SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA

EQUITY IN ACCESS TO IMMUNIZATION SERVICES AMONG CHILDREN IN URBAN GA SOUTH MUNICIPALITY

BY

AMPONSEM, AMA FOSUA
10704167

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE.

JULY, 2019

DECLARATION

I, Ama Fosua Amponsem hereby declare that except for references made to other works, which have been duly acknowledged this research is my own work. The study is undertaken under the guidance and supervision of Dr. Patricia Akweongo of the School of Public Health, University of Ghana. This work has not been partly or fully submitted for any other degree, neither has it been submitted concurrently in candidature for any other degree.

.....

Ama Fosua Amponsem
(Principal Investigator)

Date: 18/10/2019

.....

Dr. Patricia Akweongo
(Supervisor)

Date: 18/10/2019

DEDICATION

This work is dedicated to my parents Mr. G. K. Amponsem and Mabel Mannoh; my siblings and friends for their love and support.

ACKNOWLEDGMENT

I thank the Almighty God for seeing me through this course of study and completing this research work successfully.

I would like to express my sincere gratitude to my supervisor Dr. Patricia Akweongo Head of Department of Health Policy, Planning and Management (HPPM).

I am grateful to the staff at the HPPM department for their support.

I am also thankful to research correspondents who willingly gave responses to the questionnaires.

I am grateful to my research assistants and the various authors from whose work important information were extracted for this study.

Finally, to my course mates especially Dr. Ivon Kuutiero, Miss Gertrude Agbeshie, Dr Melvin Agbogbatey, Ms Rabiatu Alawiye, Mr Alexis Kuuridong and Dr Abraham Opare. I appreciate your company and it has been wonderful being with you.

LIST OF ABBREVIATION

ANC	Antenatal Care
BCG	Bacillus Calmette-Guerin
DTP	Diphtheria- tetanus- pertussis vaccine
EPI	Expanded program on immunization
GAVI	Global alliance for vaccines and immunization
GDHS	Ghana demographic and health survey
GHS	Ghana health service
GVAP	Global Vaccine Action Plan
JHS	Junior high school
LMIC	Low and middle-income countries
MDG	Millennium Development Goal
OPV	Oral polio vaccine
PCV	Pneumococcal vaccine
SDG	Sustainable Development Goal
SHS	Senior high school
UNICEF	United Nations children's fund
WHO	World health organization

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Introduction:

Improving child health outcomes has been central to global development efforts over the last four decades. Vaccine-preventable diseases are the most common cause of childhood mortality, with an estimated three million deaths each year. The Ghana Demographic Health Survey 2014 report established a 76.0% coverage in the urban and in the rural a coverage of 78.6% among children aged 12-23 months who received all the basic needs of vaccination. It is therefore essential that child immunization service is equitable in order to achieve Sustainable Development Goal 3- Ensure healthy lives and promote wellbeing for all at all ages.

Objectives:

The study sought to determine equity in access to child immunization services and the barriers associated with all eligible children having access to the service in urban Ga South Municipality.

Methods:

A cross-sectional explorative design using quantitative method approach was used. A total of 202 mothers with children 12 to 59-month-olds residing in the Ga South Municipal were enrolled to respond to questionnaires for this study. Multi-stage cluster sampling technique was used in the selection of participants. For the data analyses process, STATA Version 15 software was used for the descriptive and statistical analysis.

Results:

The results of the study revealed that 144(71.3%) children who participated in the study were fully vaccinated, 54(26.7%) were partially vaccinated and 4(2.0%) had never received a vaccination. Pentavalent 3 vaccine coverage in urban Ga South Municipality was also recorded as 85.2%. Birth order of the child and monthly income of the mother contributed to disparities in the coverage of Pentavalent 3. Factors that influenced access to immunization service among

children included a higher education, vaccine availability at the immunization centers, a mother being employed, monthly allowance, and distance to the immunization centers.

Conclusion:

Access to immunization services among children in urban Ga South Municipality was good but equity in the service was not achieved. Availability of vaccines at all child immunization outreach points in the municipal, distance to immunization and monthly income of mothers were significantly associated with reaching all eligible children for immunization.

Recommendation:

More outreach points for child immunization must be cited close to homes by the Ghana Health Service in the Ga South Municipality in order to improve coverage by the Ghana Health Service. Vaccine must be made available by Ghana Health Service.

CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Universal immunization of children is vital in curbing childhood mortality and morbidity worldwide hence the need to establish equity. Achieving equity in immunization implies giving all eligible children equal opportunities to access these services and identifying underprivileged and helpless children at risk of non-vaccination (Lauidsen et al., 2011).

Childhood vaccination was introduced as a worldwide intervention to improve the survival and health of children by reducing vaccine-preventable deaths. Immunization is an established instrument for managing and eliminating deadly communicable illnesses and an estimated annual average of 2 to 3 million fatalities. It is one of the most cost-effective health investments, with proven approaches making it available to even the most vulnerable and difficult to reach populations. It has obviously defined target groups, it can be efficiently provided through outreach, and vaccination does not involve any major changes in lifestyle (Legesse & Dechasa, 2015).

The UN confirms that Ghana had fewer kids (49.3 per 1000 live births in 2017 compared with 58 per 1000 births in 2014) under the age of five who died from preventable causes than ever. The worldwide mortality rate of under-five people decreased from 12.7 million to 6 million fatalities a year between 1990 and 2015. Increased routine immunization coverage, early and accurate diagnosis of infant illnesses, as well as simplified and community-based pneumonia, diarrhea and malaria therapy have considerably decreased the fatalities of little children. While preventive measures such as provision of secure drinking water, improved sanitation, distribution of insecticide-treated nets, rotavirus vaccination and pneumococcal infection, supplementation of vitamin A, community-based management of acute malnutrition and [illegible] little children has so far improved their lives.

With the Expanded Programme on Immunisation (EPI) guidelines, a child must be given Bacillus Calmette Guerin (BCG), Oral Polio Vaccine (OPV) in three doses, three doses of Diphtheria Pertussis Tetanus (DTP) and measles vaccine by the first birthday (JHSPH IVAC, 2009). If this was followed well, childhood morbidity and mortality will be reduced in order to be able to reach Millennium Development Goal 4: reduce child mortality.

1.0 State of immunization service in the African regions

The threat of a toddler dying before era five is still the highest in the African region of the WHO (74 per 1000 live births), about 8 times greater than in the European region of the WHO (9 per 1000 live births). Several nations still have very elevated death rates of under-five – especially those in the WHO African region, home to 5 out of 6 nations with a death rate of above 100 fatalities per 1000 live births. Furthermore, there are still major inequalities among high-income and low-income nations in child mortality. In 2017, in low-income nations, the under-five mortality rate was 69 fatalities per 1000 live births – about 14 times the regular in high-income nations (5 fatalities per 1000 live births). Important priorities include decreasing these imbalances across countries and saving more children's lives by preventing avoidable deaths of children (WHO, 2019).

To enable equity in the immunization service, after Expanded Program on immunization initiated in 1984 to make vaccines available to children, an international organization, Global Alliance for Vaccines and Immunization (GAVI) created in 2000 - a global vaccine alliance that uses public-private partnership committed to creating equal access to new and underused vaccines for children living in poor areas. The GAVI countries include Ghana and other sub-Saharan countries. Another, Global Vaccine Action Plan (GVAP) was also established in 2012 to ensure equitable access to existing vaccines (World Health Organization. Global vaccine action plan 2011–2020. 2013; Geneva, Switzerland: WHO). Reaching unvaccinated kids –

typically in distant rural areas that are poorly served, deprived urban environments, fragile countries, and conflict-torn regions – is crucial if the GVAP's objectives are to be met.

Despite the measures taken to bridge the gaps in the immunization services in low and middle-income countries like the Sub- Sahara African countries, there is still more work to be done in order to attain equity. An estimated 5.4 million children under age 5 died in 2017—roughly half of those deaths occurred in sub-Saharan Africa (UNICEF, 2018). Most children in these countries are not fully immunized while some do not start the immunization service at all. The Diphtheria- tetanus- pertussis vaccine (DTP3) is a reliable meter for childhood vaccination coverage for age 2 with access to basic immunization service (GAVI, 2017). The percentage of infants in Africa who received the full three doses of the DTP3 was about 71% (WHO, 2010). Six million children in the Sub- Sahara African region did not receive the DTP3 by the age of one in 2010. In addition, vaccine efficacy was small in low- and middle-income countries (LMICs) compared with higher-income nations, hence the need for strong and equitable coverage of childhood immunization in the region (Kirsten et al, 2010 and Njamnshi et al, 2007).

1.1 Equity in immunization in Ghana

In Ghana, the government adopted guidelines for vaccinating children from the World Health Organization (WHO) and UNICEF In accordance with these rules, a baby should receive the following vaccinations to be considered fully vaccinated: one dose each of BCG and measles, three doses of the polio vaccine as well as DTP. In Ghana, an additional vaccine against yellow fever is recommended for children. BCG, which protects against tuberculosis, should be given at birth or at first clinical contact DPT (GDHS report, 2014).

The 2014 Ghana Demographic Health Survey (GDHS) indicated that 77% of children aged 12-23 months was completely immunized (all fundamental vaccinations were received). This

proportion was slightly smaller than that reported in the 2008 GDHS (79 %). Only 2% of kids in Ghana did not receive any vaccinations, compared with 1% of children who received no vaccinations in the 2008 GDHS. Additionally, seventy-one percent of infants were completely immunized at 12 months of age, which is slightly greater than the 2008 GDHS (70 percent).

Depending on the context, the coverage of vaccination does not differ considerably, but some important developments exist. In urban areas, the majority of children are likely to have all basic vaccinations, but all age-appropriate vaccinations in rural areas are most probable. Children who are their mother's sixth or greater birth have lowered age-appropriate vaccination rates and are more likely to have never been vaccinated. Children with secondary or higher education mothers have significantly higher rates of fundamental and age-appropriate vaccinations. The percentage of children with all fundamental vaccinations does not vary with the mother's quintile wealth but increases with the mother's growing wealth, age-appropriate vaccinations. Among women with secondary or higher schooling, immunization coverage had enhanced (83% in 2014 compared with 74% in 2008). Furthermore, enhanced immunization coverage among motherless children (76% in 2014 compared to 73% in 2008) was reported.

1.2 Problem Statement

Vaccines prevent more than 2.5 million deaths in children every year and it has been shown that children who receive all the appropriate vaccinations by the age of 9 months are less likely to die than those who do not (Rutherford et al., 2009). Unfortunately, there are considerable challenges to attaining universal child immunization coverage in developing nations, particularly in sub-Saharan Africa (Lancet, 2016).

There has been insufficient progress in lowering child mortality in Ghana. Child mortality is still the country's second-largest death rate. The amount of fatalities under five has stopped

twice the Millennium Development Goal target since 2008 - 82 deaths per 1000 live births in 2011 compared with a target of 40 (UNICEF, 2016).

There are existence of inequalities in child immunization among urban residents shown in a study portrayed the need to establish if equity really exist in an urban setting concerning child immunization (Egondi et. al, 2015). The GDHS 2014 report established a 76.0% coverage in the urban in the rural a coverage of 78.6% among children aged 12-23 months who received all the basic needs of vaccination. Coverage estimates alone are not an adequate criterion to determine the accomplishment of certain levels of performance by a nearby immunization program within the larger population.

A study done in Ghana exhibited disparities across the various regions and districts concerning child immunization and this highlights the need to measure if equity exist in the service (Yawson et al., 2017).

Another study projected the need to target specifically susceptible children in urban areas to evaluate whether immunization is being used to its complete potential (Asuman, Ackah and Enemark, 2018).

1.3 Research Question

This study sought to address the following research questions

- What is the proportion of children in Ga South Municipality that have been fully immunized for pentavalent-3?
- What are the disparities in access to pentavalent-3 vaccine among children in urban Ga South Municipality?
- What factors influencing access to immunization services among children in urban Ga South Municipality?

1.4 Objective of the study

1.4.1 General Objective

To determine the equity in the access to immunization services among children in urban Ga South Municipal.

1.4.2 Specific Aims

- To assess the proportions of children fully immunized for the pentavalent-3 vaccine in urban Ga South Municipality.
- To determine disparities in pentavalent-3 vaccine coverage among children in Urban Ga South Municipality.
- To assess factors influencing access to immunization services among children in Ga South Municipality.

1.5 Significance of the Study

The findings of this study would highlight if inequities exist in the child immunization service in the urban setting. It gives an overview of the coverage of immunization among children in urban Ga South Municipality and factors influencing access to the service. Findings of this study would help inform how to reach all children with the immunization services by providing the loop holes needed to fill to ensure equity in the service is achieved.

1.6 Conceptual Framework

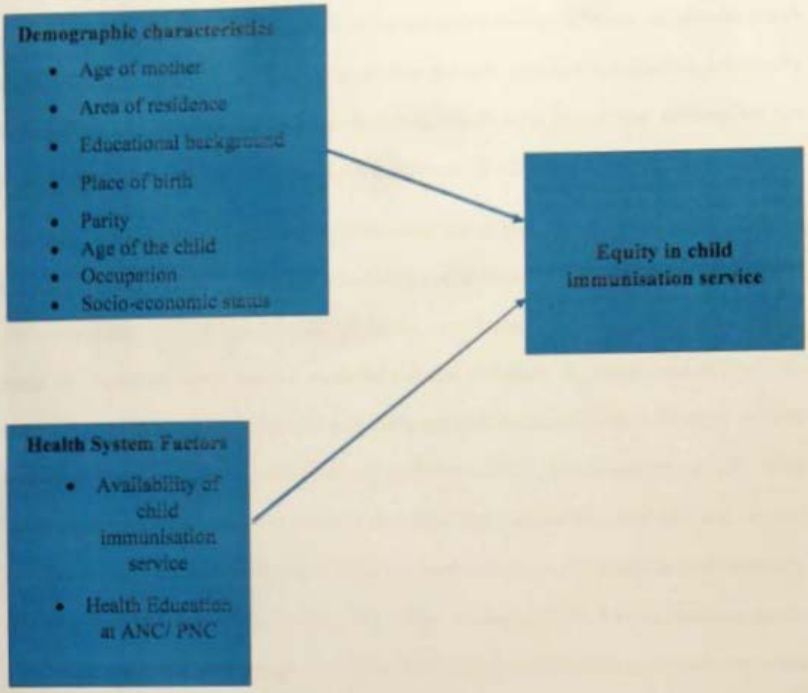

Figure 1.1: Conceptual framework

The conceptual framework demonstrates the path through which individual and health system factors affect equity in access to immunization services. Individual factors such as the age of the mother and age of the child, area of residence, educational background, and occupation of the mother, socio-economic status and parity will possibly affect equity in the child immunization service in the Ga South Municipality. Older mothers tend to understand the impact and significance of childhood immunization than young females. The mothers' location from the access points can encourage or prevent the use of the service. The educational background may probably influence their access to the service due to their inability to understand the information given on the service and the importance of vaccinating their

children. Mother's occupation is another factor that influences vaccination uptake. A child born in a health facility can have better access to immunization than a child born outside the health facility. Socioeconomic factors and transport costs for each immunization session, particularly if health care facilities are not in close proximity, could be a reason why services are not available (Adenike, Adejumoke, Olufunmi, & Ridwan, 2017).

The health system factors (variables), on the other hand, have an influence on the equity in access to child immunization service. Availability of the service in various outreach point in the municipality will influence the use of the service. Improving access to vaccination in all fields of a country could have a multidimensional influence on health care delivery by improving health workers' efficiency and coverage and maximizing the efficiency of their health interventions (Coleman, Howard and Jenkinson, 2011). The frequency of ANC visits and vaccination services can be ascribed to the reality that females who visit ANC are exposed to health centers and there is a chance for health staff to encourage females to seek after-care for themselves and their newborns Dixit, Dwivedi, and Ram, 2013). Use of postnatal care is found to be associated with completion of infant immunization. Children examined within two months of their birth were more probable to receive complete vaccination (Etana & Deressa, 2012).

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

2.1 Immunization

The World Health Organization (WHO) describes immunization as the method by which an individual becomes immune or resistant to an infectious disease, typically through vaccine administration. Vaccines stimulate the body's own immune system to safeguard the individual from infection or disease afterwards.

Ghana has fewer children under the age of five who die from preventable causes than ever before, according to the United Nations (the mortality rate of children under the age of 5 is 49.3 per 1000 live births). The worldwide mortality rate of under-five people decreased from 12.7 million to 6 million fatalities a year between 1990 and 2015. Increased regular immunization coverage, early and precise diagnosis of childhood diseases, along with streamlined and community-based pneumonia, diarrhea, and malaria therapy, have considerably decreased the number of fatalities of young kids.

In Ghana, the Expanded Programme on Immunisations was launched in 1978. In reaction to a domestic policy to decrease maternal and infant morbidity and mortality caused by vaccine-preventable diseases, the immunization program was launched. Six antigens were introduced at the beginning of the immunization program for expectant mothers and kids. Child vaccinations included tuberculosis vaccination with Bacillus Calmette-Guèrin (BCG), measles, Diphtheria-Pertussis-Tetanus (DPT) and oral polio for pregnant females under the age of 12 and tetanus toxoid vaccination. In 1992, the domestic immunization program launched a yellow fever vaccination program for children and contributed to their survival and healthy growth. (Asuman, Ackah and Enemark, 2018).

Since the program was started, the immunization program in Ghana has been periodically reviewed. In 2002, the DPT vaccine was substituted by a pentavalent vaccine (DPT-Hep B-Hib) to include hepatitis B and haemophilus influenza type B immunizations. Also in 2012, two new vaccines for pneumococcal and rotavirus were introduced to protect children from pneumococcal diseases, particularly pneumonia and diarrhea. A kid must receive three doses of pneumococcal vaccine at the age of 6 months, 10 months and 14 months, and two doses of rotavirus at the age of 6 months and 10 months. At nine months in 2013, the measles vaccine alone was substituted by a measles-rubella vaccine. A second dose of the measles-only vaccine was introduced in the same year as an 18-month booster. (Asuman, Ackah and Enemark, 2018).

2.2 Child Immunisation Coverage

Immunization is one of public health's most economical measures to date, preventing approximately 2 to 3 million deaths a year. The world is closer than ever in relation to the eradication of polio as a direct result of immunization, with only three surviving polio-endemic countries – Afghanistan, Nigeria, and Pakistan. Children under 5 fatalities from measles, a significant child killer, globally decreased by 85% and sub-Saharan Africa decreased by 89% between 2000 and 2016. And as of March 2018, all but 14 countries eradicated maternal and neonatal tetanus, a disease with a mortality rate of 70 to 100% among newborns. The proportion of children getting DTP is often used as an indicator of how well nations provide regular immunization facilities. Global coverage levels for the third dose of vaccine for diphtheria, tetanus, and pertussis (DTP3) reached 85% in 2017, up from 72% in 2000 and 21% in 1980. Nonetheless, over the current decade, advancement has stopped and the Global Vaccine Action Plan (GVAP) target of 90% or higher coverage of DTP3 has yet to be met by 71 nations. In 2017, around 19.9 million children under the age of 1 did not receive the three recommended doses of DTP worldwide and 20.8 million children in the same age group did not receive a single dose of measles-containing vaccine. (Levine, O.S., et al., 2011).

Studies have shown that there are frequent failures of complete immunization among those in touch with health facilities to obtain additional interventions in maternal and child health. Vaccine coverage requiring various doses (DPT and polio) is often smaller than vaccine coverage in most nations requiring single doses (measles and BCG) (Bbaalee, 2013).

Many countries' immunization output is powerful and comparatively consistent as measured by DTP3 coverage. These consist of Algeria, Egypt, Iran, Jordan, Libya, Morocco, Sudan, Palestine and Tunisia, with DTP3 coverage of at least 90% between 2010 and 2017. In addition, Iraq, Syria, and Yemen, which were affected by extended disputes and civil wars, saw important falls, with Syria displaying the biggest drop from 80% to 48%. Djibouti fought to increase its coverage by more than 90% and saw a decrease from 88% to 68% (Saxenian, Sadr-Azodi, Kaddar and Senouci, 2017).

Global immunization coverage with DTP3 remains at 85% in the past few years, it is important to highlight that an additional 4.6 million infants have been vaccinated globally in 2017 compared with 2010, due to global population growth. Although DTP3 coverage in the African region remains at 72% since 2010, the regional population growth meant that to sustain the same coverage level, about 3.2 million more infants would have been vaccinated in 2017, compared with 2010 (UNICEF, 2017)

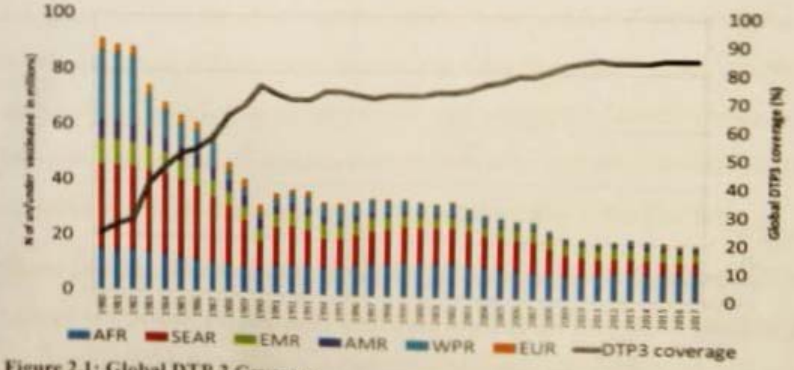

Figure 2.1: Global DTP 3 Coverage

2.3 Equity in access to immunization

The World Health Assembly approved the 2011-2020 Global Vaccine Action Plan (GVAP) in 2012, which calls on all nations to achieve and maintain 90% domestic coverage and 80% coverage in all provinces for the third dose of vaccine-containing diphtheria-tetanus-pertussis (DTP3) by 2015 and 90% domestic coverage and 80% coverage in all counties by 2020 for all medicines included in domestic immunization schedules (WHO, 2013). The GVAP also demands for a focus on vaccination equity by decreasing the gap in coverage between low-income and high-income nations and decreasing the pockets of low sub-national vaccination coverage. Most nations have historically been categorized by the World Bank as low-income within the WHO African Region (World Bank, 2017). In many nations, immunization facilities typically work in a resource-constrained setting in contrast to high-income countries. Most of the 47 WHO African region nations are focused on heavy investments from overseas donors, including GAVI, the Vaccine Alliance, which paid at least US$ 6 billion in 2000-2016 to introduce vaccines and strengthen the health system in 37 African region (Saxenian et al., 2011).

Conflict is one of the primary variables – together with underinvestment in domestic immunization programs, vaccine storage and illness outbreaks – that disrupts health systems and prevents the viable delivery of vaccination services. Approximately 40% (almost 8 million) of under-immunized children live in vulnerable or humanitarian environments, including conflict-affected nations. These children are the most susceptible to disease outbreaks. In Yemen, for example, kids accounted for more than 58% of the more than one million people affected by an outbreak of malaria or watery diarrhea in 2017 alone. (UNICEF, 2017).

Vaccines have improved their safety and accessibility than ever through the joint attempts of UNICEF with partners and nations. In low-income countries, the price of fully immunizing kids is only US$ 18 per kid, down from US$ 24.5 in 2013. Increasing numbers of nations now

offer pneumococcal conjugate vaccines (134 countries by the end of 2017) and rotavirus vaccines (90 countries by the end of 2017) in their immunization programs, thereby providing safety against pneumonia and diarrhea. (WHO, 2017)). While low-income countries have largely been able to close coverage gaps with GAVI assistance, the Vaccine Alliance is lagging behind in the execution of vaccines in middle-income countries struggling to identify national and external funding sources. .

Complex health system barriers to childhood immunization still exist in this urban setting; emphasizing that even in urban areas with great physical access, there are hard to reach people. As the rate of urbanization increases especially in sub-Saharan Africa, this could be the reason for the stalling coverage in the region (Babirye, J., Engebretsen, I., Rutebemberwa, E., Kiguli, J., & Nuwaha, F., 2014).

Comparing information on social determinants with information on vaccination coverage can open a window for inequities affecting immunization uptake, reveal excellent potential for service enhancement and generate opportunities for increased coverage of vaccination (Boyce et. al, 2018).

A study done in Ghana depicted Greater Accra having gaps in coverage at the end of 2014 as 66.7% of healthcare centers having staff in health care being equipped in the last 2 years on EPI. This was expected to increase to 90% of facility training at least 80% of their Health Care Workers on routine EPI (Yawson, A. E., Bonsu, G., Senaya, L. K. et. al., 2017).

2.4 Disparities in Urban Setting immunization coverage

Studies in developing nations have shown significant distinctions between rural and urban co verage of child immunization. Rural communities stay underserved in a number of vital services in developing nations where there are extensive spatial disparities in accessibility and access to health facilities and data. Several surveys showed reduced levels of immunization

among kids in urban regions, particularly slums and informal settlements in Kampala (Babirye, J., Engebretsen, I., Rutebemberwa, E., Kiguli, J., & Nuwaha, F., 2014) and in Nairobi (Egondi, T., Oyolola, M., Mutua, M. K., & Elungata, P., 2015).

Reduced access to services, poor awareness of caregivers, missed chances and elevated dropout rates are significant variables affecting low levels of immunization. Again, the use of maternal health care and understanding of the era at which the kid starts and ends vaccination are the primary variables connected with full immunization coverage (Etana & Deressa, 2012).

In the urban poor area, immunization coverage is much lower than that of regional surveys that report urban data as a whole. Household socioeconomic status, female analphabetism, health consciousness and gender inequality are key determinants of child immunization coverage (Devasenapathy N, Ghosh Jerath S, Sharma S, et al, 2016).

Children born to mothers who are immigrants or to large families have less vaccine acceptance. This seems to be the case in urban areas where people have moved from rural areas to make a living in urban areas (Anello et al., 2017).

2.5 Maternal factors

Parents do not perceive immunization as a right to their children so access to the child in many developing countries' immunization services are very little. Some of the variables substantially connected with immunization coverage in this research were antenatal care follow-up, father's education, mother's occupation and family earnings. Mostly, those who had a higher frequency of ANC visits had fully immunized their wards as well as children with more educated parents (Legesse & Dechasa et. al, 2015).

Mothers are often caregivers in Africa like the Ghanaian society and hence, most studies have focused their influence on the immunization of children so many studies have extensively concentrated on maternal features, especially educational attainment and literacy (Egondi, T.,

Oyolola, M., Mutua, M.K., & Elungata, P., 2015; Olorunsaiye, C. Z., Langhamer, M. S., Wallace, A. S., & Watkins, M. L, 2017), employment status (Bugvi, A., Rahat, R., Zakar, R., Zakar, M., Fischer, F., Nasrullah, M., & Manawar, R., 2014; Uthman, O. A., Adedokun, S. T., Olukade, T., Watson S., Adetokunboh, O., Adeniran, A et al., 2017), age and age at birth (Olorunsaiye, , C. Z., Langhamer, M. S., Wallace, A. S., & Watkins, M. L, 2017), media exposure (Tsawe, M., Moto A., Netshivhera, T., Ralesego, L., Nyanthi, C., & Susuman, A. S., 2015), marital status and religion (Landoh, 2016) were discovered to have strong connections with a child's immunization status. The presence of such strong maternal impacts on child immunization represents parent's traditional childcare duty in most developing nations, in line with the policy recommendation that empowering women in family decision-making, such as child health, may be crucial to achieving universal immunization coverage among underserved populations (Antai, D., 2011; Wado, Y. D. ibab., Afework, M. F. Antahu., & Hindin, M. J., 2014).

The use of maternal health care and mother's understanding of vaccine-preventable diseases and vaccine-preventable diseases are important considerations connected with full coverage of immunization. Use of maternal health care can be correlated with completion of infant immunization-kids whose mothers have ANC are more likely to be fully vaccinated than those not attending ANC (Etana & Deressa, 2012; Babalola & Fatusi, 2009).

Disparities exist in terms of maternal factors that influence child immunization. In a population-based cohort study, Anello et al., (2017) determined the socioeconomic factors that influence childhood vaccination in two Northern Italian regions. It was found that 1.9% of the children had not been vaccinated at all and 11% without vaccines like measles, mumps, and rubella, etc. Children born to mothers who were over 35 or under 25, unmarried, had higher formal education and were citizens of highly developed countries were more likely to refuse vaccination for their children. However, a literature review conducted by Hinman and

McKinlay (2015) found that the greatest disparity existed for children born to women with no education compared with those born to women with secondary (or higher) education.

Furthermore, a cross-sectional survey undertaken by Tsuchiya et al. (2016) found that children were more likely to be vaccinated for mumps during the vaccination period if their mothers were older or living abroad, and less likely if their mothers had three children or were living in rural regions. Lakew, Bekele and Biadgilign (2015) also conducted a cross-sectional study on factors influencing immunization coverage in Ethiopia using the 2011 Ethiopian Demographic and Health Survey and found that sources of information from vaccination card, received postnatal check-up within two months after birth, women's awareness of community conversation program and women in the rich wealth index were the predictors of full immunization coverage.

2.6 Measurement of Equity in access to immunization services

Vaccine inequities are the unjust differences in vaccine coverage among different social groups which are usually linked to various forms of disadvantages such as discrimination, poverty and lack of access to goods and services (Hinman & McKinlay, 2015). These inequities are unfortunately the norm, both in terms of access to and use of vaccine services (Hinman & McKinlay, 2015).

In 2012, the Global Vaccine Action Plan (GVAP) is a structure which was adopted at the Sixty-fifth World Health Assembly by all the Member States of the World Health Organization (WHO) aims to reach the 2011–2020 Decade of Vaccines (DoV) vision of "a world in which all individuals and communities enjoy lives free from vaccine-preventable diseases". The mission of the GVAP was to "improve health by extending the full benefits of immunization to all people by 2020, irrespective of where they are born, who they are or where they are. To achieve this mission, the GVAP has articulated five goals and six strategic goals. One is to [illegible] and 80% in each district or equivalent administrative unit with

three doses of vaccines containing diphtheria-tetanus-pertussis (GVAP Secretariat Report, 2017).

Over a period, improvements in vaccination coverage in Africa (53 nations) have been produced. Referring to estimates of coverage from the WHO and the United Nations Children's Fund (UNICEF), the DTP3 coverage of at least 80% was used as a measure in 1980, 1990 and 2000, then in 2010. While in 2010, 35 nations recorded 80% domestic DTP3 coverage, in 80% of their counties, only 16 (30%) countries reported at least 80% DTP3 coverage. The DTP drop-out rate [(DTP1–DTP3)/DTP1 x 100%) is also used to measure the efficiency of EPI, where a DTP drop of less than 10% is deemed good. Between 1974 and 1990, there was an improvement in the percentage of nations with a drop-out rate of DTP of less than 10%, which stagnated between 1990 and 2000 and then increased considerably from 28% in 2000 to 60% in 2010 (Machingaidze, Wiysonge & Hussey, 2013).

Socio-economic variables are a means to measure health equity. Parents ' educational background can be used as a predictor of child health inequalities, particularly that of the mom and the household wealth index. A research emphasizes the significance of maternal education in the well-being of children: increasing maternal education is likely to have a beneficial impact on the health outcome of a baby (Wamani et al, 2004).

Another research using a domestic household survey to explore equity assessment of the use of health facilities in Afghanistan used the built-up measurement of wealth status from the mortality survey in Afghanistan. A household's wealth was measured by assessing household assets (e.g. television and bicycle ownership); and household dwelling characteristics (e.g. drinking water source, sanitation facilities, and dwelling floor and roof building material) (Kim et. al, 2016).

Assessing health equity involves comparing health and social determinants among more and less advantageous social groups. This data enables assessment of whether policies and programs lead to or do not lead to higher social justice in health (Braveman and Gruskin, 2003).

2.7 Summary of the Chapter

The reviewed literature showed that childhood vaccination was launched to help reduce child mobility that resulted from a vaccine-preventable disease. The African region seems to be lagging in coverage and this has been solicited for by organizations like GAVI and GVAP to be able to raise in coverage to meet the 90% DTP-3 national coverage benchmark for the region. It establishes the fact that Ghana, as well as others in the African region, use the pentavalent vaccine in place of the DTP vaccine. The various studies exhibited factors that have influenced on access to immunization across various countries include marital status, ANC visits and follow up, geographical area, parity, the gender of the child, educational background of parents of the child, age of mother, media exposure, religion, and employment status. Studies in the literature also portray disparities in various regions within countries of which some were categorized into urban and rural with the urban settings doing well in immunization coverage. It is also well noted that the DTP3 coverage, as well as DTP drop-out rate, as a means to measure childhood vaccination and to establish if equity exists in access to the child immunization service. The socio-economic factors of the mothers of the children will be used to also measure equity. The next chapter presents the methods applied to collect data in the study.

CHAPTER THREE

METHODS

3.0 Introduction

This chapter outlines the research methods that were used to collect primary data. The chapter begins by explaining the research design, sampling method, data collection, data analysis, validity and reliability testing analysis, limitations of the study and ethical issues are all contained in this section.

3.1 Study Design

This study used an explorative cross-sectional design to determine the immunization coverage of children in the Ga South Municipality using Pentavalent 3 as an indicator. A quantitative research design was adopted for this study. The quantitative method was designed to capture data on the Children between 12 and 59 months of age and their mothers' demographic characteristics.

3.2 Research Setting/ Study Location

The study was carried out in urban Ga South Municipality in the Greater Accra Region of Ghana.

3.2.1 Geography and demography

Amanfro, Weija, Kokrobite, Mallam, Gbawe, and Bortianor form the urban part of the Municipality. The Municipality's total population was 411,377 with a higher female ratio (51.1 percent) than male population (48.9% as at 2010). The highest proportion of all age groups were people aged between 0-4 years (13.7%). The municipality has an urban population of 86.7%. The percentage of women in their reproductive stage was 39.8% (15-19 was 9.8, 20-24

was 10.5, 25-29 was 10.7 and 30-34 was 8.8) in the Ga South Municipality as at 2010 (Ghana Statistical Service, 2010).

3.2.2 Healthcare Provision

The Ga South Municipal Hospital is the main center for child immunization but due to geographical influence in the service, satellite clinics have been set up within various communities to enable access to the service. These satellite clinics include Malam Demonstration Clinic, Oblogo Clinic, Dalton Clinic, Obom health center, Amanfro health center, Bortianor health center, and Kokrobite health center.

3.3 Research Population

The target population included children 24 to 59 months of age and their mothers living in urban Ga South Municipality.

3.3.1 Inclusion Criteria

The inclusion criteria were all children of 24 to 59 months old who had been living in urban Ga South Municipality since birth and were eligible to access child immunization services.

Children of the age 24- 59 months old who were living in urban Ga South and not necessarily born in urban Ga South.

3.3.2 Exclusion Criteria

Caregivers who were not the mothers of the children were not included in the study.

Children within the required age bracket who were not born in Ga South Municipality were not considered in the study.

Mothers who were incapable of giving their consent for the study were exempted.

3.4 Sample Size Determination

Multi-stage cluster sampling technique was used in the selection of participants. The minimum sample size for the study was calculated using the Cochran, 1963 formula:

$$N = \frac{z^2 p (1-p)}{d^2}$$

using an 82.3.% Greater Accra coverage of basic immunization among children aged 12-23 months documented in the 2014 Ghana Demographic and Health Survey report, p=0.823

The allowed margin of error (d) was 5% or 0.05

The Z value corresponding to a 95% confidence interval= 1.96

Substitution of the above parameters into the sample size formula gave the minimum sample size required for the study.

The minimum sample size was calculated as;

$$N = \frac{1.96^2 (0.823) (1-0.823)}{(0.05)^2} = 223.8$$

Based on the study "Evaluation of immunization coverage and its associated factors among children 12–23 months of age in Techiman Municipality, Ghana, 2016 (Adokiya et al, 2016), a 10% was adopted to cater for non-response and possible bias. The sample size was therefore rounded to 246 participants.

Therefore, 10% non-response rate was 22.38 (0.1 x 223.8), making a total sample size of (n=223.8+22.38) = 246.18 approximated as 246 participants.

3.5 Study variables

Redman and Mory, (2009) define a study variable as a characteristic that has quality or quantity and varies. The following variables were used for the study: A dependent variable, which refers to a variable that is simply measured by the researcher. It is the variable that reflects the influence of the independent variable. The variables in this study were mainly categorical outcome.

The table below describes the variables that were measured in this study:

Table 3.1: Variable table

Variable	Categorization	Description	Scale of measurement
Socio-demographics	Socio-demographic characteristics of respondents	• Maternal age • Maternal highest education • Marital status • Socio-economic status (economic quintiles) • Occupation • Place of residence • Parity	Nominal and ordinal
Disparities	Disparities in pentavalent-3 vaccine coverage	• Maternal factors • Socioeconomic factors	Nominal and ordinal
Determinants of equity in immunization	Factors that influence access to immunization services	• Proximity to a health facility • ANC attendance • Availability of immunization services in health facility and community	Nominal and ordinal

3.6 Collection of Data Collection technique and tools

Quantitative data collection approach was employed in this study. Face-to-face interviews were also used to collect data using a structured questionnaire. The questionnaire was made up of both open and close-ended questions that constituted the main variables measured in the study.

These were the socio-demographic characteristics, disparities, and determinants of vaccine equity. The data were gathered from the child health record cards on immunization and mothers' verbal recall on ward's immunization.

3.6.1 Data Management

The questionnaires returned were inspected for completeness, acceptability, and inconsistency to ensure the correctness of the information provided by the respondents. Prior to statistical analysis, data were cleaned by screening to ensure there were no errors and omissions managed. All information was electronically stored and password protected in a personal computer and on Google drive, and access was limited to only the researcher and the supervisor.

3.7 Data Processing and Analysis

The questionnaires administered to the participants had a unique code. A template was created using Microsoft Excel 2016 and a database was used to enter data from the completed questionnaires. The appropriate label name was assigned to each variable. Data was entered every day during the period of data collection.

The data was checked for missing values and errors. It was scrutinized and cleaned and validated as a means of ensuring data quality. The data was then imported from excel to Stata and coded and analysed based on the research objectives. To describe the data, descriptive statistics were used, mainly the socio-demographics characteristics. Cross tabulations were used to test for the association between variables and regression analysis was done to check for the strength of the association.

The proportion of children fully immunized for pentavalent-3 was assessed using descriptive statistics. This was done by looking at the children who had no pentavalent-3 vaccine, one pentavalent-3 vaccine, two pentavalent-3 vaccine and three pentavalent-3 vaccine to assess the

proportion that completed the full three pentavalent-3 vaccine. The disparities within pentavalent-3 vaccine coverage were also determined by looking at the factors that influence a child's likelihood of being vaccinated than the other colleagues who do not have those opportunities. Regression was used to verify factors affecting access to immunization facilities.

3.8 Ethical considerations

Ethical considerations for this study related to approval of the study, privacy and confidentiality, the informed consent, voluntary participation and withdrawal, the risks and benefits involved in the study, and results dissemination. These have been explained below.

Ethical approval

Ethical clearance to conduct the study was obtained from the Ghana Health Service Ethics Review Committee. This gave the mandate to conduct the study.

Permission for the study

Permission was sought from the Ga South Municipality traditional council leaders and the mothers eligible for the study and upon approval included in the study.

Informed Consent

The purpose of the study, the study procedures, the rights of study participants, the potential risks and benefits involved in participating in the study, and other necessary aspects involved in research were carefully explained to the understanding of research participants. They were given the opportunity to raise concerns which were addressed appropriately. They were also allowed to ask questions which were answered and addressed to their satisfaction before they answered the questionnaires. Participants were given the information sheet to read and understand the study processes. In the event they do not understand, it was read to them in the presence of someone who could read and understand. Participants were given written informed

consent to sign when they agreed to participate in the study (the participants' consent is shown in Appendix A).

Potential Risks and benefits

The risk involved in the study was minimal and usually came as taking a few minutes of participants' time to answer the questions, which might be a form of distress to the participants. Also, participants may be asked a question which may be a form of distress to them. The study findings contribute to a robust policy on equity in vaccine coverage. It will inform policymakers to plan and implement social support and equitable and sustainable health policies and they will all made known to the participants.

Privacy and confidentiality

Data obtained from study participants will be kept confidential and used for academic purposes only. The results were presented and discussed without revealing the identities of the respondents and their responses.

Voluntary withdrawal

Study participants were not obliged to answer every question and were free at any moment to withdraw from the research.

Data storage

All the study materials, including written informed consent forms and questionnaires, will be kept in a secure cabinet at the completion of the study and the electronic copies will be stored in a password protected database on the laptop of the researcher. Study participants' information in the electronic database will be only accessible to the researcher.

Results dissemination

The outcome of this study will be made available to the study participants and the facilities as well as the various stakeholders in the vaccine and immunization field in Ghana. The policymakers in the country's health sector will also be engaged based on the findings of the study. The results will also be circulated through publications in scientific journals, presentation at conferences, workshops, and symposiums.

Compensation

The participants were informed that there would be no compensation given as this study would not lead to any harmful effect.

Protocol amendments

It was noted that in the event of any change in the protocol or study site, the Ghana Health Service Ethics Review Committee would be notified accordingly.

Conflict of interest

The researcher declares that there was no conflict of interest to disclose.

Funding information

The researcher provided funding for the research without support from any third party.

CHAPTER FOUR

RESULTS

4.1 Socio-demographics characteristics of mothers with eligible children in urban Ga South Municipality

A total of 202 mothers participated in the study with a response rate of 202 out of 246 (82.11%). The mean and median ages of the mothers were 31.42 and 32 (±5.2 SD) respectively. Out of the 202 mothers, 3(1.5%) had no formal education. Many more mothers 94(46.5%) completed secondary school and 59(29.2%) attained tertiary level education with the mean falling within the secondary level (±0.76 SD). Monthly income earned by the mothers were shown as 35(17.3%) below 500 Ghana cedis, 110(54.5%) 500-1000 Ghana cedis, 44(21%) 1000-2000 and 13(6.4%) above 2000 Ghana cedis with a mean within the below 500 Ghana cedis monthly income category (±0.78 SD). Most of the mothers 117 (57.9%) reported that they stayed in modern designed homes, 177(57.9%) possessed at least one television set and 188(91.6%) had at least one radio. Table 4.1 shows the results of the socio- demographic characteristics of mothers.

Table 4.1 Socio-demographic characteristics of mothers with eligible children in urban Ga South Municipal

Variables		Frequency	Percentage
Marital Status			
	Single	26	12.9%
	Married	160	79.2%
	Cohabitation	16	7.9%
Age			
	20-29	80	39.6%
	30-39	108	53.5%
	40-49	14	6.9%
Education			
	None	3	1.5%
	Primary	46	22.8%
	Secondary	94	46.5%
	Tertiary	59	29.2%
Monthly Income			
	Below 500 Ghana cedis	35	17.3%
	500-1000 Ghana cedis	110	54.5%
	1000-2000 Ghana cedis	44	21%
	2000 and above	13	6.4%
Occupation			
	Unemployed	14	6.9%
	Self-employed	132	65.4%
	Employed	50	24.8%

4.2 Socio-demographic characteristics of children aged 12 to 59 months in Ga South Municipality

A total of 202 children were included in the study, 102(50.5%) were males. The ages of the children ranged between 23 and 58 months old with a mean of 90.4 (±8.7 SD). The birth order of the children who participated was recorded as 80(39.6%) being firstborn to their mothers, 108(53.5%) being second or third born to their mother. A greater proportion of 188(93.1%) was born in a health facility (Table 3).

Table 4.2: Socio-demographic characteristics of children aged 12 to 59 months in urban Ga South Municipality

Variable		Frequency	Percentage
Sex	Male	102	50.5%
	Female	100	49.5%
Place of delivery			
	Home	14	6.9%
	Health facility	188	93.1%
Birth order			
	1	80	39.6%
	2-3	108	53.5%
	≥4	14	6.9%

4.3 Accessibility to vaccination services

A majority of 157 (77.7%) of participants reported having access to health centers that provide immunization services within an hour walking distance. A fair proportion of them, 94(47.2%) reported that they spent an hour, 98(49.3%) reported that they spent two hours in travel time to the health facilities. Only 7(3.5%) reported that they spent less than 30 minutes in travel time to receive a vaccine for their child.

Vaccines were reported as available as 177(87.6%) reported that they had the vaccines on their visits to the immunization centers. However, twenty-five (12.4%) mothers reported not having the vaccine being available for their wards at the child immunization centers. All the respondents reported that there were health workers available at the child immunization centers.

About 96(47.5%) reported that the health workers delivered the service carefully, 49(24.3%) reported that they were not sure of the service delivered and 57(28.2%) reported receiving poor services from health workers at the immunization centers. Table 4.3 details results of the availability of and accessibility to vaccination services.

Table 2.3: Accessibility of vaccination services

Variable		Frequency	Percentage
Distance			
	≤ 30minutes	47	23.3%
	1 hour	110	54.5%
	2 hours	45	22.3%
Waiting time			
	≤ 30minutes	7	3.5%
	1 hour	94	47.2%
	2 hours	98	49.3%
Health workers available			
	No	0	-
	Yes	202	100%
Vaccine available			
	No	25	12.4%
	yes	177	87.6%
Service delivery			
	Poor	57	28.3%
	Not sure	49	24.3%
	Careful	96	47.5%

4.4 Immunization status of children 24-57 months old fully immunized for the pentavalent-3 vaccine in urban Ga South Municipality

Of the total children in this research, 144(71.3%) were fully vaccinated, 54(26.7%) were partly vaccinated and 4(1.98%) had never been vaccinated. Table 4.4 shows the results of immunization status of pentavalent 3 vaccine of children 24-57 months in urban Ga South Municipality.

Table 4.4: Immunisation Status of children aged 24-57 months old in urban Ga South Municipality

Variable		Frequency	Percentage
Immunization Status			
	None	4	2%
	Partially vaccinated	54	26.7%
	Fully vaccinated	144	71.3%
Pentavalent-3 status			
	Not received	30	14.85%
	Received	172	85.15%

4.5 Proportion of children 24-57 months old fully immunized for the pentavalent-3 vaccine in urban Ga South Municipality

172(82.2%) had received vaccination for Pentavalent- 3 while 30(14.9 %) had not received the Pentavalent-3 vaccine. Table 4.5 shows proportion of children 24-57 months old fully immunized for the pentavalent-3 vaccine in urban Ga South Municipality

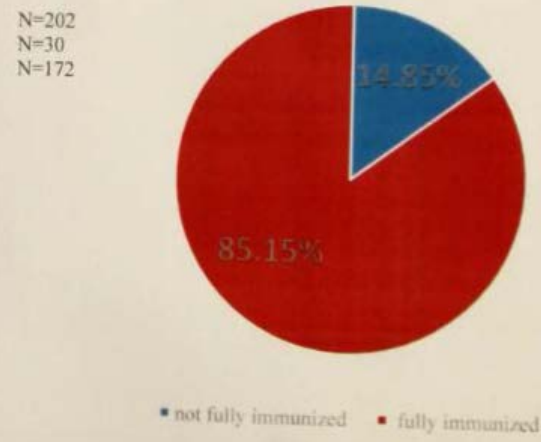

Figure 4.5: Proportion of children fully immunized for the pentavalent-3 vaccine in urban Ga South Municipal

4.6 Logistic Regression: Disparities in access to pentavalent-3 vaccine coverage among children 24-57 months old in urban Ga South Municipality

The disparities in access to pentavalent-3 vaccine were measured using logistic regression. The education level of the mothers, employment status, monthly income of mothers and distance of 2 hours away from the immunization site of the respondents home were found to be factors influencing disparities in the pentavalent- 3 vaccine coverage. After adjusting for the other variables, educational status of mothers, employment status of mothers and mothers' monthly income remained significant and in addition mothers' concern on vaccine safety and birth order of the child. Table 4.6 displays the results of logistic regression of disparities in access to pentavalent-3 vaccine coverage among children 24-57 months old in urban Ga South Municipality.

Table 4.3: 6 Logistic Regression: Disparities in access to pentavalent-3 vaccine coverage among children 24-57 months old in urban Ga South Municipality

Variable		Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Educational status					
	No Formal education	1.0			
	Primary	3.4(1.1,10.51)	0.0	3.2(1.93,4.94)	0.00
	Secondary	3.1(0.38,1.13)	0.0	3.0(0.37,1.21)	0.0
	Tertiary	3.0(0.45,1.23)	0.0	3.0(0.62,1.38)	0.0
Employment status					
	Unemployed	1.0			
	Self employed	13.1(3.29,52.39)	0.0	13.2(0.45,80.92)	0.0
	Employed	12.5(1.08,143.43)	0.0	12.2(0.24,85.71)	0.0
Monthly income (GHS)					
	<500				
	500- 1000	4.4(1.3,15.05)	0.0	4.2(4.84,6.99)	0.0
	1000-2000	3.5(7.4,17.17)	0.0	3.2(4.57,7.08)	0.0
	>2000	9.3(1.7,4.87)	0.0	5.2(1.29,6.54)	0.0
Birth order					
	<3	1.0			
	>3	0.3(0.10,1.02)	0.1	0.1(0.0,0.07)	0.0
Distance					
	≤ 30 min	1.0			
	1 hour	2.5(0.77,8.32)	0.1	2.3(-0.04,0.19)	0.2
	2 hours	0.2 (0.07,0.62)	0.0	0.2(-0.41,-0.14)	0.0
Vaccine safety					
	Yes	1.0			
	No	0.8(0.26,2.49)	0.7	0.4(0.74,1.0)	0.0

4.7 Logistic Regression: Factors influencing access to immunization services among children 24- 57 months old in urban Ga South Municipality

A logistic regression model revealed that educational status of the mothers, birth order of children, employment status, monthly income of the mother of the child, vaccine availability at the immunization centers closer to the mothers, service delivered at the immunization site and the concern of the safety of the vaccine by mothers were the main factors influencing access to child immunization in urban Ga South Municipality because of their level of significance. Table 4.7 presents results of logistic regression of factors influencing access to immunization

Table 4.7 Logistic Regression: Factors influencing access to immunization services among children 24- 57 months old in urban Ga South Municipality

Variables		Crude OR	P Value	Adjusted OR	P Value
Marital status					
	Single	1.0			
	Married	0.1(-4.1,0.77)	0.2	0.04((-0.1,0.3)	0.1
	Cohabiting	0.06(0.9,9.3)	0.1	0.07(-0.6,0.0)	0.1
Education status					
	No Formal education	1.0			
	Primary	0.2(-0.13,0.97)	0.1	0.4(-13.3,1.97)	0.1
	Secondary	0.2(0.15,1.19)	0.0	0.3(0.96,9.3)	0.1
	Tertiary	0.2(0.48,1.51)	0.0	0.4(0.96,9.3)	0.1
Employment status					
	Unemployed	1.0			
	Self employed	2.4(-0.83,4.08)	0.2	0.08(-0.8,4.0)	0.1
	Employed	2.5(0.56,1.11)	0.1	2.0(0.38,1.28)	0.7
Monthly income (GHS)					
	<500	1.0			
	500- 1000	2.2(-4.42—0.41)	0.0	2.0((-4.44,-0.41)	
	1000-2000	1.8(0.49,0.90)	0.0	1.8(0.65,7.67)	0.1
	>2000	2.5(0.3,0.88)	0.0	2.0(0.78,7.97)	
ANC attendance					
	<3	1.0			
	>3	0.4(-3.4,1.4)	0.1	0.1(-2.8,4.6)	0.6
Lack of money					
	No	1.0			
	Yes	0.3	0.7(-5.4,7.7)	0.3	
Waiting time					
	≤ 30 min	1.0			
	1 hour	0.1(-0.7,0.0)	0.04	0.4(-0.72,-021)	0.1
	2 hour	0.03(-0.5,0.1)	0.23	0.6(-0.56-0.13)	0.2

Distance					
	≤ 30 min	1.0			
	1 hour	1.5(-0.23,0.11)	0.4	2.0(0.01,0.22)	0.5
	2 hours	2.0(-4.80,-0.07)	0.0	2.0(1.64,1.92)	0.1
Vaccine available					
	No	1.0			
	Yes	0.2(0.46,0.85)	0.00	0.2(0.24,2.41)	0.00
Vaccine safety					
	No				
	Yes	0.51(-0.25,0.13)	0.01	0.34(-0.27,0.79)	0.00
Service delivery					
	Careless	1.0			
	Not sure	0.3(-0.27,0.59)	0.00	0.4(0.24,0.63)	0.00
	Careful	0.4(-0.24,0.64)	0.00	0.6(0.15,0.71)	0.00
Birth order					
	<3	1.0			
	>3	0.2(0.13,0.39)	0.00	0.2(0.02,0.41)	0.00

CHAPTER FIVE

DISCUSSION

This study evaluated equity in access to immunization services among children in urban Ga South Municipality. Specifically, the study objectives were to assess the proportion of children fully immunized for pentavalent-3 vaccine, to determine disparities in pentavalent-3 vaccine coverage and to assess factors influencing access to immunization services among children in Ga South Municipality. Childhood full immunization status among 23-58 months was confirmed using child health card and mothers recall.

5.1 Proportion of children fully immunized for Pentavalent- 3 vaccine

In this study, 71.3% children had been fully immunized. Compared with the GDHS (Ghana Demographic Health Survey) report for 2014 that showed that the urban setting in Ghana reported 76% for all basic vaccinations for children; and Greater Accra Region, reported 82.3%, which implies that urban Ga South Municipal has fairly good coverage of childhood vaccination in the region (GDHS report, 2014). The target set by the Global Vaccine Action Plan (GVAP) is to reach at least 90% national coverage and 80% coverage in every district or equivalent administrative unit with all vaccines in national programs (GVAP Secretariat Report, 2017). The study indicates that urban Ga South is close to meeting the global target at the district level. A study done in Nairobi and Ethiopia indicated a low coverage of child immunization in the urban areas (Egondi et al, 2015; Etana and Dehasa et al, 2012).

This study found an immunization coverage for pentavalent- 3 vaccine as 85.25% which was within the same range as the coverage for pentavalent- 3 in the urban setting (88.1%) in Ghana and in the Greater Accra region (91.9%) (GDHS report, 2014). GVAP proposed a goal to achieve 90% domestic coverage and 80% coverage in each county or equivalent administrative unit with three doses of vaccine-containing diphtheria-tetanus-pertussis (DTP) by 2 (GVAP

Secretariat Report, 2017). In Ghana, the pentavalent vaccine dose is what contains the diphtheria-tetanus-pertussis (DTP) and in urban Ga South Municipality, the coverage for this vaccine was 85.25% which projects a good coverage for the entire district.

5.2 Factors influencing access to immunization and disparities in equity to immunization

This study revealed that the educational status of mothers has an influence on the pentavalent-3 vaccine. It was also shown as a factor that influences access to immunization services among children. Various studies agree that the higher the educational level of the mother, the greater their chance of completing immunization for their children (GDHS, 2014; Adokiya et al, 2016). Another study comes to terms with the above and anticipated that this may be because as the educational status of the family gets improved, health-seeking behavior of the family may perhaps enhance resulting in a positive impact on the program (Legesse & Dechasa, 2015; Hinman and McKinlay, 2015). A study in Nairobi's informal settlements also established that the lower educational level of mothers contributed massively to the inequalities in access to child immunization exhibited (Egondi et al, 2015). Nevertheless, this study observed educational status as a contributor to disparities in the pentavalent-3 vaccine but not as an influence on a child's full immunization when adjusted for.

Monthly income and employment status of the mothers also showed an effect on the immunization coverage of children in urban Ga South. The higher the monthly income of the mother, the higher the chance of her child accessing the immunization service. Again when it was adjusted, the monthly income of the mothers remained an impact on childhood immunization. A study done in Pakistan displayed a link between the type of maternal occupation and incomplete child immunization and another that was consistent with the results projected that it is likely that poorly paid mothers may not find the time or resources to travel to their nearby health facility for immunization (Antai et al, 2009; Bugvi et al, 2014). Again monthly income of mothers, vaccine safety and vaccine availability at the vaccination sites

were projected as the main factors hindering equity in the access of childhood vaccination. A study elaborated how vaccine availability had an impact on childhood vaccination coverage (Etana and Derasa, 2012). Another study also exhibited income of the household as well as knowledge of immunization by mothers as determinants of immunization among children (Devasenapathy N, Ghosh Jerath S, Sharma S, et al, 2016).

The birth order of the children demonstrated influence in the coverage of the pentavalent 3 vaccine. Birth order tends to determine the overall coverage of vaccines in certain areas (Anello et al, 2017). Howbeit, this study did not have birth order as disparity when it as not adjusted for, Another study was done also exhibited that birth order was a vital predictor of full immunization and they predicted a possibility that the lower birth order of the child, the more he or she is immunized. This may be due to the enthusiastic about having children and they exert appropriate care and upbringing of the children (Antai et al, 2012).

Distance from the homes of the correspondents to the vaccination centers emerged as a determinant of the pentavalent vaccine and also access to immunization service. Those who lived two hours away had difficulty accessing the service as well as a disparity in the pentavalent 3 vaccine. The closer the mothers lived to immunization sites the more likely the child is immunized. A study conducted in Nigeria was consistent with the distance between primary health care facilities and children's immunization status. (Adenike, Adejumoke, Olufunmi, & Ridwan, 2017).

Safety of the vaccine was a concern to some of the correspondents which showed a significance when it was adjusted in this study as a factor influencing access to immunization and a disparity shown in the pentavalent 3 vaccine in urban Ga South. It is possible that due to the uncertainty of the safety of the vaccine (Devasenapathy N, Ghosh Jerath S, Sharma S, et al, 2016).

Vaccine availability and the services rendered at the immunization sites by the health workers [illegible] ntavalent 3 vaccine and access to immunization in the urban

Ga South Municipality. A study revealed that vaccines being available at the immunization centers had an impact on the coverage of child immunization due to willingness to use the service (Coleman, Howard and Jenkinson, 2011).

In this study, media exposure, marital status, lack of money, waiting time to receive vaccines, service received at the outreach sites and ANC attendance in urban Ga South Municipal, there was no significant association with access to immunization among children aged 23–58 months.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion of the study

In a wrap, the study observed that a majority of the children aged 24-57 months living in urban Ga South Municipality were fully immunized hence, most had access to the immunization service. There were also disparities in pentavalent-3 vaccine coverage among children in urban Ga South Municipality- birth order of the child, monthly income, employment status of mothers, educational status of the mothers, employment status, distance of two hours from the homes of the respondents and vaccination outreach points and concern of the safety of vaccines by mothers.

Few factors showed an influence on access to immunization services among children in Ga South Municipality: monthly income of mothers, birth order of the child, vaccine availability, and service delivered at the immunization sites, the concern of vaccine safety by mothers and vaccine availability at the vaccination centers.

6.2 Recommendation

In order to reach all children eligible for childhood vaccination, more outreach points for child immunization must be sited close to the homes by Ghana Health Service to cater for distance inconvenience experienced by the mothers.

Interventions also need to explore ways to increase the use of child immunization services among low-educated and poor women in urban areas through immunization campaigns by the Ghana Health Service. Ghana Health Service must also ensure that vaccines are made available at all child immunization service centers and in addition service provided by the child health care workers must be supervised to enable improvement.

REFERENCES

Adenike, O. B., Adejumoke, J., Olufumi, O., & Ridwan, O. (2017). Maternal characteristics and immunization status of children in north-central of Nigeria. *Pan African Medical Journal*, *26*, 1–15. https://doi.org/10.11604/pamj.2017.26.159.11530

Anello, P., Cestari, L., Baldovin, T., Simonato, L., Frasca, G., Caranci, N., … Canova, C. (2017). Socioeconomic factors influencing childhood vaccination in two northern Italian regions. *Vaccine*, *35*(36), 4673–4680. https://doi.org/10.1016/j.vaccine.2017.07.058

Antai, D. (2011). Rural-urban inequities in childhood immunization in Nigeria: The role of community contexts. *African Journal of Primary Health Care and Family Medicine*, *3*(1). https://doi.org/10.4102/phcfm.v3i1.238

Asuman, D., Ackah, C. G., & Enemark, U. (2018). Inequalities in child immunization coverage in Ghana: evidence from a decomposition analysis. *Health Economics Review*, *8*(1), 1–9. https://doi.org/10.1186/s13561-018-0193-7

Babalola, S., & Fatusi, A. (2009). Determinants of use of maternal health services in Nigeria - Looking beyond individual and household factors. *BMC Pregnancy and Childbirth*, *9*, 43. https://doi.org/10.1186/1471-2393-9-43

Babirye, J., Engebretsen, I., Rutebemberwa, E., Kiguli, J., & Nuwaha, F. (2014). Urban settings do not ensure access to services: findings from the immunization program in Kampala Uganda. *BMC Health Services Research*, *14*, 111. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed12&NEWS=N&AN=24602169

Bugvi, A., Rahat, R., Zakar, R., Zakar, M., Fischer, F., Nasrullah, M., & Manawar, R. (2014). Factors associated with non-utilization of child immunization in Pakistan: Evidence from the Demographic and Health Survey 2006-07. *BMC Public Health*, *14*(1), 1–7. https://doi.org/10.1186/1471-2458-14-232

Devasenapathy, N., Jerath, S. G., Allen, E., Sharma, S., Shankar, A. H., & Zodpey, S. (2015). Reproductive healthcare utilization in urban poor settlements of Delhi: Baseline survey of ANCHUL (Ante Natal and Child Health care in Urban Slums) project. *BMC Pregnancy and Childbirth*, *15*(1). https://doi.org/10.1186/s12884-015-0635-8

Egondi, T., Oyolola, M., Mutua, M. K., & Elungáta, P. (2015). Determinants of immunization inequality among urban poor children: Evidence from Nairobi's informal settlements. *International Journal for Equity in Health*, *14*(1), 1–5. https://doi.org/10.1186/s12939-015-0154-2

Etana, B., & Deressa, W. (2012). Factors associated with complete immunization coverage in children aged 12-23 months in Ambo Woreda, Central Ethiopia. *BMC Public Health, 12*(1), 1. https://doi.org/10.1186/1471-2458-12-566

Hinman, A. R., & McKinlay, M. A. (2015). Immunization Equity. *American Journal of Preventive Medicine, 49*(6), S399–S405. https://doi.org/10.1016/j.amepre.2015.04.018

Landoh, D. E., Ouro-Kavalah, F., Yaya, I., Kahn, A. L., Wasswa, P., Lacle, A., … Soura, A. B. (2016). Predictors of incomplete immunization coverage among one to five years old children in Togo. *BMC Public Health, 16*(1), 1–7. https://doi.org/10.1186/s12889-016-3625-5

Lauridsen, J., & Pradhan, J. (2011). Socio-economic inequality of immunization coverage in India. *Health Economics Review, 1*(1), 1–6. https://doi.org/10.1186/2191-1991-1-11

Lakew, Y., Bekele, A., & 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), 1–8. https://doi.org/10.1186/s12889-015-2078-6

Legesse, E., & Dechasa, W. (2015). An assessment of child immunization coverage and its determinants in Sinana District, Southeast Ethiopia. *BMC Pediatrics, 15*(1), 1–14. https://doi.org/10.1186/s12887-015-0345-4

Levine, O. S., Bloom, D. E., Cherian, T., De Quadros, C., Sow, S., Wecker, J., … Greenwood, B. (2011). The future of immunization policy, implementation, and financing. *The Lancet, 378*(9789), 439–448. https://doi.org/10.1016/S0140-6736(11)60406-6

Olorunsaiye, C. Z., Langhamer, M. S., Wallace, A. S., & Watkins, M. L. (2017). Missed opportunities and barriers for vaccination: a descriptive analysis of private and public health facilities in four African countries. *The Pan African Medical Journal, 27*(Supp 3), 6. https://doi.org/10.11604/pamj.supp.2017.27.3.12083

Redman, L. V., & Mory, A. V. H. (2009). *The romance of research.* Belmont: The Williams and Wilkins Co.

Rutherford, M. E., Mulholland, K., & Hill, P. C. (2010). How access to health care relates to under-five mortality in sub-Saharan Africa: Systematic review. *Tropical Medicine and International Health, 15*(5), 508–519. https://doi.org/10.1111/j.1365-3156.2010.02497.x

Saxenian, H., Sadr-Azodi, N., Kaddar, M., & Senouci, K. (2019). Immunization financing and program performance in the Middle East and North Africa, 2010 to 2017. *BMJ Global Health, 4*(2), 1–8. https://doi.org/10.1136/bmjgh-2018-001248

Tsawe, M., Moto, A., Netshivhera, T., Ralesego, L., Nyathi, C., & Susuman, A. S. (2015). Factors influencing the use of maternal healthcare services and childhood immunization in Swaziland. *International Journal for Equity in Health, 14*(1), 1–11. https://doi.org/10.1186/s12939-015-0162-2

Tsuchiya, Y., Shida, N., Izumi, S., Ogasawara, M., Kakinuma, W., Tsujiuchi, T., & Machida, K. (2016). Factors associated with mothers not vaccinating their children against mumps in Japan. *Public Health, 137*, 95–105. https://doi.org/10.1016/j.puhe.2016.03.002

Antai, D. (2011). Rural-urban inequities in childhood immunization in Nigeria: The role of community contexts. *African Journal of Primary Health Care and Family Medicine, 3*(1). https://doi.org/10.4102/phcfm.v3i1.238

Asuman, D., Ackah, C. G., & Enemark, U. (2018). Inequalities in child immunization coverage in Ghana: evidence from a decomposition analysis. *Health Economics Review, 8*(1), 1–9. https://doi.org/10.1186/s13561-018-0193-7

Babalola, S., & Fatusi, A. (2009). Determinants of use of maternal health services in Nigeria - Looking beyond individual and household factors. *BMC Pregnancy and Childbirth, 9*, 43. https://doi.org/10.1186/1471-2393-9-43

Babirye, J., Engebretsen, I., Rutebemberwa, E., Kiguli, J., & Nuwaha, F. (2014). Urban settings do not ensure access to services: findings from the immunization program in Kampala Uganda. *BMC Health Services Research, 14*, 111. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed12&NEWS=N&AN=24602169

Bugvi, A., Rahat, R., Zakar, R., Zakar, M., Fischer, F., Nasrullah, M., & Manawar, R. (2014). Factors associated with non-utilization of child immunization in Pakistan: Evidence from the Demographic and Health Survey 2006-07. *BMC Public Health, 14*(1), 1–7. https://doi.org/10.1186/1471-2458-14-232

Devasenapathy, N., Jerath, S. G., Allen, E., Sharma, S., Shankar, A. H., & Zodpey, S. (2015). Reproductive healthcare utilization in urban poor settlements of Delhi: Baseline survey of ANCHUL (Ante Natal and Child Health care in Urban Slums) project. *BMC Pregnancy and Childbirth, 15*(1). https://doi.org/10.1186/s12884-015-0635-8

Egondi, T., Oyolola, M., Mutua, M. K., & Elungáta, P. (2015). Determinants of immunization inequality among urban poor children: Evidence from Nairobi's informal settlements. *International Journal for Equity in Health, 14*(1), 1–5. https://doi.org/10.1186/s12939-015-0154-2

Etana, B., & Deressa, W. (2012). Factors associated with complete immunization coverage in

children aged 12-23 months in Ambo Woreda, Central Ethiopia. *BMC Public Health, 12*(1), 1. https://doi.org/10.1186/1471-2458-12-566

Landoh, D. E., Ouro-Kavalah, F., Yaya, I., Kahn, A. L., Wasswa, P., Lacle, A., … Soura, A. B. (2016). Predictors of incomplete immunization coverage among one to five years old children in Togo. *BMC Public Health, 16*(1), 1–7. https://doi.org/10.1186/s12889-016-3625-5

Lauridsen, J., & Pradhan, J. (2011). Socio-economic inequality of immunization coverage in India. *Health Economics Review, 1*(1), 1–6. https://doi.org/10.1186/2191-1991-1-11

Legesse, E., & Dechasa, W. (2015). An assessment of child immunization coverage and its determinants in Sinana District, Southeast Ethiopia. *BMC Pediatrics, 15*(1), 1–14. https://doi.org/10.1186/s12887-015-0345-4

Levine, O. S., Bloom, D. E., Cherian, T., De Quadros, C., Sow, S., Wecker, J., … Greenwood, B. (2011). The future of immunization policy, implementation, and financing. *The Lancet, 378*(9789), 439–448. https://doi.org/10.1016/S0140-6736(11)60406-6

Olorunsaiye, C. Z., Langhamer, M. S., Wallace, A. S., & Watkins, M. L. (2017). Missed opportunities and barriers for vaccination: a descriptive analysis of private and public health facilities in four African countries. *The Pan African Medical Journal, 27*(Supp 3), 6. https://doi.org/10.11604/pamj.supp.2017.27.3.12083

Rutherford, M. E., Mulholland, K., & Hill, P. C. (2010). How access to health care relates to under-five mortality in sub-Saharan Africa: Systematic review. *Tropical Medicine and International Health, 15*(5), 508–519. https://doi.org/10.1111/j.1365-3156.2010.02497.x

Saxenian, H., Sadr-Azodi, N., Kaddar, M., & Senouci, K. (2019). Immunization financing and program performance in the Middle East and North Africa, 2010 to 2017. *BMJ Global Health, 4*(2), 1–8. https://doi.org/10.1136/bmjgh-2018-001248

Tsawe, M., Moto, A., Netshivhera, T., Ralesego, L., Nyathi, C., & Susuman, A. S. (2015). Factors influencing the use of maternal healthcare services and childhood immunization in Swaziland. *International Journal for Equity in Health, 14*(1), 1–11. https://doi.org/10.1186/s12939-015-0162-2

Uthman, O. A., Adedokun, S. T., Olukade, T., Watson, S., Adetokunboh, O., Adeniran, A., … Wiysonge, C. S. (2017). Children who have received no routine polio vaccines in Nigeria: Who are they and where do they live? *Human Vaccines and Immunotherapeutics, 13*(9), 2111–2122. https://doi.org/10.1080/21645515.2017.1336590

Wado, Y. D. ibab., Afework, M. F. antahu., & Hindin, M. J. (2014). Childhood vaccination in rural southwestern Ethiopia: the nexus with demographic factors and women's autonomy. *The Pan African Medical Journal*, *17*(Supp 1), 9. https://doi.org/10.11694/pamj.supp.2014.17.1.3135

Yawson, A. E., Bonsu, G., Senaya, L. K., Yawson, A. O., Eleeza, J. B., Awoonor-Williams, J. K., … 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*, *75*(1), 1–10. https://doi.org/10.1186/s13690-017-0179-7

APPENDICES

APPENDIX A:

Participant consent form

School of Public Health

College of Health Sciences

University of Ghana

Project Title: Equity in access to immunization services among children in urban Ga South Municipal

Institutional Affiliation:

School of Public Health,

Department of Health Policy and Planning Management,

University of Ghana

Legon

Background

Personal Introduction:

The Principal investigator of this study is Amponsem Ama Fosua, a Master of Public Health student and conducting a study on Equity in access to immunization services among children in urban Ga South Municipal. This research is for academic purposes and a requirement for the award of a Master's Degree in Public Health. This study is being supervised by Dr. Patricia Akweongo of School of Public Health, University of Ghana, Legon.

Procedure:

Taking part in this study will take about 20 minutes of your time and we expect your honest response in answering the questions. The questions are about you and immunization of your child

Risk and Benefits:

There may be psychological distress as a result of you talking about your experiences however, findings may inform policymakers to plan and implement social support and equitable and sustainable health policies.

Right to Refuse:

Your participation is voluntary and you can withdraw at any time without consequences. Even though we would be very grateful if you decide to partake in this study and answer all the questions sincerely, neither you nor the study will be affected if you decide not to take part in this study.

Anonymity and Confidentiality:

Your responses will be confidential and your identity will be anonymous. This will be ensured by assigning codes to the participants on the form. The questionnaire will be kept in a locked cabinet after data entry and can be accessed by only the researcher and will be destroyed when it is no longer relevant to the research. Information from this research will be used solely for this study and any publications that may result from this study.

Your rights as a Participant:

This research will be reviewed and approved by the Ghana Health Service Ethical Review Committee. If you have any questions about your right as a research participant, you can contact the Ethical Review Administrator (Ms. Hannah Frimpong) on 0507041223.

Compensation:

There will be no compensation or fee paid to participants for agreeing to participate in this study.

Before taking consent;

If you have any questions, kindly ask or for further clarifications, please don't hesitate to contact the Principal Investigator (Amponsem Ama Fosua) on;

Telephone number: 0247612339, 0268278182 Email:

Participant

The procedures, risk, benefit and details for the study title "EQUITY IN ACCESS TO IMMUNISATION SERVICES AMONG CHILDREN IN URBAN GA SOUTH MUNICIPAL" have been read and explained to me. My questions have been answered to my satisfaction and have the opportunity to ask further questions at any time. I understand I have the right to refuse to answer any particular questions and withdraw from the study at any time. I agree to provide information to the researcher(s) on the understanding that my name will not be used without my permission. I also agree to participate as a volunteer.

....

Date signature or thumbprint of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the procedures, benefit, details and possible risk of the study were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the study.

....

Date signature of witness

I certify that nature and purpose, the potential benefits and possible risks associated with participating in this research have been explained to me by the above individual.

....

Date signature/ thumbprint of volunteer

INTERVIEWER'S STATEMENT:

I have explained the procedure to be followed in this study to the clients in the language that they understand best and they have agreed to participate in the study.

....

Signature Date

APPENDIX B: QUESTIONNAIRE

Section A: Mother's Socio-Demographic Characteristics

A1. Mother's age in completed years.....

A2. Level of education of Mother

(a) No education [ ] (b) Primary[ ]

(c) Secondary [ ] (d) Tertiary [ ] e. (Other specify).....

A3. Marital status:

(a) Single [ ] (b) Married [ ]

(c) Cohabiting [ ] (d) Previously Married [ ]

A4. Religion of Mother

(a) Christian [ ] (b) Muslim [ ] (c) Traditionalist [ ] (d) Other.....

A5. Main Occupation of the Mother

(a) Employed [ ] (b) Self – employed [ ]

(c) Unemployed [ ] (d) Others (please specify) .....

A6. How much income do you earn monthly from your main occupation?

(a) Below 500 [ ] (b) 500- 1000 [ ]

(c) 1000- 2000 [ ] (d) Above 2000 [ ]

A7. Do your receive cash remittances from relatives/friends

1) Yes 2) No

A8. If Yes (A7) In the last 3 months how much cash did you receive as remittance? GHS.....

A8. Are you the biological mother of the child?

(a) Yes [ ] (b) No [ ]

A9. Area of residence? .....

Section B: Health Facility Factors

B1. How many ANC (Antenatal care visits did you make during the pregnancy of this child?

(a) None [ ] (b) Once or Twice [ ] (c) More than 4 visits

B2. Where did you deliver your child?

(a) At health facility [ ] (b) at Home [ ] Other specify

B3. How do you get to the health facility when you come for immunization?

(a) Own Private transport

(b) Public transport

(c) Walking

(d) Other (specify).....

B4. How far is the health facility from you?

(a) > 30 minutes' walk/drive [ ] (b) 1-2 hours walk/drive [ ]

(c) 3-4 hours walk /drive [ ] (d) > 5 hours walk/drive [ ]

B5. How often do you come for postnatal visits to immunize your child?

a) Once a month [ ] b) every two months [ ]
b) c) every 3 months [ ] d) Other specify.....

B6. What immunization care /services do you receive when you visit the clinic?

a) Child Immunisation [ ] b)

B7. Are you able to access all the vaccines any time you visit the CWC (Child Welfare Clinic)?

(a) Yes [ ]

(b) No [ ]

B8. If No, how many times have you missed a vaccination your child needed since you started bringing the child to the immunization center

a) Once [ ] b) Twice[ ]

C) Thrice [ ] d) More than thrice [ ]

B9 What were the reasons why you were unable to obtain the vaccine your child needed?

a) Nurse not available
b) Vaccines not available
c) The number of children required to open the vaccine not available (list all the possible reasons??

B10. How will you appraise the responsiveness of healthcare providers to you when you attend immunization programs?

(a) Extremely careful and friendly [ ]
(b) Quite careful and friendly [ ]
(c) Not Sure [ ]
(d) extremely careless and unfriendly [ ]
(e) quite careless and unfriendly [ ]
(f) Other (specify)..... [ ]

B11. If Yes, How long did you have to wait to have your child vaccinated?

(a) Less than 30 minutes [ ] (b) One hour [ ]
(c) Two hours [ ] (d) Three hours [ ]
(g) Four hours [ ] (f) At least five hours [ ]

B13. Do you have a card for WHO and Government recommended routine immunisation schedule?

(a) Yes [ ]
(b) Yes but I cannot locate it [ ]
(c) No [ ]

B14. What do you think are the reasons for noncompliance with immunization schedule?

(a) Concern about vaccine safety Yes [ ] No [ ]
(b) Long distance trekking/walking Yes [ ] No [ ]
(c) Long waiting time Yes [ ] No [ ]
(d) Lack of money Yes [ ] No [ ]
(e) Social engagements (Too busy) Yes [ ] No [ ]
(f) Fear of side effects Yes [ ] No [ ]
(f) Others (please specify) .....

B15. How often has there been shortage in vaccines on a scheduled visit for immunization:

(a) Every time [ ] (b) Not too frequent [ ]

(c) Not sure [ ] (d) Very few occasions [ ]

(e) Never [ ]

Section C: Child's Demographic Characteristics

C1. Gender of Child:

(a) Male [ ]

(b) Female [ ]

C2. Place of birth:

(a) Home [ ]

(b) Health facility [ ]

(c) Others (please specify) .....

C3. Age of child (in months).....

C4. Birth Order of child:

(a) 1 [ ]

(b) 2 – 3 [ ]

(c) >3 [ ]

C5. Immunisation status

(a) Not immunised [ ]

(b) Partially immunised [ ]

(c) Fully immunised [ ]

C6. Was the following immunization taken by a child on the scheduled date or other dates?

Antigen	Response		
	Scheduled Date	Other Date	None
BCG			
OPV 0			
OPV21			
OPV3 2			
OPV 3			
IPV			
Penta 1			
Penta 2			
Penta 3			
Pneumococcal 1			
Pneumococcal 2			
Pneumococcal 3			
Rotavirus 1			
Rotavirus 2			
Measles-Rubella 1			
Measles-Rubella 2			
Yellow Fever			
Men A			

Section H: Assets and Possessions of Household

HOUSING		
H1.	Does your household have a modern design?	Yes.....1 No.....2
H2.	What is the main material for the wall?	Concrete.....1 Mud.....2 Bricks.....3
H3.	Type of roofing material (excluding animal compounds)?	Zinc.....1 Concrete.....2 Mud.....3 Thatch.....4 Concrete tiles.....5 Other.....6
H4.	What are the most frequently used cooking utensils in your household?	Earth bowls/pots.....1 Aluminum pans.....2 Earth/aluminum.....3 Aluminium/Plastic pans.....4 Others.....5
H5.	What are the toilet facilities in your household?	Free-range.....1 Pit latrine.....2 KVIP.....3 Pan latrine.....4 WC.....5 Others.....6
H6.	What type of source of drinking water does your household have?	Standing pipe.....1 borehole.....2 Stream.....3 Well.....4 Other.....5
OTHER POSSESSIONS		
H7.	How many functioning bicycles do members in your household own?	None.....1 One.....2 Two.....3 Three.....4 More than three.....5
H8.	How many functioning cars/vehicles are owned by household members	None.....1 One.....2 Two.....3 Three.....4 More than three.....5
H9.	How many functioning motorbikes are owned by household members	None.....1 One.....2 Two.....3 Three.....4 More than three.....5
H10	How many wooden/iron beds are in your household?	None.....1 One.....2 Two.....3 Three.....4 More than three.....5

H11.	How many functioning radio sets alone are in your household?	None.....1 One.....2 Two.....3 Three.....4 More than three.....5
H12.	How much functioning radios with tapes are in your household?	None.....1 One.....2 Two.....3 Three.....4 More than three.....5
H13.	How many functioning TV sets are in your household?	None.....1 One.....2 Two.....3 Three.....4 More than three.....5
H14.	How many functioning DVD/VCRs/Home theatres are in your household?	None.....1 One.....2 Two.....3 Three.....4 More than three.....5