FACTORS ASSOCIATED WITH COVERAGE GAP OF MEASLES VACCINATION IN SAGNERIGU DISTRICT

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UDS/CHD/0241/16

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BY

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A THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH, SCHOOL OF ALLIED HEALTH SCIENCES, UNIVERSITY FOR DEVELOPMENT STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN COMMUNITY HEALTH AND DEVELOPMENT

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DECLARATION

While acknowledging information from other sources, I hereby declare that this submission is my own work towards the partial fulfilment of the requirements for the award of MSc in Community Health and Development at University for Development Studies. To the best of my knowledge; it contains no material previously published by any other person.

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(Name of Supervisor)	Signature	Date

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Without the cooperation and support of several people who helped in diverse ways, this work would not have been successful.

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DEDICATION

I wish to dedicate this research work to my husband, my mother and my children for their love, care, prayers and financial support for the successful pursuance of this course. May the good Lord grant them a fair share of prosperity and health.

ABSTRACT

People in Northern Ghana especially caregivers of children are mostly characterized to be poor and illiterates which make them vulnerable to peasant occupations translating into their negligence in vaccinating their children against the measles virus. Sagnerigu Municipality was chosen as a case study in this regard. A simple random sampling technique was used to select 300 caregivers and 40 clinic staff for the study. A questionnaire was used as a method of data gathering to obtain views of respondents about the factors associated with measles coverage gap and Statistical Package for Social Scientist (SPSS version 20) was used as statistical tool to analyse the data obtained. After the study, one key finding was that the caregivers with low educational level are likely not to vaccinate their children against measles 1 and 2. Another finding was that vaccination services were rendered free of charge to caregivers. The study recommended the following. Objective one; the health directorate should device a plan by which proper education of the relevant health program is carried out in the Municipality. Of particular importance will be the need to vaccinate children against the childhood diseases. Objective two; Parents/caregivers should be encouraged by Ministry of Education to take up non formal education which will boost their entrepreneurial zeal to help improve their economic standard. Objective three; health staff should do a follow-up vaccinations and also monitor side effects.

ACRONYMS

GAVI……. Global Alliance for Vaccine Immunization.

WHO……. World Health Organization

MOH……. Ministry of Health

GDHS……Ghana Demographic and Health Survey

VPD…….. Vaccine Preventable Diseases

CHPW…….. Child Health Promotion Week

BCG……Bacillus Chalmette Guerin

UNDP…….. United Nations Development Program

CHRB…….. Child Health Record Book

CWC……. Child Welfare Card

MR……Measles Rubella

MMR…….. Measles Mumps Rubella

DHMT……. District Health Management Team

EPI……Expanded Program on immunization

BCG……Bacillus Calmette Guerin.

UNICEF…….. United Nations Children Emergency Fund

CHIPS…….. Community-Based Health Planning and Services

NHIS……. National Health Insurance Scheme

NGO……. None Governmental Organization

NID…….. Nation Immunization Day

DHIMS……District Health information management.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Globally measles remains a major cause of morbidity and mortality, especially in young children under 5 despite the existence of a safe and effective vaccine (Melissa, et al., 2016). Measles virus is the etiologic agent of measles and highly contagious and vaccine preventable illness according to Melissa, et al., (2016). They continued that measles result in a systemic illness which causes profound immune suppression often leading to severe complications. Globally, there have been 134,200 measles deaths -about 367 deaths every day or 15 deaths every hour (WHO, 2015).

The World Health Assembly (2010) declared that measles can and should be eradicated. They indicated that significant progress has been made via increased global coverage of first and second doses of measles – containing vaccine, leading to a decreased in global incidents of measles and through improved case based surveillance. By the end of 2016, 85% of children should have received measles 1 and by their second birthday through routine health services-up from 73% in 2000. Two doses of the vaccine are recommended to ensure immunity and prevent outbreaks, and 164 countries had included a second dose as part of routine immunization, and 64% of children received second doses of measles vaccine according to National immunization schedules (WHO, 2016).

The current Global incidence of measles is 36 cases per million populations, down from 146 cases per million populations in 2000 (Patel, et al., 2016). Measles incidence declined by 75% compared to 2000 and in 2015, 109 countries achieved an incidence of less than 5 case per million populations (Perry et al., 2016, Srebel, 2016). According to Patel and et al., 2016, the

incidence varies by WHO region; the African, Eastern Mediterranean and European regions reported increased incidence in 2014 to 2015 due to large measles outbreaks. Each region per number of reported cases were 98,621 (incidence of 100 per million) for the African region, 423 (0.6 per million) for the region of Americans, 21,335 (33 per million) for the Eastern Mediterranean region, 25,974 (31 per million for the European region, 29,109(17 per million) for the south- East Asian region and 65,176 (35 per million for the Western pacific region. It is only the regions of Americas verified the elimination of measles 2016, demonstrating the feasibility of elimination in low and middle- income countries (WHO, 2016, Pan American, 2016).

Measles still remain one of the leading causes of death among children under five (5) years in some developing countries especially parts of Africa and Asia, more than 95% of measles deaths occur in low per capital income Nations (WHO fact sheet, 2017). In the Africa region, although the total number of cases has fallen, some countries still have large outbreaks that include Angola, Ethiopia and Somalia (Akalu, 2015). The latest country on outbreak been Guinea, on 25-02-2017 measles epidemic was declared in fourteen of the 38 health districts in Guinea(Government of Guinea report 2017). Between February and April 2017, a cumulative of 4800 and 4893 suspected cases including 17 deaths with case fatality rate of 0.4% were reported (WHO, 2017). Though there are still some cases occurring in parts of the region there is some tremendous reduction. The successes made to reduce measles death in Africa need to be maintained if not improved upon in order to avoid outbreaks. The significant decline in measles deaths in Africa was made possible by the firm commitment of national governments to fully implement the measles reduction strategy, which includes vaccinating all children against measles before their first birthday through routine health services and providing second opportunity measles via mass vaccination campaign (WHO/UNICEF REPORT, 2007).

Ghana has not reported any confirmed death from measles since 2003, however focal outbreaks are reported in a number of district every year (GHS, 2014) In this same year, a total number 1,039 suspected measles cases were confirmed, reported in 179 (82.8%) district(GHS, 2014). Five districts in 3 regions: N/R, W/R and BA had outbreaks in the first quarter of 2014. 3 out of the 5 were in N/R (GHS, 2014). In 2014, during the outbreak, 43 suspected measles cases were reported and 21 were confirmed positive.

Vaccination is one of the major interventions put in place in Ghana to achieve good health by either through preventive or curative measure for children and their mothers to ensure their growth and development. Measles was targeted for elimination by 2015.The measles vaccine has been in use for over 50 years. It is safe, effective and inexpensive. It costs approximately one dollar to immunize a child against measles and children are vaccinated free of charge in Ghana and yet some children receive measles 1 and are denied of measles 2 vaccination (DHIMS, 2016). This study seeks to determine the factors leading to measles1 and measles 2 gaps in the Sagnerigu district of northern region of Ghana.

1.2 Problem Statement

The WHO strategic advisory group of experts on immunizations (SAGE) concluded that the 2015 global milestone and measles elimination goals were not achieved because immunization coverage gaps persist (WHO, 2016). Outbreaks of measles have been reported over the past 5 years, particularly affecting children between the ages of 1 and 5 years (Herrera, et al., 2015).

According to Ghana demographic report (2014), Ghana did not improve on the percentage of children that received all the basic immunization (BCG, measles, and polio among others).

In 2014, the national coverage for measles-1 and measles-2 vaccination were 88% and 62% respectively as against 95% targeted by WHO for all antigens (WHO factsheet, 2016).The

implication of measles 1 and measles 2 vaccination are: It will provide benefit if the child was a poor responder to the 1st dose, 2nd dose is necessary if a child is indigenous to a high-risk area for developing measles. Some children will develop normal antibody titers in response to the initial dose of Measles, Mumps, and Rubella (MMR) vaccines and develop higher antibody titers after the 2nd dose of the vaccine. If children miss routine vaccination and are not reached the vaccination gap would not close. Ghana could not meet the WHO vaccination target of 95%. Measles outbreak will happen if there are gaps in vaccination. The situation in Sagnerigu District in 2016 as far as coverage for measles-1 and measles-2 were 93% and 65% respectively resulting in a gap of 28% (DHIMS, 2016). In order to contribute to the overall poverty reduction in Ghana as one of the goals of the government and help achieve the SDG 3, there is the need to decrease the magnitude of vaccine-preventable diseases through immunization as an essential component of Primary Health Care. Hence the need to investigate the factors that are associated with the coverage gap between measles 1 and measles 2 vaccinations in the Northern Region, a case study in Sagnerigu district.

1.3 Research Questions

1. What are the demographic and socio-cultural factors contributing to vaccination coverage gap for measles 1 and measles 2 among under-five children in the Sagnerigu District?
2. What are the economic factors contributing to vaccination coverage gap of measles 1 and measles 2 among under-five children in the Sagnerigu District?
3. What is caregiver immunization related knowledge and attitude that influence measles 2 vaccination schedule for under-five children in the Sagnerigu district?
4. What is the association between the factors and vaccination coverage gap of measles 1 and measles 2 among under- five children in the Sagnerigu District?

1.4 Study Objectives

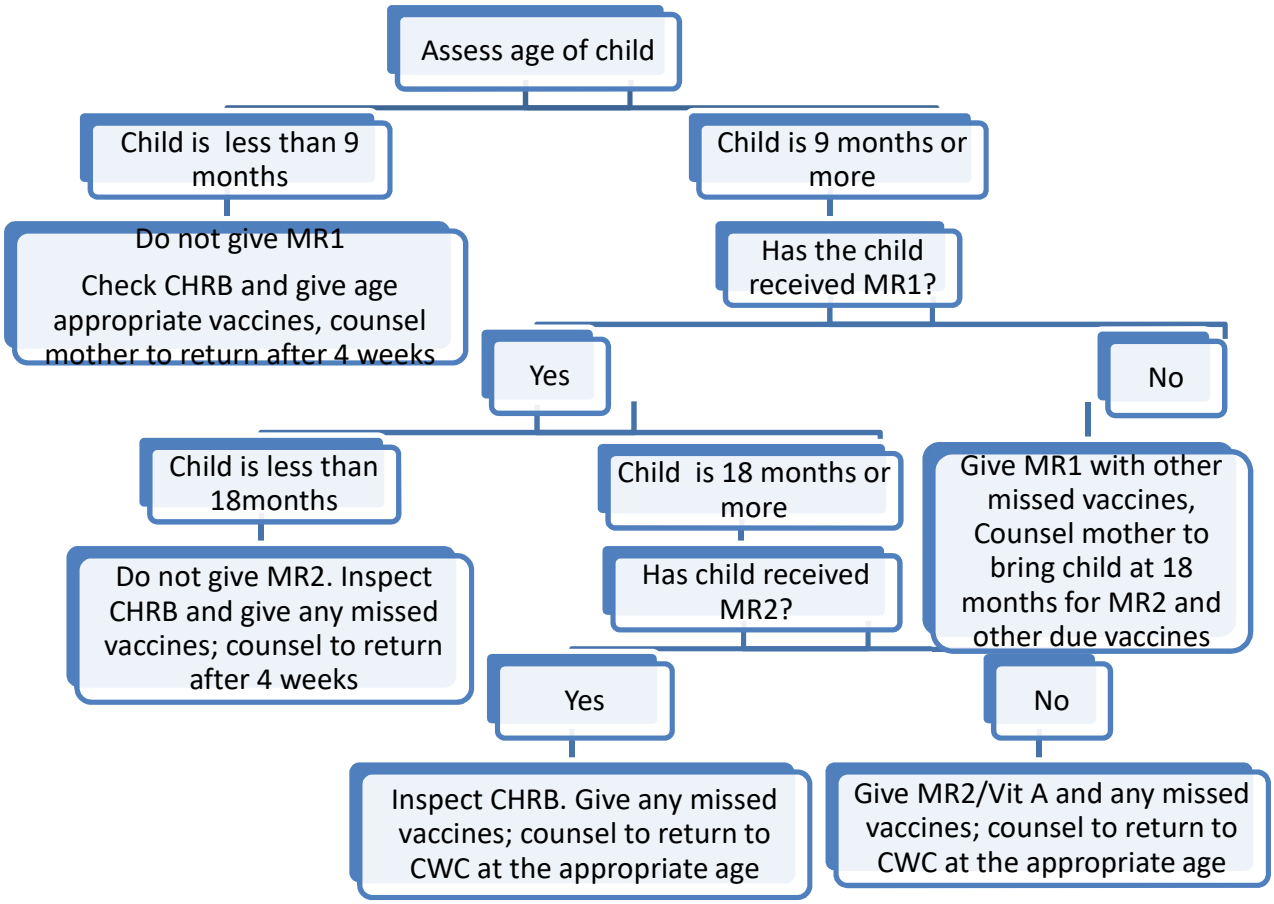
1.4.1 Main Objective

The main objective of the study was to investigate Factors associated with coverage gap of measles 1 and measles 2 vaccination using Sagnerigu District as a case study.

1.4.2 Specific Objectives

1. To assess demographic and socio-cultural factors contributing to vaccination coverage gap for measles 1 and measles 2 among under-five children in the Sagnerigu District.
2. To determine the economic factors contributing to vaccination coverage gap of measles 1 and measles 2 among under-five children in the Sagnerigu District.
3. To evaluate caregiver immunization related knowledge and attitude that influence measles 2vaccination schedule for under-five children.
4. To identify the association between the factors and vaccination coverage gap of measles 1 and measles 2 among under- five children in the Sagnerigu District.

Figure 1.1 A CONCEPTUAL FRAMEWORK FOR MEASLES IMMUNIZATION SCHEDULES



Source: National EPI Presentation, 2016

The Conceptual framework explains the routine immunization schedule for assessing children less than five (5) years for measles and other antigens. The vaccine is given according to age and a regular visit of four (4) weeks interval respectively for other services. A mother or care-taker brought a child to the child welfare clinic (CWC) session. The child is assessed whether he/she is less than nine (9) months. If the child is less than nine (9) months do not give measles 1 but check the Child Health Record Book and the appropriate vaccine, counsel the mother to return in four (4) weeks' time. A child who is nine (9) months and above, check or ask the mother

whether the child has received measles 1 and if ***yes*** is the child less than 18 months. A child less than 18 months is not given measles 2 but rather check from Child Health Record Book whether he has missed any antigen if yes give the appropriate vaccine and counsel mother on the next visit after four (4) weeks. A child is 18 months check from the Health Record Book or ask the mother if the child has received measles 2 if ***no*** give measles 2 inspect and add any missed vaccine, counsel the mother to return after four weeks. Finally, if a child is 18 months but did not receive measles1 give alongside with other missed vaccine counsels the mother to bring the child after four weeks for measles 2. Considering the above narrated procedure, if a child should missmeasles 2 it means there is a problem that needs to be identified and for the right agencies and departments to take the necessary actions.

1.5 Justification for the Study

The WHO strategic advisory group of experts on immunization (SAGE) concluded that the 2015 global milestone and measles elimination goals were not achieved (WHO Fact sheet 2016) SAGE recommended an increased focus on improving immunization system in general to ensure that the gains made so far in measles control can be sustained.

The research seeks to assess the vaccination coverage of measles 1 and measles 2 among children and, find out possible reasons that might account for that. Again, the findings of the study will be used as a confirmatory evidence to either support previous reports given by the district health administration on measles or identify differences and suggest corrective measures accordingly. The study will inform the DHMT, policy makers, funding agencies and other stakeholders on the management tools to employ to increase coverage and reduce the incidence of vaccine preventable diseases in our societies. The research will set a platform for which

further studies can be conducted for the purpose of improving coverage of vaccination of measles. Finally, monitoring and evaluation can be done by making reference to the outcome of this study by comparing the findings to a given standard and making inference to the entire population.

1.6 Study Limitation

Most of the respondents were illiterates and as a result, the research student had to read the questionnaire and as well do interpretations with the help of key informants in some cases in order to obtain the required information. This limitation however led to time constraints. Two months was initially allocated for the study which proved after the two months to be inadequate for me to collect data of this sort within such a limited time.

A limitation that one must not lose sight of is poor finance. Poor financing on the part of the student due to extra cost incurred in feeding, health and printing of relevant secondary data.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

A literature review is an organized written presentation of information on a topic that has already been published by scholars. The purpose of the literature review was to convey to the reader what is currently known regarding the topic of interest (Burns & Grove, 2005). In view of the fact that immunization coverage data serves as an indicator of a health system's capacity to deliver essential services to the most vulnerable members of a population, various research studies have been conducted using completed immunization surveys.

2.1 Overview of Measles

According to a WHO report (2011), it was estimated that, in 2008, measles caused between 117,000 and 164,000 child deaths throughout the world. According to the Namibia Demographic and Health Survey report of 2006 – 2007, immunization coverage in Namibia has remained below 90%. Data that were obtained from a study that was conducted in Namibia during 2006 (Ministry of Health and Social Services and Macro International Inc., 2008) revealed that 83% all children between the ages of 12 and 23 months had been immunized against measles. The study also indicated that, in the Kunene region, the measles immunization coverage was 60% and in the Opuwo Health District 40% – less than Taapopi's (2002) finding of 68%.

It is possible to ascertain the measles immunization coverage by using various demographic and socio-economic characteristics of parents and caretakers of children, their perceptions and beliefs as well as their lack of motivation, lack of information and negative experiences regarding

immunization. Population immunity assessment is key to determining progress towards elimination of measles as advised by World Health Organization (WHO, 2011).

2.3 Modifying variables

This refers to those variables that may modify the perceptions regarding immunization. These variables include, among other things, level of education, age of parents, ethnicity, gender, culture, accessibility to immunization services, transport, information, motivation of parents/caretakers regarding immunization, past experiences of parents on immunization and health facility related problems. These variables that influence personal perceptions are all individual characteristics and are discussed below:

2.3.1 Level of education of parents/caretakers and immunization

Several studies have found that education plays a vital role in the decision to access health services as well as the decision to immunize children with low levels of education being associated with lower immunization coverage. This was also the finding in a study which was conducted in the Democratic Republic of Congo. The study indicated that the educational level of the father and the mother's knowledge of the Expanded Programme of Immunization (EPI) were significant factors as regards to the immunization of their children (Mapatano, Kayembe, Piripiri, &Nyandwe, 2008). The educational status of the parents was found to be the most significant factor as regards to the immunization status of children in rural Nigeria (Odusanya, Alufohai, Meurice, &Ahonkai, 2008).

Another study reported that, in general, a similar pattern existed throughout Africa. Thus, the specific implication of these findings is that the better educated the parents the better the immunization status of their children (Ministry of Health and Social Services and Macro

International Inc., 2008). A study conducted in the Outapi district in the Omusati region in Namibia revealed that, despite the fact that many parents had attained primary through to tertiary education, immunization coverage was less than 80% (Shikongo, 2010). A study conducted in peri-urban Karachi in Pakistan found that the educational status of parents were significantly associated with the immunization status of their children with 50% of non-immunized children being more likely to have an illiterate father only, 71% of partially immunized children being more likely to have an illiterate mother only and more than four times as likely to both an illiterate father and an illiterate mother (Siddiqi, Khan, Nisar, &Siddiqi, 2007).

A similar study conducted in Malawi revealed that the educational level of the mother is an important determinant of immunization status of the child. In 2004, 84% of the children whose mothers had a secondary and higher level of education were fully vaccinated compared to 55% of the children whose mothers had had no education (Munthali, 2007).

A study conducted in Mozambique found that low educational level on the part of mothers was strongly associated with low vaccine uptake (Jani, De Schacht, Jani, &Bjune, 2008). Another study conducted in Nairobi, Kenya found that the mothers' level of education was associated with vaccination of their children with mothers with primary or higher level education being more likely to have children who were fully vaccinated (Mutua, Kimani-Murage, &Ettarh, 2011).

Educational background has also been found to be a factor in non-African countries and, in India, it was reported that most of the non-immunized children were the sons and daughters of illiterate mothers (Sharma, Kumar, Goel, &Mangar, 2008). However, it emerged from the literature that, even in "developed countries", the level of education of parents was a factor as regards the immunization of children. In Japan, Matsumura, Nakayama, Okamoto, & Ito (2005)

found that the mothers of non-immunized children possessed insufficient knowledge about immunization of children while a study conducted in Austria indicated that low measles vaccination coverage is directly associated with the educational level of the fathers (Stronegger&Freidl, 2009).

2.3.2 Age of parents and immunization

A studies conducted in Africa found that the age of mothers, guardians or caretakers did not significantly influence the vaccination status of the children as there was no apparent difference between those children who were fully vaccinated and those who were either partially vaccinated or not vaccinated (Taapopi, 2002).

In Japan it was found that the main characteristics of mothers of unvaccinated children included the mothers being aged younger than 30 years, working and concerned about the adverse events of the vaccine (Matsumura et al., 2005). A study conducted in Kinshasa, Democratic Republic of Congo, found that the age of the mother, whether young or old, did not influence the immunization status of the child (Mapatano et al., 2008). Mutua et al. (2011) found that in Nairobi, Kenya, maternal age was a strong predictor of the vaccination status of children with older mothers being more likely to have children who were vaccinated as compared to mothers who were aged less than 20 years and whose children were not vaccinated

2.3.3 Ethnicity and immunization

The ethnic group of mothers may also be a factor associated with the immunization status of children. A study conducted in the Opuwo Health District in the Kunene region by Taapopi(2002) found that more children in the Himba tribe were either partially vaccinated or not vaccinated, as compared to the children in other tribes such as the Hereros, Vambos and

Zembas. The Himba community is a traditionally nomadic tribe in Namibia and similar to the nomadic population in the Henan province of China (Taapopi, 2002). A study conducted in China found that immunization coverage of children in a nomadic population was less than 60% while the overall coverage with four kinds of vaccines was 32% only (Guo&Feng, 2000).

In the urban slums of the luck now district in India, it was found that the Muslim religion, scheduled caste or tribes and high birth order were significantly associated with the partial immunized status of children (Nath, Singh, Awasthi, Bhushan, Kumar, & Singh, 2007). Another study conducted in Nairobi, Kenya found that ethnicity was significantly associated with the vaccination status of children with the children from the Luhya, Luo and other ethnic groups having a lower likelihood of vaccination as compared to Kikuyu children (Mutua et al., 2011).

This study intends to establish whether this finding is same as the caseof the study area in view of the many interventions involving health education, outreach services and improved service delivery.

2.3.4 Birth order and immunization

Researchers have also found that birth order may be one of the factors affecting the immunization status of children. In other countries it has been shown that there is a strong association between immunization status and birth order with children born into larger families having a low vaccination uptake and first-born children being more likely to be immunized on time than second-born children. A study conducted in Malawi found that the vaccination coverage among the first-born children was higher than those who were born later – 79% of the first-born children aged 12 to 23 months had been fully vaccinated as compared to 58% of the children who were sixth or above in the birth order (Munthali, 2007). Matsumura et al. (2005)

reported the same findings in Japan, namely, that children who had not been vaccinated were often not the first born.

These findings have been recorded from outside Ghana and, most especially, in settings very different to Sagnerigu District, in particular, and the Northern region in general. Accordingly, this study seeks to establish whether the effect of birth order, as proved elsewhere, is valid in Sagnerigu District and in the Northern region.

2.3.5 Gender of the child and immunization

The literature also discussed the effect of cultural factors on immunization. Research conducted in Chandigarh in India indicated that measles coverage is lower in female children than in male children – 56% versus 63.5%. The study indicated that, as a result of cultural beliefs that males are more important than females; female children were not taken care of in the way that male children were (Sharma et al., 2008). However, a study conducted in Malawi revealed that there was no difference between the vaccination coverage of male children and the vaccination coverage of female children (Munthali, 2007). In addition, a study conducted in a rural setting in Mozambique by Jani et al. (2008) did not find any significant difference in the gender of children with respect to children with either complete or incomplete vaccination status.

A study conducted in Surat, India, found that the sex of the child was associated with child immunization because, when the two genders were compared, the proportion of fully immunized children was higher in females (27%) than in males (23%). These results indicated a welcome change as regards the caring for female children in India and may be contrasted with the findings of the study conducted in 2008 by Sharma et al. (Trivedi, Mundada, &Chudasama, 2009).

In view of the fact that studies conducted in both African and non-African countries have shown that the gender of a child is not associated with the immunization of the child except in India, this study intends to establish whether this finding is also valid in the District in question.

2.3.6 Financial support and immunization

The issue of financial support to the mothers by partners and other family members to enable the mothers to access vaccination sites is also discussed in the literature as most of the mothers of children are either housewives or unemployed. A study conducted in Kinshasa, Democratic Republic of Congo, found that the father's involvement was associated with the child's vaccination status in the high coverage zone with fathers either providing transport fare or accompanying the mothers to the vaccination sites (Mapatano et al., 2008).

In Mozambique, Jani et al. (2008) found that mothers were often motivated in children's immunization, they understood the benefits of immunization and they were willing to walk long distances to access health care. In view of the fact that the majority of the mothers in the study were peasant mothers with no formal income, the money for the travelling costs must have come from other family members or alternative sources. The study also found that the level of incomplete vaccination status was high as a result of the difficulties experienced in accessing the health facility as the population settlements were more dispersed (Jani et al., 2008).

A study conducted in Pakistan found that, in many cases, poverty constituted a barrier to vaccination as the parents were often not able to afford the costs of the supposedly "free" immunizations with the travel costs, opportunity costs, and demands for unofficial payments (Cockcroft et al., 2009). A study conducted in Nairobi in Kenya revealed that financial barriers

among the socio-economically disadvantaged groups were significantly associated with the vaccination status of children (Mutua et al., 2011).

2.3.7 Transport and immunization

The transport to health facilities is one of the factors associated with low immunization coverage. A study conducted in the Opuwo Health District in Namibia by Taapopi (2002) found that accessibility to health facilities was associated with immunization status. The study found that 21% of the mothers whose children were partially vaccinated and 17% of the mothers whose children were not vaccinated lived far from health facilities and had no access to transport. Another study conducted in difficult to reach areas in the Lagos metropolis found that obstacles such as the nature of the mothers' busy work schedules, the long distances to outreach clinics and the unavailability of transport to access vaccination centers were associated with low immunization coverage with these accounting for 48% of non-immunized children of the cases studied (Adeiga et al., 2005). Another study conducted in rural Mozambique showed that distance to health facility and spending more than hour to reach the nearest health facility had a negative influence on the immunization uptake with 52% mothers interviewed during the survey living far away from the nearest health facility (Jani et al., 2008).

2.3.8 Lack of information about immunization

Lack of information about immunization may also be a factor affecting the immunization coverage. Mothers and caretakers may be unaware of the need for follow up visits and also unaware of the need for their children to be vaccinated. A study conducted in the Opuwo Health District identified the lack of information as one of the factors associated with child vaccination (Taapopi, 2002) while a study conducted in the difficulty in reaching areas of the metropolis of

Lagos revealed that the lack of information about the details of vaccination programmes contributed to approximately 41% of the failures either to receive or complete the required vaccinations (Adeiga et al., 2005).

The lack of knowledge regarding the subsequent vaccinations was also found to be one of the reasons for the partial immunization of 10% of children in the Lucknow district in India (Nath et al., 2007). In Karachi, Pakistan it was found that approximately 14% of the mothers had children who had not been vaccinated appropriately as a result of the fact that the mothers possessed inadequate knowledge of the immunization schedules (Siddiqi et al., 2007).

A study conducted in rural Nigeria showed that there was a significant correlation between the mothers' knowledge of immunization and the rate of full immunization (Odusanya et al., 2008). Trivedi et al. (2009) reported that a lack of information (place, time, date, etc) among the parents in Surat, India was one of the major causes of dropouts from the vaccination programme. The study further reported that an unawareness regarding the need for routine immunization was the main reason for children not being vaccinated.

In both the Democratic Republic of Congo and Mozambique most mothers recognize the health workers as the major source of information about immunization and mothers trust these health workers (Mapatano et al., 2008; Jani et al., 2008).

2.3.9 Lack of motivation regarding immunization

The literature also discussed a lack of motivation as regards to immunization as one of the factors associated with the immunization status of children. A study conducted in the Opuwo district in Namibia found that 54% children were partially vaccinated and 30% were not vaccinated as a result of inadequate motivation. Mothers and caretakers were willing to have their children vaccinated but, in view of the fact that they did not understand the benefits of

vaccination, they tended to postpone taking their children for vaccinations and, thus, the children's opportunity to be vaccinated were lost (Taapopi, 2002). Adeiga et al. (2005) reported that lack of motivation was one of the reasons advanced by mothers in Lagos, Nigeria for their failure either to vaccinate or complete the immunization of their children with a lack of motivation accounting for 12% of the reasons for failing to immunize.

Children missed being vaccinated because mothers had not been educated about the importance of immunization during the antenatal period. In the Lucknow district in India it was found that 16% of mothers had no faith in the effectiveness of vaccination and were often apprehensive as a result of sickness on the part of the elder sibling (Nath et al., 2007). Siddiqi et al. (2007) found that mothers in peri-urban Karachi in Pakistan had refused to allow their children to be vaccinated as a result of a lack of motivation with 33% of mothers perceiving vaccination as unnecessary, 26% reporting child sickness on the due date, 26% maintaining that the vaccine made their children sick and 10% considering that their children were too weak to be vaccinated.

2.3.10 Negative experiences as regards immunization

Negative experiences as regards immunization may be one of the factors associated with low immunization coverage. Yawn et al identified fear of side effects as an important factor for under immunization when they conducted a study in an affluent community in the United States of America. In other countries such as Malawi, Ethiopia, Bangladesh, the Philippines, India and the Democratic Republic of Congo it emerged that mothers understood the side effects of immunization with some mothers viewing them as a normal occurrence, some expecting them to disappear anyway and others seeing in them a sign that the vaccine was working (Mapatano et al., 2008).

Taapopi (2002) found that another contributing factor to low immunization coverage was the possible reaction of children to vaccinations, including fever, pain on the injection site and irritability. However, adverse reactions may discourage mothers from immunizing their children simply as a result of a lack of understanding. Both qualitative and quantitative studies conducted in Pakistan cited fear of the adverse effects of vaccination as a reason for children not being vaccinated. Among those mothers (43%) who had heard of possible bad effects, many mentioned the actual side effects of vaccination, including fever and also pain and swelling at the vaccination site, while others mentioned fears and misconceptions about the side effects including the fact that the child may either die or become sterile as a result of having been vaccinated (Cockcroft et al., 2009)

Accordingly, this study is intended to establish whether the findings regarding the fear of adverse effects which proved significantly in Namibia, the USA and Pakistan are valid in the Sagnerigu District or not.

2.3.11 Health facility related problems and immunization

The factors affecting immunization status that emerged from some of the older studies tended to be more logistic and administrative in nature. More recent studies, however, have also continued to support the findings that logistic and administrative problems may prevent an optimum immunization status in children. In this regard a study conducted in the Democratic Republic of Congo indicated that health system factors such as health services barriers have a detrimental effect on immunization programmes (Mapatano et al., 2008).

A study conducted in Namibia found that health facility related problems influenced immunization. Some children were brought to the clinics but were not vaccinated either because the clinics were closed or because there was no vaccine available at the clinic. On the other hand,

other children were brought to the clinics for treatment but their health passports were not inspected by the health workers and, thus, they missed the opportunity to be vaccinated (Taapopi, 2002). A study conducted in rural Mozambique identified reasons for incomplete vaccination that were associated with health services delivery as the following: long waiting times for vaccination, no personnel on duty at the health facilities, no vaccines available on the days required, no information about the correct days for vaccination, and vaccinations not given as a result of the children being ill (Jani et al., 2008).

2.3.12 Interface with health care

The interaction which a parent or head of a family has with the health care provider is an important determinant of health decision making. Studies investigating the acceptability of vaccines have noted that advice from a physician/health worker about a vaccine may play a significant role in the parents' final vaccination decision (Dinh, Rosenthal, Doan, Trang, & Pham, 2007). For example, Gust, Darling, Kennedy, & Schwartz (2008) found that, for those parents who were resistant to vaccinating their children or who delayed vaccination, the advice of a physician was the main factor that would change their minds.

2.3.13 Personal/parental beliefs related to vaccination

The personal beliefs of parents hold vaccines, the process of vaccination and adverse reactions and immunity may affect the way in which they view the risks pertaining to their vaccination choice, how they view their children's susceptibility to disease and the effects the vaccination may have on their children.

Anthropologist Emily Martin conducted a study that investigated the way in which the American public viewed the immune system. Among her conclusions she found that the way in which the

public conceptualizes the immune system and how it works differs dramatically from the scientific understanding of immunity. In addition, she found that the public is somewhat conflicted about vaccination as a result of the way they perceived the impact of vaccination on the immune system. Vaccines were generally believed to have the effects of training or educating the immune system while, at the same time, they may compromise to an immune system that should be able to fend off disease if a person concerned were healthy (Sturm et al., 2005).

2.3.14 Advice for parents

Parents make the decision about whether or not to vaccinate their children after reasoning for themselves the risks and benefits of vaccination. The Center for Disease Control (CDC) provides guidelines to parents for considering vaccinations of children by offering the following recommendations:

Before making a decision, parents/caretakers should review the information on vaccination while taking into account the components of the vaccine, the side-effects of vaccination, the duration of the immunity provided and number of shots needed to ensure immunity. When seeking information about vaccination online, they should verify that the information comes from a valid source. It is also important to talk to the health worker (doctor or nurse) about the benefits and risks of vaccines and about adverse reactions to vaccines. In addition, parents/caretakers should alert the health worker should the child have any allergies or sensitivities to the vaccine components; and also should the child be either moderately or severely ill. Parents/caretakers should also report any adverse reactions experienced after vaccination.

Although these models provided a significant direction and focus to perceptions, the researcher was, nevertheless, aware of the inherent limitations in these models, including a failure to take into account factors such as the environment, economics and also social norms in the form of

peer pressure (Chin et al., 2000). These limitations were taken into account when the literature search, as discussed above, was conducted.

2.4 Summary

In this chapter the researcher (student) discussed current information about those factors that were associated with low measles immunization coverage in both the developed and developing countries. The literature review focused on variables, such as education, age and ethnicity, which may modify the perception of parents and caretakers. It should be noted that all the literature discussed above provided evidence that immunization is one of the best practices that may improve the living standards of the world population and, most especially, of children. However, immunization requires a concerted effort on the part of both the service providers and the beneficiaries of immunization. There remain wider gaps to fill, particularly in the developing countries where resources are minimal and where factors such as culture and other social beliefs are hold away over modern science, as may be the case in Sagnerigu District and in Ghana in general.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the research methodology that was used to conduct the study. The outline is study design, study population, sample size and sample procedure, research instruments, data collection procedure, quality control, data analysis and ethical considerations.

3.1 Profile of the Study Area

Sagnerigu is one of the six (6) newly created districts in the Northern Region in the first half of 2012. It was carved out of the Tamale Metropolis by Legislative instrument (LI) 2066. It was inaugurated on 24th June, 2012. One of the reasons for the creation of the district was to redirect development projects to the communities north and west of the metropolis (now sagnerigu) which were relatively less developed as compared to the urban areas in the Tamale Metropolis. The Sagnerigu has 79 communities, comprising of 20 urban, 6 peri-urban, and 53 rural areas. The district covers a total land size of 200.4km2 and shares boundaries with the Savelugu-Nantong Municipality to the North, Tamale Metropolis to the south and east,Tolon District to the west and Kunbungu District to the north-west. Geographically, the district lies between latitudes $9^0$16’ and $9^0$34’ north and longitudes 0^0 57’ west. The Tamale airport, which is now the gateway to northern Ghana is located approximately 14 kilometers from downtown Tamale and located within the boundaries of Sagnerigu District. The airport is mainly used for national and current regional scheduled flights between Tamale, Accra and other cities in Ghana as well as the capital cities of some West African countries. Public transportation by taxi is one of the most convenient means of getting around the district. However, the most popular means of transportation for the

local people is the motorbike. Transportation out of the district to the adjourning towns and districts is, however, largely facilitated by the private mini-bus system (trotro) and the metro mass transport system. A few of the roads in the district are fairly good. However, many rural roads are in deplorable state and in need of resurfacing and reconstruction. Most of the farming and peri-urban communities are linked to the market centers by feeder roads (DHIMS, 2016).

The Economy of the people is largely subsistence with Agriculture being their main occupation. Over 80% of the people depend on Agriculture for their livelihood. Other economic activities include weaving, agro-processing (Shea butter extraction), meat processing, fish mongering, whole sale and retail sales of general goods, transportation and many others. These activities are on a medium and small scale. The potential of the district in Agriculture is enormous. The land is suitable for the cultivation of cereals, tubes and rearing of animals. Animals reared include cattle, goats, pigs and poultry birds for domestic and commercial purposes. A good number of the populace is engaged in small scale manufacturing business. They include smock weavers, blacksmiths, bakers, mechanics, Shea butter extraction and groundnut oil extraction (DHIMS, 2016).

3.1.1 The District Health Care System.

Health services in the district are managed at three (3) levels:

1. District Health Administration
2. Sub-district level
3. Community level

At the district health administration, the District Health Management Team (DHMT) is responsible for overall planning, monitoring, supervision, evaluating, training, co-coordinating of all health programs in the district. It is also responsible for conducting operational research and linking up with other agencies and NGOs in health provision and promotion. The District has been divided into six (6) sub-districts, each with management team known as Sub-district Health Management Team (SDHMT). The district has 22 facilities and out of the 22 facilities they have 5 private hospitals And 5 Community-Based Health Planning and Services (CHPS) the rest are health centers (DHIMS, 2016).

3.2 Research Design

A research design maximizes control over factors that may interfere with the validity of a study finding whilst guiding the investigation in planning and implementing the study in a way that is likely to achieve the intended goal (Obimbo, 2013). The study will employ descriptive cross sectional study design. The study will also employ both the qualitative and quantitative research approaches. This mixed approach was used to come out with rich data that will represent a wide range of responses by capturing the best of both quantitative and qualitative outcomes. The study was a non –interventional study.

3.3 Research Population and Sample Size Determination

The target population for this study will comprise key informants (the health facilities in charges, mother support group) and mothers/caregivers who were available at the time of the research. A target of (383) study population was used for the study. This study sample was assumed by the use of COCHRAN Formula. In 2016, Sagnerigu District coverage for measles1 and measles2 were 94% and 60% respectively resulting by a gap of 34% (DHIMS,2016).

N = $\frac{Z^2Pq}{d^2}$ where N = sample size, Z = standard number distribution which is =1.96, p= prevalence rate in the population=26.5% (the gap), q=1-p and d =degree of accuracy/desired error of margin which is 0.05

$$N = \frac{(1.96)^2 \times 0.265 \times 0.735}{(0.05)^2}$$

$$\frac{3.8416 \times 0.19478}{0.0025}$$

$$\frac{0.74825}{0.0025} = 299.3 \approx 300$$

3.4 Sampling Technique

Simple random sampling for quantitative data and purposive sampling technique for qualitative data was used to sample the study participants for the study. This sampling technique was chosen because of the nature of the vaccination (regular cases at the health centers).

3.5 Data Collection Tool

This research uses qualitative and quantitative methods. Qualitative data was collected through key informant interview, and a structured questionnaire which will have both closed and open-ended questions was used in this study to collect the primary data. This idea of using questionnaire was considered because it can be administered to a large number of study participants concurrently with uniform instructions and explanations. Also, the fact that the study participants were able to complete the questionnaire in a confidential setting will diminish possible bias. The questionnaire was designed in line with the study objectives as impetus for

enhancing the study validity, and this was strengthened by the systematic flow of the study as a mark of reliability. Too much information will not be given to prevent attrition that will possible introduce bias. Study subjects selected may drop out of the study becoming impatience if too much information is sought. Subjects were allowed to attend to crucial issues first those with personal transient factors such as wanting to solve pressing issues was inconvenienced.

3.6 Data Collection Processes

Threats on internal validity were reduced by interviewing the subjects at one point in time and in the mornings only. The number to be interviewed per day was from one to ten. The researcher took 15 to 20 minutes per subject during 2 hours of interviewing subjects per day.

The researcher took into account the unforeseeable problems that could interfere with implementation of data collection plan. Such as institutional changes, resistance from health staff and lack of experience in data collection technique, all these were managed well.

3.7 Sources of Data Collection

Data was gathered from both primary and secondary sources. Primary data was obtained using a structured questionnaire. Copies of the questionnaire were administered by the researcher. Secondary data was obtained from reliable records and related literature, such as books, journals and internet articles. Data triangulation was ensure by using different data collection methods, namely, field note taking, interview and validating the findings through discussions with key health workers.

3.8 Data Analysis and Presentation

The data that was collected from the field, was collated, sifted through and edited in order to address questions that will have been answered partially or not answered by respondents. After editing, the open-ended questions were coded (that is, the assignment of numbers or codes to responses to make them easy to identify certain themes). Quantitative data was entered manually in to the computer and analysis done using Statistical Package for Social Sciences (SPSS) version 20.0 for the final analysis. Before performing the desire data transforming, the data was cleaned by running consistency checks on every variable. Corrections were made after verification from the questionnaire and the database was generated. The data was analyzed using basically descriptive statistics involving mainly frequency distributions and cross tabulations.

3.9 Scope of the Study

The study covers only issues regarding the coverage of measles vaccination in the Sagnerigu district. The research will also look at factors that contribute to the gap in the coverage of vaccination of measles 1 and measles 2 among children in the Sagnerigu District in the Northern Region of Ghana.

3.10 Organization of the Study

The research work was organized into six chapters: chapter one contains the background to the study, the problem statement, objectives of the study, research questions and justification of the study. Chapter two focuses on the literature review whiles chapter three will deal with the research methodology which focuses on introduction, study design, study population, sample size, sample techniques, data collection instruments, data analysis and ethical consideration and chapter four presents the data analysis and discussion of the results. Chapter five focuses on

discussions based on the results in chapter four and chapter six comprises the conclusion and recommendations of the study.

3.11 Ethical Consideration

An introductory letter was obtained from the University for Development Studies and send to the regional health directorate for approval before the commencement of the research work. Participant consent was sort for. Research involving human subjects should always be guided by good clinical practice and human right principles to ensure protection of study participants. Some of the ethical responsibilities of the research were to maintain privacy, informed consent-ensuring that there is voluntary participation, protection of study participants, informing study participants what the study is for, how information was used and whether there is any potential risk expected.

CHAPTER FOUR

PRESENTATION OF RESULTS AND ANALYSIS

4.0 Introduction

This chapter deals with the analysis and discussion of results. The analysis was based on data gathered from the questionnaires administered to examine the factors associated with coverage gap of measles vaccination in Sagnerigu. The results are presented in accordance with the objectives of the study. The presentation begins with the socio-demographic profile of the respondents.

4.1 Demographic Information

This section of the study presents the results and discussion on demographic findings. Since research comprised more of qualitative or descriptive element, the researcher made use of categorization of data collected under suitable headings in a tabular form to show the flow of information. The demographic characteristics of the respondents include major occupation, estimated monthly income and others that were relevant to enable the researcher make analysis and recommendations. Not only that, it also included demographic information of children. The results are presented below.

Table 4.1a Demographic information of respondents

Variables	Response	Frequency	Percentage
Respondent's age	15-20	20	6.7
	21-25	74	24.7
	26-30	106	35.3
	31-35	55	18.3
	36-40	36	12
	41 and above	9	3
Marital status	Single	11	3.7
	Married	286	95.3
	Divorced	3	1
Relationship with child	Mother	289	96.3
	Father	6	2
	Grandparent	3	1
	Sister	2	0.7
Respondent's religion	Christianity	21	7
	Muslim	279	93
Educational level	Illiterate	149	49.7
	Primary	42	14
	JHS	30	10
	SHS	49	16.3
	Tertiary	30	10
Respondent's Occupation	Unemployed	12	4

	Trading	170	56.7
	Housewife	56	18.7
	Farmer	11	3.7
	Others	51	17
Marriage type	Monogamy	105	35
	Polygamy	195	65
Treatment from traditional source	Yes	99	33
	No	201	77
Number of children	1-2	146	48.7
	3-4	111	37
	5-6	39	13
	7 and above	4	1.3
Child record books	Yes	288	96
	Yes but cannot locate it	12	4

Source: Field survey, 2018

Out of the 300 respondents who constituted the sample for this study, 35.3 (106/300) percent of the respondents were within the age category of 26–30 years whereas other group of respondent were within the age category of 21 – 25 years with 24.7% whereas the remaining respondents fell within the age category of 31-35 years, 36-40 years, 15-20 years and 41+ with 18.3%, 12%, 6.7% and 3.0% respectively. Considering the marital status, 95.3% (286/300) were married and 3.7% were still single whiles the least of 1% (3/300) were divorced. Information on relationship with child shows that 96.3% (289/300) were mothers who have much of their times for children and the remaining of 2%, 1% and 0.5% were fathers, grandparents and sisters. The

characteristics of the respondents and their association with religious afflictions, 93% (279/300) were Muslims and the remaining of 7% were Christians.

Educational level was included for the purpose of determining the level of literacy in the study area. Out of the sample 300 respondents, 49.7% (149/300) had no formal education, 16.3% were senior high school leavers and the remaining 14% and 10%were primary, junior high and tertiary leavers respectively. Based on the analysis it was realized that level of illiteracy is so higher in the study communities. Which could be a factor consisting with the coverage gaps between measles 1 measles 2 vaccination.

Another variable was respondent' current occupation. Considering the sample of 300 respondents, 56.7% (170/300) of the respondent were traders, following this were housewives with 18.7%. 17% (51/300) were in other category of employment whilst 4% and 3.7% were unemployed and farmers respectively. Marriage type was considered to determine whether it has any influence on the study topic. It was revealed that, 65% (195/300) practices polygamous marriage and the remaining 35% (105/300) were those in monogamy marriage. Despite the higher rate of illiteracy among respondents, they still rely on hospitals for treatment. 77% (201/300) of the respondent have never relied on traditional source for treatment whiles 33% (99/300) says they have ever rely on treatment from traditional source.

On the aspect of child bearing,48.7 percent of the respondents are in the category of having 1-2 children whereas 37 percent have 3-4 children. Thirteen (13) percent of them also fell in the category of 5-6 children whilst four of them representing 1.3 percent have 7 and above children. Information on child records books shows that, 24.0% (288 respondents) were having the record books whereas 12 respondents representing 4% were not able to trace their children record books.

Table 4.1b Child's Characteristics

Variables	Response	Frequency	Percentage
Gender of child	Male	137	45.7
	Female	161	53.7
	Both, twins	2	0.7
Place of birth	Home	45	15
	Hospital	255	85
Age of child (in months)	1-10	100	33.3
	11-20	123	41
	21-30	32	10.7
	31-40	20	6.7
	41-50	10	3.3
	51 and above	15	5
Birth Order	1st	73	24.3
	2nd	78	26
	3rd	59	19.7
	4th	45	15
	5th	29	9.7
	6th	11	3.7
	7th	5	1.6
Has child taken all vaccines scheduled for first year of life?	Child completed entire schedule	51	17

	Child completed but not according to schedule	91	30.3
	Incomplete vaccination	157	52.3
	Ongoing	1	0.3
Area of residence	Rural	59	19.7
	Urban	241	80.3

Source: Field survey, 2018

Out of the sample 300 respondent, 86% (129/300) children born were males and the rest of the remaining (21 respondents) were females with 14%. Place of birth of children were considered to determine the patronage of mothers in the hospital facilities. It was showed that, (255 children) were delivered at the hospitals with 85% and those that were born homes with 15% (45/300). On the aspect of child age in months, majority of children who were the age category of 11 – 20 months were (123/300) with 41%, following this were those within 1 – 10 month with 33.3% whereas the rest of 21 – 30 month, 31 – 40 month, 41 – 50 month and 51+ were just a few with 10.7%, 6.7%, 3.3% and 5% respectively.

On birth order of respondents' children, it is revealed that 73 respondents appeared to have 1st order representing 24.3%, 2nd birth order has 78 respondents which constitutes 26%, the 3rd birth order has 59 with a percent of 19.7 %, whiles 4th and 5th has 45 and 29 respondents respectively with their percentages as 15% and 9.7% respectively. Furthermore, the birth orders for 6th and 7th carry 11 and 5 responses and corresponding percentages of 3.7 and 16 respectively.

Another variable looked at was the level of child vaccination scheduled covered for their first year of lives. It however reveals that 51 children completed the entire schedule which constitutes

17%, 91 children completed but not according to schedule which, also represents 30.3% of the total respondents. It further prove that 157 children did not complete vaccination with a percent of 52.3% whilst only one child is still in the process (on going) constituting 0.3%. Information on the area of residence of respondents, it is revealed that 59 respondents are from rural settings constituting 19.7% and those from urban centre happen to be 241 with a percentage of 80.3%. This therefore indicates that majority of respondents are in urban and may have a variety of chances to child vaccination.

4.2 Socio-Demographic Information of Respondents

In an attempt to achieve the objectives of the study, information was gathered on socio-demographic variables of the respondents. This was expressed in frequencies and percentages with its respective variables thus; partner's work, nuclear family income level, amount needed for vaccination services and payment for measles 1 vaccination. This is clearly presented in the below matrix.

Table 4.2 Socio-demographic information

Variables	Frequency	Percentage (%)
Partner's work		
Farmer	124	41.3
Teacher	70	23.3
Mason	55	18.3
Other	51	17.0
Nuclear family income level		
Low	126	42
Middle	167	55.7
High	7	2.3
Amount needed for vaccination		
No money needed	157	52.3
GHS 2	39	13
GHS 4	19	6.4
GHS 5	57	19
Other	28	9.3
Payment for measles 1 vaccination		
Yes	11	3.7
No	289	96.3

Source: Field survey, 2018

Out of the 300 respondents who constituted the sample for this study, a total of 124 respondents' partners were engaged in farming representing 41.3% whilst 70 were teachers representing

23.3%. The analysis revealed that respondents whose partner's were masons with only 18.3% and other professions accounts for the least number of responses with 17%.Information on nuclear family income level or wealth status revealed that, of the respondents (55.7%) were in the middle income category, while 42% belong in the low income category and 2.3% being the least represents those in the high income level. Considering how much money was needed for the vaccination service, majority (52.3) % responded that no money is needed for the vaccination service and the rest who needed a token of money such as 2 Ghana cedi, 4 Ghana cedi, 5 Ghana cedi and others were respectively 13%, 6.4%, 19% and 9.3%. There was also another revelation for the payment of measles 1 vaccination. With only 3.7% of the respondents agreed to exchanging money for the first vaccine while 96.3% of the respondents agreed to pay nothing for the vaccine.

4.3 Socio-Cultural Practice of Caretakers regarding child vaccination

This segment of the study presents socio-cultural practices of mothers regarding child vaccination in the Sagnerigu district. Data collection and analysis was mainly quantitative method, matching each variable against its corresponding response by respondent presented in frequencies and percentages. The table below demonstrates various levels of responses by the 300 respondents in the study area in each variable category.

Table 4.3 Socio-cultural practice of caretakers

Variable	Frequency	Percentage (%)
Place of vaccination services		
Hospital	8	2.7
Health centre	265	88.3
Clinic	25	8.3
Other	2	0.7
Health facility been far from house		
Yes	165	55
No	135	45
How far if yes (in meters)		
Less than 300 meters	11	3.7
between 300 and 500 meters	100	33.3
Above 500 meters	54	18
Knowledge of vaccination scheduled days		
Yes	285	95
No	15	5
Means used to send child for vaccination		
By foot	166	55.3
Bicycle	11	3.7
Motorbike	65	21.7
Car	54	18
Tricycle (Yellow Yellow)	4	1.3

Support from family to go for vaccination		
Yes	128	42.7
No	170	56.6
Road network to health centre		
Bad	68	22.7
Very bad	11	3.7
Good	203	67.7
Very good	18	6
Attitude of staff during vaccination		
Good	276	92
Average	21	7
Bad	1	0.3
Very bad	1	0.3
Long queue to vaccinate child		
Yes	214	71.3
No	85	28.3
Beliefs regarding child vaccination		
Yes	144	48
No	156	51.3
Specific beliefs regarding child vaccination		
Sick child	23	7.7
Child with boils	98	32.7
Child receiving herbal treatment	16	5.3

Other	7	2.3
Seeking permission from husband		
Yes	251	83.7
No	49	16.3
Awareness of myths about measles		
Yes	20	6.7
No	280	93.3

Source: Field survey, 2018

In terms of place of vaccination services, 2.7% had received the measles vaccine from the hospitals while 88.3% received from health centers and 8.3% from the clinics. Only 0.7% of the respondents received the vaccine from other places. With regards to the distance between the respondents' destination and the health facility, 55% of them responded affirmatively to the distance being far between their destinations and the health centers whereas 45% responded otherwise. In relation to the distance covered in meters, 3.7% of the respondents' destination was less than 300 meters from the health facility while 33.3% were staying between 300 to 500 meters away from the health center and 18% was staying 500 meters and above.

Knowledge of vaccination scheduled days was another important factor that was taken into consideration. The study revealed that only 5% of the respondents didn't know of the immunization scheduled days for the vaccine whereas majority (95%) were those who knew when the immunization has been scheduled to. There was also a revelation that, 55.3% of the respondents walk from the house to the vaccination center while 3.7% used bicycle and 21.7% used motorbike. Only (18 and 1.3) % used car and tricycle (yellow yellow) respectively to send their children for vaccination. The issue of financial support to the mothers or caretakers in

sending the children for vaccination either by providing transports fare or accompanying them. 42.7 % of the respondents get support from family to go for vaccination services whiles majority (56.6) % were those who did not support immunization.

Considering the road network to the health center, 22.7% of respondents admitted to the bad nature of the road whereas 3.7% responded to the road being so bad and 67.7% affirmed to the good nature of the road. With only 6% responded that the road networks to the health centers are in a very good condition. With regards to the attitude of staff during vaccination, majority (92) % were those who responded that the attitude of the health staff during vaccination was good whereas 7% responded to the staff attitude being average and 0.3% ,0.3% respectively responded to their attitude as being bad and very bad. The issue of long queue to vaccinate the child,71.3% responded that there needed to join a long queue to vaccinate the child whiles 28.3% admitted to not joining a long queue during vaccination.

An attempt was also made to figure out some of the general beliefs regarding child vaccination, 48% admitted that their reluctance to send the child for vaccination was influenced by some belief system while 51.3% indicated that beliefs did not influence their choice to vaccinate their children. In relation to specific beliefs with regards to child vaccination, 7.7% of the respondents believed that a sick child should not be sent for vaccination whereas 32.7% believed that a child with boils particularly should not be sent for vaccination. 5.3% of the respondents believed that a child receiving herbal treatment need not to be vaccinated and only 2.3% have other beliefs besides the aforementioned. Majority(83.7)% of the respondents were those who needed the permission of the husband before sending the child for vaccination and only 16.3% didn't need to seek permission from the husband before the child could be sent for vaccination. Twenty (20)

respondents representing 6.7 percent further indicated they have heard some myths about measles whereas 93.3 percent (280/300) said they have never heard of any myths about measles.

4.4 Caregiver Knowledge and Attitude

This section presents results and analysis of data gathered on caregiver's knowledge and attitude regarding children vaccination in the municipality. Data is presented under suitable variables to enable simple flow of information for easy understanding and interpretation.

Table 4.4 Caregiver Knowledge and Attitude

Variables	Frequency	Percentage (%)
Age child supposed to take measles 1		
At 6 months	3	1
At 9 months	278	92.7
At 12 months	2	0.7
Don't Know	17	5.7
Age child supposed to take measles 2		
At 9 months	1	0.3
At 12 months	2	0.7
At 18 months	278	92.7
Don't Know	19	6.3
Child receive measles 2 and time		
Yes, scheduled date	85	28.3

Yes, other date	59	19.7
Child did not receive measles 2 at all	152	50.7
Other	4	1.3
Reasons child miss measles 2 or scheduled date		
Long distance walking	18	6
Long time waiting	12	4
Lack of money	5	1.7
Non availability of vaccine	85	28.3
Social engagement	64	21.3
Not due	31	10.3
Religious denomination against vaccination		
Yes	23	7.7
No	277	92.3
Vaccination is beneficial		
Highly agree	162	54
Agree	129	43
I don't know	5	1.7
Disagree	1	0.3
Highly disagree	3	1
Child receive measles 1		
Yes	283	94.3
No	17	5.7
Informed to come back for measles 2		

Yes	249	83
No	51	17
Child had side effects of measles 1		
Yes	65	21.7
No	234	78
Child didn't take measles 1	1	0.3
If yes, what were you told to do		
Do nothing about it	1	0.3
Give Paracetamol	28	9.3
Tepid sponge	2	0.7
To bath child	31	10.3
To massage it	3	1
Will send child for measles 2 if yes		
Yes	64	21.3
No	1	0.3
Important to follow schedule religiously		
Highly agree	112	37.3
Agree	123	41
I don't know	30	10
Disagree	35	11.7
Vaccination is harmful		
Highly agree	3	1
Agree	12	4

I don't know	18	6
Disagree	232	77.3
Highly disagree	35	11.7
Perception that child receives many vaccinations		
Yes	32	10.7
No	268	89.3
Fear of effects on child immune system		
Yes	23	7.7
No	277	92.3
Preferred route of vaccination administration		
Injection	200	66.7
Oral	100	33.3
Reason not sending child for measles 2 vaccination		
Need to participate in harvesting	15	5
To attend funeral	44	14.7
Illness in the house	44	14.7
Difficult managing time due to work	79	26.3
Others	95	31.7
Not due	23	7.7
Had health education on immunizations including measles		
Yes	270	90
No	30	10

Told what to do in case child body gets warm		
Yes	268	89.3
No	32	10.7
If yes what were you told to do?		
Give Paracetamol	101	33.7
Bath the child	133	44.3
Apply cold compress at the site of injection	10	3.3
Send child to health centre if not improved	24	24
Would immunize next child		
Yes	299	99.7
No	1	0.3
Recommend routine immunization to others		
Yes	297	99
No	3	1
Schedule day for routine immunization		
Monday	5	1.7
Tuesday	84	28
Thursday	110	36.7
Weekdays	94	31.3
Daily	7	2.3

Source: Field survey, 2018

On testing the respondents' knowledge on when the child is supposed to take measles 1, 1% responded that the child will take measles 1 at 6 months while 92.7% responded that the child

will take measles 1 at 9 months of age. 0.7% said 12 months and 5.7 % didn't know when the child will take the vaccine. With measles 2, 0.3% said the child will take the vaccine at 9 months while 0.7 % responded that the child is supposed to take measles 2 vaccines at 12 months. Majority were those who said the child will take the vaccine at 18 months while 6.3% didn't know when the child is supposed to take the measles 2 vaccination. With regards to when the child receive measles 2 immunization, 28.3% received the second vaccine at the scheduled date whereas 19.7% received the vaccination but not on the scheduled date.50.7% of the respondents of the respondents said they did not receive the measles 2 vaccine at all and 1.3% responded to other vaccines but not measles 2.

Information obtained on the reasons why a child could not take the second vaccine on the schedule date showed that, 6% of the total respondents indicated it was due to the long distance walking, 4% said it was due to the long time waiting, 1.7% indicated it was due to lack of money, 28.3% said it was due to non-availability of the vaccine, 21.3% indicated it was due to social engagement and 10.3% said the date was not yet due. Religious denomination against child vaccination by respondents was 7.7% and 92.3% of the responses showed a support for child vaccination.

And with regards to the benefits of the vaccine, 54% highly agreed that the vaccine was beneficial, 43% only agreed without so much confidence, 1.7% didn't know whether it was beneficial to take the vaccine or not, 0.3% did not agreed that the vaccine was beneficial and 1% highly disagreed without hope on the vaccine. There were 94.3% responses that child has taken measles 1 and 5.7% of not taking the first vaccine. In relation to measles 2, 83% of them responded that they were asked to come back for measles 2 and only 17% of them responded otherwise. Information was also obtained on the side effects of measles 1; majority (78) %

responded that the vaccine didn't have any side effect on their children, 21.7% said the vaccine had effects on the child after vaccination and 0.3% said their children didn't take measles 1 vaccine at all. With regards to what the respondent did after having measles 1 vaccine side effects, 0.3% said they didn't do anything about it, 9.3% said they gave Paracetamol when the symptoms developed, 0.7% with tepid sponge, 10.3% bathed the child and 1% massaged the portion on child body measles injection was administered.

After measles 1 vaccination, respondents were asked whether they will send their children for measles 2 immunization, 21.3% said they will go for the second vaccine and 0.3% said no. Considering the influence of religion on the vaccination schedule, 37.3 % highly agreed that immunization schedule should be followed religiously, 41% agreed, 10% didn't know and 11.7 % disagreed. And with the harmfulness of the vaccination on child, 1% highly agreed that the vaccine is harmful to the child, 4% agreed the vaccine is harmful, 6% didn't know, 77.3% disagreed to the harmfulness of the vaccine and 11.7% highly disagreed. There were 10.7% responses on influence of perception of the child receiving many vaccines and 89.3% debunked the idea of being influenced by perception.

The study also seeks to test the state of the vaccine on immune system of children. It was revealed that 7.7% of the respondents affirmed to the stress of the vaccine on child's immune system and 89.3 % denied the side effects of the vaccine on the Child's immune system. With preferred route of vaccination administration, 66.7% of the preferred vaccination through injection and 33.3 % preferred the child's vaccine administration orally. Considering the reason for not sending the child for measles 2 vaccinations, 5% of the respondents said they took part in harvesting, 14.7% attended funeral, 14.7% fell sick, 26.3% had difficulty managing the vaccination schedule with work, 31.7 were engaged in other activities and 7.7% were not due for

immunization. And with parental health education on child immunization for measles, 90% of the respondents had health education on measles immunization and only 10% didn't have education any health education including measles.

With regards to the management of the child's condition in case it gets warm, 89.3% of the respondents they were informed by health staff on what to do in terms of these conditions and 10.7% didn't have any knowledge on that. In relation to what they specially do during these conditions, 33.7% said they give Paracetamol, 44.3% bath the child, 3.3% apply cold compress at the site of the injection and 24% send the child to the health centre if not improved. About 99.7% of the respondents said they will go for immunization for their next children and 0.3% was not willing to go for the vaccine anymore on their next birth.

To test the confidence of respondents on the benefit of the vaccine to children, the researcher required recommendations from parents. There was 99% response from respondents that they will recommend the vaccine to others and only 1% responded otherwise. The study also revealed that there was no static day for immunization as each of the days had a response beginning from 1.7% response representing Monday, 28% for Tuesday, 36.7 for Wednesday, 31.3 for weekdays and 20.3% daily.

4.5 Vaccination Coverage Gap Associated Factors

In the hypothesis testing to obtain vulnerability level of respondents to vaccination coverage gap by the use of odd ratios, 95% confidence interval and p-values, the determined values do not only results in decision regarding H_0 but it also gives an additional insight into the strength of the decision. A greater p-value for example than the significance (of 0.05 as in this case) indicates

that there is no or little likelihood the H_0 can be true. It is then rejected in preference to H_1. If on the other hand, the determined p-value is smaller than the significance value (of 0.05) in this case, then it shows there is significant chance that the H_0 is not false.

Table 4.5a Measles 2 Vaccination Coverage Gap Associated Factors

Variable	Response	Number (%)	AOR	95% CI	P-value
Level of education	Illiterate	149 (49.7)	2.65	1.40-3.67	0.0001
	Primary	42 (14.0)	2.02	1.21-2.73	0.012
	JHS	30 (10.0)	1.49	1.78-2.09	0.014
	SHS	49 (16.3)	1.43	0.32-1.06	0.681
	Tertiary	30 (10.0)	0.69	0.51-0.70	0.693
Number of children	1-2	146 (48.7)	0.27	0.67-1.65	0.513
	3-4	111 (37.0)	0.83	0.73-0.98	0.427
	5-6	39 (13.0)	1.31	1.86-2.45	0.003
	7 and above	4 (1.3)	3.37	2.53-3.96	0.001
How far if yes (in meters)	Less than 300	11 (3.7)	0.37	0.83-1.37	0.054
	Between 300 and 500	100 (33.3)	1.72	1.86-2.25	0.035
	Above 500	54 (18.0)	4.81	2.74-3.62	0.002
Long queue to vaccinate child	Yes	214 (71.3)	1.97	2.54-3.17	0.000
	No	85 (28.3)	0.92	0.49-1.25	0.057
Beliefs regarding child vaccination	Yes	144 (48.0)	2.43	2.56-3.74	0.022
	No	156 (51.3)	0.71	0.82-1.22	0.064

Awareness of myths about measles	Yes	20 (6.7)	3.86	2.77-4.21	0.004
	No	280 (93.3)	0.79	0.56-1.32	0.082
Age child supposed to take measles 2	At 9 months	1 (0.3)	-	-	
	At 12 months	2 (0.7)	1.35	1.42-2.79	0.021
	At 18 months	278 (92.7)	0.29	0.77-1.39	0.092
	Don't Know	19 (6.3)	2.51	2.69-3.42	0.004
Vaccination is beneficial	Highly agree	162 (54.0)	0.78	0.47-2.73	0.055
	Agree	129 (43.0)	0.51	0.53-1.42	0.083
	I don't know	5 (1.7)	1.31	1.97-2.57	0.001
	Disagree	1 (0.3)	-	-	-
Child receive measles 1	Yes	283 (94.3)	0.47	0.62-1.34	0.073
	No	17 (5.7)	1.47	2.78-3.53	0.000
Informed to come back for measles 2	Yes	249 (83.0)	0.32	0.45-0.88	0.472
	No	51 (17.0)	1.39	1.45-2.65	0.003
Child had side effects of measles 1	Yes	65 (21.7)	2.77	1.89-2.44	0.005
	No	234 (78.0)	0.93	0.63-0.98	0.678
Vaccination is harmful	Highly agree	3 (1.0)	1.41	1.32-2.41	0.005
	Agree	12 (4.0)	2.39	1.53-1.92	0.004
	I don't know	18 (6.0)	2.57	2.61-3.14	0.007
	Disagree	232 (77.3)	0.71	0.59-1.12	0.063
	Highly disagree	35 (11.7)	0.44	0.75-0.93	0.136
Perception that child	Yes	32 (10.7)	1.98	2.07-2.78	0.001

receives many vaccinations	No	268 (89.3)	0.29	0.43-0.67	0.051
Had health education on immunizations including measles	Yes	270 (90.0)	0.75	0.98-1.43	0.714
	No	30 (10.0)	1.33	1.57-1.92	0.046

Source: Field survey, 2018

From the table, it is clearly shown that, the illiteracy level of the respondents has a direct influence on the vaccination of their children with measles 2. In that, a p-value of 0.000 was obtained. This implies that, those who are not educated with a total of 49.7% are likely not to vaccinate their children. In that same vein, those who attained primary school and JHS as their highest educational level do not also vaccinate their children with p-values of 0.012 and 0.014 respectively. This means that, the higher the educational level of the respondents the higher the possibility of them vaccinating their children against measles 2. In addition, respondents with 5-6 children in the study area are also more likely not to vaccinate their children since they are used to this vaccination with a p-value of 0.003. Respondents with 7 children and above are also likely not to vaccinate their children with a corresponding p-value of 0.001. This succinctly shows that, the more the mothers gives birth to children the lower their zeal to vaccinate their children against measles 2.

From the table, it is shown that the farther away the health facility from the neighborhood of respondents the lower they send their children for measles 2 vaccination. As shown in the table, those whose homes are between 300-500 meters and above 500 meters away from the health facility do not vaccinate their children because of the presumed long distance to be covered with p-values of 0.035 and 0.002 respectively. Undoubtedly, knowledge of the vaccination schedule

days is also a factor that influences vaccination of the measles 2. In this line, those who are not aware of the schedule days do not vaccinate their children. This is backed by a p-value of 0.025 from the findings. This means that, there is a direct relationship between the knowledge of schedule days and the level of vaccination.

The times spend on the queue for vaccination is something that deters them. As a factor, a p-value of 0.000 was realized which implies that, chunk number of the respondents run away from the vaccination as a result of the long queue they normally experience. Also, belief regarding child vaccination of measles as in, its ineffectiveness as something against cultural and custom values etc. in this, a p-value of 0.022 was obtained. Those who do not know that a child is supposed to be vaccinated against measles 2 influences the reason why most of them do not vaccinate their children.

Moreover, 1.7 % of the people do not know how beneficial measles 2 vaccination is with a correspondent 0.001 which increases their chance of not vaccinating their children. Also, 17 of the respondents who could not vaccinate their children against the measles 1 do not have the chance vaccinating their children against the measles 2 which is been realized with a p-value of 0.001. 17% of the respondents were not also informed about measles 2 vaccination when they went for the vaccination against measles 1 and this will result to their inability to make it for measles 2 vaccination and in this regard, a p-value of 0.003 was obtained.

Moreover, 3 respondents highly agreed that, the vaccination against measles is harmful to children`s health thus are likely not to vaccinate their children with a p-value of 0.005 as shown in table 4.5a in that same vein, 12 of the respondents agreed that, vaccination of children is

harmful to their children also with a p-value of 0.004. This in no doubt influences them not to vaccinate their children.

From the study, as much as 30 respondents did not receive health education on immunization including measles which makes them unaware about the benefits associated with measles immunization hence are highly likely not to immunize their children against measles. This is established with key reference to the p-value of 0.046 as against those who had never received any health education on immunization including measles.

Table 4.5b Measles 1 Vaccination Coverage Gap Associated Factors

Variables	Response	Number (%)	AOR	95% CI	P-value
Level of education	Illiterate	149 (49.7)	2.77	1.62-2.46	0.002
	Primary	42 (14.0)	2.83	2.89-2.46	0.023
	JHS	30 (10.0)	0.57	0.74-0.99	0.001
	SHS	49 (16.3)	0.49	0.93-1.07	0.325
	Tertiary	30 (10.0)	0.31	0.68-0.91	0.447
Number of children	1-2	146 (48.7)	0.48	0.77-1.23	0.051
	3-4	111 (37.0)	0.68	0.83-1.	0.065
	5-6	39 (13.0)	1.72	1.64-2.25	0.001
	7 and above	4 (1.3)	1.97	2.71-2.89	0.000
Amount needed for vaccination service	No money needed	157 (52.3)	0.34	0.42-0.68	0.073
	GHS 2	39 (13.0)	0.47	0.87-1.08	0.055
	GHS 4	19 (6.4)	1.62	2.54-2.81	0.033
	GHS 5	57 (19.0)	2.46	2.57-3.74	0.003

	GHS 6 and above	28 (9.3)	2.83	2.42-2.96	0.000
How far if yes (in meters)	Less than 300	11 (3.7)	0.73	0.59-1.23	0.072
	between 300 and 500	100 (33.3)	1.52	1.81-1.98	0.047
	Above 500	54 (18.0)	3.81	2.74-3.56	0.022
Support from family to go for vaccination	Yes	128 (42.7)	0.27	0.32-0.75	0.211
	No	170 (56.6)	1.17	1.02-1.87	0.001
Long queue to vaccinate child	Yes	214 (71.3)	1.97	2.54-3.17	0.003
	No	85 (28.3)	0.92	0.49-1.25	0.053
Beliefs regarding child vaccination	Yes	144 (48.0)	1.92	1.49-2.25	0.024
	No	156 (51.3)	0.88	0.45-1.98	0.201
Awareness of myths about measles	Yes	20 (6.7)	1.47	1.55-2.13	0.009
	No	280 (93.3)	0.52	0.70-0.98	0.340
Age child supposed to take measles 1	At 6 months	3 (1.0)	1.17	1.21-1.94	0.011
	At 9 months	278 (92.7)	0.45	0.77-0.95	0.082
	At 12 months	2 (0.7)	-	-	-
	Don't Know	17 (5.7)	1.54	2.17-2.45	0.025
Vaccination is beneficial	Highly agree	162 (54.0)	0.78	0.47-2.73	0.611
	Agree	129 (43.0)	0.51	0.53-1.42	0.552
	I don't know	5 (1.7)	1.31	1.97-2.57	0.048
	Disagree	1 (0.3)	-	-	-

	Highly disagree	3 (1.0)	1.45	1.52-1.99	0.003
Vaccination is harmful	Highly agree	3 (1.0)	1.25	1.47-2.15	0.000
	Agree	12 (4.0)	1.59	1.77-2.43	0.005
	I don't know	18 (6.0)	0.37	0.55-0.79	0.021
	Disagree	232 (77.3)	0.48	0.67-1.51	0.051
	Highly disagree	35 (11.7)	0.41	0.54-0.92	0.088
Perception that child receives many vaccinations	Yes	32 (10.7)	1.98	2.07-2.78	0.041
	No	268 (89.3)	0.29	0.43-0.67	0.074
Had health education on immunizations	Yes	270 (90.0)	0.75	0.98-1.43	0.082
	No	30 (10.0)	1.33	1.57-1.92	0.032

Source: Field survey, 2018

It is established from the studies that, those who are illiterates and those who attained primary and JHS level of education are the people who are unlikely to vaccinate their children against measles 1 with p-values of 0.002, 0.023 and 0.001 respectively. This shows that, the level of education one attains serves as a factor that influence vaccination against measles 1 thus, the higher educated they are the high possibility of them vaccinating their children. Also, those who have 5-6 and above 7 children do not vaccinate their children against the measles 1 with p-values of 0.001 and 0.000 respectively.

In addition, those who need GHS 4, 5, 6 and above to go for vaccinations are more likely not to vaccinate their children. Because of the relative higher amounts as against those who need nothing and those who need only 2 Ghana cedis as represented in the table, this is factual with due consideration to the p-values of 0.033, 0.003 and 0.000 respectively. This clearly shows that,

the amount that is due to be needed for vaccination services has a trickledown effect on whether a child receives a vaccination doze or not. The distance covered in order to receive a service is also something considerable. In that, those whose homes are 300-500 meters and above away from vaccination centers are more likely not to vaccinate their children with p-values of 0.047 and 0.022 respectively. This means that, the longer the distance to the health facility the less likely for their children to be vaccinated.

Moreover, those who do not receive any support from family and friends in a form of doing their house chores on their behalf and or giving them little amount of money do not vaccinate their children as the services rendered are demand-driven which mostly goes with the spending of money. This is supported with a p-value of 0.001. The queue being long also deters the people from vaccinating their children as they do not want to leave their work in the name of vaccination. This is with a correspondent p-value of 0.003 as indicated in the table above.

Furthermore, 144 people stated that, their beliefs regarding child vaccination as in customs and values does not allow them to vaccinate their children with a p-value of 0.024. This is in line with the awareness of myths about measles; people who believe in those myths do not vaccinate their children against measles 1 with a p-value of 0.009. Also, as much as 17 people do not know the age a child should attain before they are vaccinated with p-value of 0.025. Most of the respondents are not aware that vaccination against measles is beneficial and so do not attach any seriousness to it indicative of the p-value of 0.048. Three people highly disagreed that, vaccination does not have any benefit to the children hence are more likely not to vaccinate their children with p-value of 0.003.

Also, people who highly agreed and those who merely agreed are likely not to vaccinate their children with respective p-values of 0.000 and 0.005 in the table. Those who do not know that vaccination is harmful are more also likely not to vaccinate children with little convincement from those who agreed that it is harmful. This supported by a p-value of 0.021.

Those who perceived that their children are receiving so many vaccinations will likely not to vaccinate their children and this is supported by p-value of 0.041 and finally, 30 people had never received any health education on any immunization including measles 1. This means that, they are more likely not to vaccinate their children against it. This is supported with a p-value of 0.032.

Interview responses from health staff

Majority of the health staff stated that measles vaccines are available always at the health facilities in the metropolis. However, a reasonable number of the respondent said that, *"mothers/caregivers are always educated on the need to vaccinate their children against both measles 1 and 2"*. In addition, majority of the staff said that they do not think people have myths on the vaccination of both measles 1 and 2. Another member said that *"to the best of my knowledge, some people think that myths does not exist again"*

On the importance of measles 2 vaccine, one of the staff stated that, *"measles 2 vaccination acts as a booster doze for measles 1 in the child system thereby increasing the health condition of the children"*. Another staff indicated that *"measles 2 vaccination serves as a booster doze incase the measles 1 was not given appropriately"*.

Another person said that, *"the measles 2 vaccination aims at achieving 95% of measles protection. In essence, this is a second fighter of the measles to ensure that a little or no traces of*

measles are found in the system of the children". Another member of the staff stated that *"the measles 2 is done purposely to cover up the missed opportunities that the first vaccination could not cover"*. One of the female staff said *"we vaccinate children against measles 2 because, not all the children get vaccinated with measles 1 and so there is the need to vaccinate against measles 2"*. This means that, the main function of the measles 2 vaccination is to boost the measles 1 vaccination done earlier.

On factors which lead to measles vaccination coverage gap, one of the staff stated that "*lack of education for mothers in relation to the benefits of vaccination against measles which compels the parents not to go for the measles 2 vaccination"*. Moreover, one of the respondents also said *"the shortage of the measles vaccines can be attributed to government inability to provide adequate vaccines to cater for the needs of the people and sometimes the vaccines delays which contribute to the gap issue because most times children are not been immunized at the right time"*.

The efforts made by the health workers in order to ensure there is an increase in measles coverage are expressed in the following statement shared by HS21; *"we normally organize mop up exercise and feed the mothers/caregivers with the information of when they should come back for the measles 2 and the reason behind that"*. As a form of recommendation from the health workers, one of them said that, *"mothers should be educated well on when to come for the measles 1 and 2"*

Another health staff stated qualitatively that, *"the reason for the gap of measles 2 is that some of the parents enroll their children very early into school thereby escaping the measles 2 vaccination*". This same staff indicated that *"their farming activities keep them busy sometimes*

which do not enable them to bring their children for measles 2 vaccination. Some of the mothers said that they do not know that there is a second vaccination for measles and hence, never bordered bringing their children here for vaccination." as an effort to increase the measles 2 coverage, the health staff stated that *"we intensify education on the need to complete the measles 2 vaccines"*

One of the staff said one of the factors that led to the gap of measles 1 and 2 is that *"some of the mothers said they have forgotten about the measles 2 vaccination and others said they have send their children to school anytime we visit their houses for the vaccination"*. In that same angle, the staff indicated that *" the reasons why some of the mothers do not bring their children for the measles 2 vaccination is that, mothers normally take their children to nearby communities during farming seasons thereby escaping the vaccination against measles 2"*. As a recommendation, the staff stated that, *"more measles vaccines should be provided in the right quantity to the health facility and that, a continual counseling should also be given to the clients on the need to vaccinate their children against measles."*

CHAPTER FIVE

DISCUSSIONS

5.0 Introduction

In this chapter, the computer aided results that have been arrived at and also analyzed are going to be further subjected to scrutiny in the light of reality of the current trends of the disease. It is in this chapter that attempts are made at suggesting very potent reasons for certain trends that may emerge from the data that were analyzed. As part of the research, some discussion on the outstanding revelations is done to propose scientific bases for some of the findings.

The issue under research is the reasons to be assigned for the gap that still exist in the vaccination in children against measles at this stage of the country' development. The study area is Sagnerigu District which inhabitants range from typically urban to typically rural in nature. This been the basis of paying proper attention to educational levels, income differentials and general difference in living conditions, it has been rather helpful in painting out the picture relating to the topic under study.

The Sagnerigu district cannot absolve itself from the low developmental indices affecting the Northern Region as a whole. Variables like illiteracy rate, housing conditions, unemployment rate, income levels among other demographic information are generally low for the Northern region in general and these translate into certain unfortunate trends that emerge from the populace of the region.

5.1 Demographic Information

As envisaged, in this study, the data showed that as many as almost half of the respondents (49.7%) have had no taste of formal education. The rest had some level ranging from primary through the secondary to the tertiary stages. Testing to see the direction of influence in so far as the existence if the gap is concerned, it was established that illiteracy influences the desirability to have child undergo vaccination against measles positively. One could not have expected any more suitable corresponding effect other than what the computer aided results have indicated. For most if not all the negatives against the willingness to have one's child vaccinated are rife in a community where ignorance abounds. This is far from suggesting that such a situation cannot achieve a turnaround but so far, the low literacy rate of the district as a whole is not in any way helping to cover the existing gap in vaccination coverage. This finding is in line with the findings of the study conducted by Odusanya et al., 2008 in rural Nigeria. Also, a similar study conducted in Malawi by Munthali, 2007 revealed that the educational level of the parent/caretaker is an important determinant of immunization status of the child.

A further analysis of the related characteristics of the selected sample of the study can offer better suggestions as to why the influence it positive for higher literacy levels. The demographic characteristics reveal that the fairly well educated have appreciably high income levels as well as established housing and living conditions. This should sound pretty obvious that a well-informed people will rather take a medical opportunity as provided from vaccination very serious and react timely to help close the gap in vaccination coverage.

As to how many children that respondents had was a variable of the grave importance. A test for its significance was carried out and the various p-values corresponding to 1-2 and 3-4 children

turned out to be 0.513 and 0.427 respectively. This is below the significance zone suggesting that having children in that range will have only little influence on the gap that exist in vaccination coverage. With higher number of children respondents appeared to have multiple problems that would not favor willingness to vaccinate children against measles. That, in my view is to be expected in these harsh economic times. The headache which parents and caretakers do suffer in looking after children would rather form sound excuses for not honoring vaccination schedules. The influence of such a factor is to increase the gap that exists in vaccination coverage in children against measles. With 1-2 and some extent 3-4 children, the problems presented are manageable and would allow the caretakers to honor vaccination schedules. And if this assertion is anything to go by then its influence will service to reduce the gap existing in coverage in vaccination. According to a study conducted by Matsumura et al., 2005 in Japan, children who had not been vaccinated were often not the first born.

5.2 Economic Factors

To be able to imagine what the influence of greater number of children would be examining the effect that next variables would have on the coverage gap. In examining the issue of whether or not any money is needed by respondents before any child is vaccinated yielded results which have various impacts on the coverage gap. Many people not only Sagnerigu district inhabitants love the fact that medical service like vaccination against measles is free but the problem is about the amount needed for food for example before child can be vaccinated at the health center or hospital. In such a community, mothers and caretakers can be from very low economic levels and to such people, money as low as the amounts quoted (GHS 4 and above) which are needed to send children for vaccination could be hard to come by. The occasions that respondent need GHS 4 and above recorded fairly high frequencies and as expected they corresponded to p-values of

less than 0.05 indicating that they have influence on the existence of the coverage gap. Situations when money needed for vaccination ranged GHS 2 or below had no influence on the gap. The amount needed could discourage caretakers from reacting promptly to vaccination schedules and this in effect is reflective of the low income brackets that most of the people in the study find themselves in. This finding corresponded with the findings of a study by Mapatano et al., 2008 in Kinshasa, Democratic Republic of Congo which revealed that father's involvement was associated with the child's vaccination status in the high coverage zone with fathers either providing transport fare or accompanying the mothers to the vaccination sites. Also, a study conducted in the Opuwo Health District in Namibia by Taapopi (2002) found that accessibility to health facilities was associated with immunization status. The study found that 21% of the mothers whose children were partially vaccinated and 17% of the mothers whose children were not vaccinated lived far from health facilities and had no access to transport.

5.3 Socio-cultural Practices

These same low economic levels can account for the level to which distances from vaccination centers impact on the gap in coverage. The proximity to vaccination centers would appear to encourage caretakers to react promptly to vaccination schedules. It is no wonder that a test of the impact that distances could have on the willingness and readiness to send children for vaccination yielded a p-value for distance less than 300 meters as 0.054 which therefore mean that nearness to vaccination centers has the influence of narrowing the coverage gap. Further distances yielded low p-values (significance zone) which have negative influence on the existing gap in coverage.

A similar argument would hold for situations where support is forthcoming from family members. Such support comes in handy in the form of little amounts to help caretakers satisfy a child at the vaccination centers, finding someone to send a child when regular caretaker is indisposed, preoccupied with some other issues etc. Very pleasant and encouraging interventions would encourage sending children for vaccinations on schedule.

Other factors which have recorded p-values at the region where their influence can have negative effects on the gap include meeting long queues at the vaccination center as well as having some beliefs about child vaccination. As to having performed notions about the vaccination, they are rife in communities where ignorance abounds particularly the illiterate communities. A similar argument can account for the issue of myths about measles. Some of such myths stem from cultural practices but to approach the vaccination of one's child without such myths is an added quality of caretakers. It will ensure that such a caretaker would react promptly to vaccination schedules. Such an attitude works out to have quite a good influence on the gap in coverage of measles vaccination. In the ignorant or underdeveloped communities beliefs and myths such as; measles is the working of witches, every normal person must necessarily have measles and survive it before counting himself/herself among the living, when measles attacks an adult it certainly will kill him/her etc are in their minds. In this study, majority of respondents did not have such preformed notions which went a long way to impact positively on the coverage gap. According to Sturm et al., 2005, vaccines were generally believed to have the effects of training or educating the immune system while, at the same time, they may compromise to an immune system that should be able to fend off disease if a person concerned were healthy.

5.4 Caregiver Knowledge and Attitude

At what age is a child supposed to take vaccination for the first time was also a variable in the study. Though there could be scientifically predetermined ages, this was tested and respondents' view of a child doing it at nine months of age recorded a p-value of 0.082 indicating it has no effect on the gap in coverage. The age ranges that are below and above nine months have p-values outside the significance zone meaning a respondent holding onto one of those ages as the right age child is supposed to take measles 1 vaccine is likely going to miss the chance of vaccinating such child which leads to coverage gap of vaccination. A study conducted in rural Nigeria showed that there was a significant correlation between the mother's knowledge of immunization and the rate of full immunization (Odusanya et al., 2008). Trivedi et al., 2008 also reported that a lack of information (place, time, date etc) among the parents in Surat, India was one of the major causes of dropouts from the vaccination programme. The study further reported that an unawareness regarding the need for routine immunization was the main reason for children not being vaccinated.

The individual impression about the usefulness of the vaccination is an important variable to be brought under scrutiny. Views of respondents on this variable was sought and analyzed. The results of this test was indicative those who responded the highly agree and simply agree that vaccination is useful recorded an overwhelming frequency which eventually had p-values of 0.611and 0.552 respectively. This result is to be expected because this means majority have a positive mindset which is a good prerequisite to a successful vaccination. Obviously other responses including highly disagree, disagree or simple ignorance tested otherwise so their effect has some impacts (negative) on the existing coverage gap.

Conversely the story was not surprising that a proportion of the responses were rather emphatic in their refuting that vaccination is harmful. Equivalently, the great clustering at the negative responses gave p-values outside the significance region which meant those responses from respondents has negative influence on the gap in coverage. The Sagnerigu district populace has also in this study overwhelmingly indicated that they do not ascribe to the notion that immunization against measles makes the number of vaccinations that a child gets too many. They rather admit it is a necessary and beneficial medical intervention.

As to whether there was any form of education given care-givers or not was tested and overwhelming positive responses yielded a p-value of 0.082. It suggest people were equipped with correct knowledge of the benefits which can constitutes the right push factor for individuals to send their children for immunization at the scheduled times. For complete immunization against measles there is a need to carry out the second vaccination. As to what influence that this repeated vaccination has on the existence of the coverage gap was tested and yielded results that do not depart from those obtained in the first vaccination. The trends are much a similar pattern with the exception of a few salient ones.

Issues of level of education, number of children and distance away from immunization center followed similar trends. Factors that will enhance willingness to get children vaccinated are further enhanced ensuring that the gap is impacted positively. Indeed, all the factors which produced a positive influence on the existence of the coverage gap were found to follow the same trend as in the first round of vaccination.

Salient issues are the factors arising as a result of the occurrence of the first immunization. A typical variable is in the form as to whether or not a vaccinated child had any side effect or not.

Even though overwhelming proportion had negative response, it is worth nothing that significant numbers did respond in the positive. As a medical exercise undertaken, it is worth noting and getting in touch with such persons to ascertain as to whether such side effects did linger and perhaps suggest position explanation and prescription for the further relief. As a medical practice, caregivers are supposed to be forewarned about very obvious side effect but anything other than the obvious side effects is certain which should raise eyebrows. The side effect occurrence has the effect of discouraging any future vaccination of child. The caretakers who experienced such side effects could propagate falsehood and fear among those whose children are yet to attain immunization ages.

Other variables arising from the occurrence of the first vaccination include; whether a child has already had the first dose, and whether caregivers had been informed to come back for a repeated vaccination. The positive response to the above question was overwhelming. Its p-value is in a range where we can describe some degree of positive influence to be in existence of the coverage gap despite the indication of the occurrence of the side effects. In few victims, this is suggestive that caretakers have accepted that even though some side effects may occur, going through complete vaccination is still a better way.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

6.0 Introduction

The main task of this research is to essay an array of variable to identify the factors that are associated with the existence of the gap in coverage in vaccination against measles in children. And indeed quite a number of such factors have been examined and their effect or otherwise on the gap in coverage tested, revealing very interesting pattern and trends.

6.1 Demographic Information

To begin with, the demography of the study population presented very obvious obstacle and advantages as well. The district as a whole is no exception to the low economic conditions that characterize the region as a whole. And as such most of the inhabitants are roped into poor occupations with the accompanying poor incomes; the few who have pierced through the economic stagnancy are those in the educated class and a few traders. These two classes of persons are reacting promptly to vaccination schedules and their effects serve to increase vaccination figures. Unfortunately, the figures are rather so low that their efforts are thwarted by the majority who are not only illiterates but also poor and ignorant. This later class is those who present adverse situation. As a whole variable as low economic ability; illiteracy and ignorance merely served no effect in so far as the gap in coverage is concerned. The economically sound class including those who are in very comfortable income brackets present situations which have been tested to have meaningful influence on the existing gap in coverage in vaccination against measles. Featuring prominently is the issue of number of children to a caretaker. As expected,

the situation where a caretaker has two or fewer number of children to contend with yields favorable variables that impact positively on the gap in coverage.

6.2 Caregiver Knowledge, Attitude and Other Factors

Apart from the above mentioned factors, there are some which emanated from the health providers. Helpful factors are those that border on good information, timely executed immunization schedules and proper explanation of any conflicting issues associated with vaccinations. Favorable factors that influence the gap include a properly packaged education by qualified health practitioners. It is such education that can help dispel certain obsolete beliefs and unguided myths that drive people away from getting their children vaccinated. As has been shown, a good knowledge of the beneficial nature of vaccination helps to impact positively on the gap under discussion. Besides these, it has also come to high vaccination and the monetary component merely serves to discourage participation. Moreover, siteing vaccination center closer to the community members encourage participation which impact favorably on the bridging of the gap in coverage.

Data on the second vaccination yielded a few more factors. Apart from the variables following the same trend as those in the first vaccination it has unearthed the issue of side effects. The numbers of those indicating they had encountered side effects appear to be significant which has the effect discouraging the victim from any other form of vaccination. Besides, it can serve to discourage those who are yet to send children for vaccination. Other possibilities all of which yield negative factors include the possibility of the vaccination being done by poor qualified staff and/or the vaccines undergoing a certain degree of contamination.

6.3 Conclusions

The demography of the study area presents many factors that have telling effects on the gap of coverage. The low literacy stands out as a tall factor. This low education has as its consequence many associated variables. Poor knowledge of benefits springs out as a consequence.

Polygamy is rife in the area under consideration and prolific breading is the order of the day. Research has brought to light that both of these do not have a positive impact on the coverage gap. Favorable factors are those that results in having very few children.

The income level of people is really low, though there is evidence of a few respondents enjoying very comfortable income brackets, the generality of the study population belongs to low income groups partly due to poor or no income generating occupations which could be traced to poor educational acquisition.

Imposition of any form of monetary payment to this kind of vaccination has the effect of discouraging participation especially among those of low incomes. Their wives and caretakers find it difficult collecting such monies and as such delay or absent themselves from vaccination schedule. Though the financially comfortable class can afford all such minor payments, its inclusion is a factor that does not encourage participation.

The occurrence of a few victims who suffer some side effects of the vaccination is a factor that has the potential of discouraging participation

6.4 Recommendations

From the findings and conclusions above, the following recommendations are being made:

1. The people of the study population should be encouraged to take up secular education seriously to raise their literacy levels so as to compete favorably for very good income earning jobs. Higher literacy levels can also whip in them the entrepreneurial zeal as a way of making ends to meet a better way.
2. The health directorate should device a plan by which proper education of the relevant health program is carried out in the district. Of particular importance will be the need to vaccinate children against the childhood diseases
3. A follow-up to vaccination should be put in place to see those who show side effects. This has the effect of dis-associating possible side effects from newly contracted diseases. Besides these, it has the effect of not discouraging others from future participation.
4. Further research should be centered on ways of minimizing factors associated with coverage gap of measles vaccination in the Sagnerigu district.

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APPENDICES

APPENDIX A - QUANTITATIVE SURVEY QUESTIONAIRE

1. Questionnaire Number _____
2. Name of facility_____
3. Name of Research Assistant_____
4. Date of Interview_____

SECTION A

A (i) Caregiver or mother socio demographic characteristics

1. Caregiver relationship with child

[ ] Mother [ ] Father [ ] Grandparent [ ] Sister [ ] Brother [ ] Other

2. Age of caregiver…….

3. Marital status

[ ] Single [ ] Married [ ] Divorced

4. Religion

[ ] Moslem [ ] Christian [ ] Traditionalist [ ] other, please state…….

5. Level of education

[ ] Illiterate [ ] Primary [ ] Secondary [ ] Tertiary

6. Estimated monthly income……GH₵

7. Main Occupation

[ ] Trading [ ] Farming [ ] Housewife [ ] Unemployed

8. Marriage type

[] Monogamy [ ] Polygamy

9. Do you sometimes seek medical help from traditional source?
[] Yes

10. Number of children caregiver has…….

11. Do you have child record book (s) for routine vaccination for your child or children?
[ ] Yes [ ] Yes but I cannot locate it [ ] No

A (ii) Childs Characteristic;

12. Gender of Child
[ ] Male [ ] Female

13. Place of birth
[] Home [ ] Hospital

14. Age of a child (in months)……..

15. Birth Order of child……..st/nd/rd./th

16. Has child taken all vaccines schedule for first year of live including measles?
[ ] Child complete entire schedule [ ] Child completed but not according to schedule
[ ] Incomplete vaccination

17. Area of residence?
[ ] Rural [ ] Urban

SECTION B

This section would seek to examine the economic factors that lead to vaccination coverage gap between measles1 and measles2.

18. What is your occupation?
[ ] Teacher [ ] House wife [ ] trader [ ] others (specify)
19. If married what work does your partner do?
[ ] Farmer [ ] Teacher [ ] Mason [ ] others (specify)

20. What is your nuclear family income level?

[ ] Low income [ ] Middle income [ ] High income

21. How much money do you need to go for vaccination service?
[ ] No money needed [ ] GH ₵ 2 [ ] GH₵4 [ ] GH₵5 [ ] others (specify)

22. Did you pay for services when you took your child for measles1 vaccination?
[ ] Yes [ ] No

23. If yes how much?
……..

SECTION C

This section of the questionnaire seeks to find out the social-cultural practice of the mother or the care giver of the child regarding vaccination.

24. Where do you send your child for vaccination services?
[ ] Hospital [ ] Health centre [ ] Clinic [ ] others (specify)

25. Is your house far from the health facility?
[ ] Yes [ ] No

26. If yes how far?
[ ] Closer [ ] Far [ ] Very far

27. Do you know the schedule days for vaccination services?
[ ] Yes [ ] No

28. What means do you use to send your child for vaccination services?
[ ] walking [ ] Bicycle [ ] Motorbike [ ] Car [ ] others (specify)

29. Do you get support from your family when you are sending your child for vaccination?
[ ] Yes [ ] No

30. How is the road network from your community to the health centre?
[ ] Bad [ ] Very bad [ ] Good [ ] Very good

31. How is the attitude of staff to you during vaccination services?
[ ] Good [ ] Average [ ] Bad [ ] Very bad

32. Do you join long queue to vaccinate your child?
[ ] Yes [ ] No

33. Do you have any beliefs regarding child vaccination?
[ ] Yes [ ] No

34. What are some of the beliefs?
[ ] Sick child [ ] Child with boils [ ] Child receiving herbal treatment [ ] Others (specify)

35. Do you have to seek permission from your husband before sending the child for vaccination services?
[ ] Yes [ ] No

36. Have you heard any myths about measles?
[ ] Yes [ ] No

37. What are some of the myths?
……

SECTION D

This section of the questionnaire is to solicit for knowledge and attitude to child vaccinations. Kindly agree or disagree to the underlying statements or provide your own answers if need be.

Caregiver Knowledge and attitude

38. At what age does a child suppose to take measles1?
[ ] At 6 months [ ] At 9 months [ ] At 12 months

39. At what age does a child supposed to take measles2?
[ ] At 9 months [ ] At 12 months [ ] At 18 months

40. Did child receive measles 2? If yes when?
[ ] Schedule date [ ] other date

41. If no what do you think are the reasons for a child missing measles2 at the schedule date?
[ ] Long distance walking [ ] Long waiting time [ ] Lack of money [ ] Non availability of vaccine [ ] Social engagement

42. Does your religious denomination preach against vaccination?
[ ] Yes [ ] No

43. Do you agree that vaccination is beneficial?
[] Highly agree [ ] Agree [ ] I don't know [ ] Disagree [ ] highly disagree

44. Did your child receive measles1 vaccination?
[ ] Yes [ ] No

45. Were you told to come back in 9 months' time for measles2?
[ ] Yes [ ] No

46. When your child took measles1 vaccination did he/she has side effect?
[ ] Yes [ ] No

47. If yes what were you told to do?
[ ] To give Paracetamol [ ] To bath the child [ ] To apply cold compress at the site of injection
[ ] Send child to health centre if not improved

48. If yes would you send your child for measles2 vaccination?
[ ] Yes [ ] No

49. Do you think it is important to follow the vaccination schedule religiously?
[ ] Highly agree [ ] Agree [ ] I don't know [ ] Disagree [ ] Disagree
[ ] Highly Disagree

50. Is vaccination harmful?
[ ] Highly agree [ ] Agree [ ] I don't know [ ] Disagree [ ] highly disagree

51. Do you have the perception that your child is receiving so many vaccinations?
[ ] Yes [ ] No

52. Do you have the fear that so many vaccines would have side effects and stress on child immune system?

53. Which of these routes of administration of vaccination did you prefer for your child?
[ ] injection [ ] oral

54. What makes you not to send your child for measles2 vaccination after receiving measles1 initially?
[ ] the need to participate in harvesting [ ] to attend funeral [ ] illness in the house [ ] difficult in managing time due to work [ ] others (specify)

55. Have you had health education on immunizations including measles?
[ ] Yes [ ] No

56. Were you told what to do in case the child body gets warm?
[ ] Yes [ ] No

57. If yes what were you told to do?
[ ] To give Paracetamol [ ] To bath the child [ ] To apply cold compress at the site of injection
[ ] Send child to health centre if not improved

58. Would you immunize your next child?
[ ] Yes [ ] No

59. Would you recommend routine immunization to others?
[]Yes [ ] No

60. Which day of the week is schedule as static day for routine immunization at your health facility?
[ ] Monday [ ] Tuesday [ ] Wednesday [ ] Thursday [ ] Friday

APPENDIX B - QUESTIONNAIRE FOR HEALTH STAFF

1. Are measles vaccines available always?
[ ] Yes [ ] No

2. If not available always what account for the shortages?
……
……
……..

3. Are mothers educated on the need for measles 1 and 2 vaccination?
[ ] Yes [ ] No

4.Do you think people have some myths on measles 1 and 2?
……
……....

5. What are the reasons for measles2 vaccination?
……
……

6. What are the factors leading to the gap of measles 1 and 2?
……
……

7. What are some of the reasons given by mothers/ caregivers for not bringing their children for measles 2immunizations in this area?
……
……

8. What are the efforts made by health workers to increase the measles 2 coverage?
……
……....

9. What recommendation will you make to help increase the coverage of measles 2?

……
……

APPENDIX C - INFORMED CONSENT

My name is Humaya Mohammed, a graduate student of the University for Development Studies. I am conducting a research to examine the factors associated with coverage gap of measles vaccination in Sagnerigu district. The findings of the research are intended to help close the gap between measles1 and measles2 and determine what socio-cultural and economic issues are important to the research topic. I do not need your name, your participation is entirely voluntary, and it involves consenting to complete a demographic form and answering some questions based on your agreement or disagreement to the statements. I would like to ask you some questions about your views and ideas on issues that affect the research topic. There are no risks or discomfort associated to your participation; however you are free to withdraw from participating if discomfort occurs. There are no tangible benefits associated to your participation. Please note that your responses will be only reviewed by my supervisor. The interview will take 10-15minutes.

Thanks for your co-operation.

Would you like to participate?

Yes [ ] No [ ]

…….. ……..

Date Signature