	0.00*	0.17 (0.06-0.54)	0.00*
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Ethnicity						
Dagao	276 (74.59)	42 (11.35)	1		1	
Waala	26 (7.03)	3 (0.81)	1.32 (0.38-4.55)	0.66	0.88 (0.24-3.286)	0.86
Brifo	4 (1.08)	2 (0.54)	0.30 (0.054-1.713)	0.177	0.25 (0.04-1.75)	0.17
Akan	1 (0.27)	0 (0)	1		1	
Others	15 (4.05)	1 (0.27)	2.28 (0.294-17.73)	0.430**	2.08 (0.25-17.55)	0.50
Religion						
Christian	257 (69.46)	35 (9.46)	1		1	
Muslim	62 (16.76)	11 (2.97)	0.76 (0.37-1.60)	0.48	0.69 (0.31-1.53)	0.36
Traditional Believer	1 (0.27)	1 (0.27)	0.14 (0.01-2.23)	0.162**	0.06 (0.00-2.12)	0.125
Non-Believer	2 (0.54)	1 (0.27)	0.27 (0.02-3.08)	0.293**	0.31 (0.02-4.84)	0.41

* p<0.05 variable with significant association with up-to-date child vaccination.

** Fishers exact p value estimated



4.6 RELATIONSHIP BETWEEN MATERNAL KNOWLEDGE AGAINST VACCINATION

Mothers with poor knowledge about vaccination were least likely to vaccinated their child up-to-date (aOR 0.40 95%CI 0.21-0.78, p=0.01). The attitude of mothers towards vaccination was also found statistically significant to the up-to-date vaccination of the child. Mothers with positive attitude were three times more likely to vaccinate their child up-to-date (aOR 3.15 95%CI 1.57-4.201, p=0.00) compared to the counterpart mothers with negative attitude toward vaccination (aOR 0.75 95%CI 0.05-0.13, p=0.01)

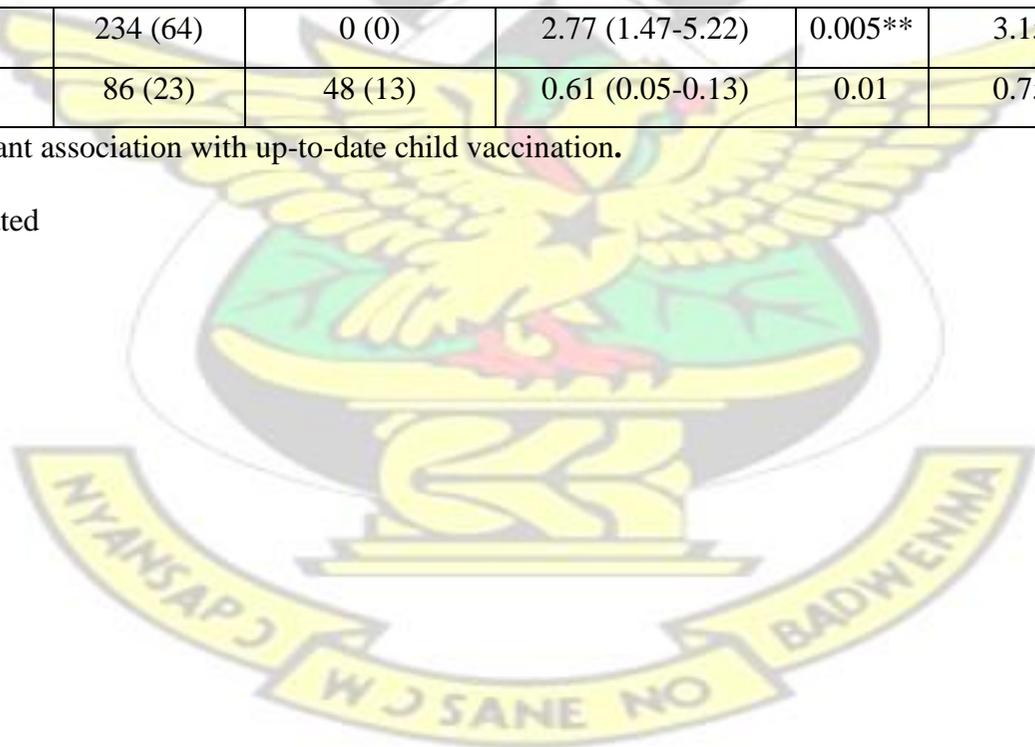


Table 4.8 Maternal knowledge and attitude against vaccination

Knowledge and Attitude factors	Vaccination (up-to-date) N (%)	Vaccination (Not up-to-date) N (%)	Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P value
Knowledge of Vaccination among Participants						
Good Knowledge	20 (5.41)	1 (0.27)	1.25 (0.22-15.24)	0.601	1.79 (0.22-14.40)	0.58
Fair Knowledge	156 (42.16)	14 (3.78)	0.55 (0.07-4.48)	0.583	0.56 (0.70-4.48)	0.57
Poor Knowledge	146 (39.46)	33 (8.92)	0.22 (0.03-1.73)	0.157	0.40 (0.20-0.78)	0.01*
Attitude of Participants towards Vaccination						
Positive Attitude	234 (64)	0 (0)	2.77 (1.47-5.22)	0.005**	3.15 (1.57-4.20)	0.00*
Negative Attitude	86 (23)	48 (13)	0.61 (0.05-0.13)	0.01	0.75 (0.05-0.13)	0.01*

* p<0.05 variable with significant association with up-to-date child vaccination.

** Fishers exact p value estimated



4.7 OTHER FACTORS INFLUENCING UP-TO-DATE VACCINATION

Other contributing factors/variables such as child's age ($p=0.719$), child's sex ($p=0.863$) and waiting time at immunization centers that influences up-to-date vaccination of the child were found not significant to up-to-date vaccination of the child. On the other hand, factors such as distance of home from service delivery point, a functional outreach service delivery point and number of antenatal contacts was found statistically significant as shown on table 4.7. Mothers who live more than 30 minutes' walk from the health facility or immunization center were less likely to fully immunized their children (aOR 0.41 95% CI 0.218-0.773; $p=0.006$).

The results also indicate the importance of functional outreach services delivery point in the community and fully vaccination of the child. Communities with a functional outreach service delivery point were four times more likely to have their child immunized up-to-date (aOR 4.23, 95%CI 1.772-10.116, $p=0.011$). Communities with no functional outreach service delivery point were less likely to have their child vaccinated up-to-date ($p=0.014$). The number of antenatal visits were found a determinant factor of immunization (aOR 1.78 95% CI 1.081-2.944, $p=0.024$) at the adjusted logistic regression analysis. The odds of up-to-date immunization for children was 1.7 times higher among mother's who have visited the antenatal clinic four times and more than mothers who had visited antenatal clinics below four times.

Table 4.9 Other categorical variables that influence vaccination of the child

Categorical Variables	Child's Vaccination Up-to-date)	Child's Vaccination (Not-up-to-date)	Adjusted OR (95%CI)	P-value
functional outreach services delivery point in the community				
Yes	295 (79.73)	33 (8.92)	4.23 (1.77-10.12)	0.01*
No	19 (5.14)	9 (2.43)	0.24 (0.10-0.56)	0.01*
I don't know	8 (2.16)	5 (1.35)	1	
Waiting time at Immunization service				
About 10 mins	21 (5.68)	1 (0.27)	1	
11-20 mins	32 (8.65)	7 (1.89)	0.22 (0.25-1.90)	0.17
21-30 mins	95 (25.68)	6 (1.62)	0.75 (0.861-1.90)	0.80
>30 mins	174 (47.03)	34 (9.19)	0.24 (0.034-1.87)	0.18
Number of ANC Visits				
Once			1	
Twice	8 (2.17)	0 (0)	1.43 (0.31-6.74)	0.65
Thrice	25 (6.79)	11 (2.98)	0.41 (0.08-2.18)	0.30
Four and above	276 (74.99)	35 (9.51)	1.78 (1.08-2.94)	0.02*
Place of delivery				
Home	31 (8.38)	8 (2.16)	1	
Hospital/Clinic/Maternity home	291 (78.65)	40 (10.81)	1.87 (0.81-4.37)	0.14
Child's sex				
Male	172 (46.48)	25 (6.75)	1	
Female	150 (40.54)	23 (6.22)	0.95 (0.52-1.74)	0.86
Distance from service delivery point				
Less than 30mins walk	184 (49.73)	17 (4.59)	1	
More than 30mins walk	138 (37.30)	31 (8.38)	0.41 (0.22-0.77)	0.01*

* p<0.05 variable with significant association with up-to-date child vaccination.

FINDINGS OF THIS STUDY

- Overwhelming majority of the children selected for this study has been vaccinated up-to-date at the specified time period.
- Cultural factors such as religion and ethnicity play no role in the up-to-date vaccination of the child. However, socio-demographic factors such as mother's occupation, level of education and age play a significant role in the up-to-date vaccination.
- It was also found in this study that knowledge about vaccination was predominant among women whose children had been vaccinated up-to-date. Women with poor knowledge about vaccination were less likely to vaccinate their child up-to-date.
- The existence of a functional outreach service delivery point in the community also improves up-to-date Childs' vaccination.
- It was also found that the number of ANC visits/contacts proves to be a significant factor that influences the up-to-date vaccination of the child.
- In this study it was found out that many women had positive attitude towards immunization, and those that had positive attitude toward immunization were 3 times more likely to vaccinate their children up-to-date

Weakness of the study

The high immunization coverage recorded in this study could be as a result of including one month children in the inclusion e criteria due the fact that all children delivered at health facility should receive immunization at birth.

CHAPTER FIVE

DISCUSSIONS

This chapter looks at the findings of the study that was aimed at identifying the factors influencing immunization coverage. Inequalities in immunization coverage among under-5 occur when primary health care services are not accessible or utilized by certain people (mostly mothers/caretakers) due to socio-economic status, ethnicity, geographical residence and other characteristic. Achieving immunization equalities requires not only the effort on provision of immunization services but also optimum utilization of these services by mothers/caretakers of under-5 who are mostly the target of childhood immunization.

High or low immunization coverage among under-five children can result from mother's knowledge on immunization, mother's age and educational level, attitude and number of health workers involve in immunization activities in that area (ChrisOtubor *et al.*, 2015).

In this study, a sample of 370 participants was used to generate the data for the study as discussed below.

The proportion of children who have been vaccinated up-to-date was remarkably high (87.03%) in this study which is slightly above the national target of at least 80% coverage in all antigens (GHS, 2015). We therefore assessed the demographic factors, knowledge and attitudinal factors, and maternal and community factors that might have influenced this high immunization rate as discussed in this chapter.

5.1 MOTHERS' KNOWLEDGE ON IMMUNIZATION

Lack of knowledge of mothers on immunization is a huge barrier and detrimental to immunization coverage (Chris-Otubor *et al.*, 2015). In this study, we found out that almost 3 in 5 (48.4%) mothers had poor knowledge of vaccination in relation to the

number of vaccinations recommended, and vaccination schedules although majority of the mothers have some education on the benefits of vaccinating their child. This finding is in line with a cross-sectional study conducted in Mangahore, India (Mahalinga *et al.*, 2014) and that of Angadi *et al.*, (2013) also conducted in rural India. The study also found an association between mothers' knowledge and level of education. Mothers who had attained Senior high school education and above were almost twice more likely to have good knowledge of vaccination and were also more likely to vaccinate their children up-to-date. This is in line the findings of a study conducted in Somalia (Mohamed *et al.* 2016), Indonesia by Holipah, M. A. and Kuroda, Y. (2018) and the results from the Ghana Demographic Health Survey (2014). Acceptance of any immunization program among under-five is highly dependent on parental attitude toward immunization. In this study it was found out that many women had positive attitude towards immunization, and those that had positive attitude toward immunization were 3 times more likely to vaccinate their children upto-date compared to their counterpart with negative attitude toward immunization. This result contradicts the finding of a study conducted in Jos North, Nigeria (ChrisOtubor *et al.*, 2015). However, it is consistent with a study conducted in a traditional city in the United Arab Emirates (Bernsen *et al.*, 2011).

5.2 MOTHERS' PERCEPTIONS OR KNOWLEDGE ABOUT THE ATTITUDES AND PRACTICES OF HEALTH WORKERS INVOLVED IN IMMUNIZATION ACTIVITIES

Numerous researches have indicated that, the acceptance of immunization program is highly dependent on both mothers/caregivers (parental) perception about staff attitudes towards immunization and knowledge on vaccine and immunization activities. This parental perception, to large extend, is due to ignorance and fear of adverse effects of

vaccine on the part of mothers, which has high negative impact on immunization coverage (WHO, 2013, and Bernsen et al., 2011). Mother's perception on the attitudes and practices of health workers to immunization activities was seen positive in this study. This findings is consistent with a study conducted in Benadir region, Somalia by Mohamed et al., (2016) in which many mothers have positive perception about providers attitude and indicated that vaccinators are friendly and supportive in terms of educating and encouraging them to continuous to access immunization service. However, this finding contradicted another study done in Enugu state by Tagbo & Uleanya, 2015, where mothers indicated negative attitude of providers as their reason for not completing their children immunization.

5.3 MATERNAL AND COMMUNITY FACTORS INFLUENCING CHILD IMMUNIZATION

Maternal education plays a significant role in children immunization. It is well documented that well educated mothers have better knowledge and understanding of childhood diseases that can be prevented by vaccine and recognize the importance of vaccination. According to the findings of this study, mothers with Primary level of education and lower were less likely to fully vaccinate their children compared to their colleague mothers with a higher level of education. This finding is in line with a study conducted by Lakew et al., (2015) in Ethiopia, where it was found out that, mothers with higher level of education were more likely to vaccinate their children up-to-date. Simila studies conducted in Kaduna state and Enugu state in Nigeria by Taiwo et al., (2017) and Tagbo & Uleanya, 2015 respectively also indicated same.

Also in Somalia by Mohamud et al., (2014) and another in United Arab Emirates by Bernsen *et al.*, (2011), indicated maternal education as a predictor of child immunization completion. That is, mothers with high education are more likely to obtained information

on immunization, have positive attitude toward immunization and are more likely to immunize their children.

The occupation of the mother was also recognized in this study as a maternal factor that influences child vaccination. Mothers into trading and other business ventures were less likely to vaccinate their children up-to-date compared to their counterpart in the civil service. This result is consistent with a cross-sectional study conducted by Tagbo & Uleanya, 2015 in Enugu state Nigeria where mothers in civil service were more likely to vaccinate their children at age specific than traders and house wives.

Another maternal factor that this study found to be significantly important to the up-to-date under-five vaccination is the mother's age. According to the findings of this study, mothers aged 40-49 were less likely to vaccinate their child up-to-date. This finding is supported by results of the Ghana Demographic and Health Survey, 2014.

However, this finding is in disagreement with a study conducted in Somalia, 2014, by Mohamud et al., which indicates that older mothers (30 years and above) are about four times more likely to immunize their children than mothers below 30 years.

Community factors such as distance, availability of functional outreaches were contributing factors that influence the up-to-date vaccination of the child. In situation where the service delivery point is far from households and also non-availability of functional outreach services, patronage of immunization service there is low. In this study, it was found out that, where the service delivery point is more than a 30minutes walk, mothers were less likely to vaccinate their child up-to-date. This finding is in support with a study conducted in Somalia (Mohammed et al., 2016). This study also found out that, where there are functional outreach services and availability of vaccinators, mothers were three time more likely to vaccinate their child up-to-date.

This finding is supported by an econometric analysis conducted in UK (Anand & Bärnighausen, 2016).

KNUST



CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Vast majority of the children selected for this study has been vaccinated up-to-date at the age specified time period. Although up-to-date vaccination of the child in this setting was impressive, knowledge about vaccination was not fairly universal among mothers. Socio-demographic factors such as mother's occupation, age and level of education play a significant role in the up-to-date vaccination.

The attitude of mothers towards vaccination was very positive. This could utterly explain why majority had their children vaccinated up-to-date.

Cultural factors such as religion and ethnicity play no role in the up-to-date vaccination of the children. However, the existences of a functional outreach service and distance to the service delivery point in the community influences the up-to-date Children's vaccination. It was also established that the number of ANC visits/contacts is significant factor that influences the up-to-date vaccination of the child.

6.2 RECOMMENDATIONS

Ghana Health Service/Health Facilities, Jirapa

- The Ghana Health Service should provide regular refresher training of health workers especially the volunteers to improve their knowledge and practice on immunization services.
- The Ghana Health Service (GHS) should collaborate with other institutions such as the Ghana Education Service (GES) and the Ministry of Health to make vaccination a compulsory requirement during enrolment of their children to school.

Midwives and community health nurses

- Midwives and community health nurses should endeavor to prioritize client education aimed at altering the negative attitude toward their child vaccination. This should be included as part of their regular sessions during child welfare clinics and outreach services
- They should occasionally educate mothers individually on the number of vaccines and the schedule of vaccination needed for their children

Mothers / parents and the community members

- Ghana education service (GES) in collaboration with parent and community members should encourage/promote girl child education to Senior High School and beyond as a long-term measure to equip them with the ability to read and understand matters relating to childhood immunization.
- Mothers into trade and business ventures should be given special attention and treatment in terms of child immunization to enable them complete their children vaccination.
- Encourage more women to attend antenatal clinic where they can access correct childhood immunization information before delivery.

For further research:

1. Similar research should be done using 11-23moths
2. Similar research should be done on mothers attitude toward immunization of their children

REFERENCES

- Anand, S. and Bärnighausen, T. (2016) „*Health workers and vaccination coverage in developing countries: an econometric analysis*’, *The Lancet*, 369(9569), pp. 1277–1285. doi: 10.1016/S0140-6736(07)60599-6.
- Asuman, D., Ackah, C. G. and Enemark, U. (2018) „*Inequalities in child immunization coverage in Ghana: evidence from a decomposition analyses*, *Health Economics Review*. *Health Economics Review*, 8(1). doi: 10.1186/s13561-018-0193-7.
- Bernsen, R. M. et al. (2011) „*Knowledge , Attitude and Practice towards Immunizations among Mothers in a Traditional City in the United Arab Emirates*“, *Journal of Medical Sciences*, 4(3), pp. 114–121.
- Bocquetnet, G., Chaiban, T., Cook, S., Escudero, P. Franco, A., Romo, C.G., Holmqvist, G., Hulshof, K., Khan, A., Kjørven, O., Malley, J. O, Guidance, P., Alim, A., Anthony, D., Borisova, I., Bourne, J., Brandt, N., Chai, J., Dickson, K., Evans, M., Garcia, F., Ganesh, V., Holland, K., Kummer, T., Pandian, D., Stewart, D., Strecker, M., Taylor, G., Van, J., Vojvoda, R., Wietzke, F. B., Yuster, A. and Zaman, M. (2016) *The State of the World’s Children 2016: A fair chance for every child*, United Nations Children’s Fund. doi: 10.18356/4fb40cfa-en.
- Burton, A., Monasch, R., Lautenbach, B., Gacic-Dobo, M., Neill, M., Karimov, R., Wolfson, L., Jones, G. and Birmingham, M. (2009) „*WHO and UNICEF estimates of national infant immunization coverage: Methods and processes*’, *Bulletin of the World Health Organization*, pp. 535–541. doi: 10.2471/BLT.08.053819.
- Bustreo, F., Okwo-Bele, J. M. and Kamara, L. (2015) ‘*World Health Organization perspectives on the contribution of the Global Alliance for Vaccines and Immunization on reducing child mortality*’, *Archives of Disease in Childhood*, 100(Suppl 1), pp. S34–S37. doi: 10.1136/archdischild-2013-305693.
- Casey, R. M., Hampton, L. M., Anya, B. M., Gacic-Dobo, M., Diallo, M. S. and Wallace, A. S. (2017) „*State of equity: childhood immunization in the World Health Organization African region*’, *Pan African Medical Journal*, 27. doi: 10.11604/pamj.supp.2017.27.3.12114.
- Chris-Otubor, G.O., Dangiwa, D.A, Ior, L.D. and Anukam, N.C. (2015) „*Assessment of Knowledge, Attitudes and Practices of Mothers in Jos North Regarding*

- Immunization*’, IOSR Journal Of Pharmacy, 5(6), pp. 2250–3013. Available at: <http://www.iosrphr.org/papers/v5i6/H0506034045.pdf>.
- Feldstein, L.R., Mariat, S., Gacic-Dobo, M., Diallo, M.S., Conklin, L.M. and Wallace, A. S. (2017) „*Global Routine Vaccination Coverage, 2016*“, MMWR. Morbidity and Mortality Weekly Report, 66(45), pp. 1252–1255. doi: 10.15585/mmwr.mm6645a3.
- Ghana Health Service (2014) „*Immunization Programme Comprehensive Multi-Year Plan*’, (May 2011), pp. 1–60. Available at: <http://www.gavi.org/country/ghana/documents/cmyps/comprehensive-multiyear-plan-for-2010-2014>.
- Ghana Health Service (2017) *Upper West Regional Regional Health Services 2016 Annual Report*.
- Ghana Statistical Service (2015) „*Ghana Demographic Health Survey*’, Ghana Statistical Service, p. 530. Available at: <https://dhsprogram.com/pubs/pdf/FR307/FR307.pdf>.
- Holipah, M. A. and Kuroda, Y. (2018) *Determinants of immunization status among 12- to 23-month-old children in Indonesia (2008-2013): A multilevel analysis*: p; 1-11
- Ibnouf, A.H., Borne, H.W. Van den and Maarse, J. A. M. (2007) ‘*Factors influencing immunisation coverage among children under five years of age in Khartoum State, Sudan.*’, South African Family Practice, p. 14. doi: 10.1080/20786204.2007.10873611.
- Ilusanya, T. O. and Oladosun, M. (2016) „*Socio-Economic Factors Influencing Health Behavior of Women and Immunization Status of Children in Nigeria*’, pp. 485–490.
- Jheeta, M. and Newell, J. (2008) „*Childhood vaccination in Africa and Asia: The effects of parents’ knowledge and attitudes*’, *Bulletin of the World Health Organization*, p. 419. doi: 10.2471/BLT.07.047159.
- Lakew, Y., Bekele, A. and Biadgilign, S. (2015) „*Factors influencing full immunization coverage among 12–23 months of age children in Ethiopia: evidence from the national demographic and health survey in 2011*“. BMC Public Health, 15(1), p. 728. doi: 10.1186/s12889-015-2078-6.

- Mahalingam, S., Soori, A., Ram, P., Achappa, B., Chowta, M. and Madi, D. (2014) „Knowledge, attitude and perceptions of mothers with children under five years of age about vaccination in Mangalore, India“, *Asian Journal of Medical Sciences*, 5(4). doi: 10.3126/ajms.v5i4.10306.
- Mihigo, R., Okeibunor, J., Anya, B., Mkanda, P., Zawaira, F., Davis, R., Cochi, S. and Rees, H. (2017) „Supplement article Case study Challenges of immunization in the African Region“, 27(Supp 3), pp. 1–6. doi: 10.11604/pamj.supp.2017.27.3.12127.
- Mohamed, A., Karanja, S. and Udu, R. (2016) „*Journal of Chemical, Biological and Physical Sciences Barriers to Full Immunization Coverage of Under Five Years Children in Benadir Region Somalia*“, (October).
- Mohamud, A.N., Amsalu F., Walegn W., Manay K. and Hardeep R.S. (2014) *Immunization coverage of 12–23 months old children and associated factors in Jigjiga District, Somali National Regional State, Ethiopia*. Accessed on 8/11/2018 from <http://www.biomedcentral.com/1471-2458/14/865>
- Negussie, A., Kassahun, W., Assegid, S. and Hagan, A. K. (2015) „*Factors associated with incomplete childhood immunization in Arbegona district, southern Ethiopia: a case – control study*“. BMC Public Health, 16(1), p. 27. doi: 10.1186/s12889-015-2678-1.
- Oku, A., Oyo-ita, A., Glenton, C., Fretheim, A., Ames, H., Muloliwa, A., Kaufman, J., Hill, S., Cliff, J., Cartier, Y., Owoaje, E., Bosch-capblanch, X., Rada, G. and Lewin, S. (2017) „*Perceptions and experiences of childhood vaccination communication strategies among caregivers and health workers in Nigeria : A qualitative study*“, pp. 1–21.
- Riedmann, E. M. (2010) „*Report: State of the world`s vaccines and immunization*“, Human Vaccines, 6(2), pp. 157–163. doi: 10.4161/hv.6.2.11326.
- Taiwo, L., Idris, S., Abubakar, A., Nguku, P., Nsubuga, P., Gidado, S., Okeke, L., Emiasegen, S. and Waziri, E. (2017) „*Factors affecting access to information on routine immunization among mothers of under 5 children in Kaduna state Nigeria, 2015*“, Pan African Medical Journal, 27, pp. 1–8. doi: 10.11604/pamj.2017.27.186.11191.
- WHO (2013) „*Global Vaccine Action Plan*“, Vaccine, 31(May), pp. B5–B31. doi: 10.1016/j.vaccine.2013.02.015.

WHO (2018) Fact sheet N°169 http://www.who.int/immunization/monitoring_surveillance/data/ago.pdf

http://www.who.int/immunization/monitoring_surveillance/data/isr.

WHO and UNICEF (2017) „*Ghana: WHO and UNICEF estimates of immunization coverage: 2016 revision*’, WHO Reports, pp. 1–21. Available at: https://data.unicef.org/wpcontent/uploads/country_profiles/Ghana/immunization_country_profiles/immunization_gha.pdf

http://www.who.int/immunization/monitoring_surveillance/data/ago.pdfhttp://www.who.int/immunization/monitoring_surveillance/data/isr.

Yawson, A. E. O., Bonsu, G., Senaya, L. K., Eleeza, J. B., Awoonor-Williams, J. K., Banskota, H. K., and Agongo, E. E. A. (2017) „Regional disparities in immunization services in Ghana through a bottleneck analysis approach: implications for sustaining national gains in immunization’, *Archives of Public Health*. *Archives of Public Health*, 75(1), pp. 1–10. doi: 10.1186/s13690-017-0179-7.



APPENDICES

Appendix 1: Questionnaire

QUESTIONNAIRE FOR MOTHERS OF CHILDREN UNDER FIVE YEARS OF AGE

We are carrying out a study on factors influencing immunization coverage. We will be speaking to mothers of children below 5 years of age. The study is for academic purpose and way of improving health service delivery. Hence you are assured that all responses shall be treated as **confidential**. Thank you for your co-operation.

Instruction: Please tick [] the appropriate answer or fill in the blank space (where necessary)

SOCIO DEMOGRAPHIC CHARACTERISTICS

1. How old are you (mother's age)?
2. Your ethnicity
Dagao [] Waala [] Brifo [] Akan [] Others
3. What is your religion?
Christian [] Islam [] Traditional [] none believer []
4. Place of residence
Urban [] Rural []
5. What is your highest level of formal education?
No formal education [] Primary school [] JHS [] SHS [] Tertiary []
6. Marital status?
Single [] Married [] Divorce [] Widow [] Cohabiting []
7. What work do you do for a living (occupation)?
House wife [] Artisan/self-employed [] Civil servant [] Trader/business woman [] Farming []
8. What is the child father's occupation
Artisan [] Civil servant [] Trader/business man [] Farming []
9. Family monthly income
 - a) \leq GHC 250 per month []
 - b) GHC 251 – GHC 500 per month []
 - c) GHC 501 – GHC 750 per month []
 - d) \geq GHC750 per month []

MOTHER'S KNOWLEDGE AND ATTITUDE ON IMMUNIZATION

10. Did you attend antenatal care (ANC) before delivery?

Yes No

11. If **No** to **question 10** above skip to next question, if **yes**, number of visits?

Once Twice Thrice Four times and above

12. Where did you deliver this child?

Home Hospital/clinic/maternity home

13. What is the birth order of this child?

1st born 2nd born 3rd born 4th or beyond

14. What is the schedule for your child vaccination/immunization?

At birth 6 weeks 10 weeks 14 weeks 9 months 18 months I don't know

15. How many vaccines are required to complete a vaccination schedule (up-to-date) by the time your child is 5 years?

Two Four Six Eight Twelve I don't known

16. What is the common vaccine/immunization side effect?

High body temperature low body temperature vomiting diarrhea others.....

17. Do you know the schedule for the next vaccination/immunization of your child?

Yes No

SCHEULING OF CHILD IMMUNIZATION

18. Age of the child.....

19. What is the sex of the child

Male Female

20. How many children do you have?

21. Is the child vaccinated up to date (full vaccinated/taken the entire age specific recommended vaccine)?

Yes No

22. Do you have this child's immunization card?

Yes and seen Yes but not seen No

23. If **no** in question **21** above, what is the main reason why you do not immunized the child up to date?

- a. Lack of knowledge on next visit
- b. Distance to the health facility
- c. Due to work load
- d. The child was sick
- e. No permission from husband/family head
- f. No money
- g. Personal disapproval
- h. Due to poor attitude of health workers
- i. Cultural disapproval
- j. Religious disapproval
- k. Long queue in the vaccination center
- l. Due to unknown side effect of the vaccine
- m. Others

24. If **yes** in question **22** above **skip** to next, **if no**, what is the main reason why you do not have this child immunization card or booklet?

I lost it my health care provider keeps it One was never provided to me

25. Have you ever postponed your child's attendance to immunization session?

Yes No

26. Averagely what is the waiting time at the health facility/immunization services center during immunization activities?

About 10 minutes 11-20 minutes 21-30 minutes >30 minutes

27. How far is your place/house to the service delivery point?

Less than 30 minutes" walk More than 30 minutes" walk

MOTHER'S PERCEPTION ABOUT THE ATTITUDE AND PRACTICE OF HEALTH WORKERS INVOLVED IN IMMUNIZATION

28. Do you have functional outreach services delivery point in the community? Yes

No

29. Averagely, how will you describe the health workers attitude toward you during immunization activities?

Very bad [] Bad [] Good [] Very good []

30. Are there enough health workers to provide immunization services in the community?

Yes [] No []

31. Do the health workers provide health education at health facility/service center during immunization session? Yes [] No []

32. Have you ever been returned home by staff because vaccines were not available?

Yes [] No []

MATERNAL AND COMMUNITY FACTORS INFLUENCE CHILD IMMUNIZATION

33. Does your culture permit child immunization?

Yes [] No []

34. Does your religion permit child immunization?

Yes [] No []

35. What informed your decision to vaccinate your child through routine immunization services?

- a) Protect against diseases []
- b) Information on Safety of vaccine []
- c) Place for vaccination is close to my house []
- d) Information on the schedule for vaccination of child []
- e) School admission requirement []
- f) Cure diseases []
- g) Unmask hidden diseases []
- h) Don't know []
- i) Others

MOTHERS' ATTITUDE TO CHILD IMMUNIZATION

Item	Agree	Disagree	Undecided
36. In order to protect children against childhood killer diseases, all children must take all the age specific vaccination			
37. Up-to-date child's vaccination help increase child's survival			
38. Do you agree to/desire client education on children age specific vaccination at child welfare clinic.			

39. Vaccination protects your child from some diseases.			
40. Do agree that all vaccines are safe for children uptake.			
41. I recommend quality refresher training of health workers especially the volunteers to improve their knowledge and practice on immunization services			
42. I recommend that all mothers do their best to send their children for all the age specific vaccination.			
43. I recommend that children should present their immunization cards before being admitted into public and private schools to compel mothers to complete their children immunization			



Appendix 2: Ethical Approval

 **KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**
COLLEGE OF HEALTH SCIENCES

 **SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL**
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Ref: CHRPE/AP/503/18 23rd August, 2018.

Mr. Desmond Bayor
Department of Community Health
School of Medical Sciences
KNUST-KUMASI

Dear Sir,

LETTER OF APPROVAL

Protocol Title: "Factors Influencing Immunization Coverage Among Children Under-Five"

Proposed Site: Jirapa Municipal.

Sponsor: Principal Investigator.

Your submission to the Committee on Human Research, Publications and Ethics on the above-named protocol refers.

The Committee reviewed the following documents:

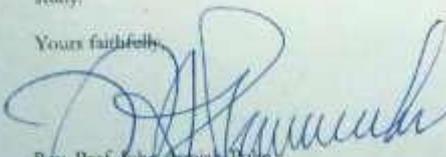
- A notification letter of 29th May, 2018 from the Jirapa Municipal Health Directorate (study site) indicating approval for the conduct of the study in the Municipality.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 23rd August, 2018 to 22nd August, 2019 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Yours faithfully,



Rev. Prof. John Acquah
Honorary Secretary
FOR CHAIRMAN

Room 7 Block J, School of Medical Sciences, KNUST, University Post Office, Kumasi, Ghana
Phone: +233 3220 63248 Mobile: +233 20 5453785 Email: chrpe.knust.kath@gmail.com / chrpe@knust.edu.gh

Appendix 3: Ethics Review Comments - Conditional Approval

 KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES

 **COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS**

Ref: CHRPE/RC/099/18 6th July, 2018.

Mr. Desmond Bayor
Community Health
Nursing Training College
Post Office Box 46
JIRAPA.

Dear Sir,

ETHICS REVIEW COMMENTS – CONDITIONAL APPROVAL

Protocol Title: "Impact of Feeding Practices on Nutritional Status of Children Under-Five."

Following an expedited review, your protocol was given a conditional approval subject to you addressing the following concerns/queries:

On the CHRPE Form:

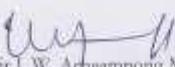
Item 1.1: 1. The study title varies. Please ensure that the title is the same throughout the protocol.
Item 2.6: 2. Which other group of mothers will be excluded? Eg. Mothers within the reproductive age, have a child under five, but is unwell.
Item 2.10: 3. Hard copies of the filled questionnaire/data collection tool and data obtained forms should be kept for more than 3 years. We propose 4 years in a locked cabinet and soft copies should be password protected.
Item 2.11: 4. Add the Ethics Committee.
Item 2.12: 5. Some issues of confidentiality will come up.
Item 2.13: 6. Your response could be by assuring privacy and re-assurance of keeping patients information strictly confidential.

On the Participant Information Leaflet (PIL) and Consent Form:

7. Kindly simplify the background and procedure information.
8. No medical jargons, use simple English such that a lay person will understand and Summarize as well.

Kindly make the necessary amendments and submit one copy each of all required documents to the CHRPE (Room 7 Block J, School of Medical Sciences, KNUST), along with a letter explaining the changes you have made to each document. The date and reference number of this letter should be quoted in your letter.

Thank you, Sir for your application.


Osomfo Prof. Sir J. W. Acheampong MD, FWACP
Chairman

Room 7 Block J, School of Medical Sciences, KNUST, University Post Office, Kumasi, Ghana
Phone: +233 3220 63248 Mobile: +233 20 5453785 Email: chrpe.knust.kath@gmail.com / chrpe@knust.edu.gh

Appendix 4: Re-Ethics Review Comments - Conditional Approval

C/o Community Health Nursing Training College,

Post Office Box 46,
Jirapa, Upper West Region.

8th August, 2018

The Chairman,

Committee on Human Research and Publications Ethics, Kwame
Nkrumah University of Science and Technology,
Kumasi.

Dear Sir

RE-ETHICS REVIEW COMMENTS - CONDITIONAL APPROVAL

With reference to your letter dated 6th July, 2018 with Ref: CHRPE/RC/099/18 on the above subject, I write to inform the Committee on Human Research and Publications Ethics Kwame Nkrumah University of Science and Technology, Kumasi of the changes I have made on the documents I submitted earlier seeking for ethical clearances.

The following amendments have been made:

On the CHRPE Form:

Item 1.1: **The study title** is amended to “Factors Influencing Immunization Coverage among Children Under-five”.

Item 2.6: **Exclusion** is revised to include also, a mother within the reproductive age, has a child under-five, but is sick or travel out of the district at the time of the study is excluded.

Item 2.10: **On how long will records be retained**, is amended as follows: The filled questionnaire will be kept in a locked cabinet and soft copies will be password protected in the PI’s office. The records will be destroyed 4 years after the final report on the study.

Item 2.11: **Access to the study data**, only the PI/Student and the Ethics Committee can access them.

Item 2.12: **participants Risk** amended to include the time spent on questionnaire and possible loss of confidentiality among mothers who may require translation of the tool to local language.

Item 1.13: **Risk of participation** will be minimized by assuring privacy and reassurance of keeping client information strictly confidential. Also, Participants' identification numbers will be used in place of names. Questionnaires are straight to the point to minimize time that would have otherwise been spent.

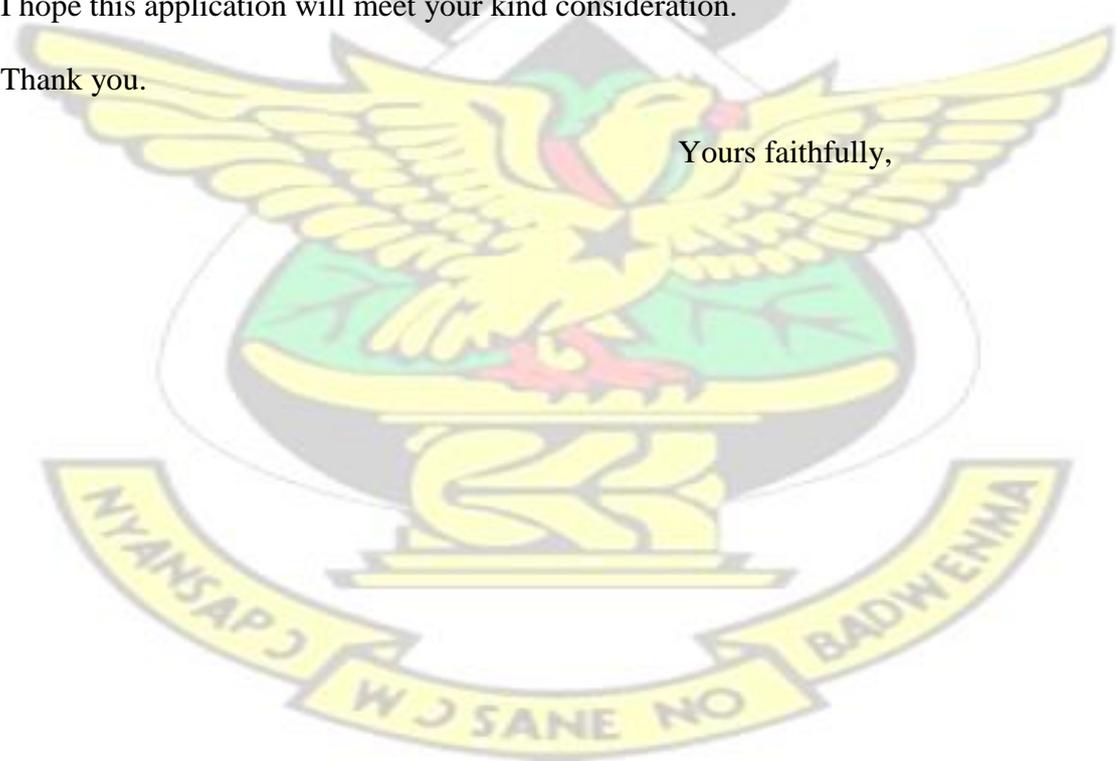
On the Participant Information Leaflet (PIL) and Consent Form:

Information of the background procedures was also revised to simplify them.

I hope this application will meet your kind consideration.

Thank you.

Yours faithfully,



Desmond Bayor 0207021823

ek.desi30@gmail.com

**Appendix 5: Letter Of
Introduction (KNUST)**

KNUST





KWAME NKURUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

COLLEGE OF HEALTH SCIENCES

School of Public Health

Department of Population, Family and Reproductive Health

KNUST-SPH/IRAR/ 13

11th June, 2018

The Chairman
Committee on Human Research, Publication and Ethics
KNUST

Dear Sir/ Madam,

LETTER OF INTRODUCTION- DESMOND BAYOR

The above-named person is an MPH student in the Department of Population, Family and Reproductive Health, School of Public Health, Kwame Nkrumah University of Science and Technology.

He is working on a study titled *"Factors Influencing Immunization Coverage among Children under Five in Jirapa District of The Upper West Region Of Ghana"*.

The school humbly requests your support and cooperation to enable him successfully complete his research work.

Thank you.

Yours sincerely,

Dr. Sam Newton
Head of Department

Appendix 6: Consent Form

Statement of person obtaining informed consent:

I have fully explained this research to _____ and have given sufficient information about the study, including that on procedures, risks and benefits, to enable the prospective participant make an informed decision to or not to participate.

DATE: _____ NAME: _____

Statement of person giving consent:

I have read the information on this study/research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction.

I understand that my participation is voluntary (not compulsory).

I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it.

I understand that I may freely stop being part of this study at any time without having to explain myself.

I have received a copy of this information leaflet and consent form to keep for myself.

NAME: _____

DATE: _____ SIGNATURE/THUMB PRINT: _____

Statement of person witnessing consent (Process for Non-Literate Participants):

I _____ (Name of Witness) certify that information given to

_____ (Name of Participant), in the local language, is a true reflection of what I have read from the study Participant Information Leaflet, attached.

WITNESS' SIGNATURE (maintain if participant is non-literate): _____

MOTHER'S SIGNATURE (maintain if participant is under 18 years): _____

MOTHER'S NAME: _____

FATHER'S SIGNATURE (maintain if participant is under 18 years): _____

FATHER'S NAME: _____

Appendix 7: District Letter Of Acceptance

In case of the reply the number and date of this letter should be quoted.



GHANA HEALTH SERVICE
MUNICIPAL HEALTH ADMIN.
P. O. BOX JP 48
JIRAPA UWR
GHANA

Tel: +233 0200515506
Our Ref. No GHS/DHD/JL/ F-36
Your Ref. No.....
Email:j-dhd@yahoo.com

29th May, 2018

THE HEAD OF DEPARTMENT
SCHOOL OF PUBLIC HEALTH
DEPT OF POP., FAMILY & PUBLIC HEALTH
KNUST, KUMASI

Dear Sir,

LETTER OF ACCEPTANCE

The management of the Jirapa Municipal Health Directorate wishes to inform you that it has accepted the student introduced to us (**Mr. Desmond Bayor**) to work on a study titled "*Factors Influencing Immunisation Coverage Among Children Under Five in the Jirapa District of the Upper West Region Ghana*" in Jirapa municipal.

We promise to give him the necessary assistance that may be needed to complete the research work.

Thank you

Yours faithfully,


Florence Angsomwine
Municipal Director of Health Service

File