KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,

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COLLEGE OF HEALTH SCIENCES SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH PROMOTION, EDUCATION AND

DISABILITY STUDIES

MATERNAL FACTORS INFLUENCING THE UPTAKE OF MEASLES/RUBELLA BOOSTER VACCINE IN THE SEKYERE SOUTH DISTRICT

BY

AMPRATWUM OPPONG AHMED

(Bed. HEALTH SCIENCES EDUCATION)

NOVEMBER, 2019

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A THESIS SUBMITTED TO THE DEPARTMENT OF HEALTH PROMOTION, EDUCATION AND DISABILITY STUDIES, COLLEGE OF HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF DEGREE OF MASTERS OF PUBLIC HEALTH IN HEALTH EDUCATION AND PROMOTION.

NOVEMBER, 2019

DECLARATION

I hereby do declare that except for references to other people‟s work which have been duly acknowledged, this piece of work is my own composition and neither in whole nor in parts has this work been presented for the award of a degree in this university or elsewhere.

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Prof. Anthony Kwaku Edusei …… ……

(Head of Department) Signature Date

LIST OF ABBREVIATIONS

ANC	-	Antenatal Clinic
BCG	-	Bacillus Calmette – Guerin
CDC	-	Center for Disease Control and Prevention
CHPS	-	Community Based Health Planning and Services
CHRPE	-	Committee on Human Research, Publication and Ethics
CWC	-	Child Welfare Clinic
DPT	-	Diphtheria, Pertussis and Tetanus
DHD	-	District Health Directorate
DDHS	-	District Director of Health Services
EPI	-	Expanded Programme on Immunization
GAVI	-	Global Alliance for vaccines and Immunization
HPV	-	Human Papilloma Virus
KNUST	-	Kwame Nkrumah University of Science and Technology
MMR	-	Measles Mumps and Rubella
MRV	-	Measles Rubella Vaccines
NIP	-	National Immunization Programme
PNC	-	Postnatal Clinic
RCH	-	Reproductive and Child Health
SDG‟s	-	Sustainable Development Goals
UK	-	United Kingdom
US	-	United State
VFC	-	Vaccines for Children Programme
WHO	-	World Health Organization

DEDICATION

This work is dedicated to my lovely wife Matilda Ansaa Gyesaw and my three daughters namely: Benedicta Gyamfuah Ampratwum, Adelaide Pomaa Ampratwum and Lois Nhyira Amoaso Ampratwum. And to my parents Mr. Oppong Badu Mohammed and Ms. Vida Gyamfua who encouraged and stood behind me during this master‟s programme.

DEFINITION OF TERMS

Expanded programme on immunization: is a World Health Organization program with the goal to make vaccines available to all children.

Immunization: is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine.

Vaccination: is the administration of a vaccine to help the immune system develop protection from a disease

Seroconversion: is the time period during which a specific antibody develops and becomes detectable in the blood. During an infection or immunization, antigens enter the blood, and the immune system begins to produce antibodies.

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ABSTRACT

Measles is the greatest vaccine-preventable killer of children in the world today and the eighth leading cause of death among persons of all ages worldwide. One of the major issues surrounding the Expanded Programme on Immunization is the failure to reach a satsifactory level of immunization coverage in our districts.

To acertain the maternal factors influencing uptake of measles booster vaccine among under five children in Sekyere South district, a cross- sectional study was carried out. A questionnaire was used to obtain data on the knowledge of mothers and caretakers regarding childhood immunisation, and measles booster vaccine, the attitudes of mothers and caretakers regarding child immunisation and measles/rubella booster vaccine and factors related to Immunization Service Delivery Quality in four selected health facilities. A total of 319 caretakers/mothers were randomly selected and enrolled into the study.

The level of knowledge regarding child immunization and measles booster vaccine was good (56.11%). Caretakers had adequate knowledge regarding immunization schedules (76.80%), benefits of immunization (80.05%) and side effects of vaccine. However, majority (75.63%) had inadequate knowledge regarding the number of vaccines required to complete an immunization. The main sources of information on immunization among participants were the health workers, 294/319 or (93.33%). Generally, majority of the respondents, 227 (71.16%) have negative attitude towards child‟s immunization and measles booster vaccination. Maternal level of education (p=0.009) were significantly associated with immunization status of the child. The mother‟s place of deliverance was also a contributing factor to child‟s immunization. Majority of the mothers (82.45%) that delivered at the health facility had their child fully vaccinated. Also, distance from the health centers also affects immunization.

Caretakers living in close proximity to health centers (less than 30 minutes‟ walk) were more likely to fully vaccinate their children. Majority, 262 (90.34%) of the caregivers agree that they were informed or advised to vaccinate their child during their ANC and PNC visits to the health facility. Only 26 (8.15%) have returned home in some occasion without measles immunization. The main reasons given included: vaccines not available (59.09%) and vaccinators were absent (13.64%). Although immunization uptake (96.86%) was high in the district, there is still the need for an implementation of new strategies such as establishment of more outreach services, intensive client education about immunization during ANC visits so as to improve immunization uptake.

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CHAPTER ONE

INTRODUCTION

1.1 Background of study

Considerable achievements have been made in successful contact to vaccines and immunization occasioning in an projected 2.5 million childhood deaths being averted globally each year (World Health Organization 2008; WHO, UNICEF et al. 2009). Vaccination services provided in recent times to more children ever than before is massively dropping the burden of illness and disability from vaccine preventable diseases and contributing to improving child suvival. In May, 1974, the World Health Organization(WHO) with the objectives of to protecting or preventing vaccine preventable diseases initiated Expanded Porgaramme On Immunization for all children to be vaccinated globally. Undeniably , immunization is one of the public health intervention to reduce morbidty and mortality among children. Tremedous progress has been made over the years in Ghana‟s Expanded Programme on Immunization services 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.

Immunization is one of the solutions to reaching Sustainable Development Goals three which is to “ensure healthy lives and promote well-being for all ages”. The Expanded Programme onImmunization is confronted the challenge of failure to achieve acceptable level of immunization coverage in fast growing populations among urban settlers.

According to Ghana Demographic and Health Survey (GSS) reports in 2014, saids 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 slighly

lower than that reported in the 2008 GDHS (79%) (Ghana Statistical Service,2015). Despite the improvements made in global immunization coverage for children over the past decades, an estimated 21.8 million infants are stiil not being reached by routine immunization services.

The word Immunisation, according to WHO (2018) is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Center for Disease Control (CDC, 2016) defined vaccines as a product that stimulate the body‟s immune system to protect the person against specific infection or disease.

Measles, also known as morbilli, rubeola, or red measles, is a highly contagious infection caused by the measles virus (Caserta, 2014). It remains an important cause of death among young children globally, despite the availability of a safe and effective vaccine (WHO, 2014). The measles vaccine has been in use for over 50 years (Goodson, 2015). According to the Centers for Disease Control and prevention (CDC), it was first introduced in the United States (U.S) in 1963 (CDC, 2015).

1.2 Problem Statement

Measles is one of the top causes of fatality among early childhood although there is a safe and cost-effective vaccine available (WHO, 2016). In 2014, the world recorded 114,900 deaths due to measles – around 314 losses every day or 13 deaths each 60 minutes (Gavi, 2016). Measles shot bring about in a 79% drop in measles fatalities between 2000 and 2014 globally (WHO, 2016). Again, in 2014, nearly 85% of the world's children population are reached with measles/rubella vaccines before they attain their first birthday through routnies immunization services – up from 73% in

2000 (WHO, 2015). Between 2000 and 2014, measles immunization averted a projected 17.1 million deaths, making measles vaccination one of the greatest achievements in public health (WHO, 2016).

Introduced in 2001, the Measles and Rubella (MR) initiative is a global partnership led by the American Red Cross, United Nations Foundation, CDC, UNICEF and WHO. The MR initiative is dedicated to safeguarding that no child dies from measles or is born with congenital rubella syndrome, decreasing measles fatalities by 95% by 2015, and reaching measles and rubella elimination in at least five WHO regions by 2020 (WHO, 2017). All WHO Regions have now conventional objectives to eliminate this preventable killer disease by 2020 (WHO, 2017).

In Ghana, it is indicated that one per cent of children have missed or not received any vaccination at all, this means that thecountry has made a great strides in the EPI. However, Sekyere South district health directorate has been recording low measles/rubella booster immunization coverage for children between 18months 24months. The district achieved 76.0% in 2016, reducing to 70.0% in 2017 and further reduced to 61.8% in 2018 . DHD Annual report (2018). National target for measles/rubella (2) booster is 90%. This is an indaction that, there is 28.2% children betweeen 18-24months are unimmunized with measles/rubella vaccines.

1.3 Rationale of Study

Evidence shows that effective and sustained immunisation coverage could prevent killer childhood infections (John, 2005). Measles is the greatest vaccine-preventable killer of children in the world today and the eighth leading cause of death among persons of all ages worldwide (Orestein et.al., 2004).

In the emergent world, persistent spread of measles virus and high childhood morbidity and mortality have led to the sanction that children be vaccinated at nine months of age and eighteen months, even though maternal antibody may interfere with seroconversion. Seroconversion rates at nine months of age average 85% (Knobler et al., 2002). Thus, this strategy provides maximum seroconversion in an attempt to defend infants at a younger age.

A single dose is clearly insufficient to reach a 95% protection level. However, if a second dose is given during the second year of life specifically at eighteen months, protection levels can be increased greatly; at 90% coverage for two independent doses, immunity levels reach 95%.

Provisional data from the (WHO, 2019) shows that during the first half year there have been more measles cases reported globally than in any year since 2006. From January 1 – July 31, 2019, 182 countries reported 364,808 measles cases to the WHO. This exceeds the 129,239 recorded during the same time period in 2018. WHO Regions with the major rises in cases include the African Region (900%), the Western Pacific Region (230%) and the European Region (150%) Because of gaps in vaccination coverage, measles outbreaks occurred in all regions, while there were an estimated 110 000 deaths related to the disease

Sekyere South district health directorate has over three year trend failed to achieve the minimun coverage of measles/rubella booster of 95.0% .Every child is supposed to receive first measle/rubella immunization at nine (9) months and second dose at 1824 months. This study will bring to bear maternal factors influening them to present their children for the second dose of measles/rubella vaccines which will go a long way to

inform policy makers to develop appropraite strategies to improve immunization coverage in the second year of life.

1.4 Research Question

1. What are the maternal factors that influence the uptake of the measles booster vaccine?
2. What are the attitudes of mothers/caretaker regarding child immunization and measles booster vaccine?
3. What are maternal related factors that impact the uptake of measles/rubella booster vaccine?

1.5 Main objective

To acertain the maternal factors influencing uptake of measles booster vaccine among under five children in Sekyere South district.

1.6 Specific Objectives

I. To acertain the knowledge of mothers and caretakers regarding child immunisation and measles booster vaccine.

II. To assess attitudes of mothers and caretakers regarding child immunisation and measles/rubella booster vaccine.

III. To determine maternal related factors that impact the uptake of measles/rubella booster vaccine.

1.7 Conceptual Framework

In this study, the established dependent variable is uptake of measles/rubella booster vaccine. The independent variables include; maternal socio-demographic characteristics, socio-economic status, educational and occupational status.

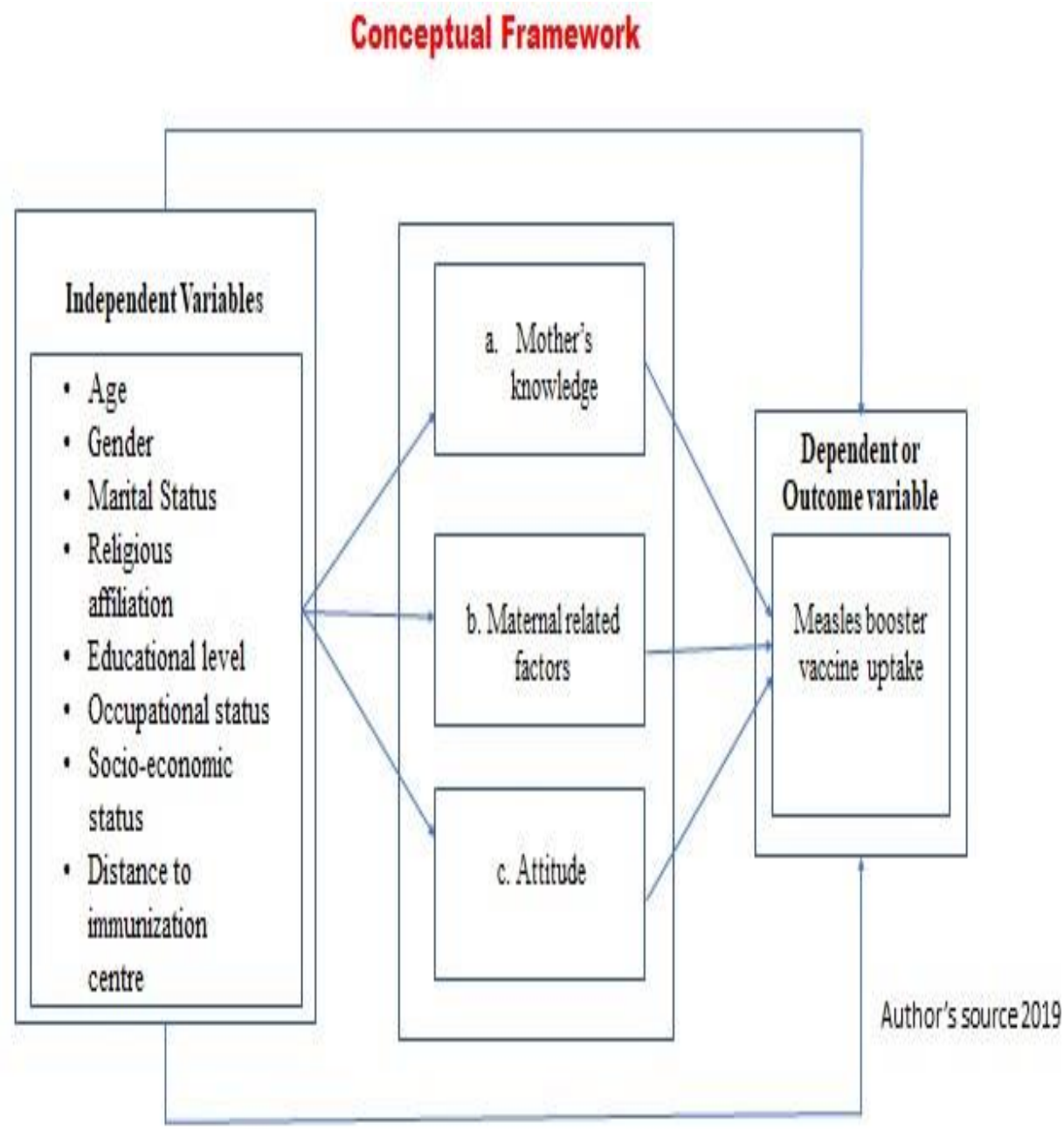

Figure 1.1 Conceptual Framework

1.8 Health profile of the study area

Background

The Sekyere South District (formaly Afigya Sekyere district) is one of the forty three (43) administrative districts in the Ashanti Region and has its capital as Agona. The district was established in 2008 by Legislative Instrument (L.I) 2008.

1.8.1 Settings and Size

The district is located in the north – eastern part of the Ashanti Region and covers a land size of 416 kilometers squared representing 1.7 % of the total land area of the 24,389 square kilometers. It falls on the latitude 60 50N and 70 10N and Logitude 10 40W and 10 25 W. It shares common borders with Ejura Sekyeredumase municipal to the north, Mampong municipal and Sekyere East to the east, Kwabre East municipal to the south and Offinso municipality to the west.

Agona, the capital, also seats the shrine of the famous Okomfo Anokye (conjuror of the famous Ashanti Golden stool).

The vegetation is partly forest and savannah. There are two forest reserves namely the Offin Forest Reserve and Gye Anoma Forest Reserve. The River Offin meanders across the length and breadth of the district from the mountains at Dawu in Jamasi sub district where it takes its source through Bipoa, Afamanaso in Agona sub district, Domeabra, Krakrom in Kona sub district before leaving the district.

1.8.2 Population

The district has a projected population of 63,658 from the 2010 population census at the beginning of the year 2019. There are 48 towns and villages in the district. The district has been divided into four sub-districts namely; Agona, Jamasi, Kona and Wiamoase. There are 74 outreach sites and a total of 51 Community Based Surveillance Volunteers (CBSVs), and 9 trained Traditional Birth Attendants (TBAs). There are 34 Community Health Planning and Services (CHPS) zones in the district.

It has 11 health facilities with 6 being public and 7CHAG facilities.

1.8.3 Economic Activity

It is also worthy of note that majority of the inhabitants are peasant farmers with very low income. Notably the district can boast of cocoa, timber and other crops like maize, cassava, plantain, oranges, and vegetables.

The district has a stone query work in Kona called NAGGOT QUERY

Some of the important tourist attractions in the district are ❖

The famous Okomfo Anokye shrine at Agona.

- ❖ Kente weaving at Agona, Kona, Jamasi, and Bepoase.
- ❖ Craft carvings at Kona

1.8.4 Transport and Communication

The general road network in the district is fairly good tarred roads which link major towns in the district which run from Kona to Jamasi, which is part of the KumasiMampong trunk road then from Jamasi to Boanim, Agona to Asamang and Agona to Bepoase through Wiamoase. From Agona through Afamanaso, Bedomase to Bipoa and Domeabra to Krakrom roads are under construction. All others are feeder roads making accessibility to the hinterland very difficult.

1.8.5 Education

There are 248 schools in the district. SDA nurses training college and Withrow University College both in Asamang, SDA college of Education in Agona are the few notable tertiary institutions in the district. 129 are public and 113 being private s.Prepre-schools account for 71, Primary schools are 91, Junior High Schools are 91, Senior High Schools are 5 and 1 special school for the Deaf at Jamasi.

1.8.6 Religion

It has a religious composition of Christians, Muslims and religious traditional believers. The only sects in the district are the Allisuna and the Tigyani. The

Christians are the majority with the religious traditional believers in the minority

1.8.7 Language and Ethnic diversity

The Asante,,s who are the indigenes of the district are in the majority constituting about 73.1% of the total population. The Brongs 1.5%, Akuapims 1.6%, Ewes 5.0%, and about 18.8% from tribes in the Northern, Upper-East and Upper-West regions make up the rest of the population in the district.

1.8.8 Culture

Akwasidae is the main traditional festival which is observed by the people and celebrated every forty days. There are nine Akwasidae events on the Asante calendar in the year. Adae Kese is the last celebrated in the year which is the climax with lot of activities. Tuesdays are the taboo days where no farming activity is done and they use these days to rest pacify their gods. Communal labour also organized in the communities.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter examinations relevant literature on the key areas the study covers. The review involves a critical scrutiny 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 cost-effective public health interventions for reducing child morbidity, mortality and disability is immunization. Immunization prevents illness, disability and death from vaccine-preventable diseases including cervical cancer, diphtheria, hepatitis B, measles, mumps, pertussis (whooping cough), pneumonia, polio, rotavirus diarrhoea, rubella and tetanus (WHO, 2018). Global immunization has resulted in the significant reduction of child mortality from 12.6 million in 1990 to 6.3 million in 2013 ((Bustreo et al., 2015). Although uptake of new and underused vaccines is increasing, global vaccination coverage still remains stagnant, with no significant changes over the past few years. By the end of 2017, about 85% of infants globally (116.2 million infants) had received 3 doses of diphtheria-tetanus-pertussis (DTP3) vaccine, protecting them against infectious diseases that can cause serious illness and disability or be fatal. In the same year, about 123 countries had reached at least 90% coverage of DTP3 vaccine. Nevertheless, an estimated 19.9 million children had not received DTP3 vaccine. WHO estimates that, an additional 1.5 million deaths could be avoided only if immunization coverage improves. 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 heath 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). The Global Vaccine Action Plan (GVAP) is a roadmap to prevent millions of deaths through more equitable access to vaccines by 2020. To date, progress towards the GVAP targets is off track (WHO, 2018).

Notwithstanding the fact that, 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 under-vaccinated. Available data about immunization indicate that Africa vaccine coverage is around 76% (using DPT3 as a proxy), is below the WHO expected target of 80% coverage and also the number of partly vaccinated children in the region is enormous (Feldstein *et al.*, 2017).

2.1.1 Immunizations 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] Annual Report, 2015).

The Expanded Immunization programme was launched in June 1978 in Ghana, with six antigens which have been increased over the years to twelve (12). 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. World Health Organization recommends that all children should receive full immunization by the age of two years to boost their immunity (WHO, 2013).

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 CalmetteGuerin (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 Anual Reports, 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 diarrhoea, respectively(Segbafah, 2012).

In 2013, the MOH replaced the measles-only vaccine at nine months with measlescontaining 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 marvellous 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) indicate 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%) Nonetheless 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 Annual Report, 2015,).

In Ghana, the immunization program is organized according to the organizational structure of the Ghana Health Delivery System; that is 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 counselling of mothers and caretakers.

Though tremendous progress in immunization service coverage has been made, from a low of 47% in 1988 to 89% 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 Annual Report, 2017). Over the past twenty-five years, the proportion of fully immunized children age 12-23 moths has increased despite the slight decline between 2008 and 2014 from 79% to 77% respectively as shown below.

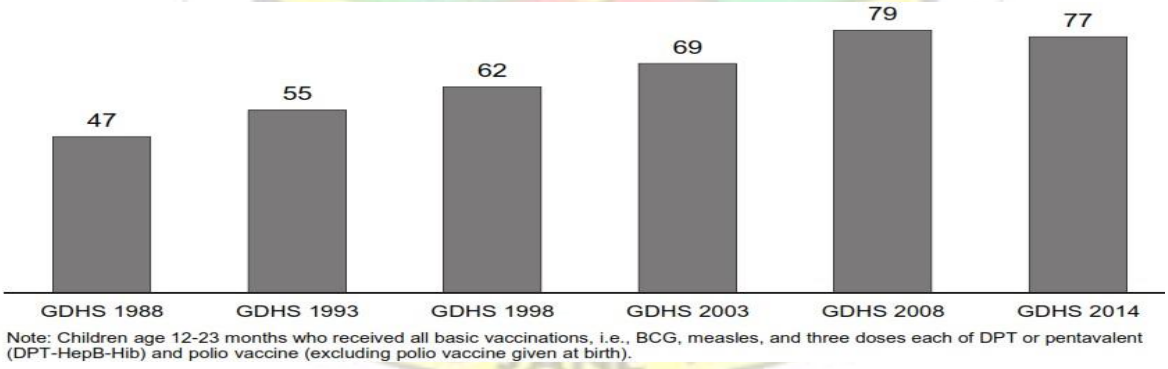

Figure 2.1: Bar chart of immunization coverage from 1988-2014-GDHS

Source: GDHS, 2014

2.2. Expanded Program on Immunization

The World Health Organization (WHO) started the global effort to use vaccination as a public health intervention in 1974 when it launched the EPI. Since then, immunization has remained one of the most cost-effective public health interventions for reducing global child morbidity and mortality (Machingaidze, *et al.,* 2015). The blueprint of the EPI program elaborates the technical and managerial functions required to effectively vaccinate children with a limited number of vaccines, with the ultimate goal of providing protection against diphtheria, tetanus, whooping cough, measles, polio, and tuberculosis, and to prevent maternal and neonatal tetanus by vaccinating women of childbearing age with tetanus toxoid (Shen, *et al.*, 2014). The main objective of EPI was to deliver multiple vaccines to all children through a simple schedule of child health visits (Shen, et al., 2014). This was proven difficult because at that time the health systems in most poor and developing countries were frail and, in some circumstances, non-existent (Shen, *et al.,* 2014). Not until 1990 when most of less-developed countries had institutionalized EPI, the vaccination coverage for poor African countries were less than 5%. However, by 1991, the global target of vaccinating 80% of the world‟s children was declared to have been met, probable saving millions of lives (Shen, *et al.*, 2014). Capacity building, resource and political commitment played a significant role in these countries.

The cost of vaccination in the developing world has subsequently grown from less than $1 in 2001 to about $21 for boys and $35 for girls in 2014, as increasingly expensive vaccines such as human papillomavirus vaccines are being introduced into national immunization programs (Shen, *et al.,* 2014). To address these and other challenges, additional efforts are needed to strengthen 8 critical components of RI: policy, standards, and guidelines; governance, organization, and management; human

resources; vaccine, cold chain, and logistics management; service delivery; communication and community partnerships; data generation and use; and sustainable financing, though these may not affect the rates of vaccination among boys and girls (Shen *et al.*, 2014).

There is also a growing concern for highly trained health workforce due to the high demand of children who require these services. The quality of the health workforce has become more critical in the face growing number of new vaccines, making competent handling and oversight of limited and expensive stocks a key issue. Health personnel remains the most cited source of health information including key details about immunization. (Shen, *et al.,* 2014).

There has been substantial progress in the performance of the EPI in Africa since its launch in 1974, though inter and intra-country differences exist. Nonetheless, according to national immunization coverage scorecards for 2014 (Machingaidze *et al.,* 2015; WHO, 2015), polio and measles outbreaks as well as high vaccine dropout rates across the continent are indicators of failures in the EPI system that require evidence-based remedial interventions. There is an urgent need to come up with strategies to improve the immunization system, strengthening poor infrastructure, addressing a lack of qualified manpower, and finding ways to provide more affordable and appropriate vaccines at all times. Increased financial and political commitment by African leaders is necessary if Africa is to sustain the gains made in

EPI and improve upon them in the African region (Machingaidze *et al.*, 2015; WHO, 2015).

2.3. Measles-Mumps-Rubella (MMR) Vaccine

Measles, mumps and rubella are highly contagious diseases that can cause serious illness, disability and death. By the end of 2017, 85% of children had received one dose of measles vaccine by their second birthday, and 167 countries had included a second dose as part of routine immunization and 67% of children received two doses of measles vaccine according to national immunization schedules (WHO, 2018). In 1998, a major myth linking Measles-Mumps-Rubella to autism resulted to an all-time low patronage of measles vaccines globally. These events of anti-vaccination movement resulted in several outbreaks of otherwise forgotten diseases such as measles, mumps and whooping cough, leading to the worst epidemics of whooping cough in the last 70 years (Mahmić-Kaknjo et al. 2017). This was however proven wrong through several studies (Hviid et al., 2019). Nonetheless, there is no specific treatment to all three diseases and left unintended can have serious complications (McCauley et al., 2012). Measles continues to be one of the leading causes of death among young children (Gabutti et al., 2017), and highly contagious disease due to ability of the measles virus of surviving in the air and infected surfaces for nearly 2 hours. It can widely be spread not only through direct contact (WHO, 2016). It is estimated that immunization prevented more than 20 million deaths in children during the 2000-2015 period, which makes this vaccine one of the most efficient health care interventions (Gabutti *et al.*, 2017). An unvaccinated child is not only at risk of catching the disease; the more unvaccinated children there are, the weaker the herd immunity, and the greater the risks of contracting the disease and developing complications.

2.4 Knowledge of Mothers and Caretakers regarding Child Immunisation and Measles Booster Vaccine.

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.

Again, mother‟s education (knowledge) and place of resident is another crucial factor influencing udder-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 result of large population in Slum and informal settlements and demographic and health system development. This is because in countries such as Ghana, emphases are 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 outweighs 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.

Rahji and Ndikom (2013), confirm that most common reasons for non-immunization were lack of knowledge about childhood immunization schedule and where to source for it. Other reasons include lack of awareness about health remunerations of immunization. About one- fifth of the women gave reasons that exposed their lack of knowledge about immunization benefits, routine immunization schedule and the prerequisite number of doses. This is similar to Zamir (2017) study conducted in Jerusalem where the results showed that Knowledge about vaccines and vaccination schedule was inadequate among mothers in the region.

Shehu *et al.* (2015) renowned that awareness plays a key role in the adoption of new ideas towards solving human problems, especially as they relate to health seeking behavior. Access to health facilities like antenatal care and place of delivery are other factors that are associated with the immunization status of children. Studies designate that mothers who attend ANC and give birth at health facility are more likely to fully immunize their children, as antenatal clinic is a means for women to be aware of immunization programme (Mutua *et al.,* 2011; Takum *et al.,* 2011). In a study conducted in Nigeria by Adedayo *et al.* (2009), most of the mothers interviewed (65.7%) got their awareness of immunization at the antenatal clinics. This finding is alike to the study done in Columbia on the behavioural and attitudinal determination of immunization of hepatitis B among infants, which showed that immunization was

meaningfully associated with suggestion from health care practitioners (Big bam *et al.*, 2006).

In addition, study steered by Abidoye (2013) in Lagos state shows that most (89.5%) mothers knew about BCG while 85.5% and 78.5% of the respondents had knowledge of OPV and DPT, respectively. However, centered on knowledge of what vaccine protect against, about 54.5% of them knew what measles, OPV and yellow fever vaccines prevent. 36% of them knew what DPT vaccine avoids. In addition, the mothers' knowledge about the different kinds of immunization was quite impressive, as majority of them (89.5%; 85.5%; 78.5%; 71%; and 73.5%) knew about BCG, OPV, DPT, Yellow fever and measles vaccinations respectively. The high level of knowledge about BCG, OPV, DPT, Yellow fever and measles vaccinations, may be due to the detail that the vaccines are named by the diseases they prevent and to some level, by the educational status of the respondents. Regarding the knowledge of the diseases vetoed by these different kinds of vaccines, more than half (54.5%) of mothers knew what measles vaccine, OPV and yellow fever vaccines prevent and a fewer proportion (36%) of these mothers retorted correctly to what DPT vaccines protect against. Although, more than three-quarter (89.5%) of the mothers were quite aware of BCG vaccination, only a quarter (25%) of them knew what it does (Abidoye, 2013). Another similar study conducted in lagos, Nigeria found that, all respondents were aware of immunization, more than half (72%) of them had good knowledge about the immunization of under- five children (Adefolalu *et al.*, 2019). However, awareness does not necessarily translate to adequate knowledge claimed by Awodele *et al.* (2010) when he discovered that, although majority of the mothers attending antenatal clinic in Lagos University Teaching Hospital were aware of the existence of immunization services, their knowledge of immunization schedule of vaccine preventable diseases is poor.

2.5 Attitudes of Mothers and Caretakers regarding Child Immunisation and Measles/Rubella Booster Vaccine

A Canadian study among mothers of young children designated a generally positive attitude towards vaccinations (Freeman *et al* 1992). In a European project, parents with children less than 3 years of age had generally positive attitudes towards immunizations in the childhood vaccination programmes, and between 81% and 97 % of parents would immunize their child in the future (Stefanoff et al 2010). In a study in Ghana, it was found that notwithstanding the apparent deficiencies in knowledge, the participants‟ general attitudes and practices towards childhood vaccination were positive (Asong, 2014). Adefolalu *et al*. (2019) found a hundred percent attitude towards immunization by mothers attending Primary Health Care centres in Ikorodu

Local Government Area, Lagos State, Nigeria.

This reinforces the findings of poor attitude being shown by mothers studied for their attitude towards returning to complete vaccination of their children (Chris–Otubor et al 2015). Only a small percentage of women (less than 3%) gave palpable reasons for their failure in availing their children for immunization. The most popular reasons given were “mother being too busy” and “there was a family problem”. Abdullahi and colleagues in a systematic review of knowledge and attitude towards immunization among key players found Positive attitudes and practices towards adolescent vaccination, especially against Human Papilloma Virus (Abdullahi et al., 2016). A similar study conducted in Florence, Italy also found a general positive Attitudes toward immunization against some infectious diseases (i.e., measles and rubella), but relatively poor for others (i.e., varicella) (Taddei *et al.*, 2014). Yaqub *et al.*, (2014) revealed that, reasons that relate to issues of mistrust are the most cited reasons for low immunization uptake rather than reasons that relate to information deficit. In the context of rural-urban dynamics, Mahalingam, et al (2014) found that overall; mothers in the urban areas have

favourable knowledge, attitudes, perceptions and practices towards vaccination than mothers in rural areas.

2.6 Maternal related factors that Impact the Uptake of Measles/Rubella booster vaccine.

There is an established correlation between maternal education and reduction in childhood mortality. One proposed link is that an increase in maternal education will lead to an increase in health care access and vaccine uptake. The analysis of a recent systematic review showed increasing child vaccination uptake with increasing maternal education. Overall, the odds of full childhood vaccination were 2.3 times greater in children whose mother received secondary or higher education when compared to children whose mother had no education (Forshaw et al., 2017).

Acocrding 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. This findings echoes the findings of another study conducted in Addis Ababa, Ethiopia, where maternal education was a determining factor of immunization (Shiferaw Birhanu *et al.* 2016). Francis *et al.*, (2017) study revealed that Vaccination status was inversely associated with the sex of the child, religion, and maternal level of education, number of ANC visits and place of residence. A finding similar to the findings of a survey conducted in Western Kenya (Sung*uti et al., 2016).* A similar study conducted in Uganda indicates that, factors which have a significant association with childhood immunization are: maternal education (especially at post-secondary level), exposure to media, maternal healthcare utilization, maternal age, occupation type, immunization plan, and regional and local peculiarities (Bbaale, 2013). Also, a study conducted in India revealed that, the significant determinants of the complete immunization were maternal age (OR=1.86, 95% CI 1.54-

3.23), parity less than three (OR=2.84, 95% CI 1.98-3.73), employment status of mother (OR=1.39, 95% CI 1.212.63) and mother's education higher than secondary level (OR=1.59, 95% CI 1.30-

2.88) (Awasthi et al., 2014).

A retrospective review of Factors associated with uptake of measles, mumps, and rubella vaccine (MMR) in a contemporary UK also showed that, maternal age, level of education and occupation are determining factors of measles-mumps and rubella vaccination (Reading et al., 2008). This finding runs through most studies particularly that of Browns‟ and colleagues cross-sectional study conducted in UK, which associated Perceived social desirability/benefit of MMR uptake (OR = 1.76, 95% CI =

1.09–2.87) and younger child age (OR = 0.78, 95% CI = 0.68–0.89) were the only independent predictors of MMR uptake (Brown et al., 2011).

Cockrane research revealed that, the most common reasons given for non-vaccination of children in some parts of developing countries were lack of information about immunisation, fear of side-effects and the immunisation centres being too far away (Chidiebere *et al.*, 2014). It was noted in a study conducted in Nigeria that, decreased likelihood for full immunisation was seen in mothers less than 18 years old, increased likelihood for full immunisation was however seen in mothers from middle and rich classes, mothers with higher educational level, mothers with access to media, mothers resident in urban areas and mothers who had institutional deliveries (Chidiebere *et al.*, 2014).

Awodele et al. (2010) in their cross-sectional study conducted in Nigeria found a significant ($P<0.05$) relationships between age of respondents, ethnicity, level of education, occupation and attitude to immunization. On a large while there is a good

evidence for an association between vaccination and perceived susceptibility to the illness, evidence for an association between perceived severity of an illness and vaccination was weak (Smith *et al.,* 2017). Knowledge about the vaccine, social influences and trust in the healthcare profession were associated factors with vaccination (Forster *et al.,* 2015; Vonasek *et al.,* 2016). The level of education of the mother was found to be a protective factor (Gul, 2016).

CHAPTER THREE

3.0 METHODOLOGY

3.1. Study Methods and Design

The study was a cross-sectional one. A quantitative approach was used to obtain demographic information of caretakers, knowledge and attitude of caretakers towards childhood immunization and maternal factors influencing the uptake of measles/rubella booster vaccine.

3.2. Data Collection Method and Instruments

A closed and opened-ended questionnaire was designed to extract the sociodemographic parameters as well as the attitude, knowledge and maternal factors influencing immunization uptake in Sekyere South district. The questionnaire administrations were conducted by the researcher personally together with three (3) experienced research assistants that were recruited and trained for the purpose of the data collection. The questionnaire administration took place in the selected communities using the local dialects of the respondents and English depending on which language the respondent is more conversant with.

The questionnaire was adopted from an unpublished thesis and tailored according to the objectives of the study (Ahiavi, 2017). The questionnaire was also structured into five sections based on the objectives of the study. The section A covered questions on relevant background information of the respondents. Section B covers questions on knowledge of mothers and caretakers regarding child immunisation and measles booster vaccine., section C cover questions on attitudes of mothers and caretakers regarding child immunisation and measles/rubella booster vaccine, whereas section D captures maternal related factors that impact the uptake of measles/rubella booster vaccine.

3.3 Study population

The study population composed children under-five and their caretakers. According to the Ghana Health Service, there is an estimated population of 6,000 of children aged 18-59 months in the district. The 6,000 which constitute about 10.55% of the total population in the district forms the target population for the study, and covered the entire four sub-districts (GHS, 2019).

3.4. Inclusion criteria

All mothers and caretakers who reside in the selected catchment areas with children aged between 18 and 59 months, and attending under-five clinics or OPD during the period of data collection are eligible to be included in the study. The participants who are above the age of 18 years and are willing to give consent to participate in the study.

3.5. Exclusion criteria

Mothers and caretakers who are not Sekyere South residents and with children who are very sick were excluded from taking part in the study.

3.6. Study Variables

Two groups of variables were identified for the study. These are the dependent variable and independent variables. The dependent (outcome) variable was whether the child had been given 2-doses of measles/rubella booster vaccine at the time of the study. For this study, the independent (response) variables included: Sociodemographic factors (Educational level, Occupation, Religious denomination, age of the child, sex of the child, age of the caregiver, marital status); attitudes of mothers, knowledge, distance from facility, time spent at immunization centre, number of ANC visits and place of delivery.

Table 3.1 Variables, measurement and description

Variable	Operational definition	Level of Measurement	Variable type
Sex	Sex of the child	Nominal	Explanatory variable
Age	Age of mother/caregiver and child in years and months respectively	Interval/ratio	Explanatory variable
Religion	Religious affiliation of caregiver	Nominal	Explanatory variable
Occupation	Economic profession of mother/caregiver	Nominal	Explanatory variable
Attitude	Reaction respondent towards immunization	Nominal	Explanatory variable
Knowledge	Level of knowledge of immunization	Ordinal	Explanatory variable

Immunization uptake	Status of child‟s immunization status	Binary/Nominal	Dependent variable
Immunization factors	Extent to which some factors influence immunization uptake	Interval	Explanatory variable

Source: Author‟s Compilation (2019)

3.7. Sampling

In order to ensure efficiency in the collections of data, a number of the adolescents from the study population were selected for the research. Due to the large size of the study population, it was impractical to use census approach necessitating the need to use sample.

Taking all into consideration, multistage sampling approach was employed. In the first stage, four health facilities in the district were randomly selected. The four health facilities selected include: Agona hospital, Kona health Centre, Salvation Army hospital and Jamasi health center. Probability Proportion to Size (PPS) was adopted to allocate the required sample for each facility. A systematic random sampling was employed in the selection of individual participants. At most of facility visited every third eligible participant were consented and interviewed. In order to avoid repeated recruitment in subsequent facility visits, a sticker with a number was attached to participant‟s child‟s card.

3.8. Sample Size Determination

The Kish (1995) approach to sample size determination was employed in determining the number of adolescents to select for the study. The total population of children between the ages of 18 months and 59 months in the four sub-districts selected was 6,000. The generic formula for Kish approach is;

$n = \frac{N}{[1+N(\alpha)^2]}$ Where n=sample size, N= sampling frame and α represent the margin of error or confidence level. The study uses a 95% confidence interval (α=0.05). For the target population of 6,000 the sample size was determined as;

$n = \frac{6000}{[1+6000(0.05)^2]} = 375$

Table 3.2 Summary of Study Population and Sampling process Districts Population Sample Sample size determination

	3202		170
Agona Kona	586	$\frac{586}{6000} \times 319$	31
Jamasi	1165	$\frac{1165}{6000} \times 319$	62
Wiamoase	1047	$\frac{1047}{6000} \times 319$	56
Total	6000		319

3.9 Pre-testing

The study was piloted at the Sekyere East district. Thirty (30) questionnaires was administered to caregivers with children between the ages of 18 and 59 months at the Effiduase sub-district using systematic sampling method. Effiduase sub-district has almost the same socio-cultural, economic, and demographic characteristics as those of the Sekyere South district. The Post-testing however was conducted in the study area (Sekyere South district). The pretest was necessary to enable us to assess the field competence of the data collection tools; do away with bias (selection) and also to make the necessary corrections to ensure its accuracy and reliability of the data collection tools. The data of the pretest was not included in the study.

3.10 Data Handling

Data collected from respondents were handled with confidentiality while maintaining the accuracy and reliability of the data. In the field, completed questionnaire was perused and evaluated for completeness and consistency. This was done to minimized incidences of missing data and outliers and to ensure that the data are valid, reliable and accurate. After the field data collection, the responses were evaluated again to ensure no error was committed in the recording. After this, the data were coded and entered into a Microsoft Excel spread sheet and saved for analysis.

3.10.1. Data Analysis

Data in the questionnaires was coded and entered using MS Excel version 2010 for Windows and then exported to STATA version 14.0 analysis. The mean, standard deviation and percentages and cross tabulation were used for descriptive analysis of obstetric and socio-demographic characteristics of study participants. To determine the level of knowledge of immunization among mothers, seven-point knowledge statements were administered. Participants were given marks based on their responses (agree, or disagree). Correct answer on the knowledge question of the questionnaire attract 2 marks, incorrect answer attracted 1 mark. Total cumulative score of 60% and above is regarded as good knowledge, 59% and below was regarded as poor knowledge (Faremi AF et al, 2014).

For the attitude, six attitudinal statements that required choosing from three options (agree, disagree and undecided) was administered to participants. For evaluation, participants that answered to 5 or less statements/questions correctly was measured to have "insufficient or poor" attitude, whereas those that responded to 6 or more statements/questions correctly will be measured to have "good" attitude.

The Pearson‟s chi-squared goodness-of-fit test was employed to determine any associations between demographic and other categorical variables and the outcome variable (measles/rubella immunization status); The Fisher‟s exact was only used for tables in which the cell is less than 5 per cent.

3.10.2. Ethical Consideration and Confidentiality

Ethical approval for the study was obtained from the Human Research, Ethics and Publications Committee of the Kwame Nkrumah University of Science and Technology (KNUST) to carry out this study. Permissions was also obtained from the following institutions: Sekyere South district Health Directorate and the five facilities were the study was conducted. Informed consent was obtained from each participating expected mother who met the inclusion criteria and agreed to participate in the study. At the beginning of all interviews, the purpose of the study was thoroughly explained to each expected mother including making her aware that the information collected was confidential and purposely used for research only. She was constantly reminded that she had the right to participate or refuse to participate or opt out at any stage of the interview and this will not have any consequences

3.10.3 Limitations of the study

Small sample size due to time and resource was identified as one limitation of the study. A study of this kind should have covered large population and facilities in the district. This limits the generalizability of our findings to geographical settings outside the study areas.

The study was cross-sectional, and therefore only able to suggest associations rather than causal relationships.

3.10.4 Strengths of the Study

The adoption of systematic random sampling and the choice of statistical analysis helped minimized bias and subsequently improved the outcome of the study.

CHAPTER FOUR

RESULTS

4.1 Socio-Demographic Characteristics of Respondents

A total of three hundred and nineteen (319) respondents meeting the inclusion criteria were contacted for the study. None of them declined and data for all variables was collected yielding a response rate of 100%. The ages ranged between 16 to 58years, with the mean age of 29.32 (SD 6.95) years and the modal age group was 25-29 years representing 25.71% or 82/319 of the respondents. Two hundred and forty-three accounting for 76.18% of respondents were Christians, sixty-four (20.06%) were Muslims, ten (3.13%) were traditional believers, and two (0.63%) did not belong to any religion. A good proportion of the caretakers were married, 201 (63.01%), whereas ninety-five (29.78%) were single. Overwhelming majority, 250 (78.37%) of the children were cared by their mothers. A good proportion 286 (89.66%) of the caretakers have had at least primary level of education and only 33 (10.34%) of them had no any form of education. Two in five (40.75%) of the caretakers were selfemployed. One hundred and eleven, (34.80%) were unemployed and seventy-eight (24.45%) worked as public servants. A little more than half of the children present were female, 167 (52.05%), whiles 152/319 or 47.95% were male. The results also show that, majority of the caretakers, 161 (67.93%) earned more than GHC 250 per month, thirty-two (13.50%) earned between GHC 251-GHC500 per month, eighteen (7.59%) earned between GHC501-GHC750 and twenty-six (10.97%) earned more than GHC750 per month. Table 4.1 shows the socio-demographic characteristics of the respondents.

Table 4.1. Socio-Demographic Characteristics of respondents

Variable categories	Frequency (n=319)	Percentage (100%)
Age of caretakers		
15-19	20	6.27
20-24	67	21.0
25-29	82	25.71
30-34	79	24.76
35-39	46	14.42
40-44	18	5.64
45-49	4	1.25
50+	3	0.94
Religious denomination		
Christianity	243	76.18
Islam	64	20.06
Traditional believer	10	3.13
No religion	2	0.63
Immediate caretaker of the child		
Mother	250	78.37
Father	41	12.85
Sister	17	5.33
Relatives	3	0.94
Others	8	2.51
Marital status of caretakers		
Married	201	63.01
Single	95	29.78
Widowed	5	1.57

Divorce	8	2.51
Separated	9	2.82
Others	1	0.31
Level of education of caretakers		
No formal education	33	10.34
Primary school	85	26.65
JHS	56	17.55
SHS	92	28.84
Tertiary	53	16.61
Occupation of caretakers		
Employed	78	24.45
Unemployed	111	34.80
Self-employed	130	40.75
Sex of the child		
Male	152	47.95
Female	167	52.05
Family Monthly income		
≤ GH₵ 250 per month	161	67.93
GH₵ 251 – GH₵ 500 per month	32	13.50
GH₵ 501 – GH₵ 750 per month	18	7.59
≥ GH₵750 per month	26	10.97

Source: field findings, 2019

4.2. Knowledge Regarding Child Immunization and Measles Booster Vaccines

The results of table 4.2 indicates that, two hundred and forty-five, 245 (76.80%) had adequate knowledge on immunization schedules of their child. Seventy-four, 74 (23.20%) did not know their child‟s immunization schedules. Close to 4 in 5 or

75.63% of the respondents had no knowledge on the number of vaccinations required to complete an immunization. The results also show that, overwhelming proportion (75.63%) of the respondents were aware of measles/rubella booster, seventeen (24.37%) were unaware. A huge percentage (85.67%) or 4 in 5 of the respondents had knowledge on the next immunization schedule. The results of table 4.2 indicate that, the leading source of information on immunization among participants were the health workers, 294/319 or (93.33%), followed by family/relatives with 16 (5.08%), next was friends, 5(1.27%) and mass media accounting for 0.32%.

A good proportion, 45.52%, of the study participants knows that vaccination protects their children from diseases. About 31.26% knows that immunization helps provide immunity for the child and 18.21% knows that, immunization is a mechanism of controlling an epidemic. About 5.01% knows that immunization helps to unmasked hidden diseases for early treatment.

The results from table 4.2 also indicates that, the main effects of immunization identified by respondents included; fever, 248 (52.10%); shivering, 7 (1.47%); pain, 175 (36.76%) and vomiting, 46 (9.66%).

To determine the overall level of knowledge of immunization among caretakers, participants were given marks based on their responses. Correct answer on the knowledge question of the questionnaire attract 2 marks, incorrect answer attracted 1 mark. Total cumulative score of 60% and above is regarded as good knowledge, 59% and below was is regarded as poor knowledge. About one hundred and seventy-nine 179 (56.11%) or more than 2 in 5 of the participants had good knowledge about immunization, eighty-seven, 87 (27.7%) of the participants knowledge about

immunization was regarded as poor. Fifty-three, 53 (16.61%) had fair knowledge about child‟s immunization.

Table 4.2: Results of Knowledge Statements on child's immunization and measles booster vaccination.

Knowledge on immunization schedules	**Frequency (n=319)**	**Percentage (100%)**
Yes	245	76.80
No	74	23.20
Knowledge on the number of vaccinations required to complete an immunization		
Yes	17	24.37
No	302	75.63
Are you aware of measles/rubella booster		
Yes	302	75.63
No	17	24.37
Knowledge on next immunization schedule		
Yes	269	85.67
No	50	14.33
Source of information on immunization		
Health workers	294	93.33
Mass media	4	0.32
Family/relatives	16	5.08
Friends	5	1.27
***Knowledge on benefits of immunization**		
Immunity for the child	206	31.26
Prevent diseases	300	45.52
Control epidemic	120	18.21
Unmasked hidden diseases	33	5.01

***Knowledge on the side effects of immunization**		
Fever	248	52.10
Shivering	7	1.47
Pain	175	36.76
Vomiting	46	9.66
Others	0	0.0%
Knowledge indices		
Good knowledge	179	56.11
Poor knowledge	87	27.27
Fair knowledge	53	16.61

Source: field findings, 2019 ***Multiple response allowed**

4.3. Attitude towards Child Immunization and Measles Booster Vaccines Table 4.3 indicates that two hundred and twenty-six, 226 (83.39%) of the respondents disagree with the statement that, measles/rubella vaccination may cause serious health problem, whereas forty-five, 93 (16.61%) agrees. Twenty-seven, 27 (8.46%) of the respondents agrees that vaccination in general are expensive, whiles two hundred and ninety-two representing, 292 (91.54%) disagree. Overwhelming majority, 297 (93.10%) of the respondents believes that children who are not vaccinated have a high risk of diseases. Fifteen, 15 (4.70%) disagree and only seven, 7 (2.2%) were undecided. Also, majority of the respondents, 296 (93.10%) believes (agrees) that ensuring that their children are fully immunized is good. Fifteen, 15 (4.70%) disagrees and 7 (2.2%) were undecided. Seventy-three, 73 (28.29%) of the respondents agrees that Measles immunization shots are not safe for children, a good proportion, 185 (71.71%) were undecided. Seventy-three, 73 (28.29%) of the respondents agrees one normally had to wait for a long time

in the clinic when you took your child to get his/her immunization shots, eighteen, majority, 228 (71.47%) think otherwise and 18 (5.65%) were undecided.

In general, majority of the respondents, 227 (71.16%) have positive attitude towards child‟s immunization and measles booster vaccines among participants.

Table 4.3: Attitude Statements of Immunization among study Participants

Variables	**Response-Frequency (percentage)**		
Attitudinal Statements about Immunizations	**Agree**	**Disagree**	**Undecided**
Measles/Rubella vaccination may cause health problems	93 (16.61%)	226 (83.39%)	0 (0%)
Vaccinations in general are expensive	27 (8.46%)	292 (91.54%)	0 (0%)
Children who are not vaccinated have a high risk of disease	297 (93.10%)	15 (4.70%)	7 (2.2%)
Ensuring that my child is fully immunized is good	296 (93.10%)	15 (4.70%)	7 (2.2%)
Measles immunization shots are not safe for children	73 (22.88%)	246 (77.12%)	0 (0%)
You normally had to wait for a long time in the clinic when you took your child to get his/her immunization shots	73 (22.88%)	228 (71.47%)	18 (5.65%)
Indices of attitude regarding child immunization			
Positive attitude	227	71.16%	
Negative attitude	92	28.84	

Source: field survey, 2019

4.4. Factors related to Immunization Service Delivery Quality

Table 4.4 indicates that, majority, 308 (96.86%) of the children were fully immunized with the Measles/Rubella booster at the time of the study. Eleven (3.14%) were not completely immunized. The results also show that, two hundred and seventy-nine (87.46%) have ever taken their children to the health institutions for healthcare services,

forty, 40 (12.54%) had not. The main reasons given for sending their children to the health institutions include; growth monitoring, 99 (34.74%); follow-up for chronic care, 3 (1.05%); became sick, 161 (56.49%) and for a check-up, 16 (7.72%). Majority, 259 (90.34%) agrees that they were informed or advised to

vaccinate their child during their visit to the health facility.

Findings of table 4.4 also indicates that, overwhelming proportion, 263 (82.45%) of the respondents had delivered at the health facility. Fifty-six, 56 (17.55%) delivered at home. A large proportion, 313 (98.74%) of the respondents had attended Postnatal care after delivery. The results also show that, overwhelming majority, 309 (97.47%) did received advice to vaccinate the child during PNC visits. About one hundred and ninety-three, 193 (60.50%) live 30 minutes‟ walk from immunization center, and about one hundred and twenty-six, 126 (39.50%) walk more than 30 minutes on average to immunization center.

Table 4.4: Factors related to Immunization Service Delivery Quality

Categorical variables	**Frequency (n=319)**	**Percentage**
Have you ever taken your child to health institution for service		
Yes	279	87.46
No	40	12.54
Reasons for taken your child to the health facility	N=279	
Growth monitoring	99	34.74
Follow-up for chronic care	3	1.05
Became sick	161	56.49

For check-up	16	7.72
Where you ever informed to vaccinate the child during the visits	N=279	
Yes	259	90.34
No	20	9.66
Place of delivery	N=319	
Home	56	17.55
Health facility	263	82.45
Did you attend PNC after delivery		
Yes	313	98.74
No	6	1.26
Did you receive any advice to vaccinate your child at PNC	N=313	
Yes	309	97.47
No	4	2.53
Estimated distance from immunization center	N=319	
Less than 30mins walk	193	60.50
More than 30mins walk	126	39.50

Source: field data, 2019

Figure 4.1 shows that, majority, 293 (91.85%) of the respondents had never returned home without getting measles immunization. Although, twenty-six, 26 (8.15%) have ever returned home without getting measles immunization.

Of the twenty-six respondents who returned home without getting measles immunization, the main reasons given were: vaccines were not available, 15

(59.09%); vaccinators were not present at the time of visit, 4 (13.64%) and I don‟t know, 7 (27.27%). Majority, 255 (80.19%) received measles booster at the age of 1year 6months (18 months), sixty-four (19.81%) were more than 18 months old when they received the booster. The result is shown on table 4.5 below

Table 4.5: Recommended Age-specific for measles/rubella booster and reasons for not vaccinating

Reasons for not vaccinating your child with measles/rubella booster	**Frequency (n=26)**	**Percentage**
Vaccines not available	15	59.09
Vaccinators were absent	4	13.64
I don‟t know	7	27.27
Age child received measles/rubella booster	N=319	
18months	255	80.19
After 18months	64	19.81

Source: field findings, 2019

4.5. Associations between Categorical variables and Measles/Rubella Immunization status

The finding of table 4.5 indicates that, caretakers who were unemployed and selfemployed were more likely to completely immunize their child with measles/rubella booster compared to civil/public workers caretakers, however, it was not statistically significant. The association between the level of education and measles/rubella immunization was found statistically significant (p=0.009). The complete immunization of the child improves with the level of education of the caregiver. Also, caretakers who stay not less than 30 minutes‟ walk from the immunization center were

more likely to completely immunize their child against measles/rubella compared to caretakers who are far away from immunization centers.

Table 4.6: Associations between Categorical variables and Measles/Rubella Immunization status

Categorical variables	**Immunization status (complete)**			
Occupation	Yes	No	χ^2	P value
Employed	77 (24.12%)	1 (0.33%)	3.6655	0.160
Unemployed	108 (33.86%)	2 (0.94%)		
Self-employed	123 (35.56%)	7 (5.19%)		
Level of education				
None	32 (10.03%)	1 (0.31%)	13.6063	0.009*
Primary	84 (26.34%)	1 (0.31%)		
JHS	50 (15.67%)	6 (1.88%)		
SHS	89 (27.89%)	2 (0.95%)		
Tertiary	53 (16.61%)	0 (0%)		
Religion				
Christian	234 (73.36%)	1 (0.31%)	2.1545	0.541
Islam	63 (19.75%)	1 (0.31%)		
Traditional believer	9 (2.82%)	1 (0.31%)		
No religion	2 (0.63%)	0 (0%)		
Child's sex				
Male	144 (45.43%)	7 (2.52%)	2.0426	0.153
Female	162 (51.10%)	3 (0.95%)		

Distance from health facility				
Less than 30mins walk	185 (57.99%)	7 (2.51%)	0.3996	0.527
More than 30mins walk	123 (38.56%)	3 (0.94%)		
Level of knowledge of caregiver				
Good	172 (53.92%)	6 (2.19%)	0.3315	0.847
Poor	84 (26.33%)	3 (0.94%)		
Fair	52 (16.29%)	1 (0.32%)		
Attitude of caregiver				
Positive	220 (62.69%)	7 (8.47%)	0.7422	0.690
Negative	88 (27.58%)	4 (1.26%)		

*P<0.005 indicates statistically significance **Fishers exact p value estimated

CHAPTER FIVE

DISCUSSIONS

Globally, one of the cost-effective public health interventions for reducing child morbidity, mortality and disability is immunization. Immunization prevents illness, disability and death from vaccine-preventable diseases including cervical cancer, diphtheria, hepatitis B, measles, mumps, pertussis (whooping cough), pneumonia, polio, rotavirus diarrhoea, rubella and tetanus (WHO, 2018). The proportion of children who have been vaccinated with measles/rubella booster was overwhelmingly high

(96.86%) in this study, and this is in line with WHO recommended uptake of 95% and the national average immunization uptake.

5.1. Knowledge Regarding Child Immunization and Measles Booster Vaccines.

Lack of knowledge of mothers on immunization is a huge barrier and detrimental to immunization coverage (Chris-Otubor *et al.*, 2015). 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. The results of this study show that, majority of the caretakers had adequate knowledge on immunization schedules. This result contradicts with the findings of Rahji and Ndikom (2013) study conducted in four sub-Saharan countries and another study conducted in Jerusalem (Zamir, 2017). According to this study, knowledge on the number of vaccines required to complete an immunization were inadequate among caretakers. The results also verify with the findings of a study conducted in Jerusalem (Zamir, 2017). Shehu *et al.* (2015) renowned that awareness plays a key role in the adoption of new ideas towards solving human problems, especially as they relate to health seeking behavior. In this study, it was found that, majority of the caretakers were aware of the measles/rubella booster. The result is inconsistent with Abidoye

(2013) study and Adefolalu *et al.*, (2019) study both conducted in Lagos state in Nigeria. In this study, participants outline the benefits of immunization to include, immunity for the child, prevent diseases, control epidemic and unmasked hidden diseases. This finding is in line with a study by Tumuhairwe (2016) conducted in Bushenyi district in Uganda where 90% of the mothers knew of the benefits of immunization. It also commensurate with other findings of a study conducted by Yousif et al., (2013) where parents had good knowledge on aspects related to the general role ofvaccinations in

preventing diseases. Also, according to the results of this study, the major side effects of immunization were fever, shivering, pain and vomiting. Mahmic-kaknjo *et al.* (2017) and Fournet *et al*. (2018) in their reviews indicated similar findings. The study also found that, health personnel (93.33%) were the main source of information about immunization. Zamir (2017) study findings conducted in Jerusalem commensurate with this finding.

However, awareness does not necessarily translate to adequate knowledge claimed by Awodele *et al.* (2010) in their study noticed that, awareness does not necessarily translate to adequate knowledge. The findings in this study contradict Awodele *et al.* (2010). In this study, however, majority of the women who were aware of measles/rubella booster had adequate knowledge about it. According to this study, half (56.11%) of the women had adequate general knowledge on immunization. This result commensurate with a study conducted in Nigeria (Adefolalu *et al.,* 2019) and that of Ramavhoya et al (2014) conducted in Limpopo, but contradicts with the results of a study conducted in Jerusalem (Zamir, 2017).

5.2. Attitude towards Child Immunization and Measles Booster Vaccines

Acceptance of any immunization program among under-five is highly dependent on parental attitude toward immunization. Although the level of knowledge about immunization was adequate in this study, the attitude towards immunization was observed negative in this study. Almost 4 in 5 of the caretakers/mothers had positive attitude towards immunization. This result is inconsistent with a study conducted in a traditional city in the United Arab Emirates and Canadian study among mothers of young children (Freeman et al 1992; Bernsen *et al.*, 2011). It also commensurate with a study in Ghana, which found that notwithstanding the apparent deficiencies in knowledge, the participants‟ general attitudes and practices towards childhood

vaccination were positive (Asong, 2014). However, it contradicts with the results of a study conducted in Nigeria (Chris-Otubor *et al.*, 2015).

5.3. Factors related to Immunization Service Delivery Quality

In order to determine service factors that impact the uptake of measles booster vaccine, Series of information was collected based on caretakers/mother‟s utilization of the health facility for other services, if there was any advice given regarding measles booster immunization and Also, if there were cancelled measles immunization appointments. This study suggests that, most of the respondents had taken their children to health institutions for other services which included; growth monitoring, sickness, check-ups and follow up for chronic care. Most of them were advised to be immunized their child during their visits to the health facility. A good proportion of caretakers attended postnatal care more than once after delivery of their children. Postnatal clinics are very important and mothers should be encouraged to attend twice at the stipulated times as this gives an opportunity for mothers to be educated on various health issues and childhood vaccines are commenced. The findings are similar to the results of a study conducted in Ethiopia (Lakew *et al.*, 2015).

It was observed that 80.19% of the children in the study received the measles booster vaccines after the recommended age of 18 months. Li *et al.*, (2013) in China reported an uptake of 76.9% for the initial MCV and 44.7% for the second dose with only 47.5% being timely administered. It was also observed in this study that, 8.15% of the mothers had returned home without getting measles immunization, with reasons given include; vaccines not available, and vaccinators been absent. A recent cohort study looking at MMR in UK have found some level of agreement with the findings of this study (Pearce *et al.*, 2008).

In this study, the association between measles/rubella booster uptake and the level of education of the mother was found positive. The higher the level of education of the mother, the more likely of her presenting her child for immunization. This commensurate the findings of a study conducted in Somalia (Mohamed *et al*. 2016) and the results from the Ghana Demographic Health Survey (2014), which found that immunization uptake increases with level of education of the mother. The result also indicates, women that delivered at health facility were more likely to be immunized their children with measles/rubella booster. This finding is inconsistent with Chidiebere *et al.* (2014) study conducted in Nigeria. Distance from immunization centers also affects measles/rubella booster uptake. In this study, caregivers close to immunization centers (less than 30mins walk) were more likely to complete their child immunization. The result is similar to Chidiebere *et al.* (2014) study conducted in Nigeria.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

This current study set out to explore maternal factors influencing the uptake of measles/rubella booster, caretaker‟s knowledge about immunization and measles/rubella booster, and attitude of caretakers towards immunization in Sekyere South district. A cross-sectional study was adopted. A structured questionnaire was designed as an instrument for gathering data for the purpose of the survey. In all 319 questionnaires were administered to a randomly selected mothers and all responses were captured.

6.1. Conclusions

Significant findings made from the results of the study are summarized as follows:

- Majority of the children selected for this study has been completely vaccinated of measles/rubella booster at the specified time period.
- The levels of education of caretakers play a significant role in the complete child immunization of measles/rubella booster.
- The study revealed that, the level of knowledge about, and attitude towards child immunization and measles booster vaccine was high among caretakers.
- It was also found in this study that knowledge about immunization was predominant among caretakers whose children had been completely vaccinated up-to-date. Women with poor knowledge about vaccination were less likely to vaccinate their child of measles/rubella booster.
- The study also revealed that, number of ANC and PNC visits, distance from health facility, place of delivery, advice from health personnel were factors affecting measles/rubella booster vaccine uptake.
- It was also found that, ANC visits/contacts also improve measles/rubella booster immunization among children in the study area due the advice given to caretakers by health professionals.

A good proportion of the children were immunized up-to date by the time of the study, indicating the value placed on the importance of immunization among mothers in Sekyere South disrict of Ashanti. High Immunization uptake was prevalence among caretakers aged 25-29 and also with mothers with good knowledge about it. The level of knowledge about immunization and measles/rubella booster vaccine was high among caretakers in Sekyere South district; however, their attitude toward immunization was poor. Maternal factors such as level of education influences immunization uptake in the study area. The main reasons given by mothers for not completely immunizing their

children of measles/rubella booster were; unavailability of vaccines, and absence of vaccinators.

6.2 Recommendations

Going forward, the researcher wishes to give the following recommendations:

1. The Ghana Health Service should ensure that more outreach centres be established in the communities to make CWC services very close to caretakers to improve service uptake.
2. Implementing of behavioural change strategies aimed at addressing some negative attitudes towards measles/rubella booster immunization. The behavioural change strategies should include routine public education on the benefits of immunization.
3. Staff at various Health facilities in the study area should continue and make it a routine habit of sensitizing the caretakers during ANC and PNC visits about immunization. This will help improve the general knowledge of immunization among caretakers some, thereby increasing immunization uptake.
4. The Ghana Health Service should periodically organize awareness campaigns and capacity building to help empower mothers on immunization.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE

Research Topic: MATERNAL FACTORS INFLUENCING THE UPTAKE OF MEASLES BOOSTER IN SEKYERE SOUTH DISTRICT OF ASHANTI.

My name is Ampratwum Oppong Ahmed, a student of KNUST, School of Public Health pursuing MPH. Health Education and Promotion. I am conducting a study on: Maternal factors influencing the uptake of measles booster. This research is purely academic. Involvement in this study is voluntary, so you may decline to respond to the

entire document or parts of it if you are not comfortable. Any information given shall remain strictly confidential. Thank you.

Health center name: …… **Batch no: ……**

Date of interview ……

Interviewer's name ……

Place of residence ……...

PART 1: SOCIO-DEMOGRAPHICS CHARACTERS OF RESPONDENT

1. Age (yrs): _____
2. Sex: Male [ ] Female [ ]
3. What is your religious affiliation { } Christianity { } Islam
   { } African Traditional Religion { } No religion { } others (specify) ……
4. Who is the immediate caretaker of the child? { } Mother { } Father
   { } Sister { } Relatives { } other (specify)…….
5. Marital Status of the immediate care taker { } Married { } Single
   { } Widowed { } Divorced { } Separated f). Other (specify)……
6. Occupational Status of the caretaker: { } Employed { } Unemployed
   { } Self-employed
7. Educational level { } none { } Primary school { } junior secondary school
   { } Secondary and certificate { } Tertiary
8. Age of child under investigation:.....
9. Sex of child under investigation { } Male { } Female
10. What is your estimated monthly income: { } ≤ GH₵ 250 per month
    { } GH₵ 251 – GH₵ 500 per month { }GH₵ 501 – GH₵ 750 per month
    { }≥ GH₵750 per month

PART 2: KNOWLEDGE REGARDING CHILD IMMUNISATION AND MEASLES BOOSTER VACCINE

11. Do you know the child immunization schedule? { } Ye { } No…… 12. Mention the time(s) of immunization schedules for the child if yes (multiple responses)

    a. At birth { }
    b. 6 weeks { }
    c. 10 weeks { }
    d. 14 weeks { }
    e. 9 months { }
    f. 18 months { }
    g. I don‟t know { }

13. Do you know the schedule for the next vaccination?

    a. Yes { }
    b. No { }

14. What is the number of vaccinations required to complete the schedule?

    a. Two { }
    b. Four { }
    c. Six { }
    d. Eight { }
    e. Twelve { }
    f. I don‟t know { }

15. Are you aware of measles/rubella booster? Yes { } No { }

16. When do we immunize the child with the following vaccines?

    { } Initial measles vaccine …… { } Measles Booster vaccine ……

17. Does vaccination against measles/rubella booster have a benefit for the child? a. Yes

b. No

18. What are the benefits of immunization? (Multiple responses allowed)

    a. Immunity for the child

    b. Prevent diseases

    c. Control epidemic

    d. Unmasked hidden disease

19. What are the side effects of immunization? (Multiple responses allowed) a. Fever { }

    b. Shivering { }

    c. Pain { }

    c. Vomiting { }

    d. Other (specify)……..….

20. What is your Source of information about immunization?

    a. Health workers { }

    b. Mass media { }

    c. Family members/relatives { }

    d. Friend { }

21. Does measles immunization have side reaction? { } Yes……..... { } No

PART 3: ATTITUDE REGARDING CHILD IMMUNISATION AND MEASLES BOOSTER VACCINE

Attitudinal Statements about Immunizations	**Agree**	**Undecided**	**Disagree**
Measles/Rubella vaccination may cause health problems			
Vaccinations in general are expensive			

Children who are not vaccinated have a high risk of disease			
Ensuring that my child is fully vaccinated beneficial is good			
Measles immunization shots are not safe for children			
You normally had to wait for a long time in the clinic when you took your child to get his/her immunization shots			

PART 4: FACTORS RELATED TO IMMUNISATION SERVICE DELIVERY QUALITY

22. Have you ever taken your child to health institution for other services?

    { } Yes…… { } No……

23. Why did you take him/her to health institution? { } For Growth Monitoring

    { } Follow up for chronic care { } Became sick { } For check up

    { } Other, specify……

24. Were you informed or advised to vaccinate the child during your visit?

    { } Yes…… { } No…….

25. Where did you deliver this child? (Asked if the respondent is the mother)

    { }Home { } Health institution { } Other, specify……

26. Who delivered you? { } Health professional { } TBA { } Lay person

    { }Other, specify……

27. Did you receive advise to vaccinate your child after delivery? { } Yes { }No

28. Did you attend post-natal care after delivery of the child? { } Yes { } No

29. If yes how many times did you attend postnatal care? …….

30. What is estimated distance from your home to the immunization center?

    a. Less than 30mins walk

    b. More than 30mins walk

31. Did you receive advice to vaccinate your child at postnatal period?

    { } Yes { } No

32. Did the staff at the clinic always inform you about when the next measles/rubella immunization shot was due? { } Yes { } No

33. Did the immunization clinics that you visited have hours that were convenient for you? { } Yes { } No

34. At what age did the child receive the measles booster vaccine?

    (Check under-five card) { } 18 months { } Other, specify ……

35. Was there any occasion on which you returned home without getting the measles vaccination during your appointment? { } Yes { } No

36. If yes, what was the reason for not getting vaccination?

    { } Vaccine not available { } Vaccinators were absent { } I Don"t know

    { } Other (specify)……...

37. Has this completed Measles/Rubella booster of the child? (Outcome variable) a. Yes

    b. No

Thank you for your cooperation!

Signature of the Interviewer……..

APPENDIX 2 LETTER OF 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

28th August, 2019.

Our Ref: CHRPE/AP/524/19

Mr. Ampratwum Oppong Ahmed
Department of Health
Promotion and Education
School of Public Health
KNUST-KUMASI.

Dear Sir,

LETTER OF APPROVAL

Protocol Title: ***"Maternal Factors Influencing the Uptake of Measles /Rubella Booster Vaccine in Sekyere South District of Ashanti."***

Proposed Site: ***Sekyere South District (Agona Hospital, Jamasi Health Centre, Wiamoase Salvation Army Hospital and Kona Health Centre).***

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 7th June, 2019 from the Sekyere South District Health Directorate (study site) indicating approval for the conduct of the study at the District.
- 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 28th August, 2019 to 27th August, 2020 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.

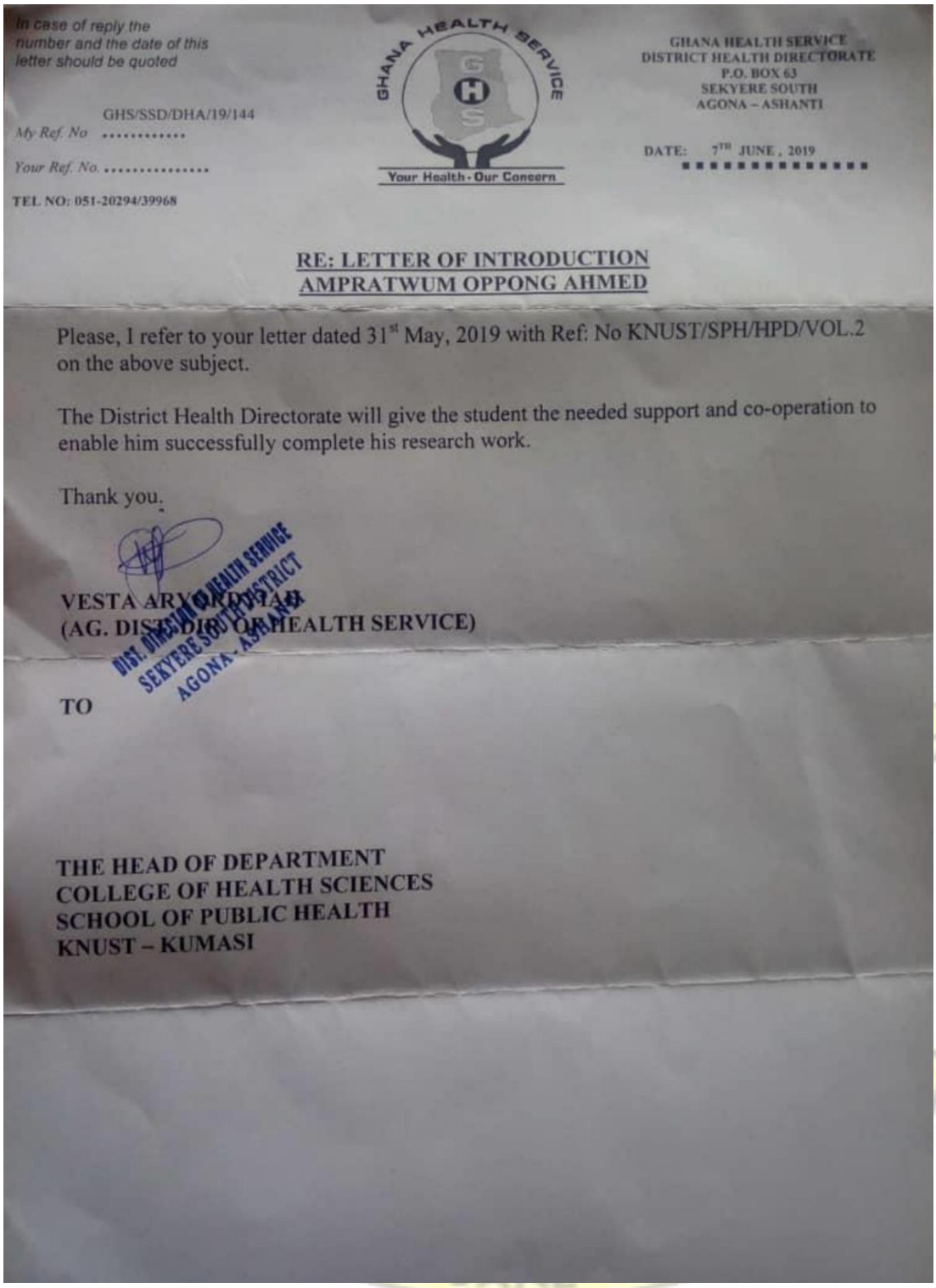
Thank you, Sir, for your application.

Yours faithfully,

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 3 LETTER OF INTRODUCTION



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

GHS/SSD/DHA/19/144
My Ref. No .....
Your Ref. No. .....
TEL NO: 051-20294/39968

GHANA HEALTH SERVICE
Your Health - Our Concern

GHANA HEALTH SERVICE
DISTRICT HEALTH DIRECTORATE
P.O. BOX 63
SEKYERE SOUTH
AGONA – ASHANTI

DATE: 7TH JUNE, 2019

RE: LETTER OF INTRODUCTION
AMPRATWUM OPPONG AHMED

Please, I refer to your letter dated 31st May, 2019 with Ref: No KNUST/SPH/HPD/VOL.2 on the above subject.

The District Health Directorate will give the student the needed support and co-operation to enable him successfully complete his research work.

Thank you.

DIST. DIRECTOR GHANA HEALTH SERVICE SEKYERE SOUTH DISTRICT AGONA - ASHANTI

VESTA ARYEE[illegible]
(AG. DIST. DIR. OF HEALTH SERVICE)

TO

THE HEAD OF DEPARTMENT
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
KNUST – KUMASI