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FACTORS ASSOCIATED WITH VACCINATION COVERAGE AMONG CHILDREN UNDER FIVE YEARS IN ABLEKUMA SUB METROPOLIS OF THE GREATER ACCRA REGION OF GHANA

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DECLARATION

I, Kaba Ayebadim Prosper, declare that with the exception of all scholarly materials, which have been duly acknowledged, this research was carried out completely by me, under supervision.

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Date: 30TH January, 2023

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Date: 30TH January, 2023

DEDICATION

This work is dedicated to my late Mother Paulina Kapochina and my dad Clement Kaba Bawinia for their exceptional support, care, and guidance to my life and throughout my academic career.

ACKNOWLEDGMENT

First and foremost, I thank God the omnipotent for seeing me through this journey. Special thanks and appreciation goes to the academic supervisor (Prof. Ernest Kenu) for his great contribution and guidance throughout the research work.

Your good work shall forever be cherished and the knowledge imparted to me has prepared me in numerous ways for my future career. May God Almighty continue to give you the strength and wisdom in all your future endeavours in peace and in good health.

For my family and friends especially Mr Yao Ahonon, thank you all for the encouragement and support. You stood by me thin and thick to see me through this noble course. God richly bless you all.

ABSTRACT

Background: Immunization of children is one of the world's most successful public health initiatives. It has made significant contributions to public health, including the elimination of smallpox and the close to elimination of poliomyelitis. In addition to the poor coverage (44% for Penta 3) in the Ablekuma sub-metro's coverages, there is consistently a high dropout rate of >10%, which indicates inefficient use of vaccination services and necessitates quick intervention. It is critical to do research on vaccine coverage-related factors in order to raise interest in immunization services and overcome the current vaccination coverage gaps.

Objective: This study therefore sought to determine the vaccination coverages and its factors influencing among the under five years of age in the Ablekuma Sub-metro in Accra Metropolis of Greater Accra Region of Ghana.

Method: A community-based descriptive cross-sectional study involving the use of a questionnaire to interview mothers or caregivers with children less than 5years was adopted. A sample of 400 mothers were selected from a cluster according to cluster proportion and conveniece sampling was used to select the respondents.

Face-to-face method and questionnaires were used to conduct the interviews. The following information was gathered: healthcare-related, caregiver sociodemographic variables, and features of the child caregiver's understanding of vaccinations.

For analysis, data were imported into STATA version 17 from Microsoft Excel version. Descriptive statistics such as frequency tables, percentages on the data collected were presented in Tables and Charts. Vaccination record book and maternal recall were used to assess vaccination status. At a 5% level of significance, bivariate analysis was used to establish association between

dependent and independent variables and multivariate logistic regression were performed to assess the independent variables influencing vaccination status .

Results: The vaccinations records of the all the 400 children were assessed, the vaccination coverage by card and history was 38.5%. The rate of partial vaccination was 61.50% (246) (95% CI: 56.62-66.16%), while only 38.5% (154) of the children were fully vaccinated.. Our study establish that vaccination status between children of caregivers who were married had decreased odds of 30% of wards been fully vaccinated compared to children of caregivers who were single. The result was significant in regression analyses (AOR=0.70, 95% [CI=0.53-0.92], health service and accessibility factor was not statistically significant with vaccination status of children.

Conclusion: The findings of this study noted that partial vaccination was high among children under five years in Ablekuma sub-Metro, 38,5% (154) of children from the 400 caregivers had been fully vaccinated. The following factor were found to be related with vaccination coverage among children under five years among sociodemographic factor was marital status of cavergivers can improve vaccination coverage. Health facility and accessibility factors were found not be associated with the vaccination status of children. Vaccine availability will increase assess hence improve coverages, while fear of side effects as some reasons given by caregivers will lead to partial vaccination. The medical center's staff should improve the health education programs offered during weighing sessions, ensure vaccine availiability and encourage participation by males in RCH clinics.

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ABBREVIATIONS AND ACRONYM

BCG: Bacillus Calmette Guerin

CHRB: Child Health Record Book

CWC: Child Welfare Clinic

CHPS: Community-Based Health Planning and Service

DHMT: District Health Management Team

DPT: Diphtheria-Pertussis-Tetanus

EPI: Expanded Programme on Immunization

GHS: Ghana Health Service

GVAP: Global Vaccine Action Plan

HIB: Haemophilus Influenza Type B

MEN A: Meningitis Vaccine

MHD: Metro Health Directorate

MOH: Ministry Of Health

MR: Measles-Rubella Vaccine

OPV: Oral Polio Vaccine

PCV: Pneumococcal Conjugate Vaccine

Td: Tetanus Dipteria vaccine

UNICEF: United Nations Children's Emergency Fund

VPDs: Vaccine Preventable Diseases

WHO: World Health Organization

YF: Yellow Fever

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

One of the most crucial public health interventions and a practical way to lower the morbidity and mortality from infectious diseases is vaccination (Sally & Kenu, 2017).

As a result of a recommendation from the World Health Assembly, the Expanded Programme of Immunization (EPI) was launched by the World Health Organization (WHO) in 1974 (WHA). A surveillance and immunization program against measles, poliomyelitis, tuberculosis, diphtheria, pertussis, and tetanus was to be developed by member states with the aid. For the six main vaccine-preventable diseases—pertussis, childhood TB, tetanus, polio, measles, and diphtheria—EPI has resulted in high immunization coverages of over 80%. (WHS, 2015). Giving to the World Health Organisation (WHO) report an estimated 19.7 million children under the age of one year did not receive basic vaccines however, even though vaccination currently averts 2-3 million deaths every year among children under five years of age (WHO, 2020). The last week of April each year is designated as World Immunization Week with the goal of promoting the use of immunizations to protect people of all ages against disease (WHO, 2019). According to the WHO (2019), vaccinations are widely acknowledged as one of the most effective and affordable health treatments in the world, saving millions of lives every year. However, there are still up to 20 million children worldwide who are either under- or unvaccinated.

Because it guarantees that every kid is immunized at the earliest possible or most suitable age, vaccination coverage is a key criterion in the examination of immunizations campaign effectiveness (Asmamaw et al., 2016.). Another significant factor for tracking and assessing vaccination campaign is its timeliness (Kiely et al., 2018). Administering vaccines within 30 days

of the recommended time to distribute scheduled vaccines at particular age groups is referred to as age-appropriate vaccination (Mbengue,Sarr,Adama,Badiene,Bintou,Camara,Mboup & Dieyel., 2017). The timing of administering planned vaccinations is crucial to maximize benefits and minimize health concerns (Asmamaw et al., 2016; Marefiaw et al., 2019).

In June 1978, Ghana introduced the Expanded Programme on Immunization (EPI), which included six antigens for children under one year: BCG, measles, diphtheria, pertussis, and tetanus (DPT), as well as tetanus toxoid (TT) vaccine for expectant mothers. The initiative was launched in response to the national health policy to lower the morbidity and mortality of diseases that can be prevented by vaccination, which then had a substantial impact on infant and child mortality in the nation. Additionally, it was in line with the government's vaccination program, which aimed to guarantee that all kids had these shots prior to their first birthday. Static, outreach, and campaigns to reach out to the majority of the unreached groups are the three strategies urged for the delivery of vaccination services in the nation.(*GhanaComprehensivemultiyearplanfor20102014.Pdf*, 2020.)

Before COVID-19 struck, the 2020-report progress on immunization coverage, at 85% for DTP3 and measles vaccine, was slowing, according to WHO,2020. Less than 20% of children born today would have received all of the immunizations that are recommended by the WHO by the time they are 5 years old. In 2019, approximately 14 million kids failed to receive potentially life-saving shots like the DTP3 and measles. Since the majority of these kids are from Africa, they most likely don't have access to alternative medical care. Children in middle-income nations bear an increasing portion of the burden; two-thirds of them are concentrated in ten middle- and low-income countries. By the end of the decade, hundreds of millions of cases and millions of future deaths will be prevented if immunization-specific goals were met, resulting in billions of dollars in

productivity gains and helping to exceed the Millennium Development Goal 4 target of reducing child mortality (Organización Mundial de la Salud, 2013)..

With Penta-3 as the stand-in benchmark to measure the development of childhood vaccination, Ghana has made considerable progress in vaccination coverage; but, the 95% coverage goal for Penta 3 coverage in 2021 could not be realized in 80% (4) of the country's then-ten areas, with the national average of Penta-3 coverage falling from 95.4% in 2019 to 93.0% in 2020. (DHIMS2).

1.2 Problem Statement

Vaccination coverage is defind as percentage of the target population that a have received a vaccine.

According to the World Health Organization, 2019, Despite the tremendous progress, vaccination has declined in recent years and dropped since 2020. The COVID-19 pandemic and associated disruptions over the past two years have strained health systems, with 25 million children missing out on vaccination in 2021, 6 million more than 2019 and the highest number since 2009 (WHO,2023).

Most prevalent crucial public health mediations and a practical way to lower the morbidity and mortality from infectious diseases is vaccination (Sally & Kenu, 2017). However, according to a study conducted in 2014 by Wado et al., there were more than 22 million kids worldwide who have not had the recommended foundational immunizations. Based on the World Health Organization (WHO, 2018), poor nations like Ghana tend to have serious concerns regarding child mortality. According to the report, for every 1000 live births in the Sub-Saharan Africa region in 2017, there were around 39 vaccine-preventable infant deaths. This is the same as 1 in every 26 children in 2017 dying before turning 5 years. (WHO, 2018; UNICEF, 2018).

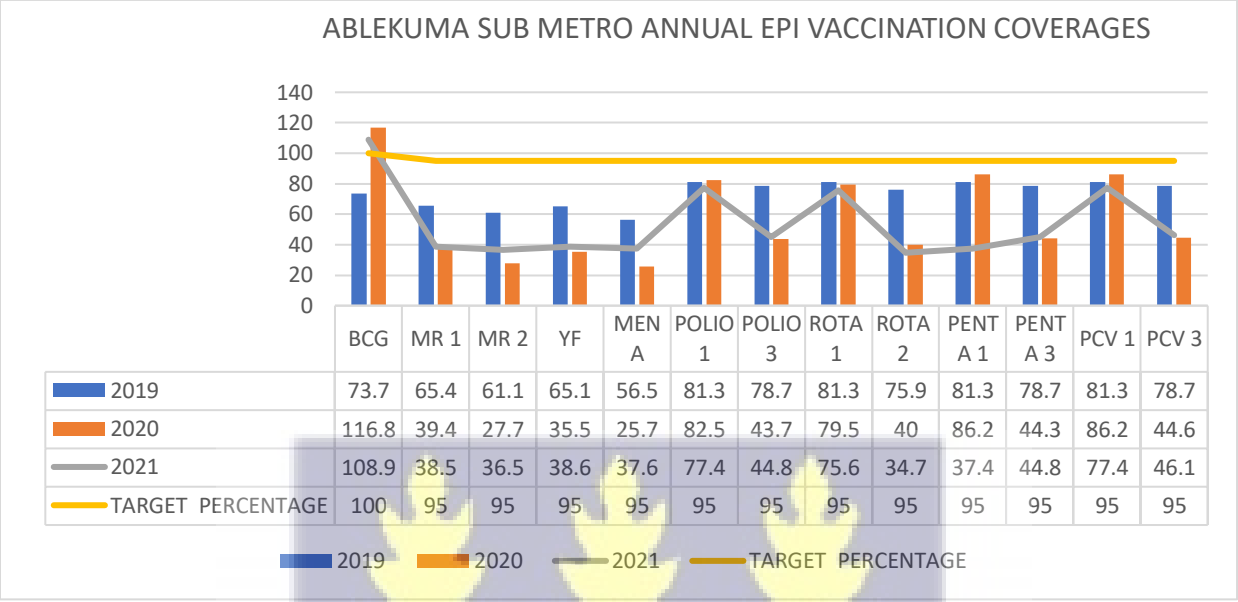
Controlling, elimination, and eradication of vaccine-preventable diseases can only be effective through achieving and maintaining high vaccination coverage. Using Penta 3 as a proxy, only sixty percent (60%) of districts in Ghana could achieve 95% above coverage, with three districts achieving less than fifty percent (50%) coverage(*Ghana Health Annual Report 2019.Pdf*, 2020). According to a study done in Ghana, although childhood immunization rates were still low, the Expanded Programme on Immunization's administrative coverage (EPI) is frequently high (Adokiya, Baguune & Ndago, 2017).

In this regard, the majority of infants do not obtain the recommended 15 doses of the seven (7) vaccines before turning one year old (Adokiya et al., 2017). Full immunization status was shown to be substantially correlated with geographical variance, child age, maternal age, parents ' education, family size, woman autonomy for child healthcare, and wealth quintiles in a cross-sectional study carried out in Bangladesh. Also, majority of children from the deprived and larger family as well as children from lesser parental education were not fully immunized (Sarker, Akram, Ali, & Sultana, 2019).

According to DHIMS data, the Ablekuma Sub- Metro has not been able to achieve its Penta 3 target for three consecutive years ranging from 2019 to 2021 thus 78,7%, 44,3% and 44,8% respectively. Health facility/system variables, sociocultural factors, and caregiver sociodemographic or economic factors that hinder the effective rollout of vaccine coverage in such resource-constrained nations could all be implicated in the issue (Gram *et al.*, 2014).

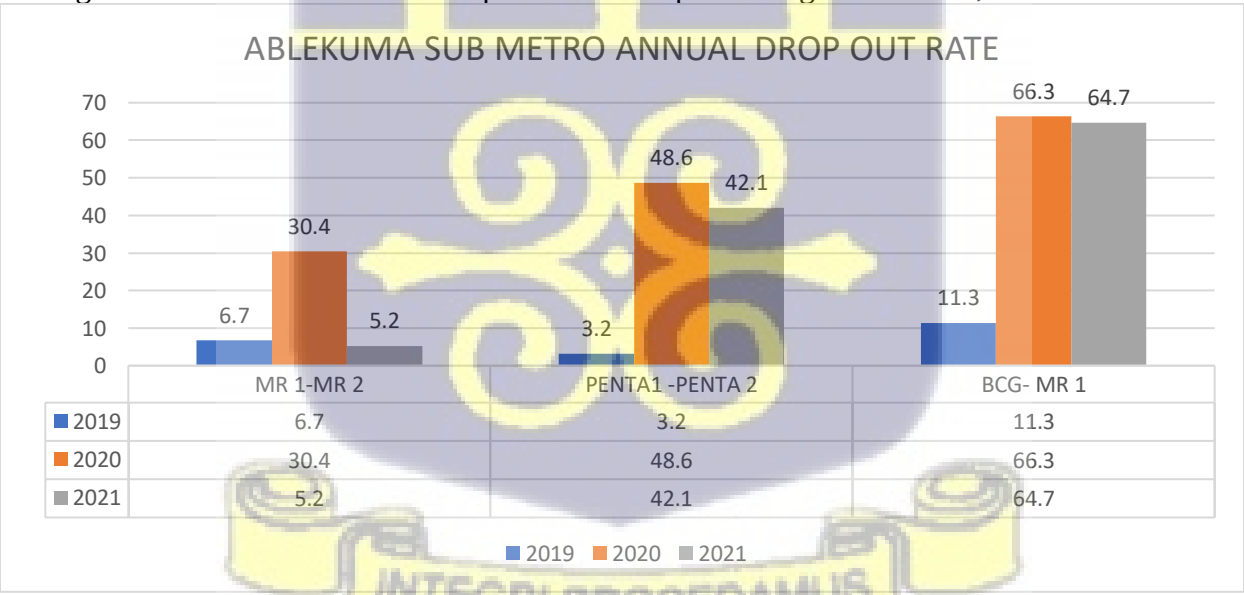
Apart from the low performances in the vaccination coverages of the sub metro, there is always a high dropout rate >10% which is a suggestion of poor utilization of vaccination services and this calls for immediate action (Field Guide for Ghana's Immunisation Programme, 2016). In order to add up to knowledge, this research will inform DHMT, policymakers, financing organizations and

other stakeholders on recommendations and strategies to increase the use of EPI services, and lay the groundwork for future research to be done to increase the use of EPI services in Ghana.



	BCG	MR 1	MR 2	YF	MEN A	POLIO 1	POLIO 3	ROTA 1	ROTA 2	PENT A 1	PENT A 3	PCV 1	PCV 3
2019	73.7	65.4	61.1	65.1	56.5	81.3	78.7	81.3	75.9	81.3	78.7	81.3	78.7
2020	116.8	39.4	27.7	35.5	25.7	82.5	43.7	79.5	40	86.2	44.3	86.2	44.6
2021	108.9	38.5	36.5	38.6	37.6	77.4	44.8	75.6	34.7	37.4	44.8	77.4	46.1
TARGET PERCENTAGE	100	95	95	95	95	95	95	95	95	95	95	95	95

Figure 1. 1: Ablekuma Sub Metropolis Annual Epi Coverage 2019-2021, Source: Dhims2



	MR 1-MR 2	PENTA1 -PENTA 2	BCG- MR 1
2019	6.7	3.2	11.3
2020	30.4	48.6	66.3
2021	5.2	42.1	64.7

Figure 1. 2: Ablekuma Sub Metropolis Annual Epi Coverage 2019-2021, Source: Dhims2

1.3 Justification of the Study

In Ablekuma sub metro health directorate, measures put in place by the Ghana Health Service (GHS) to improve immunization coverage includes; mop-up activities and defaulter tracing. The mop-up activities are carried out every quarter of the year to immunized children between 0-5 years who have not had access to immunization and residing in the hard to reach areas. Also, defaulter tracing is done to identify and immunize children who have missed a particular antigen (Ablekuma SMDH, 2021).

Despite the above measures, immunization coverage in the municipality has been consistently decreasing in trend. This undermines efforts by stakeholders. The opportunity for re-emergence of vaccine preventable diseases as well such us the Yellow Fever outbreak (Savannah, Upper West, Bono and Oti regions) and Measles and Rubella outbreak in greater Accra their outbreaks, this study is important as it elicited the factors associated with the low coverage to prevent future outbreaks of vaccine preventable diseases.

Additionally, the findings of this study will highlight factors that influence vaccination coverage which will help effectively improve immunization coverage in the Ablekuma sub metro health directorate and help in the achievement of Sustainable Development Goal 3 "Ensure healthy lives and promote wellbeing for all at all ages" (WHO, 2019).

Subsequently, the findings of the study provide evidence for decision making by the Ablekuma sub metro health directorate and the GHS at large to strengthen immunization services so as to stop the occurrence of diseases that can be prevented through vaccination in the Ablekuma sub metro health directorate.

1.4 Conceptual Framework

Figure 1. 3: Conceptual Framework

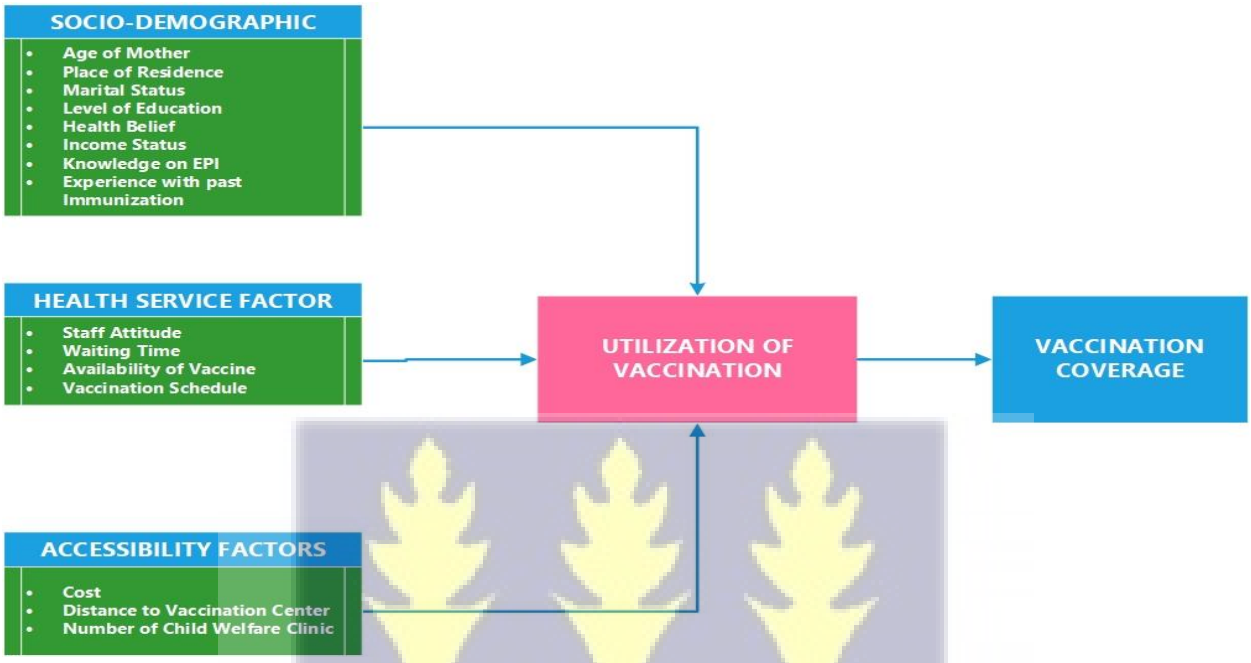


Figure 1.3 presents the conceptual framework developed for the study based on literature and the theoretical analysis. It shows how the socio-demographic characteristics, health facility factors and accessibility factors link up with each other to encourage mothers and caregivers to utilise immunisation for their children.Socio-demographic characteristics of the caregiver may influence incomplete vaccination. These factors may also influence the child's characteristics such as sex and orphanage. The age of the caregiver also influences the birth order of the child. In most instances, caregivers give high priority to the first and second-born compared to successive children which may lead to incomplete vaccination. Child sex has not been documented by most studies as a factor for incomplete vaccination. However, some families may have a preference for

male children compared to females which may likely lead to incomplete vaccination. Children whose parents are not alive may be underprivileged from vaccination. They may be left in the hands of their grannies and may not have the needed support or attention to utilize vaccination services and may influence incomplete vaccination Socio-demographic factors such as the educational level of the caregiver determine the choice of utilizing health care services. Caregivers with poor knowledge of vaccination may likely not attend immunization sessions regularly. This may lead to incomplete vaccination of the child due to limited knowledge on the importance of vaccination in preventing childhood diseases. Married women may likely complete vaccination as opposed to unmarried. The latter may not attend monthly clinics due to limited support by family members and social stigmatization in some societies which may deprive the child of receiving vaccinations. Ethnicity and religion also influence incomplete vaccination. Some Muslim countries do not accept vaccination due to their beliefs against vaccination, while other ethnicities due to their traditions and norms may see vaccination as a western concept. The occupation and family type of caregiver influence incomplete vaccination. Working mothers may not have the time to take their child to the clinic regularly as it may coincide with working hours while extended families may not have the means to support the welfare of all the children below five years to maintain their routine vaccination. Healthcare-related factors may also contribute to incomplete vaccination. Means of travel to the clinic can deter caregivers from attending vaccination sessions regularly. Easy access to the clinic may encourage the mothers to attend the clinic, because of the limited time and resources that may be spent to reach the vaccination site. Travel time to the vaccination site may also influence incomplete vaccination, especially if caregivers take long hours to reach the facility. Waiting time is an important factor that can impact caregiver decisions to attend the clinic regularly. Health care workers not starting sessions on time or sometimes favoring

friends and family members may discourage some caregivers to attend clinics. Health facilities with long waiting hours may influence incomplete vaccination among children.. Vaccination status of infants are therefore influenced by these factors as depicted in the figure below.

1.5 Research Questions

1. What are the sociodemographic factors influencing vaccination coverage in the Ablekuma Sub metropolis?
2. What are the health facility factors influencing vaccination coverage in the Ablekuma Sub metropolis?
3. What are the availability factors associated vaccination coverage in the Ablekuma Sub metropolis?

1.6.0 Objective of the study

1.6.1 General Objective

To determine factors influencing vaccination coverage among children under five years in the Ablekuma Sub metropolis of the Greater Accra Region of Ghana.

1.6.2 Specific Objectives

1. To determine sociodemographic factors influencing vaccination coverage in the Ablekuma Sub metropolis.
2. To determine health facility predictors influencing vaccination coverage in the Ablekuma Sub metropolis.

3. To examine accessibility factors associated vaccination coverage in the Ablekuma Sub metropolis.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Vaccination should be acknowledged as a fundamental aspect of the right to health and as a responsibility of the individual, the community, and the state. Vaccination avoids an estimated 2.5 million deaths each year. Safe from the threat of vaccine-preventable diseases, immunized children have the chance to thrive and a better chance of realizing their full potential. The vaccination program during adolescence and maturity increases these benefits even further. Vaccines and immunization are a crucial investment in the future of the globe since they are a component of a comprehensive set of interventions for disease prevention and control.(Organización Mundial de la Salud, 2013).

2.2 Demographic and Socioeconomic Factors on Vaccination Coverages

Demographic and Socioeconomic Factors on Vaccination Coverages which include maternal age, parity, education, sex of child, family income, occupation.

Ewang et al., 2020 revealed that a person's career and degree of education, among other demographic factors, can influence whether their children are immunized. A study found that children's age was a contributing factor to immunization coverage (Bani Salameh et al., 2021). Delays in immunization were substantially associated with the mother's employment level, education, child's age, birth order, and fathers' education. (Alrowaili et al., 2019).

A study conducted by (Sally & Kenu, 2017) in the Kwahu Afram Plains Municipality also revealed that childhood immunization status was substantially associated with the mother's parity and educational level. This was supported by a related study carried out in the Ga West municipality, which found that after controlling for the impact of other variables, mothers with secondary and

upper educational points had increased chances of having children who were not fully immunized by 5.24 times compared to mothers with primary and lower educational levels.

According to a Burkina Faso-based study on the sociodemographic factors that determine timely adherence to vaccination schedules, a mother's education not only affects her children's vaccination status but also encourages observing the timetable on time (Schoeps et al., 2013). However, the same studies by (Sally & Kenu, 2017), 14.4% of the study participants did not complete their schedule because mothers were too busy and 9.5% attributed their failure to complete vaccination scheduled to fear of side reaction from the vaccine. According to a related study (Negeri & Heyi, 2015), maternal education, maternal occupation, father's education, family income, and the presence of radio or television in the house were strongly linked to an increase in immunization completion among children aged 12 to 23 months. Multiple logistic regression analysis revealed a variation in the extent of child immunization depending on whether television and radio were present in the household. Children from families with televisions had a 1.6 times higher immunization completion rate than children from families without televisions. In a multiple logistic regression, there was no association between marital status, religion, ethnicity, the father's profession, family size, or the presence of a radio in the home and the completion of child immunization. Due to ignorance of the need to return for the second and third doses of the vaccination, 85 respondents (62.0%) did not answer. (Negeri & Heyi, 2015)

Studies have confirmed that mothers interviewed do not have comprehensive information about the routine vaccination schedule, therefore, their levels of knowledge were very low with regards to immunization services (Verulava et al., 2019). However, the results are comparable to the study in Uganda which reveals that, mothers with at least a secondary level of education had good knowledge and showed better practice near childhood immunization than mothers who had either

a primary level of education or no formal education at all (Adefolalu, Kanma-Okafor, & Balogun, 2019). Subsequently, studies in Malawi revealed that geographical region, household income, baby PNC check within 2 months and the number of under-5-year-old children in the home were both substantially linked with under-vaccination among children aged 12-23 months. (Ntenda, 2019). Similar studies in Afghanistan reveal that the residency, wealth status (children from poorer homes), and educational level of caregivers were all substantially correlated with the vaccination status for children aged 12-23 months, in its entirety (Farzad, Reyer, Yamamoto, & Hamajima, 2017).

Caregivers are frequently the major decision-makers for their children's healthcare, including vaccination. The involvement of parent in the vaccine decision-making process for their children; thus, their opinion is important. Numerous studies have examined the knowledge, attitudes, and vaccination views of parents of young children. The lack of knowledge was a recurrent finding in those studies, and the absence of information was cited as a major factor in parents' decisions to delay or forgo vaccination. Mothers, who are generally responsible for childcare and vaccine-related decisions, have been the subject of very little research. Mothers' knowledge has been suggested as a key component in determining childcare and influencing vaccination decisions for their children (Luman et al, 2003). Particularly, vaccine apprehension has grown in recent decades, leading to a persistent drop in the percentage of children receiving vaccines in many nations, including the United States, and causing outbreaks of diseases that are preventable by vaccination e.g., measles, pertussis, and mumps (Salmon, et al, 2015). Parental decisions about vaccinations for their children fall into several kinds. The spectrum from wholly refusing all vaccines, delaying them on purpose, or omitting some of them to wholly adhering to the recommended vaccination

schedule (Larson et al, 2014). Vaccines and their side effects continue to be a source of concern for parents. (Benin et al, 2006)

Vaccination awareness is much higher among women who have completed high school. The efforts of a strong primary health care strategy are also beneficial. One of the most basic methods for minimizing infectious diseases is to increase knowledge, positive attitudes, and acceptable perceptions about vaccination. The impact of maternal education and practice on immunization status has been proven in studies (Mugada et al, 2017). Parents' negative views, such as a mother's dread of vaccination, bad effects, and a tendency to avoid immunization because of a slight illness, are seen to be barriers to a child's vaccination (Mugada et al, 2017). Mothers who are anti-vaccination do not vaccinate their children and do not seek additional information from health professionals or other sources (complete distrust). Some non-immunization specialists who hold a negative stance also contribute to the propagation of incorrect vaccination information. Some parents believe that vaccination may cause autism, according to a survey conducted in the United States (Smith et al, 2009). The role of the media, the internet, and social media in immunization is critical. After medical workers, mothers believe the internet to be the second most trustworthy source. Because healthcare staff involved in the immunization system are the most credible source of information for the majority of moms, the research highlights the importance of improving their technical capabilities as well as interpersonal communication skills (Jones et al, 2012).

Several types of research have been conducted to reveal the association of health-related factors like; staff attitude, availability of logistics, waiting place, waiting time, and suitability of vaccination scheduled time with vaccination coverage in different places of the globe, vaccine not available (10.0%) (Sally & Kenu, 2017) 47.4% of reported immunization locations or dates are unknown. (Negeri & Heyi, 2015).

The following factors are obstacles to full vaccination coverage in Asian and African nations: lower parental education levels, lower household income, female gender of the child, religious affiliations, place of delivery, mothers receiving postnatal care after two months of delivery, household assets and expenses, ethnicity, age, and parity (Canavan, et al, 2014). Malnutrition, diseases that can be prevented by vaccination, and malaria were shown to be the main causes of death in Ethiopian children under the age of five (Federal Ministry of Health, 2010). Small-scale studies carried out across the country also identified factors like mothers' knowledge of child immunization, postponing immunization, and perceived support from health institutions, institutional delivery and antenatal care (ANC) attendance, tetanus toxoid vaccination, location and residence visited by health workers, women's decision-making autonomy, the number of children under the age of five living in the household, parents' education, and proximity to health facilities. (Wado et al, 2014).

In a study on childhood immunization and employment, Tagbo et al. (2014) evaluated the immunization coverage and its contributing factors in children between the ages of 11 and 23 months in Enugu Metropolis.

The ethnicity and childhood immunization study by Muiru (2009) looked into the variables impacting the use of immunization services in Kenya's regions with low and high rates of infant mortality... Ethnicity was among the variables that were discovered to affect the use of immunization services.

Mukungwa (2015) used the Zimbabwe Demographic and Health Survey (ZDHS) data to analyse the variables of immunization status of children aged 12-23 months in Zimbabwe. Parity was found to be a significant predictor of childhood immunization.. Awasthi et al. (2015) did a study to determine the factors that influence children's complete immunization status who are between the

ages of 12 and 23 months and live in Varanasi, Indiaurban ,'s slums. The study's findings demonstrated that parity less than three is a significant predictor of full immunization (OR = 2.84, 95% CI: 1.98-3.73).

On how marital status determines vaccination of children, to improve routine immunization services, Weiss, Choudhary, and Solomon (2013) looked into the performance determinants of routine immunization. The researchers analyzed secondary data from the most recent project household immunization survey conducted in 2011 and compared the results to previous survey reports from the Core Group Polio Project (CGPP program area) and the state of Uttar Pradesh (as determined by the proportion of children who received the DPT vaccine). In order to determine whether there is any proof that routine immunization services are being disrupted, this was done. To determine the factors that influence routine immunization coverage, researcher's model survey respondents' characteristics, their exposure to CGPP, and their communication behaviors against their children's receipt of important immunizations. The study's findings indicated that immunization coverage is influenced by marital status.

The influence of religion on childhood immunization, to improve routine immunization services, Weiss, Choudhary, and Solomon (2013) looked into the performance determinants of routine immunization. The study's findings revealed that religion influences immunisation coverage.

In Kenya's Kaptembwo site, Nakuru County, Lilian et al. (2013) employed descriptive, bi-variate, and multivariate logistic regression to find independent predictors of complete immunization among children aged 12-23 months. In order to choose the samples for a cross-sectional community-based survey, cluster sampling was used. The findings revealed an 8.9% drop-out rate between the first and third doses of the pentavalent vaccine. The location of the child's birth, the size of the family, suggestions for the next visit's date for growth monitoring, and their opinions

of the types of health immunization services provided were other factors that predicted full immunization. To identify defaulters and lower the drop-out rate, the study did not evaluate characteristics connected to health services, such as accessibility in terms of distance.

The results of vaccinations are also affected by the mother's educational level. In order to examine complete and timely immunization coverage and related characteristics in children aged 12-23 months in Gem, Siaya County, Kenya, Lisa et al. (2014) used primary data. The sample was chosen using a straightforward random approach. The results of multivariate logistic regression showed that children of mothers with lower maternal education or children living in homes where the spouse was away were less likely to have received all recommended vaccinations. The study, which was done in a rural area, also discovered evidence of the distance decay effect, according to which the effectiveness of vaccination reduced as distance from the vaccination clinic increased. Olumuyiwa et al. (2008) assert that education level affects vaccine coverage. The researcher discovered that immunization coverage was greater in places where most mothers had a general understanding of the signs of diseases that could be prevented by vaccination. Furthermore, there was significant coverage in regions where affordable immunization services were offered at privately funded health facility. Although the majority of mothers were knowledgeable of vaccination. The conclusions are based on primary data that was used to identify factors that influence full immunization status among children aged 12-23 months through analysis utilizing multiple regression models.

The location of living also plays a role in determining vaccination coverage. Henry et al. (2011), who demonstrated that children in urban regions had consistently higher immunization rates than their rural counterparts, lend support to this viewpoint. This is explained by the fact that immunization services are easier to access in metropolitan areas because there are more health

facilities there. Overall, many children between the ages of 12 and 23 months missed the equivalent third DPT3 dose, even though one-fourth of all children received the three necessary polio doses.

In Oromia Regional State, Eastern Ethiopia, Hussein et al. (2013) conducted multivariate logistic analysis to determine the variables that affect immunization coverage among children aged 12-23 months. Data analysis for this cross-sectional community survey included both qualitative and quantitative components. The sample size was chosen using a stratified multi-stage cluster sampling technique combined with basic random sampling. The findings showed that mothers did not return their children for the second and third doses of vaccination because they were uninformed of the need for them; they believed that vaccination was contraindicated; and they were unaware of the location and/or timing of the immunizations. However, the study did not demonstrate how involving the health worker would improve coverage.

Belachewet al. (2012) investigated the factors influencing immunization coverage using a cross-sectional community-based study using a modified WHO EPI cluster sampling method for sample selection. According to the findings, being born in a health facility, antenatal care follow-up, and mother's knowledge of the age at which vaccination begins were significant determinants of immunization coverage, whereas the mother's place of residence and her socio-demographic characteristics were not significantly associated with full immunization among children. However, the study did not take into account that mothers' reports can underestimate or exaggerate the immunization coverage, or that moms might forget the complete amount that the kid received. The authenticity of the vaccination dosages the youngster received was also not taken into account by the study.

In Kenya's Kilifi County, Ndirituet al. (2006) examined the effects of family size, seasonal rainfall, clinic distance, and mother's age on timely immunization. Simple random surveys and cluster

sample surveys were carried out in 2002 and 2004, respectively. Following that, coverage was calculated using an inverse Kaplan-Meier survival analysis of data from mothers' recalls and immunization cards, and it was confirmed by looking through administrative records from both national and local vaccine distributors. To ascertain the impact of sex, family size, clinic distance, mother's age, and rainy season on immunization rates, the model was fitted to recurrent vaccination data. According to the findings, immunization rates decreased for every kilometer traveled between a home and a vaccination center, during rainy seasons, and when families grew to include up to four children. The study did not, however, examine the effects of immunization during seasonal rains.

In general, poor people are less likely to vaccinate their children, while people from affluent homes are more inclined to do so since they are aware of the benefits to their health. In order to compare the immunization coverage of several vaccines used among tribal and rural children in a varied socioeconomic context in India, Godi et al. (2008) conducted a qualitative and quantitative study

2.3 Health Service Factors and Vaccination Coverages.

Several types of research have been conducted to reveal the association of health-related factors like; staff attitude, availability of logistics, waiting place, waiting time, and suitability of vaccination scheduled time with vaccination coverages in different places of the globe. vaccine not available (10.0%)(Sally & Kenu, 2017). The location or timing of 47.4% of reported vaccinations is unknown (Negeri & Heyi, 2015).

An investigation carried out in Senegal discovered that full immunization status was substantially correlated with ethnicity, place of delivery, use of ANC and PNC services, maternal age, access to mass media, and wealth index (Sarker et al., 2019).

In Asian and African countries, barriers to full vaccination coverage consist of: lower parental education, lower income, the child's gender being female, religion such as traditional and Muslim, place of delivery and mothers receiving a postnatal check-up after 2 months of birth, household assets and expenditure, ethnicity, age, and parity (Canavan, et al, 2014). Factors including malnutrition, vaccine-preventable illnesses, and malaria were identified as the leading causes of death among Ethiopian children under the age of five (Federal Ministry of Health, 2010).

Studies conducted in the nation also uncovered elements like mothers' knowledge of child immunization, delaying child immunization, and perceived support from health institutions, institutional delivery and antenatal care (ANC) attendance, tetanus toxoid vaccination, location and household visited by health workers, women's decision-making autonomy, the number of children under five in the household, mother's education, and proximity to health facilities (Wado et al, 2014).

Numerous hypotheses support the idea that socioeconomic and demographic factors dominate the demand for healthcare services at the individual level. A model of healthcare utilization was created by Andersen in 1968. In this study, major variables in the use of health services were age, location (rural or urban), provider incentives, place in the social structure, and health beliefs. Studies looking into the use of health services have frequently employed this paradigm. A person will determine whether to use healthcare based on their location, which might be either urban or rural, the hypothesis states. Health services are typically used more frequently in urban regions than in rural ones.

Utilization of health services is also influenced by a person's place in society. Others who are more well educated and in stable employment are likely to use health care services more frequently than people who are less well off in society. The degree to which a person uses services like

immunization also depends on their beliefs about health. The likelihood that people will use health services depends on their perception of their value. Resources that are accessible within the family and in the community are examples of additional aspects that operate as enabling features. Due to their greater purchasing capacity, people with high socioeconomic class are anticipated to use health services more frequently than people with low socioeconomic status. He afterwards went back and looked at the health system (Anderson 1970).

The revised model recognized that the nature of the health service and its intended use will also affect utilization and that health habits are a direct cause of health outcomes. According to the population characteristics and accessibility of health services, the new model will have varied variables for use and frequent use of each individual health care service. (Andersen, 1995; Andersen & Newman, 2021).

In the end, Young (1981) proposed a choice-making model based on his ethnographic research on the use of health care in Mexico. It contained 4 elements that were crucial in helping a person decide which health services to use. The first element is perceptions of gravity, which Young defines as an individual's opinion of the seriousness of their sickness and how their social network views it. People are more likely to use medical services if the sickness is considered severe than if it is not. Because of its ease and the need to save expenses, among other reasons, people who know about an effective at-home therapy are more inclined to use it than to turn to a professional healthcare system. This is the second factor he mentioned. (Wolinsky, 1988b).

The third element is faith in the treatment, which measures how strongly a person feels that the ailment can be treated and determines whether they will use it or not. The evaluation of the cost and accessibility of health services is included in the fourth factor, access to treatment. He added that access might have a significant impact on how often people use medical services. The

economic cost of seeking medical attention includes not only the cost of the treatment but also the time lost from work and the cost of transportation, which also accounts for the travel time to the hospital given the patient's location. Geographically, accessibility issues could worsen (Young & Young-Garro, 1982).

According to Grossman (1999), the basic need for health is what drives demand for medical care in general and other health inputs. Age, education, health status, and income are taken into account by this model as important factors in the production of health through the demand for health capital (Grossman, 1972). Because being sick is a source of disutility, consumers seek health as a consumption good because it directly meets their needs. Because health affects how much time is needed for both market-related and non-market-related activities, it is in high demand as an investment commodity. A person receives a starting health stock that declines with age and could grow with investment. According to Grossman (1999), the amount of health capital required rises with wage rate. The greater a person's wage rate, the more valuable an increase in healthy time is to him since healthier time translates to earning more income, which leads people to spend more in their health. Education also improves the productivity of the health sector; as a result, fewer inputs are needed to create a given amount of health capital. Because they value their health more, educated people want more health care than ignorant people do.

Data from the 1993 and 1998 National Family Health Surveys, which included 43,416 children between the ages of 2-35 months, were used by Ashleshar et al. (2021) to conduct a study in rural areas of India. The multinomial logit regression models for polio and non-polio vaccines were employed separately in the qualitative analysis to estimate the likelihood that a kid would receive "no cover," "some cover," or "full age-appropriate cover." Health infrastructure was employed as a hierarchical variable and each child was given a category based on the best healthcare facility in

their village (no facility, dispensary or clinic, sub-centre, primary health centre and hospital). The presence of various specialties of community health workers in the village and other relevant health facilities were also considered as variables. The findings demonstrated that, while the presence of health infrastructure had a little impact on immunization coverage, larger and better equipped infrastructure had a higher impact. The presence of community health workers in the hamlet did not lead to higher immunization rates.

2.4 Accessibility to Vaccination Centers for Service and Vaccination Coverages

Low vaccination coverage across the length and breadth of the world has been attributed to many factors in several studies of which accessibility is key among them. Due to this, the 194 Member States of the World Health Assembly approved the Global Vaccine Action Plan (GVAP) in May 2012 to create a roadmap to prevent millions of deaths by 2020 through more equitable access to vaccines for everyone, regardless of where they were born, who they are, or where they live (WHO, 2016.). It has been revealed in a related researches on accessibility to vaccination services and vaccination coverages that some caregivers indicated that the places of vaccination is too far hence their inability to get their children immunized or fully immunized,(Negeri & Heyi, 2015; Sally & Kenu, 2017). In 2019 according to world health statistic, according to World Health Statistics (2015), 14 million newborns did not receive a first dose of the DTP vaccine, and an additional 5.7 million only received a half dose (WHO V&B 02.27.Pdf,), which is suggestive of low access and utilization. The lower rate of vaccination refusal observed in Bedouin schools lends support to the idea that accessibility issues are more of a problem than a failure to follow the advised vaccination schedule for school-age children, with higher socioeconomic status groups, as

evidenced by the fact that fewer Bedouin students refuse vaccinations. (M. Yitshak-sade et al., 2016).

It follows that an evaluation of health facility factors will aid in shedding more light on the reasons behind the high or low immunization coverage. For instance, a study found that aspects of the healthcare system, such as accessibility, affordability, vaccination knowledge and attitudes, and medical advice, were also important drivers of vaccination. (Nagata et al., 2013).

Physical social determinants, such as social and cultural norms, as well as intermediate determinants, such as housing-place of residence, behavioral beliefs, social influences, prior vaccine experiences, perceived susceptibility, sources of information, and perceived health status, have been described as causing vaccine hesitancy in adults 65 and older. (Nagata et al., 2013).

The findings revealed that while the majority of mothers were aware of vaccination, their ability to access vaccination services was mostly influenced by their place of residence, caste, and line of work. The qualitative data showed that the population, especially the rural area, was dissatisfied with the vaccination services that were offered. According to the study's findings, certain vaccines had poor coverage in rural regions and moderate coverage in tribal communities. The need for public health services affected the demand for vaccinations (Gordi et al,2008).

According to Ibnouf, A. et al. (2007), the accessibility of a health facility affects immunization outcomes. In Khartoum State, Sudan, he conducted a cross-sectional study that found that children whose mothers walked less than 30 minutes to the immunization site were 3.4 times more likely to have received the proper vaccinations than children whose mothers walked for more than 30 minutes. Therefore, the amount of time it took to go to the closest vaccination facility had a significant impact on the child's accurate vaccination status.

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CHAPTER THREE

3.0 METHODS

3.1 Study Area

The Ablekuma sub-metro has the largest population in the Accra metropolis with an estimated population of 263,856. It consists of four health areas namely Mamprobi Sempe, Mamprobi Jamestown / Chorkor, Korle Gonno, and Korle-Bu / Zoti. The sub metro shares boundaries with Ablekuma Central on the North, the West – Ablekuma West, the East – Ashiedu Keteke, and to the South – Gulf of Guinea

The sub metro has the following health facilities in its catchment area:

- 2 Government facilities
- 27 Functional CHPS
- 3 Private Facilities and
- 1Maternity Homes
- Mamprobi hospital is the administrative head of the Ablekuma Sub-Metro

3.1.1 Ablekuma sub Metro Population

Table 3. 1Ablekuma Sub Metro Population Breakdown 2022

HEALTH AREA	POPULATION TOTAL	UNDER 1 POPULATION	UNDER > 5 POPULATION	PERCENTAGE %	SAMPLE SIZE
CHORKOR	50,005	2000	9445	36.7	146
MAMPROBI SEMPE/ SALVATION	34472	1379	6511	25.3	101
KOLRE GONNO	43,465	1739	8210	31.9	127
KORLE BU ZOTI	8311	322	1570	6.1	24
ABLEKUMA SUB METRO	136,253	5450	25736	100	398

Source: Ablekuma sub Metro Health Directorate.

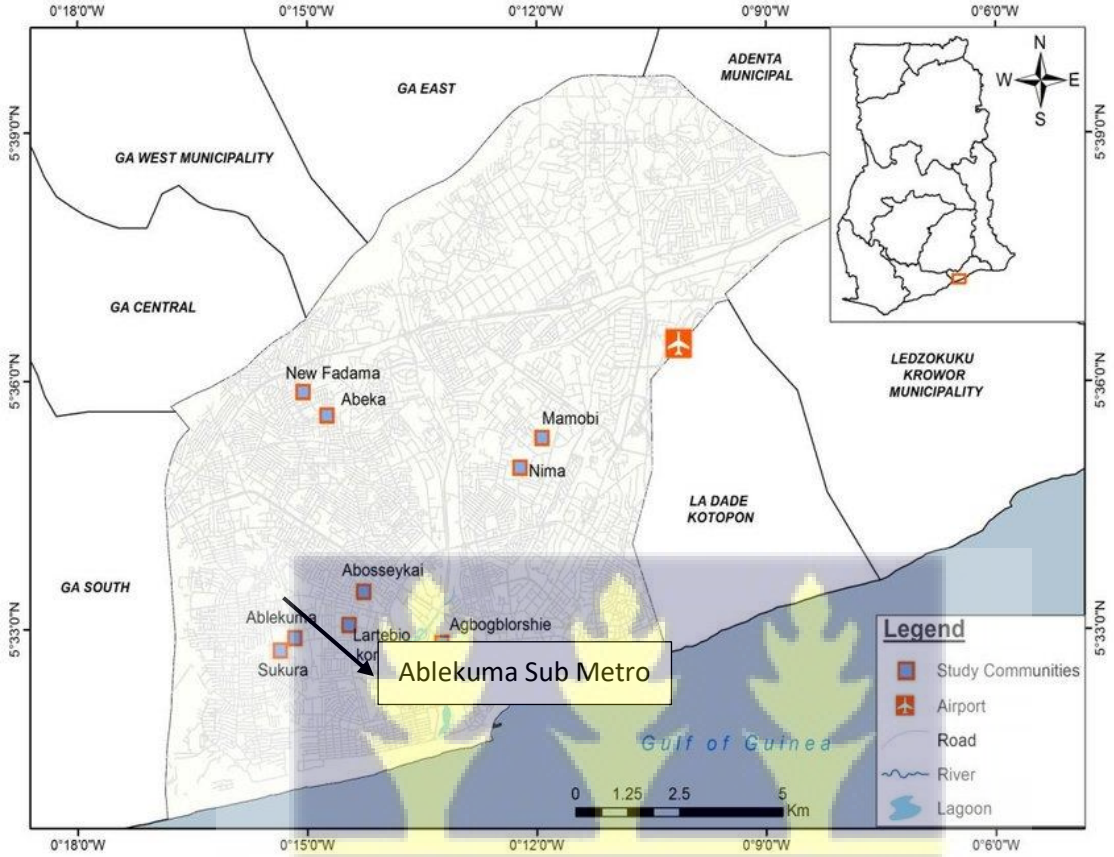


Figure 3. 1: Map of Ablekuma Sub Metro: Source: Google

3.2 Study Design

The study used community-based descriptive cross-sectional design among sample of mothers of children aged less than 5years (0-59months) old from households at Ablekuma Sub Metro of Greater Accra Region.

3.3 Study Population

Mothers or caregivers who live in the Ablekuma sub-metro and have children under the age of five made up the study population.

3.3.1. Inclusion Criteria

All moms or caregivers with children under the age of 5 who have lived in the study region for at least 18 months and have consented to participate were eligible.

3.3.2 Exclusion Criteria

1. All mothers or caregivers who have children less than 5years but not mentally stable.

3.4 Sampling Technique

The population was put into four clusters according to the health areas under the sub-metropolis namely Chorkor, Korle Gonno, Mamprobi-Sempe and Korle bu zoti health areas. The cluster percentage representation in the population was used to calculate their respective sample size in the study's sample size: Chorkor (36.1%), Korle Gonno (25.3%), Mamprobi-Sempe (31.9%) and Korle Bu Zoti (6.1%) health areas (Ablekuma Sub Metro Population, 2022). The principal investigator divided the entire population into sections or clusters of health areas under the metropolis that represent the population. Convenience sampling was then employed to choose respondents from the four clusters with respect to their proportion of the entire sample population. Mothers or caregivers who were at vaccination centres and households within the clusters and consented were selected for this study.

3.4.1 Sample Size

Employing the Snedecor and Cochran (1989) sample size formula based on an Ablekuma South Municipality prevalence of 44.3 % of PENTA 3 coverage, the confidence level of 95%, and a margin of error of 5%,

Using the formula, $n = \frac{(Z^x a/2)^2\ p\ (1-p)}{d}$, where;

d^2

n = sample size required

$(Z^x a/2)^2$= reliability co-efficient = 1.96 at 95% confidence level

d = margin of error = 5% or 0.05

p = population prevalence of PENTA 3 coverage = 44.8% (DHIMS, 2021).

$$n=\frac{1.96^2 x 0.44\ (1-0.44)}{0.05^2}$$

=379 (Minimum sample size)

Assuming 5% non-response rate of 379, it implies 5/100 × 379 = 18.9

= 19

Therefore, the total sample size =379+ 19 = 398 participants

Using proportionate sampling to determine exact number of participants to be interviewed in each cluster.

HEALTH AREA	POPULATION TOTAL	UNDER 1 POPULATION	UNDER > 5 POPULATION	PERCENTAGE %	SAMPLE SIZE
CHORKOR	50,005	2000	9445	36.7	146
MAMPROBI SEMPE/ SALVATION	34472	1379	6511	25.3	101
KOLRE GONNO	43,465	1739	8210	31.9	127
KORLE BU ZOTI	8311	322	1570	6.1	24
ABLEKUMA SUB METRO	136,253	5450	25736	100	398

3.4.2 Study Variables

Table 3. 2: Definition of Study Variables

VARIABLES	OPERATIONAL DEFINITION	TYPE OF VARIABLE	SCALE OF MEASUREMENT
Dependent			
Vaccination coverage	Percentage of the target population that have received a vaccine	quantitative	Ratio
Independent variables			
Socio-demographic factors			
Age of mother/caregiver	Age at as last birthday	continuous	Ratio
Age of child			
Educational level	No formal education primary JHS, SHS/ vocational, Tertiary	categorical	Ordinal
Marital status	Single, married, divorced, widow	categorical	Nominal
Occupation	Formal or informal work or non	categorical	Nominal
Parity	Number of children one has ever given birth to	Discrete	Ratio
Income level	How the caregiver/mother earns in a mother	categorical	Ordinal
Employment status	Are you employed	categorical	Nominal
Place of delivery	Where did you deliver	categorical	Nominal
Religion	Was your religion	categorical	Nominal
Health Service Factors			
Staff attitude	Poor, good	categorical	Ordinal
Waiting place	Place for waiting before receiving the service	categorical	Nominal
Waiting time	Duration between point of service and point of exit	continuous	Interval
vaccination scheduled time	Period of vaccination	continuous	Interval
Availability of logistics	Are there logistics for CWC	Categorical	Nominal
Accessibility factors			
Distance to CWC	How far is the CWC from home	categorical	Nominal
Number of CWC	Number of CWC in the health area	quantitative	Ratio
Time of CWC	When does the CWC session start	continuous	Interval

Cost of vaccination	How much do you pay for CWC services	categorical	Nominal
Patient-level factors			
Knowledge about EPI	Poor, medium good	categorical	Ordinal

3.5 Data Collection Tool and Technique

A structured questionnaire that was tailored to the study from the WHO Standard EPI cluster survey questionnaire served as the main instrument for gathering data for the investigation. Door-to-door visits and in-person interviews were undertaken at the household level in each cluster, and the child welfare clinics also used addiction assessment to gather secondary data from the Child Health Records Book (CHRB).The respective health area percentage namely Chorkor (36.1%), Korle Gonno (25.3%), Mamprobi-Sempe (31.9%) and Korle bu Zoti (6.1%) was used to get representative sample out of the 398 sample population.

The concepts that make up the study's objectives were used to structure the questionnaire. There were a few sub-questions with multiple choice answers for each theme. Literate responders were able to easily respond to the questions since they were written in clear, simple english language. Mothers who met the inclusion criteria were interviewed face-to-face in each cluster. Regardless of the number of children, mothers who had more than one child in less than five years were classified as a single respondent. This study did not include mothers who declined to take part in it. The child health records book had information on the numerous factors including the children of participating mothers' date of birth, sex, and immunization status (CHRB). Records of vaccinations of children were obtained from the mother where CHRB is not available. There were ask about the various antigens and whether or not their children have received them.

3.6 Data Analysis

For statistical analysis, the acquired data was cleaned and coded in MS Excel before being exported to STATA version 17. The participants' demographic features were evaluated using descriptive statistics. While some parameters were reported as mean and standard deviation of the normally distributed data or medians, all qualitative data was provided as frequency and percentages. The relationship between socio-demographic characteristics, health facility parameters, and accessibility factors and vaccination coverage was determined using regression analysis.

Vaccination status, which had a dichotomous response, was the outcome of the study. A child was classified as fully vaccinated if he/she had received one dose of BCG, three doses ofOPV, DPT-HepB-Hib and PCV, two doses of rota virus vaccine and one dose of measles and yellow fever at the time of the study. A child was classified as not fully vaccinated if he/she had not received any or none of the above mentioned vaccines at the time of the study.

In the descriptive analysis, frequency tables were generated for socio-demographic characteristics, child characteristics. Bivariate logistic regression analysis was conducted to examine the strength of the association between the dependent variable and each of the independent variables at a 95% confidence interval. Multiple logistic regression models at a 95% confidence interval were used to determine the true association of variables that were statistically significant at bivariate analysis. For children who were incompletely vaccinated or missed a vaccine dose, the caregivers were asked for the reasons. We analyzed these reasons based on the number of responses given by participants and summarized them into proportions.

3.7 Limitation of the Study

The inability of certain parents and caregivers to recall whether their children received all of the recommended immunizations or, in some cases, the specific vaccines that were given—especially

when the Child Health Record Book (CHRB) is missing—posed a recall bias problem for this study.

3.8 Ethical Issues

For ethical permission of this inquiry, the Ghana Health Service's Ethical Review Committee (GHS-ERC: 064/09/22 was consulted. The Sub Metro's Health Authorities as well as the Municipal were also made aware of this study to seek their support. The content and purpose of this study was fully revealed to the respondent and their consent was sought before data was collected. The respondent was also assured of confidentiality. During Data collection, codes were assigned to respondents to ensure confidentiality and easy flow of information. Any information obtained in the course of the research from the respondent was kept in a cabinet under lock and key was made available to only those involved directly with the study. The research work was self-funded. The study was voluntary, and participants had the option to withdraw at any time without repercussions. Participants were urged to ask any questions that would help them understand the study better in order to get more information.

3.8.1 Confidentiality

Throughout the whole investigation, respondents received assurances of confidentiality and privacy. All information about specific subjects was kept private and anonymous and was used just for this study. Access to all data was controlled, and only the research supervisor and principal investigator (PI) had access. For the purpose of conducting the final data analysis, participant names were excluded.

3.8.2 Risks

There were minimal risks associated with participating in this study because assessment is harmless.

3.8.3 Covid-I9 Protocol

All investigators were in nose mask and maintained one (1) meter physical distance between participants. Participants without nose mask were provided with one by the investigator and also provided with hand sanitizers before and after the interview.

3.8.4 Compensation

The results of this survey will be shared with the University of Ghana administration as well as the Sub-Metro Health authority without paying the respondents anything in exchange. Mothers of children who had not received all of their vaccinations were advised to do so. Again, the study's findings and suggestions will inform policy choices about immunization, which will have a favorable impact on vaccination coverage.

CHAPTER FOUR

4.0 RESULTS

4.1: Socio-demographic characteristics of mother of children under five years.

A sum of 400 mothers and caregivers answered to the questionnaires whose children were between 0 and 59 months.

According to analysis on the sociodemographic features of childbearing moms, 163 (41%) of them were married, while only 2 (1%) were widowed. Six (1%) people were aged 45 or older, compared to 254 (64%) who were in the youngest age group of 25 to 34 years. According to the religious background data, 318 people (79.50%) identified as Christians, while 11 people (2.75%) themselves as followers of another religion.

In terms of the mothers' education level, 169 (42.25%) had finished secondary school, while 51 (13%) had no formal education. Similarly, the level of education of the fathers showed that 190 (47.5%) had completed a secondary education while 36 (9.0%) reported having no formal education. Regarding the moms' monthly earnings, the biggest percentage, and 124 (31%) indicated that they made between GHS501 and GHS1000, while the lowest percentage, 69 (17.3%), and indicated that they made GHS1000 or more each month. The primary employment of 319 moms, who had a monthly income of 79.7%, and the lowest number of 81 mothers, who made a monthly income of 20.3%, were both gainful employment as shown in Table 4.1 below.

Table 4. 1 Socio-demographic characteristics of respondents

Variable	Total N (%)
AGEGROUP	
18-24 years	81 (20)
25-34 years	254 (64)
35-44 years	59 (15)
45 years or more	6 (1)
MARITAL STATUS	
Single	135 (34)
Married	163 (41)
Divorced	8 (2)
Co-habiting	92 (23)
Widowed	2 (1)
Religion (mother)	
Christian	318 (79.50)
Muslim	59 (14.75)
Traditional	12 (3.0)
Others	11 (2.75)
Level of education (mother)	
Primary	112 (28)
Secondary	169 (42.25)
Tertiary	68 (17)
No formal Education	51 (12.75)
Level of education (Father)	
Primary	93 (23.25)
Secondary	190 (47.50)
Tertiary	81 (20.25)
No formal Education	36 (9.0)
Monthly income (mother)	
< 376	99 (24.75)
376 - 500	108 (27)
501 - 1000	124 (31.0)
> 1000	69 (17.25)
Main occupation (mother)	
Employed	319 (79.75)
Unemployed	81 (20.25)
community	
Chorkor	150 (37.50)

Korle Gonno	122 (30.50)
Mamprobi	102 (25.50)
Korle bu	26 (6.50)
Total	400 (100)

4.2: Socio-demographic characteristics of mothers or caregivers and vaccination.

At the bivariate level, the carers' marital status was found to be statistically significant in relation to their immunization status (X2=10.38, p-value=0.026).

The findings showed that of the 135 single parents, 40 (30.0%) of their children had had a full course of vaccination, compared to 66 (40.0%) of the 163 married women, 42 (46%) of the 92 cohabiting women, 4 (50%) of the 8 divorced women, and 2 (100%) of the women who had been widowed.

At the bivariate level, the age of the carers (X2=9.1, p-value=0.002) was found to be statistically significant in relation to vaccination status. In a similar vein, the findings revealed that 98 (39%) of the 254 (64%) moms in the 25- to 34-year-old age range had fully immunized their kids. There was no statistical associationassociation between any other variables and vaccination status. Table 4.2 presents the findings.

Table 4. 2:Association between sociodemographic characteristics and vaccination status

		N (%) with Vaccination		
Variable	Total N (%)	Full	Partial	P-value(X^2)
Marital status				0.026*(10.38)
Single	135	40(30)	95(70)	
Married	163	66(40)	97(60)	
Divorced	8	4(50)	4(50)	
Co-habiting	92	42(46)	50(54)	
Widowed	2	2(100)	0(0)	
Age group				0.028*(9.10)
18-24 years	81	24(30)	57(70)	

25-34 years	254	98(39)	156(61)	
35-44 years	59	27(46)	32(54)	
45 years or more	6	5(83)	1(17)	
Religion (mother)				0.783* (1.16)
Christian	318	123(39)	195(61)	
Muslim	59	23(39)	26(61)	
Traditional	12	3(25)	9(75)	
Others	11	5(45)	6(55)	
Level of education (Mother)				0.186 (4.81)
Primary	112	40(36)	72(64)	
Secondary	169	60(36)	109(64)	
Tertiary	68	34(50)	34(50)	
No formal Education	51	20(39)	31(61)	
Monthly income (mother)				0.103 (6.18)
< 376	99	29(29)	70(71)	
376 - 500	108	40(37)	68(63)	
501 - 1000	124	54(44)	70(56)	
> 1000	69	31(45)	38(55)	
Main occupation (mother)				0.962 (0.002)
Employed	319	123(39)	196(61)	
Unemployed	81	31(38)	50(62)	
Level of education (Father)				0.654 (1.62)
Primary	93	35(38)	58(62)	
Secondary	190	69(36)	121(64)	
Tertiary	81	36(44)	45(56)	
No formal Education	36	14(39)	22(61)	
Place of delivery				0.595 (1.03)
Health facility	334	131	203	
TBA Center	19	8	11	
Home	47	15	32	

All other p-values are from the Chi-square test; the Fisher's exact test's p-values (*)

4.3 Association between Mother's knowledge on vaccination status

Out of 192 (48%) mothers who were able to mention one vaccine administered in the thigh (PCV, Penta, or IPV), only 85 (44%) had fully vaccinated their children; however, this difference was statistically significant with a p-value of 0.023. Out of 109 (44%) mothers who could mention two doses were required at the 18th month, only 109 (44%) had fully vaccinated their ward; however,

this difference was statistically none of the other variables statistically correlated with vaccination status. Results are displayed in Table 4.3.

Table 4. 3 Association between Mother's knowledge on vaccination status

		N (%) with Vaccination		
Variable	Total N (%)	Full	Partial	P-value(X^2)
Vaccine prevented Diseases				0.445(0.58)
At least 5 diseases	121	50(41)	71(51)	
less than 5 diseases	279	104(37)	175(63)	
At what age should a child be given his/her first vaccination				0.467 (0.53)
within 2 weeks	358	140(39)	218(61)	
others	42	14(33)	28(67)	
Mention one vaccine which is administered orally (Mouth)				0.571(0.32)
Polio or Rotavirus	295	116(39)	179(61)	
others	105	38(36)	67(67)	
Mention one vaccine which is administered in the thigh				0.023* (5.19)
Penta, PCV or IPV	192	85(44)	107(66)	
others	208	69(33)	139(77)	
Mention one vaccine which is administered in the upper arm				0.098 (???)
Measles, Yellow Fever or Men A	226	95(42)	131(58)	
Others	174	59(34)	115(66)	
How many doses of the vaccine given in the thigh (PCV or Penta) should a child receive				0.029*(4.75)
Three (3) doses	318	131(41)	187(59)	
Others	82	23(28)	59(72)	

What is the vaccination schedule for the vaccine given in the thigh(PCV or DPTHepBHib)				
				0.420(0.65)
6, 10 and 14 weeks	311	123(40)	188(60)	
Others	89	31(35)	58(65)	
Which vaccine is administered at 9 months				0.085(2.98)
Measles or Yellow Fever	241	101(42)	140(58)	
others	159	53(33)	106(67)	
Are children supposed to take vaccination on 18th Months?				0.238(1.39)
Yes	340	135(40)	205(60)	
No	60	19(32)	41(68)	
If yes, how many?				0.011(6.43)
2	249	109(44)	140(56)	
Others	91	26(29)	65(71)	

4.4 Association between vaccination status and health service variables

No significant association between health service parameters was discovered in this investigation i.e. distance to the facility, waiting area, waiting time, staff attitude, and reason for non-vaccination ($p = >0.05$) and vaccination status. The results are shown in table 4.4.

Table 4. 4: Association betwee Health Service variables and vaccination status

		N (%) with Vaccination		
Variable	Total N (%)	Full	Partial	P-value(X^2)
Distance to the nearest facility or vaccination Center				0.590 (0.28)
Near (< 1km)	346	135(39)	211(61)	
Far away (> 1km)	54	19(35)	35(65)	
Waiting Area at the Vaccination Center				0.339 (0.91)
Yes	370	140(38)	230(62)	
No	30	14(47)	16(53)	
Long waiting time for vaccination				0.992(0.0001)
Yes	283	109(39)	174(61)	
No	117	45(38)	72(62)	

Is time for Child Welfare clinic convenient				0.211(1.56)
Yes	383	145(38)	238(62)	
No	17	9(53)	8(47)	
Staff attitude (Vaccinator)				0.159a (4.75)
Good	383	150(39)	233(61)	
Poor	17	3(18)	14(82)	
Has your child ever being denied Vaccination				0.724 (0.125)
Yes	118	47(40)	71(60)	
No	282	107(38)	175(62)	
What was the reason of your child not being vaccinated				0.355* (0.63)
No vaccine or logistics	113	46(41)	67(59)	
staff not present	5	1(20)	4(80)	
Have you ever paid for any service at CWC				0.921 (0.01)
Yes	165	64(39)	101(61)	
No	235	90(38)	145(62)	

All other p-values are from the Chi-square test; the Fisher's exact test's p-values (*)

4.5 Association between child sociodemographic characteristics and vaccination status.

This study revealed no evidence of a statistical relationship between the sociodemographic features of children, including their sex, birth order, age, and vaccination status. According to these statistics, 178 male youngsters (81.4%) out of 219 (54.8%) had received all recommended vaccinations. Additionally, 257 (81.1%) of the 317 people (or 79.3%) in the 0–12 month age range) who were vaccinated completely. In terms of birth order, it was discovered that 173 (81.7%) of the 212 children (52.9%), who were in positions 2-3, had received all recommended vaccinations. The outcomes are displayed in table 4.5.

Table 4. 5 Association between socio-demographic characteristics of the child and immunisation

		N (%) with Vaccination		
Variable	Total N (%)	Full (%)	Partial (%)	P-value(X^2)
Sex of child				0.964 (0.79)
Male	219(54.75)	178(81.4)	41 (18.6)	
Female	181(45.25)	148(81.6)	33(18.4)	
Age of child (months)				1.000*
0-12	317(79.3)	257(81.1)	60(18.9)	
13-24	64(15.9)	53(83.3)	10(16.7)	
25 or More	20(4.9)	16(81.8)	4(18.8)	
Birth order of child				0.74 (0.02)
1	127(31.7)	106(83.3)	21(16.7)	
2-3	212(52.9)	173(81.7)	39(18.3)	
4 or more	62(15.4)	47(77.1)	12(22.9)	

All other p-values are from the Chi-square test; the Fisher's exact test's p-values (*)

4.6 Factors influencing immunisation

Only marital status and the age of the mother were shown to have a significant effect on the immunization outcomes of children among the variables anticipated to affect vaccination coverage, which also included income, job status, and the number of doses received on the thigh. Compared to single, married, and cohabiting mothers, divorced mothers had a 51% lower odds of not ensuring that their kids had all of the recommended vaccinations [aOR=0.70:95% CI=0.27-0.94: p=0.031]. Mothers' ages; however, caretakers aged 45 years and older had a 6% lower likelihood that their children had received all recommended vaccinations [aOR=0.06:95%CI=0.07-0.65: p=0.02]. Maternal income was statistically significant at the

bivariate level (p=0.01), but it lost significance following multivariate adjustment (p=0.37). The outcomes are displayed in table 4.6.

Table 4. 6 Factors influencing vaccination Outcome

	N(%) with Vaccination		Unadjusted		Adjusted	
Variable	**Full (%)**	**Partial (%)**	cOR(95% CI)	P-Value	aOR(95% CI)	P-Value
Marital Status						
Single	40(30)	95(70)	Ref		Ref	
Married	66(40)	97(60)	0.61(0.38,1.14)	0.054	0.96(0.53,1.7)	0.918
Divorced	4(50)	4(50)	0.50(0.28,0.87)	**0.014***	0.51(0.27,0.94)	**0.031***
Co-habiting	42(46)	50(54)	0.42(0.16,1.76)	0.237	0.57(0.12,2.7)	0.486
Widowed	2(100)	0(0)	-	-	-	-
Age group(Mothers)						
18-24 years	24(30)	57(70)	Ref		Ref	
25-34 years	98(39)	156(61)	0.67(0.39,1.14)	0.146	0.89(0.46,1.7)	0.729
35-44 years	27(46)	32(54)	0.499(0.247,1.00)	0.052	0.68(0.29,1.61)	0.388
45 years or more	5(83)	1(17)	0.084(0.009,0.759)	0.27	0.06(0.07,0.65)	**0.02***
Level of education (Mother)						
Primary	40(36)	72(64)	Ref		Ref	
Secondary	60(36)	109(64)	I.16(0.58,2.29)	0.667	1.11(0.52,2.3)	0.772
Tertiary	34(50)	34(50)	1.17(0.61,2.2)	0.629	1.02(0.49,2.11)	0.952
No formal Education	20(39)	31(61)	0.64(0.30,1.34)	0.243	0.58(0.21,1.61)	0.303
Monthly income (mother)						
< 376	29(29)	70(71)	Ref		Ref	
376 - 500	40(37)	68(63)	0.70(0.39,1.26)	0.239	0.63(0.32,1.2)	0.19
501 - 1000	54(44)	70(56)	0.53(0.30,0.93)	**0.03***	0.55(0.26,1.13)	0.1
> 1000	31(45)	38(55)	0.50(0.26,0.96)	0.039	0.67(0.25,1.8)	0.43
Main occupation (mother)						
Employed	123(39)	196(61)	Ref		Ref	
Unemployed	31(38)	50(62)	0.987(0.59,1.63)	**0.037***	1.56(0.844,2.89)	0.15
Distance to the nearest facility or vaccination Center (Perception)						
Near	135(39)	211(61)	Ref		Ref	
Far away	19(35)	35(65)	1.17 (0.64,2.14)	0.591	1.2(0.64,2.42)	1.56
How many doses of the vaccine given in the thigh (Pcv or Penta) should a child receive?						
Others	23(28)	59(72)	Ref		Ref	

Three(3) doses	131(41)	187(59)	0.55(0.32,0.94)	**0.031***	0.67(0.47,1.11)	0.12

**** Significant p-values***

4.7 Childs Vaccination status of children under five in Ablekuma sub metro at the time of study.

The results shows that out of the 400 mothers who were interviewed 154 (37%) of them had fully vaccinated their children. The pie chart below displays the findings. The results are shown in figure 4.1.

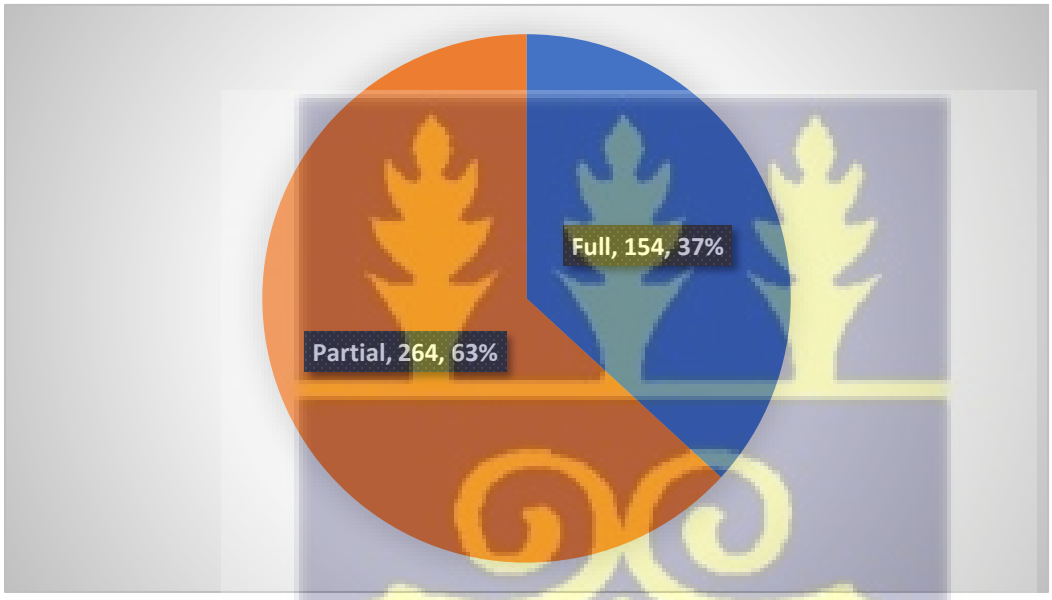


Figure 4. 1:Vaccination status of children of caregivers

4.8 Reason for Non-Vaccination or Incomplete Vaccination

Mothers whose child had not been fully vaccinated stated problems that prevent them from getting their child fully vaccinated. Most of the mothers (51.8%) stated that they are aware of the immunization date but their child has not been fully vaccinated because the immunization date is not due. Again, unavailability of the mother (16.2%) is another reason why children were not been fully vaccinated. Some of the mothers were not even aware of the immunization schedule.

Significant proportion of the respondents expressed that they were not attended to when visited immunization centre. Fear of side reaction, distance to immunization centre, cultural/religious believe, inconvenience schedule, and waiting time are factors that obstruct full vaccination status of the surveyed children. Table 4.7 presents the results.

Table 4. 7 Reason for Non-Vaccination or Incomplete Vaccination

Obstacles	Frequency (N=400)	Percentage (%)
Immunization date not due	126	51.8
Mother wasn't available	40	16.2
Place of immunization too far	2	0.8
No reason	21	8.5
Went but was not given vaccination.	22	8.9
Unaware of the vaccination schedule	2	0.8
Time of immunization inconvenient.	1	0.4
Postponed until another time.	6	2.4
Family issues, such as mother's or child's illness	9	3.6
Fear of side reaction.	8	3.2
Cultural/religious reasons.	4	1.6
I don't have card/child's health records	3	1.2
Long waiting time.	1	0.4

Source: Field Work, 2022

4.9: Vaccines received by Children under the Age of 5

According to Table 4.8, most of the surveyed children under the age of 5 years had been vaccinated for Polio (75.3%) and Measles (61.0%). Other diseases that the children had been vaccinated against were tuberculosis (37.0%), Tetanus (43.8%) and yellow fever (46.0%). Few

proportions of the children had been vaccinated against; Pertussis (9.3%), Hepatitis B (16.5%), H. Influenza B (6.8%), Meningitis (11.3%), and Diarrhoea (23.8%).

Table 4. 8 Vaccines received by Children under the Age of 5 years

Disease	Frequency (N=400)	Percentage (%)
Polio	301	75.3
Tuberculosis	148	37.0
Tetanus	175	43.8
Pertussis	37	9.3
Hepatitis B	66	16.5
H. influenza B	27	6.8
Pneumonia	74	18.5
Diarrhoea	95	23.8
Measles	244	61.0
Yellow fever	184	46.0
Meningitis	45	11.3
Malaria	19	4.8
Cholera	1	0.3
Eye Infection	2	0.5
Worm Infestation	2	0.5

Source: Field Work, 2022

CHAPTER FIVE

5.0 DISCUSSION

5.1 Discussion of findings

On the use and coverage of vaccinations among children in Ghana, some data have been released. In administrative fields, however, the factors affecting children's vaccination status are not well understood or investigated. Incomplete vaccination rates are influenced by socio-demographic factors like the mother's marital status, level of education, occupation, and employment status as well as child characteristics like birth order (Adokiya et al., 2017; Sally & Kenu, 2017), as well as healthcare-related factors like long waiting times (Yawson et al., 2017). Knowing what causes children to receive only partial vaccinations may help the community and the nation as a whole to improve vaccination rates. The study's goal was to identify the variables that affect the vaccination rates of children under the age of five in the Ablekuma sub-Metro.

5.2 Socio-demographic characteristics of cavergivers that affects partial vaccination of children.

This study found association between complete immunization of children and the marital status of the mothers thus mothers who were divorced had reduced odds of their children being fully vaccinated compared to single, married and cohabiting mothers. Similar results were found in a 2012 study by Balogun et al. in Lagos, Nigeria, which found that children of cavergivers who were currently married and had at least a post-secondary education been more prepared to receive SMS reminders for childhood immunizations among women attending a tertiary facility in Lagos, Nigeria (Balogun et al., 2012).

Numerous research has suggested that the caregiver's education degree influences their child's immunization status. Utilization of immunization services is influenced by the caregiver's educational background, which also influences how frequently they visit the clinic hence improving childhood vaccination. Geweniger and Abbas discovered in 2020 that a caregiver's primary and secondary education contributed to 100% immunization coverage of their wards (Geweniger and Abbas, 2020) however, this study discovered that the educational level of caregivers was not a factor that affects their children vaccination coverage or status.

The employment status was acknowledged as a factor affecting incomplete immunization coverage of children. But according to this study, caregivers occupation is not a factor that affects their children partial vaccination coverage thus whether a mother is employed or not does determine if their wards will be fully or partially vaccinated. According to studies, children of caregivers whose families are with steady jobs and high earnings may use medical services more frequently which will translate in wards vaccination status (Hu et al., 2013). However, this might also rely on how much money a person makes, how they perceive the world, and how important they think vaccinations are. According to a study conducted in Ghana, children of working mothers had high immunization rates. But the author also made clear that children born to working mothers might realize the value of immunizations, feel empowered by their families, and be able to hire maids to take care of their kids and other domestic duties (Sowe & Johansson, 2019).

According to a study by Kibongani Volet, Scavone, Catalán-Matamoros, & Capuano from 2022, several religious groups, including Protestants, Catholics, Jews, Muslims, Christians, Amish, Hinduists, and Sikhi, have religious objections to vaccinations (Kibongani Volet et al., 2022). This finding is in contrast to that of our study, which found no association between caregiver religion and incomplete vaccination coverage of their wards in Ghana, where Christians make up the

majority of the population. Thus mothers religion did not influence the partial vaccination status of their wards.

5.3 Caregiver knowledge on childhood vaccination

Our results revealed no association between vaccination coverage of children and caregiver knowledge, children being fulling vaccinated was not a result for the caregivers knowledge but might improve the in vaccination coverage of children. Despite the fact that the Ablekuma Sub Metro has many public and private healthcare facilities, there are still many children of caregivers who are unaware of the diseases covered by the recommended immunization schedule. The causes may be related to the restricted pre-clinic health discussions, the high client flow during vaccination sessions, particularly at base/fixed clinics, and the limited amount of time for healthcare personnel to connect with patients. Through their encounters with healthcare professionals, women who exhibit appropriate health-seeking behavior may have adequate understanding of vaccination and immunization regimens. In 2017, Ababu et al. conducted a cross-sectional community-based survey in Ethiopia and discovered that children of caregivers with low vaccination knowledge had a higher likelihood of receiving just partial vaccinations as opposed to children of caregivers with high vaccination knowledge (Ababu et al., 2017). Caretakers' of children understanding of the value of immunizations promotes frequent clinic visits. The results of this study contradict past assertions that caregiver knowledge influences a child's vaccination status; yet, most children of mothers and other caregivers who had a limited or negative view of vaccination reported that more than 60% of their children were not fully immunized.

5.4 Health facility factors that affect childhood vaccination status.

Additionally, it has been discovered that travel time to the immunization site predicts that children born to mothers with relatively shorter distance to vaccination centres where more likely to be full

vaccinated than children born to mother with distance (far) to CWC centres. The amount of time, effort, and resources required to get to the clinic may affect the children's immunization status. A caregiver might yet continue going to the clinic despite the lengthy journey time if they are completely aware of the value of vaccination. Children of caregivers who walked for less than 30 minutes had better vaccination outcomes than those who walked for more than 30 minutes, according to a 2015 study by Adhikary et al. of 249 mothers and carers in Bangladesh (Adhikary et al., 2015). Travel time to the vaccination site was noted as a factor in children's immunization status in a 2018 study by Id et al., that was done in China. Compared to children whose caregivers traveled for less than 20 minutes, children whose caregivers traveled for more than 40 minutes had a 62.0% higher risk of incomplete immunization (Id et al., 2018). Since the aforementioned assertions do not accord with our findings, no association between the trip/distance time to the facility or child welfare clinic and vaccination status of children was discovered. In this study's bivariate and multiple logistic regression analyses, there was no relationship between waiting time at the clinic and vaccination status that was not statistically significant. Our results are comparable to those of a study carried out in Malaysia by Azhar et al. in 2012, which likewise found no association between waiting time and vaccination default of children (Azhar et al., 2012).

5.5 Child characteristics that affect incomplete vaccination

Given how long it takes for a child to finish their vaccinations, there is a good probability that if a caregiver frequently visits the clinic, the child will have all the shots before finishing their vaccinations on time. However, this has proven difficult in many areas, as a sizable portion of children skip regular shots before finishing the program, preventing them from receiving all of their recommended shots. It has been suggested that a child's age can indicate whether they will receive an incomplete immunization. The age of the child was not identified in the current

investigation as a factor influencing incomplete vaccination status of children. Similar to this, a 2017 study conducted in Ghana by Adokiya et al. found no relationship between a child's age and inadequate immunization (Adokiya et al., 2017). In comparison to children aged 12 to 24 months, children aged 48 to 59 months had decreased probabilities of having incomplete vaccinations, according to a recent study in Bangladesh by Sarker, Akram, Ali, and Sultana, 2019. (Sarker, Akram, Ali, & Sultana, 2019). Children may stop receiving vaccinations before they should, especially if the caregivers don't follow the health care professionals' instructions regarding the schedule. Many people believe that a child has finished vaccination after two to three consecutive visits without receiving the vaccination. Studies have indicated that birth order is a predictor of childhood vaccination coverage. According to Tauil et al., comprehensive evaluation of publications from 2016, having a firstborn child in Kenya increased the likelihood of inadequate immunization by 2.15 times (Tauil et al., 2016). Feldstein et al., cross-sectional study in Sierra Leone in 2020 found that infants born second or later had higher odds of not receiving the full pentavalent series of vaccinations compared to children born first (Feldstein et al., 2020). A 2014 study by Calhoun et al. refuted the earlier assertions that birth order is a predictor of insufficient immunization of a child (Calhoun et al., 2014). Our research, which concurs with this conclusion, did not discover any links between a child's birth order and incomplete vaccination status. According to Hailu et al., studies from 2019, a female child's incomplete vaccination rate was reduced by 36.0% when compared to a male youngster (Hailu et al., 2019). Compared to male children, female children had a higher chance of receiving all recommended vaccinations. Contrary to these assertions, this study demonstrates that there is no association between a child's sex and vaccination status of children whether they are fully or partially vaccinated., and it is also consistent with research from India (Devasenapathy et al., 2016).

5.6 Caregivers factors influencing incomplete childhood vaccination.

According to this study, children of caregivers who were divorced had 49% lower odds of being fully immunized than children of carergivers who were single, married and co-habiting. Multiple regression analysis showed that the result was significant (aOR=0.51, 95% [CI=0.27-0.94). This was supported by a study done in Japan in 2022 by Kuroda, H. et al., which reported on a statewide, prospective birth cohort study that looked into the relationship between maternal marital status and childhood under the age of two years of immunization. Compared children of married mothers, unmarried mothers had a roughly 1.3 times higher chance of vaccinating their children fully (Kuroda, H et al, 2022).

In this study, factors impacting incomplete childhood vaccination coverage were not substantially associated with outcome variable such mothers' education level, income, occupation, and distance to the facility, both at bivariate and multiple logistic regression analysis.

5.7 Reasons by caregivers for incomplete vaccination among children

Children's vaccinations may not be complete for a number of reasons which reduce the chance of children been fully vaccinated, according to caregivers. These factors, which include those relating to individuals, communities, and healthcare facilities, were cross-cutting at all levels. In a recent study, caregivers' busy schedules (16.2%), a shortage of vaccines (9%), and ignorance of the child's cause for missing the vaccine dose (8.5%) were cited as the three main contributing factors for inadequate immunization of children. However, additional issues were also brought up, such as the caregiver's journey, the unwell child, the caregiver's attitude, the adverse effects of the immunization, and the mother's pregnancy as factor contributing to incomplete vaccination of children. These variables are not shocking, especially for overworked caretakers. As the Ablekuma sub-Metro is the center for commerce and other economic activity and is surrounded by

marketplaces, this may be the result of the hectic schedule. Our results found that these reason affect vaccination coverage negatively and were consistent with a study conducted in southwest Uganda, which found that reasons for incomplete vaccination among children included travel or financial issues (18.0%), fear of side effects (44.0%), shortages of vaccines (3.1%), laziness (44.0%), discouragement from a spouse or family member (11.0%), crowds or lengthy waits (7.0%), being too busy (5.0%), and not knowing (11.0%). (Vonasek et al., 2016). Lack of knowledge of caregivers and barriers were cited in studies conducted in India as the main causes of partial vaccination or non-immunization among 283 children (Aggarwal et al., 2012).

5.8 Limitation

The cross-sectional design meant that the temporal relationship between the significant factors and vaccination status of children could not be inferred however this study design was used because I allow the data collection and analysis within the time frame of the study.

Full evaluation of all the factors eg cultural belief known to be associated with vaccination status of children could not be done in this study.

Immunization histories established through mothers recall may introduce bias to the study. Poor recall of mothers who could not produce the vaccination cards may either over-estimate or under-estimate the vaccination coverage.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The findings of this study noted that partial vaccination was high among children under five years in Ablekuma sub-Metro, 37% (154) of children from the 400 caregivers had been fully vaccinated. Factors originate to be connected with vaccination coverage among children under five years among sociodemographic factor was marital Status thus divorved mothers of caregivers and vaccine availability, and fear of side effects as some reasons given by caregivers for partial vaccination.

6.2 Recommendations

The accompanying suggestions were developed in light of the study's findings and the justifications provided by parents for not vaccinating their children completely;

Recommendations for public practice and policy

Ministry of Health/ Expanded Programme on Immunization

1. Should guarantee the timely and consistent delivery of vaccines andcatch-up/mop upcampaigns.

2. To integrate immunization initiatives in their programs, they should collaborate more closely with the Directorate of Health Education and Promotion.

Regional Health Directorate

1. Discuss with key people in the community the value of immunizations for children under the age of five in preventing childhood illness.

Health Facility Staff

1. Increase the focus of clinic health education initiatives.

2. Regardless of the scheduled date, vaccinations should be given to children who are overdue.

3. Boost male involvement in reproductive and children's health without making them wait in line at vaccination clinics or facilities.

6.2 Recommendation of Future Research

To better understand the phenomenon and strive toward its improvement in Ghana and throughout Africa, an explorative study that uses the ethnographic research design will serve to elicit detailed explanations from participants on the numerous variables explored in this research.

REFERENCE

3_Regional_vaccine_action_plans_2016_progress_reports.pdf. (n.d.). Retrieved May 25, 2021,fromhttps://www.who.int/immunization/sage/meetings/2016/october/3_Regional_vaccineaction_plans_2016_progress_reports.pdf

Adokiya, M. N., Baguune, B., & Ndago, J. A. (2017). Evaluation of immunization coverage and its associated factors among children 12–23 months of age in Techiman Municipality, Ghana, 2016. Archives of Public Health, 75(1), 1-10.

Asmamaw, A., Getachew, T., Gelibo, T., Taye, G., Bekele, A., Teklie, H., Defar, A., Tadesse, M., Tadelle, T., Amenu, K., Assefa, Y., & Kebede, A. (n.d.). Determinants of full valid vaccine dose administration among 12-32 months children in Ethiopia: Evidence from the Ethiopian 2012 national immunization coverage survey. Ethiop. J. Health Dev., 7.

Ababu, Y., Braka, F., Teka, A., Getachew, K., Tadesse, T., Michael, Y., Birhanu, Z., Nsubuga, P., Assefa, T., & Gallagher, K. (2017). Behavioral determinants of immunization service utilization in Ethiopia: a cross-sectional community-based survey. The Pan African Medical Journal, 27(Supp 2), 2. https://doi.org/10.11604/pamj.supp.2017.27.2.10635.

Adhikary, M., Haque, R., & Tanira, S. (2015). Determinants of child Immunization under the expanded programme on Immunization (EPI) in a rural setting of Bangladesh. Journal of Dhaka Medical College, 22(2), 201–206. https://doi.org/10.3329/jdmc.v22i2.21543

Azhar, S. S. et al 2012. (2012). Factors influencing childhood immunization Defaulters in Sabah, Malaysia. The International Medical Journal Malaysia, 11(1)

Bani Salameh, A. K., Malak, M. Z., & Abu Adas, M. H. (2021). Factors associating vaccination delay among Jordanian children under two years of age. Journal of Pediatric Nursing. https://doi.org/10.1016/j.pedn.2021.01.005

Becker, G. S., & Murphy, K. M. (1993). A simple theory of advertising as a good or bad. The Quarterly Journal of Economics, 108(4), 941-964.

Benin, A. L., Wisler-Scher, D. J., Colson, E., Shapiro, E. D., & Holmboe, E. S. (2006). Qualitative analysis of mothers' decision-making about vaccines for infants: the importance of trust. Pediatrics. 117(5):1532–41. pmid:16651306

Canavan, M. E., Sipsma, H. L., Kassie, G. M., & Bradley, E. H. (2014). Correlates of complete childhood vaccination in East African countries. PloS one, 9(4), e95709.

Dwumoh, D., Essuman, E. E., & Afagbedzi, S. K. (2014). Determinant of factors associated with child health outcomes and service utilization in Ghana : multiple indicator cluster survey conducted in 2011, 72(1), 1–10. https://doi.org/10.1186/2049-3258-72-42.

Devasenapathy, N., Jerath, S. G., Sharma, S., Allen, E., Shankar, A. H., & Zodpey, S. (2016). Determinants of childhood immunization coverage in urban poor settlements of Delhi, India: A cross-sectional study. BMJ Open, 6(8). https://doi.org/10.1136/bmjopen-2016-013015

Ethiopia, F. M. O. H. (2010). National expanded programme on immunization, comprehensive multi year plan 2011-2015. Addis Ababa, December.

Ewang, B. F., Eyong, M. E., Cumber, S. N., Nkfusai, C. N., Yankam, B. M., Anye, C. S., Achu, J. R., Suh, B. M., Nkeng, M. N., Nzoyom, R. B., Tsoka-Gwegweni, J. M., & Akum, E. A. (2020). Vaccination Coverage Under the Expanded Program on Immunization in South West Cameroon. International Journal of Maternal and Child Health and AIDS, 9(2), 242–251. https://doi.org/10.21106/ijma.308.

Fernandez, R. C., Awofeso, N., & Rammohan, A. (2011). Determinants of apparent rural-urban differentials in measles vaccination uptake in Indonesia. Rural and remote health, 11(3), 40-53.

Feldstein, L. R., Sutton, R., Jalloh, M. F., Parmley, L., Lahuerta, M., Akinjeji, A., Mansaray, A., Eleeza, O., Sesay, T., Kulkarni, S., Conklin, L., & Wallace, A. S. (2020). Access, demand, and utilization of childhood immunization services: A cross-sectional household survey in Western Area Urban district, Sierra Leone, 2019. Journal of Global Health, 10(1), 1–12. https://doi.org/10.7189/jogh.10.010420

Geweniger, A., & Abbas, K. M. (2020). Childhood vaccination coverage and equity impact in Ethiopia by socioeconomic, geographic, maternal, and child characteristics. Vaccine, 38(20), 3627–3638. https://doi.org/10.1016/j.vaccine.2020.03.040

Ghana Health Annual report 2019.pdf.

GhanaComprehensivemultiyearplanfor20102014.pdf.

Hu, Y., Li, Q., Chen, E., Chen, Y., & Qi, X. (2013). Determinants of childhood immunization uptake among socio-economically disadvantaged migrants in East China. International Journal of Environmental Research and Public Health, 10(7), 2845–2856. https://doi.org/10.3390/ijerph10072845

Id, L. C., Zheng, J., Cao, L., Cui, J., Duan, M., & Xiao, Q. (2018). Factors influencing the routine immunization status of children aged 2-3 years in China. 1–12.

Kiely, M., Boulianne, N., Talbot, D., Ouakki, M., Guay, M., Landry, M., Sauvageau, C., & De Serres, G. (2018). Impact of vaccine delays at the 2, 4, 6 and 12 month visits on incomplete vaccination status by 24 months of age in Quebec, Canada. BMC Public Health, 18. https://doi.org/10.1186/s12889-018-6235-6

Larson, H. J., Jarrett, C., Eckersberger, E., Smith, D. M, & Paterson, P. (2014). Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature, 2007–2012. Vaccine. ;32(19):2150–9.pmid:24598724.

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.

Marefiaw, T. A., Yenesew, M. A., & Mihirete, K. M. (2019). Age-appropriate vaccination coverage and its associated factors for pentavalent 1-3 and measles vaccine doses, in northeast Ethiopia: A community-based cross-sectional study. PLoS ONE, 14(8). https://doi.org/10.1371/journal.pone.0218470.

Mbengue, M. A. S., Sarr, M., Faye, A., Badiane, O., Camara, F. B. N., Mboup, S., & Dieye, T. N (2017). Determinants of complete immunization among senegalese children aged 12–23 months: Evidence from the demographic and health survey. BMC Public Health, 17. https://doi.org/10.1186/s12889-017-4493-3.

Morice, C. P., Kennedy, J. J., Rayner, N. A., & Jones, P. D. (2012). Quantifying uncertainties in global and regional temperature change using an ensemble of observational estimates: The HadCRUT4 data set. Journal of Geophysical Research: Atmospheres, 117(D8).

Mugada, V., Chandrabhotla, S., kaja, DS., & Macha, S. G. K. M. (2017). Knowledge towards childhood immunization among mothers and reasons for incomplete immunization. Journal of Applied Pharmaceutical Science7(10) 157-61.

Negeri, E. L., & Heyi, W. (2015). An assessment of child immunization coverage and its determinants in Sinana District, Southeast Ethiopia. BMC Pediatrics, 15, 31. https://doi.org/10.1186/s12887-015-0345-4.

Organización Mundial de la Salud. (2013). Global vaccine action plan 2011-2020. World Health Organization.

(PDF) May we improve vaccine timeliness among children? A cross sectional survey in northern Saudi Arabia. (n.d.). Retrieved May 27, 2021, from https://www.researchgate.net/publication/333499281_May_we_improve_vaccine_timeliness_among_children_A_cross_sectional_survey_in_northern_Saudi_Arabia

Salmon, D. A., Dudley, M. Z., Glanz, J. M., & Omer, S. B. (2015). Vaccine hesitancy: causes, consequences, and a call to action. Vaccine, 33, D66-D71.

Sally, E. T., & Kenu, E. (2017). Evaluation of access and utilization of EPI services amongst children 12-23 months in Kwahu Afram Plains, Eastern region, Ghana. The Pan African Medical Journal, 28. https://doi.org/10.11604/pamj.2017.28.238.11538

Schoeps, A., Ouédraogo, N., Kagoné, M., Sié, A., Müller, O., & Becher, H. (2013). Socio-demographic determinants of timely adherence to BCG, Penta3, measles, and complete vaccination schedule in Burkina Faso. Vaccine, 32(1), 96–102. https://doi.org/10.1016/j.vaccine.2013.10.063

Smith, M. J., Woods, C. R, Marshall, G. S. (2009) Parental vaccine concerns in Kentucky. Journal of the Kentucky Medical Association 107(9) 342-9.

Sowe, A., & Johansson, K. (2019). Disentangling the rural-urban immunization coverage disparity in The Gambia : A Fairlie decomposition. Vaccine, 37(23), 3088–3096. https://doi.org/10.1016/j.vaccine.2019.04.062

Tao, W., Petzold, M., & Forsberg, B. C. (2013). Routine vaccination coverage in low-and middle-income countries: further arguments for accelerating support to child vaccination services. Global health action, 6(1), 20343.

Wado, Y. D., Afework, M. F., & 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(Suppl 1).

WHO/UNICEF. (2014). WHO _ WHO and UNICEF estimates of national infant immunization coverage methods and processes.

WHO_V&B_02.27.pdf. (n.d.). Retrieved May 31, 2021, from http://apps.who.int/iris/bitstream/handle/10665/67791/WHO_V&B_02.27.pdf;jsessionid=0132C3D5C8CE2856A431BA2502751760?sequence=1.

World Health Statistics 2015—World Health Organization—Google Books. (2015.). RetrievedApril20,2021,from https://books.google.com.gh/books?hl=en&lr=&id=Kl00DgAAQBAJ&oi=fnd&pg=PP1&dq=World+Health+Organization.+World+Health+Statistics.+2015.&ots=8NrHiuYUwi&sig=IHH7466gHzJ4molnjYRHC5tg1c&redir_esc=y#v=onepage&q&f=fals

APPENDICES

Appendix 1: Questionnaire

FACTORS ASSOCIATED WITH VACCINATION COVERAGE AMONG CHILDREN UNDER FIVE YEARS OF AGE IN ABLEKUMA SUBMETRO

IDENTIFICATION

QUESTIONNAIRE NUMBER: ..... NAME OF COMMUNITY:……

CLUSTER NUMBER: …… HOUSEHOLD NUMBER: ……

SECTION A: CLIENT'S BACKGROUND AND OTHER CHARACTERISTICS

NO. QUESTIONS RESPONSES CODE

SKIP

NO.	QUESTIONS	RESPONSE	CODE	SKIP
1	How old are you (age at last birthday)			
2	Have you ever attended school	YES……	1	
		NO……..	2	→ 4
3	What is your highest level of education	Primary…….	1	
		Secondary…….	2	
		Tertiary…….....	3	
4	What is your employment status	Employed……..	1	
		Unemployed……	2	
5	How much is the estimated monthly family income	Below ¢376……	1	
		¢ 376-500 ……...……	2	
		¢ 501- 1000 ……..…..	3	

		Above ¢1000……..	**4**	
6	What is your marital status	Single……	**1**	
		Married……	**2**	
		Co-habiting……..	**3**	
		Divorced……...	**4**	
		Widow……...	**5**	
7	What is the highest level of education of child's father	None……..	**1**	
		Primary…….....	**2**	
		Secondary……...	**3**	
		Tertiary ……..	**4**	
8	What is your region	Christian…….	**1**	
		Muslims……..	**2**	
		Traditional……..	**3**	
		None……...	**4**	
9	How many children do you have in addition to child			
10	Birth order of child			
11	Place of delivery	Health facility ……	**1**	
		TBA Center ……...	**2**	
		Home……...	**3**	

SECTION B: MOTHER'S KNOWLEDGE ON IMMUNIZATION

NO	QUESTIONS	RESPONS	SCORE
12	Mention at least five (5) disease that can be prevented by childhood vaccination in Ghana? Attention: tick as mentioned		

	☐ Polio Tuberculosis Tetanus Pertussis Hepatitis B H.influenza B Pneumonia Diarrhoea Measles Yellow fever Meningitis **NB:** Tick as correct if mother mentions more than 5 diseases	At least 5 diseases…… Less than 5 diseases…….	1 0
13	At what age should a child be given his/her first vaccination?	Within 2 weeks…… Others ……..	1 0
14	Mention one vaccine which is administered orally (mouth)	Polio or rotavirus…… Other.....	1 0

15	Mention one vaccine which is administered in the thigh	Penta, PCV or IPV…… Other…….	1 0
16	Mention one vaccine which is administered in the upper arm	Measles Yellow Fever or MEN A …… Other…… ……	1 0
17	How many doses of the vaccine given in the thigh (PCV or penta) should a child receive?	Three (3) doses…… Other.....	1 0
18	What is the vaccination schedule for the vaccine given in the thigh (PCV or DPTHepBHib)	6, 10 and 14 weeks…….. Other….....	1 0
19	Which vaccine is administered at 9 months?	Measles or Yellow Fever……. Other……	1 0
20.a	Are children supposed to take vaccination on 18th months?	Yes …… No ……....	1 0
B	If yes how many	2 ……..……..…….. Other ……..	1 0

HEALTH FACILITY FACTORS

	QUESTIONS	RESPONSE	CODE	SKIP
21	Distance to the nearest health facility or vaccination center	Near (< 1km)…… Far away (> 1km)……	1 2	
22	Is the place of waiting at the vaccination center convenient	Yes…….. No……..	1 2	
23	Does it take a long time for your child to be vaccinated at the health facility	Yes…….. No……...	1 2	
24	How do you rate the attitude of nurse/vaccinators	Good……..……. Poor……..	1 2	→ 26

ACCESSIBILITY FACTORS

25	Is the timing of vaccination schedule convenient?	Yes…….. No……..	1 2	
26	Has your child ever being denied vaccination	Yes…….. No……..	1 2	→ 29
27	What was the reason of your child not being vaccinated	No vaccine and or the other logistics …… Staff not present ……..	1 2	

28	**Have you ever paid for any service at CWC**	**Yes…… No……..**	**1 2**	

SECTION C: CHILD'S IMMUNIZATIONS

NO	QUESTIONS	RESPONESES SKIP	CODE
29	What is the date of birth of child? (dd/mm/yyyy)	……../……./…….	
30	Sex of child	Male…… 1 Female…….. 2	
31	Do you have a card where child's vaccinations are written down? If yes ,may I see it please (verify date of birth)	Yes…… 1 No…… 2	→ 44 32 →

1. Copy dates from the card
2. Write '11' in day' Colum if card shows that a dose was given, but no date is recorded

	DD	MM	YYY
BCG			
POLIO 1			
POLIO 2			
POLIO 3			
DPTHepBHib 1			
DPTHepBHib 2			
DPTHepBHib 3			
PCV1			
PCV2			
PCV3			
Rota1			
Rota2			
Rota3			
MR			
Yellow Fever			
MEN A			

33	Did child ever have any vaccinations to prevent him/her from getting diseases?	Yes…….. 1 No…… 2 Don't know……. 3	End
34	Has child received vaccination against tuberculosis (BCG), the is, an injection in the right upper arm that usually causes a scar?	Yes…… 1 No…… 2	
35	Has child received polio vaccine that is drops in the mouth?	Yes…… 1 No…… 2 Don't know…….. 3	36
36	How many times was the polio vaccine given?	Number of times	
37	Has child received DPT HepBHib vaccination, that is,	Yes…….. 1	38

	an injection given in the left thigh?	No…..... 2 Don't know……..… 3	
38	How many times was the DPTHipBHib vaccination given?	Number of times ☐	
39	Has child received a vaccine for pneumonia (PCV), that is, an injection given in the right thigh?	Yes……..…. 1 No……..... 2 Don't know……..… 3	40
40	How many times was the PCV vaccination given?	Number of time ☐	
41	Has child received a vaccine for Diarrhoea (rotavirus) that is, drop in the mouth, where child was given the whole content of the vial?	Yes…… 1 No…… 2 Don't know…….. 3	42
42	How many times was the Rotavirus vaccine given?	Number of times ☐	

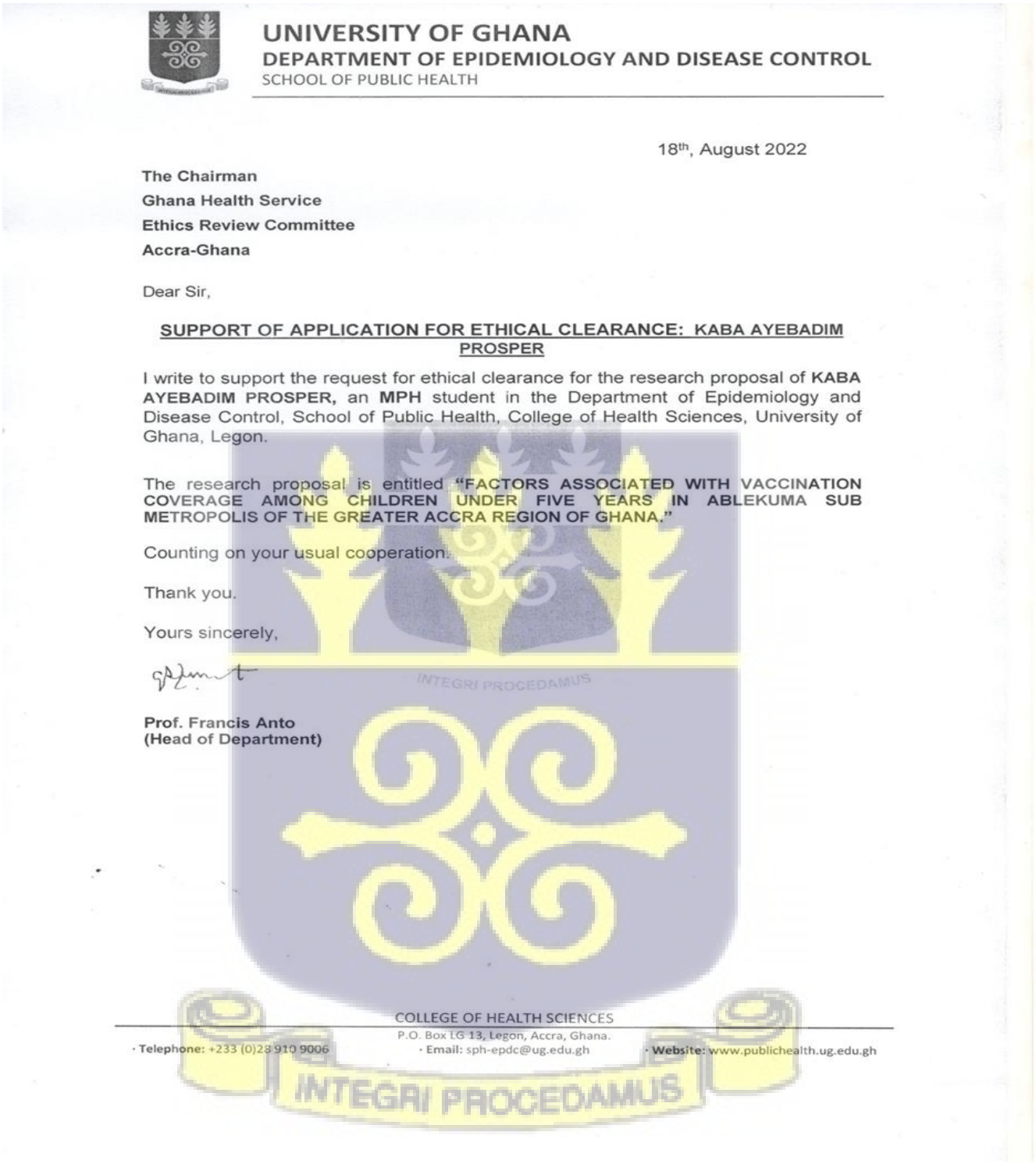
43	Has child received Measles /MR injection-that is, a shot in the left upper arm at the age of 9 month or older-to prevent him/her from getting Measles?	Yes…… 1 No……. 2 Don't know……... 3	
44	Has child received Yellow Fever injection-that is, a shot in the right upper arm at the age of 9 month or older-usually given at the same time as Measles?	Yes……... 1 No…….....……. 2 Don't know…… 3	
45	Vaccination status of child	Fully vaccinated……..... ➡ 1 Partially vaccinated……... 2 Not vaccinated……... 3	End
	REASON FOR NON VACCINATION OF INCOMPLETE VACCINATION		
46	Lack of information	Unaware of need for immunization 1	

		Unaware of need to return for 2nd or3rd dose ...…2 Place and time of immunization unknown .....…..3 Wrong ideas about contraindications ……...…….4 Other ……..…… ……5	
	Obstacles	Place of immunization too far ……..……..1 Time of immunization inconvenient .....…2 Mother too busy ..……..……...3 Family problem including illness of mother or child ill ……..…4 Went but was not given vaccination……5 Long waiting time ……..…..…6	

		Postponed until another time ……..……..7 Cultural/religious reasons ……..…….....8 Fear of side reaction ……...…9 The poor attitude of staff..……. ..…...…10 Other (Specify) ……..... 11	

MANY THANKS

Appendix 2: Introductory letter



UNIVERSITY OF GHANA
DEPARTMENT OF EPIDEMIOLOGY AND DISEASE CONTROL
SCHOOL OF PUBLIC HEALTH

18th, August 2022

The Chairman
Ghana Health Service
Ethics Review Committee
Accra-Ghana

Dear Sir,

SUPPORT OF APPLICATION FOR ETHICAL CLEARANCE: KABA AYEBADIM PROSPER

I write to support the request for ethical clearance for the research proposal of **KABA AYEBADIM PROSPER,** an **MPH** student in the Department of Epidemiology and Disease Control, School of Public Health, College of Health Sciences, University of Ghana, Legon.

The research proposal is entitled **"FACTORS ASSOCIATED WITH VACCINATION COVERAGE AMONG CHILDREN UNDER FIVE YEARS IN ABLEKUMA SUB METROPOLIS OF THE GREATER ACCRA REGION OF GHANA."**

Counting on your usual cooperation.

Thank you.

Yours sincerely,

Prof. Francis Anto
(Head of Department)

INTEGRI PROCEDAMUS

COLLEGE OF HEALTH SCIENCES
P.O. Box LG 13, Legon, Accra, Ghana.
· Telephone: +233 (0)28 910 9006 · Email: sph-epdc@ug.edu.gh · Website: www.publichealth.ug.edu.gh

INTEGRI PROCEDAMUS

Appendix 3: Ethnical Clearance

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Digital Address: GA-050-3303
Mob: +233-50-3539896
Tel: +233-302-681109
Email: ethics.research@ghs.gov.gh

My Ref. GHS/RDD/ERC/Admin/App |22|469
Your Ref. No.

11th October, 2022

Prosper Ayebadim Kaba
School of Public Health,
University of Ghana

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC: 064/09/22**
Study Title	Factors Associated with Vaccination Coverage Among Children Under Five Years in Ablekuma Sub Metropolis of the Greater Accra Region of Ghana
Approval Date	11th October, 2022
Expiry Date	10th October, 2023
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of a yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

You are kindly advised to adhere to the national guidelines or protocols on the prevention of COVID -19

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
Dr. Naa-Korkor Allotey
(Ag. Head, Ethics & Research Management Department)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra