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DETERMINANTS OF MATERNAL HEALTH CARE SERVICES UTILIZATION IN SIERRA LEONE BETWEEN 2009 AND 2013

BY

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DECLARATION

I declare that this thesis entitled "Determinants of maternal health care services utilization in Sierra Leone between 2009 and 2013" has been composed wholly by myself under the guidance and supervision of Professor Richard M.K Adanu.

Except where stated otherwise by reference or acknowledgement, this work is entirely my own.

This work has not been submitted in whole or in part, for any other degree or professional qualification.

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DEDICATION

This thesis is dedicated to the Almighty God for being the source of my strength throughout this course, to my mother; Janet Maotta Yamba, my wife; Pheabean Yamba and daughter; Lovette Maotta Yamba for their undying love.

I also wish to dedicate this thesis to the memory of my late father; Simeon Brima Yamba, Who always had confidence in me.

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ABSTRACT

BACKGROUND: Sierra Leone has one of the worst maternal health indices among other countries, and it is also one of the countries with the lowest human development index.

Majority of the causes of maternal morbidity and mortality can be prevented by means of utilization of adequate antenatal care, institutional delivery and skilled birth attendants.

However, utilization of Maternal Health Care (MHC) services is generally low in the country. There is an alarming shortage of skilled Health Care Workers (HCW) and limited number of Health Care Facilities (HCF).

OBJECTIVE: To identify the factors that influenced the utilization of MCH Services during the five years period preceding the 2013 Sierra Leone Demographic and Health Survey (SLDHS).

METHOD: Data on the most recent pregnancy during the five years period preceding the 2013 Demographic and Health Surveys (DHS) were used.

Outcome measures were Antenatal Care and Delivery Care. Chi square test and Logistic regression models were used to determine the relationships between key socio-demographic factors and outcome measures.

RESULTS:

Antenatal Care

Almost all pregnant women (94%) in Sierra Leone received antenatal care (ANC) from skilled providers (doctor, nurse, midwife, or MCH aide) during the five years period preceding the 2013 SLDHS; most commonly from a nurse/midwife (58%), followed by MCH Aide (34%).

The government health facilities were the commonest place of ANC for the majority (95%) of the pregnant women.

Almost all of the women (98%) made at least one ANC visit, whilst 89% made four (4) or more visits during their pregnancy.

About 93% of women took iron tablets or syrup during pregnancy and 89% of the women were informed about signs of pregnancy complications during ANC visit. Ninety five percent of women's most recent births were protected against neonatal tetanus whilst only 75% took antimalarial prophylaxis.

Place of residence, age and religion of the respondents were found to be significant determinants of ANC services utilization during the five years period preceding the 2013 SLDHS. Almost all (99%) of the women in the urban area had ANC at a health facility compared to those in the rural area (98%).

Delivery Care

Only about 59% of deliveries occur in health facilities; mainly in government health facilities (57%). More than 2 in 5 births occur at home. Nearly 6 in 10 deliveries were assisted by skilled providers.

Women whose marital status was described as separated/divorced/widowed were more likely to give birth in a health facility.

Those women who practice traditional/other religion were less likely to give birth in a health facility.

Similarly, women who had ANC and also those from households with high wealth index were most likely to have their births attended by a skilled provider.

CONCLUSIONS: The utilization of Delivery Care services by the women was low, despite the high utilization of the ANC services.

Home delivery is still a serious problem in Sierra Leone because a greater proportion of the women gave birth in homes in the hands of unskilled birth attendants.

The utilization of MHC services was influenced by several socio-demographic characteristics of the women such as Age, Region, Religion, Household Wealth Index, Marital Status, Place of Residence and Parity.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ANC	Antenatal Care
DHS	Demographic and Health Survey
FANC	Focused Antenatal Care
MDGs	Millennium Development Goals
MHC	Maternal Health Care
MMR	Maternal Mortality Ratio
PoD	Place of Delivery
SBA	Skilled Birth Attendant
SDGs	Sustainable Development Goals
UBA	Unskilled Birth Attendant
UNDP	United Nation Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World health organization
WRA	Women of Reproductive Age

DEFINITION OF TERMS

ANTENATAL CARE: Antenatal care (ANC) can be defined as the care provided by skilled health-care professionals to pregnant women and adolescent girls in order to ensure the best health conditions for both mother and baby during pregnancy.

DELIVERY CARE: this can be defined as the care provided by skilled attendant to pregnant women during childbirth.

DIRECT OBSTETRIC DEATH: Maternal deaths resulting from obstetric complications of the pregnant state, from interventions, omissions, or incorrect treatment, or from a chain of events resulting from any of these.

INDIRECT OBSTETRIC DEATH: Maternal death resulting from previous existing disease or disease that developed during pregnancy and that was not due to direct obstetric causes but was aggravated by the physiological effects of pregnancy.

MATERNAL MORTALITY OR MATERNAL DEATH: is 'the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

MATERNAL MORTALITY RATIO (MMR): The number of maternal deaths occurring in a given year per 100,000 live births during the same period.

MATERNAL MORTALITY RATE: The number of maternal deaths in a given period per 100,000 women of reproductive age.

SKILLED BIRTH ATTENDANCE: The process by which a woman is provided with adequate care during labour, delivery and the early postpartum period.

SKILLED BIRTH ATTENDANT: An accredited health professional – such as a midwife, doctor or nurse – who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns.

CHAPTER ONE

1.1 INTRODUCTION

Maternal health, according to the World Health Organization, refers to "women's health throughout pregnancy, delivery, and the postpartum period". Maternal Health entails the health care aspects of family planning, preconception, antenatal, and postnatal care; all of which are aimed at reducing maternal morbidity and mortality.

Maternal Health (MH) has become the most significant determinant of global, regional, national and local wellbeing (WHO, 2006).

According to the World Health Organization (WHO), in 2013 about 289, 000 women died of pregnancy related death worldwide. Developing countries contributed 99% to these deaths; Sub-Saharan Africa region alone contributed 62%. The Maternal Mortality Ratio (MMR) in developing regions was 230 per 100,000 live births, whilst that for the developed regions was 16 per 100,000 live births. SSA region had the highest regional MMR of 510 per 100,000 live births.

At country level, Sierra Leone had the highest MMR of 1100 per 100,000 live births (United Nations Development Programme (UNDP), 2016).

Deaths related to pregnancy and childbirth claim a mother's life every minute of every day. About eight(8) out of every ten(10) of these deaths are preventable(Gayle et al., 2010).

From the result of the global, regional and sub-regional estimates of the causes of maternal death that occurred from 2003 to 2009 in one hundred and fifteen (115) countries analysed by the World Health Organization (WHO), over seventy percent (70%) of those deaths were due to direct obstetric causes (such as haemorrhages and hypertensive disorders). The remaining thirty

percent (30%) were due to Indirect obstetric causes and other causes such as HIV/AIDS, infection, cardiovascular diseases, etc. (Say et al., 2006).

The global MMR dropped to 216/100 000 live births over 25 years period (from 1990 to 2015).

Sierra Leone also managed to reduce its MMR from 2,630/100,000 live births in 1990 to 1,360/100,000 live births in 2015. However, this reduction was far from achieving the target of the MDG 5. The MMR of Sierra Leone is still among the highest in the world (Assaf & Winter, 2015).

Reducing maternal mortality has been a common goal to governments and several international organizations.

According to Amnesty International, maternal death is a human rights issue. The organization believes that preventable maternal death occurs as a result of depriving women of their essential human right to better health care. Therefore, failure to make available the appropriate Maternal Health Care (MHC) services to mothers during pregnancy and delivery can be considered a violation of their rights to life, health, equality and non-discrimination(Welfare & Health, 2010).

Several steps have being taken by governments and international organizations at regional and continental levels in order to reduce or eliminate preventable maternal deaths.

For instance, the 2009 African Union (AU) campaign titled “Accelerated Reduction of Maternal Mortality in Africa (CARMMA)” brought the attention of the entire Africa region to this challenge. People were trained to advocate for policies that will improve maternal health. CARMMA was adapted from the Maputo Plan of Action (Maputo PoA) which was adopted in 2016 by the AU. The main aim of Maputo PoA was to ensure that Africa achieves access to universal comprehensive sexual and reproductive health by 2015.

The July 2010 AU Summit theme was “Maternal, Child and Infant Health and Development in Africa”. It was agreed without objection that more investments should be made in Maternal and Child Health (MCH).

Similarly, in April 2010, another global move was made by the then Secretary-General of the United Nation requesting leaders to pay more attention on the health of women and children (United Nations Development Programme (UNDP), 2016).

The Sierra Leone government has also placed some importance on MHC by incorporating it into the country's development agenda plan. The government launched a five-year Poverty Reduction Strategy Paper called "Agenda for Change (2008-2012)". Priority was given to the reduction of maternal and child mortality. The government also implemented Free Health Care services for pregnant women, breastfeeding mothers and children less than five years of age (UNFPA, 2013).

The utilization of MHC services in Sierra Leone is influenced by factors such as traditional and religious beliefs, acceptability of interventions, perceptions on quality of care, socio-economic status of the women, education, rural/urban residence, employment status, relationship status of the women, knowledge about danger signs in pregnancy, distance from health facilities, and parity (UNFPA, 2013).

This study was therefore carried out in order to find out the various determinants of utilization MHC services in Sierra Leone during the five years period preceding the 2013 Sierra Leone Demographic and Health Survey (SLDHS).

This study focused on the Antenatal (ANC) and Delivery care.

1.2 Problem statement

Getting pregnant and giving birth to a child is one of the most dangerous risks a woman can take in Sierra Leone. For approximately every 73 live births in 2015, one woman dies; mainly as a result of preventable maternal causes. In 2015 alone the estimated maternal death was 3,100.

Majority of the women in Sierra Leone reside in rural areas; where access to health care during pregnancy is difficult. Most of them who will need caesarean sections will not receive it because of the fact that many of the birth attendants are actually unskilled and do not know how to perform a caesarean section or to carry out other procedures that can help the mothers survive.

The health of a mother and the newborn are closely linked. Sierra Leone's neonatal mortality rate in 2015 was 35 per 1,000 live births; which was among the highest in the world.

There are also large number of adolescent pregnancies, which have a direct effect on maternal mortality(Survey, 2013).

Sierra Leone is also one of the poorest countries in the world. The country was ranked one hundred and seventy nine (179) out of the one hundred and eighty eight (188) countries included in the 2015 United Nations Human Development Report(United Nations Development Programme (UNDP), 2016).

The decade-long civil conflict that raged from 1991 to 2002 wrecked the infrastructure, human capacity and the entire health systems in the country.

During the post-conflict period, unsustainable practices and corruption became embedded as the norm. Maternal health – an important indicator for determining the wellbeing of a nation was not given the attention it deserves.

The MDG 5 which was aimed at Improving maternal health through reduction of the year 1990 MMR by three-quarters (MDG 5A) and achieving universal access to reproductive health (MDG 5B), was not achieved by Sierra Leone. The country had the highest MMR at 1,360 deaths per 100,000 live births (WHO, UNICEF, UNFPA, World_Bank_Group, & UNPD, 2015).

Underneath these statistics lies the pain of human tragedy for us all; and especially for thousands of families who have lost their love ones as a result of pregnancy and child birth.

The Ebola epidemic in 2014 also significantly affected maternal and neonatal health services. During the outbreak there was a general fear of infection among both health care workers and patients. This also resulted to a low uptake of MHC services in the entire country (UNICEF, 2014)

There was an already existing problem of shortage of health personnel in Sierra Leone even before the outbreak. This problem was exacerbated by the Ebola outbreak which claimed the lives of so many healthcare workers. An estimated thirty percent (30%) of those healthcare workers were working in Maternal and Child Health Units. The Ebola outbreak also made many hospitals to stop providing services to the people, including pregnant women (Brolin Ribacke et al., 2016).

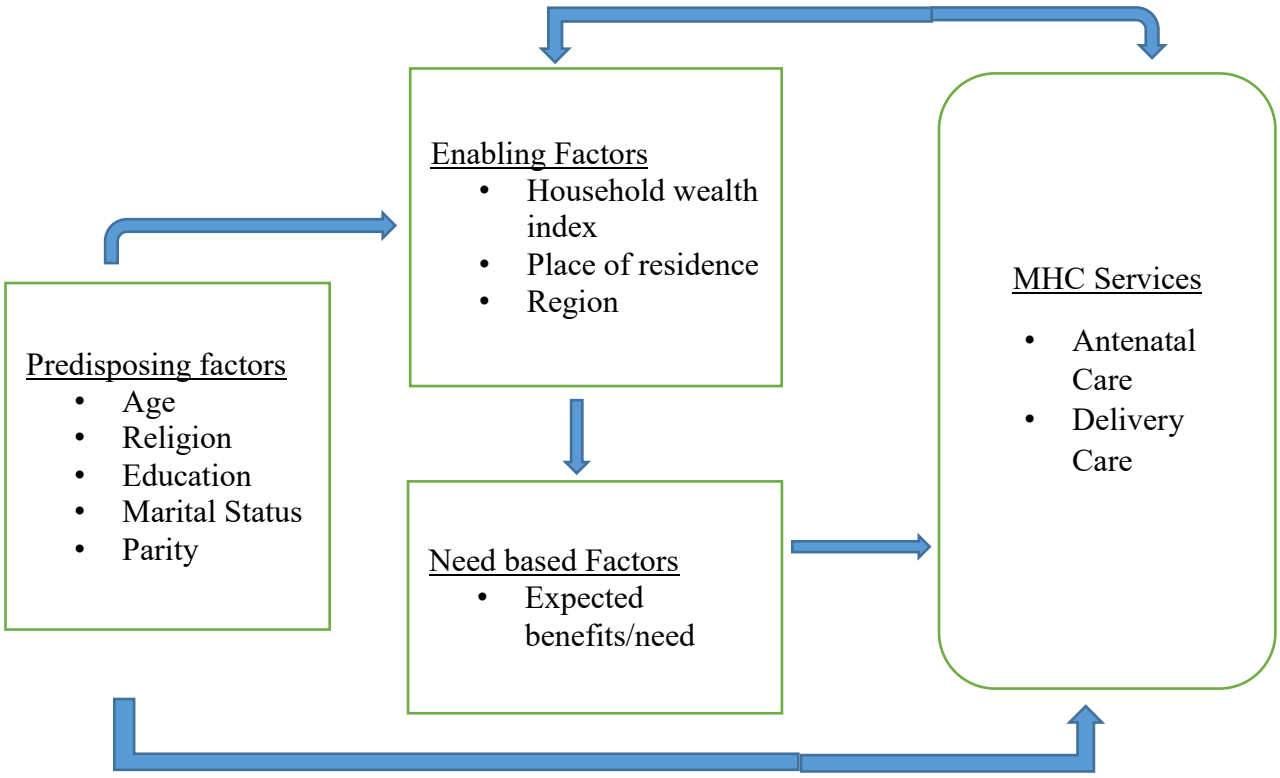
Given this gloomy picture about this problem, there is much more needed to be done in order to salvage the population exposed to the risk of preventable maternal death, which should be of grave concern to everyone. This is more so as it impinges on the country's general development.

1.3 Conceptual framework of the study

This framework was adapted from Andersen and Newman's behavioural model of the determinants of health service utilization.

The framework shows the relationship between the independent (predictor) variables considered in this study and how they affect the outcome variables.

Figure 1: Conceptual Framework of the determinants of MHC Services utilization



This model was chosen for this study because it is in line with the study objectives.

According to the model, some characteristic factors can contribute to, or determine the uptake of health care services by an individual.

These characteristic factors are considered the independent variables in this study. They are categorized into three (3):

1. Predisposing factors;
2. Enabling factors and
3. Need based factors.

The dependent (or outcome) variable are the various MHC Services (Antenatal care and Delivery care services) that are utilized.

The predisposing factors are those socio-demographic characteristics that might cause some people to utilize MHC Services more than others. These socio-demographic characteristics in this study includes: age, education, religion, marital status and parity.

The enabling factors assume that some resources are needed by an individual in other to utilize health services. The enabling factors in this study include the household wealth index, place of residence, and region.

The Need-based factor is considered the stimulus for the use of MHC Services. Only the Predisposing and Enabling factors are considered in this study.

1.4 Justification

This study is justified on the following grounds:

Foremost, maternal death is a very serious issue of public health concern, especially for developing countries where the uptake of MHC services is low. ANC, delivery and postpartum care are three most important interventions proposed by the WHO in order to reduce maternal death. Identifying those factors influencing the utilization these services would have meaningful effect on the reduction of the high MMR in countries like Sierra Leone.

Also, findings from this study may help in the implementation of sexual and reproductive health programmes in Sierra Leone.

Next, findings from this study may be of value to for the country as a whole and for decision makers in planning, implementing and evaluating various interventions related to reduction of maternal mortality and to achieve the targets of goal 3 of the Sustainable Development Goals (SDG3) in 2030.

Finally, this piece may benefit the society, particularly Women in the Reproductive Age (WRA) to better utilize MHC Services which will improved their health status and wellbeing.

1.5 Objectives

1.5.1General Objectives

To identify the factors that influenced the utilization of MCH Services during the five years period preceding the 2013 SLDHS.

1.5.2 Specific Objectives

i. To estimate the proportion of women that utilizes the various MHC Services.
ii. To assess the main determinants of the utilization of MHCS
iii. To examine the pattern of uptake of MHCS.
iv. To determine the level of utilization of Antenatal and Delivery Care services.

1.6 Research Questions

i. What is the level of utilization of Antenatal and Delivery care services?
ii. What factors determine the choice of place ANC among pregnant women?
iii. Which socio-demographic factors influenced utilization of delivery services?
iv. What is the proportion of women who received MHC services from skilled and unskilled providers?

CHAPTER TWO

2.0 LITERATURE REVIEW

This study is looking at the determinants of Maternal Health Care (MHC) services utilization in Sierra Leone during the five years period preceding the 2013 SLDHS.

2.1 Strategy for Literature Search

Various secondary materials including research findings from different sources in the form of articles, journals, books, etc. is utilized in the process, more so, those having to do with maternal health care.

Materials were got from the following data bases: PubMed, Google, Google scholar, Jstor, Research gate, Science direct, Elsevier and Scopus. Materials were also got from the websites of international organizations that deals with maternal health (E.g. WHO, UNFPA, UNDP, UNICEF, MEASURE dhs.com and USAID).

In order to expand or narrow the search for the literature, different words were combined during the search for articles.

Box1: Literature Search techniques

"Maternity" or "Maternity care" or "Maternal health Care" or "maternal health" or "maternal health Care Services" or "Reproductive Health" or "antenatal care" or "prenatal care" or "obstetric care" " Natal care" or "delivery care" or " Intrapartum care" or "skilled birth attendant" or "institutional delivery" or "Home delivery" or "health facility" or "utilization of' " or "factors affecting" or "factors influencing" or "factors associated" or "factors associated with" or "determinants of" or "influence of" or "components of" or "women employment" or "household wealth Index" or "religion" or "parity" or "educational attainment" or " Sierra Leone" or "Africa" or "sub-Saharan Africa" or "Demographic and Health Survey" or " Maternal Mortality Rate" or " Maternal Mortality ratio" or "Maternal Death"

The available related literature was critically reviewed and presented with the aim of describing:

- The concept of MHC;
- Status of MHC in Sierra Leone;
- Components of MHC services;
- Determinants of utilization of MHC services.

2.2 Concept of Maternal Health Care (MHC)

Motherhood is expected to be a good and fulfilling experience, but unfortunately it is a period that is however characterised by suffering, illness and even death (WHO 2017).

Maternal health should not be taken as just a "women's issue". It concerns the wellbeing of everyone (including men, boys and girls) and the integrity of communities, societies and nations.

Globally, maternal mortality is still high. An estimated 800 women die daily due to complications they develop during pregnancy, childbirth or postpartum period.

In 2010 alone, 287 000 maternal deaths were reported. Almost all (99%) of these deaths occurred in developing countries. Majority of these deaths are preventable if adequate MHC Services are available, and are well utilized by the women("Maternal mortality fact sheet," 2015).

It has been shown that the health of mothers and their babies are closely related. Therefore, to prevent maternal deaths there should be interventions that are effective and sustainable. Such interventions include provision of essential services such as quality ANC, skilled attendance at birth, emergency obstetric and newborn care, nutrition, and postpartum care (UNICEF, 2009).

According to Addisse (2003), the main objective of a MHC program is to reduce maternal and child morbidity and mortality.

Achieving this objective requires the following:

- Provision of primary health care services.
- Provision of Integrated MCH services more particularly in the rural settings.
- Provision of MHC services at a cost compactible with the financial, material and human resources of the country.
- Initiation, development and co-ordination of operational and other relevant research in Maternal and Child Health.
- Preventing malnutrition and infection among mothers and children through health education and nutrition supplementation.
- Promoting the use of immunisation, safe water and sanitation.
- Efficient supply of, and promoting effective Family Planning programmes (Addisse, 2003).

2.3 Status of maternal health care in Sierra Leone

In September 2000, MHC was set as a target by world leaders during the United Nation meeting on the development of the eight (8) MDGs. The MDG 5 was the maternal health goal.

The MDG 5 (improve maternal health) has two targets set for every country: to reduce the MMR by three quarters (MDG 5A) and to achieve universal access to reproductive health (MDG 5B) by 2015. Although substantial progress on these targets has been made by some countries, many developing countries (Sierra Leone inclusive) did not achieve the needed reductions in 2015. Sierra Leone was very far from reaching the target (World Bank Group, 2016).

Most maternal deaths are preventable because the interventions to prevent them from happening are well known. Some of these interventions include: Improved access to quality ANC during pregnancy, availability of skilled attendant during labour and delivery, and regular postpartum care. These interventions can decrease the maternal mortality and improve maternal health ("WHO Maternal mortality fact sheet," 2015).

Many initiatives have been implemented in Sierra Leone in order to improve maternal health. Some of these initiatives include the implementation of the National Population Policy 2009, the National Health Sector Strategic Plan 2010-2015, and the Free MCH Care Initiative.

These challenges include: the 2014 Ebola epidemic, the civil war which ended in 2002, poverty, large rural population, poor infrastructure, high total fertility rates, low use of modern contraceptive, high level illiteracy level, low female education, traditional/cultural beliefs, limited number of health facilities, etc. (Statistics Sierra Leone (SSL) and ICF International 2014).

The shortage of skilled health care providers (doctors, nurses or midwives, MCH Aide) is also alarming in the country. According to the WHO recommendation, a minimum of twenty three (23) skilled healthcare providers per 10,000 populations is expected for countries. Sierra Leone is having only two (2) skilled providers per 10,000 populations.

In addition to this human resource challenge is a problem of access to quality health care, limited health expenditure, and issues of shortage of drug and medical supplies.

Despite an overall increase in uptake of ANC as reported by the 2013 SLDHS reports compared to the 2008 Sierra Leone DHS reports, the country still have one of the worse maternal, neonatal and child health mortality indices.

High proportion of pregnant women are still giving birth in homes with the assistance of unskilled birth attendance like TBAs, Traditional healers, and Community volunteers other(Sharkey et al., 2016).

In the move towards the Sustainable Development Goals (SDGs) Sierra Leone has aligned with other countries that also have high maternal mortality in order bring down their MMR to 140 per 100,000 live births(MOHS, 2016).

To achieve the Sustainable Development Goal 3 (SDG 3) target, the government has implemented key plans such as establishing an active Community Health Worker (CHW) programme to provide easy access to MHC services; provision of drugs like antimalarial; upgrading some health facilities to Basic Emergency Obstetric and Newborn care (BEmONC) centres; and strengthening the Maternal Death Surveillance and Response (MDSR)(MOHS, 2006).

2.4 Components of Maternal Health Care Services

According to Annet (2004), the components of MCH services include: care during antenatal, delivery, and postpartum periods. This study focused on only antenatal and delivery care.

2.4.1 Antenatal Care (ANC)

The relative contribution of ANC to maternal health is a serious debate. Complications arising during pregnancy and delivery are most of the time not predictable, and they often occur without warning signs. The debate is that the traditional use of ANC to identify “risk factors” (such as age, parity, height, etc.) attributed to poor maternal outcomes has little benefit because these “risk factors” are not the direct causes of the poor outcomes(Bloom, Lippeveld, & Wypij, 1999).

However, several systematic reviews have shown an association between ANC during pregnancy and utilization of delivery care services. Utilization of ANC services can therefore lead to further utilization of additional maternal services like institutional delivery and seeking assistance for complications during delivery and postnatal period(Tsegay et al., 2013).

The former World Health Organisation guidelines on ANC categorise pregnant women into two broad categories; those who needing only routine ANC (about 75% of pregnant women), and those with exiting health conditions or risk factors that require special care (25% of pregnant women).

Four (4) or more ANC visits was recommended for the first category of women (with additional visits should conditions emerge which require special care). This is referred to as Focused Antenatal Care (FANC). The second category requires more ANC visits(Maternal & Neonatal Health (MNH), 2004)

The guideline was also specific about the timing and contents of ANC visits based on the gestational age of the pregnancy. Clinical examinations and laboratory investigations that serve an immediate purpose and have been proven to be beneficial were done.

Examples of such clinical examinations and laboratory investigations include fundal height determination, measurement of blood pressure, urinalysis for bacteriuria and proteinuria, and blood tests to detect syphilis, HIV and anaemia. Measurement of height and weight during ANC visits are no longer part of the routine check-up (Fife, 2010).

FANC has been found to improve maternal outcomes by offering opportunity to detect and treat diseases earlier. For instance, control of high blood pressure or early detection of high blood pressure prevents eclampsia. This will lead to reduction of maternal mortality.

Similarly, other interventions like detection and treatment of anaemia, giving antimalarial prophylaxis, and immunization against neonatal tetanus, are some of the services provided during ANC that can also result to improve maternal neonatal outcomes(Maternal & Neonatal Health (MNH), 2004).

Activities that can be incorporated into ANC services include: providing counselling and education to pregnant women about their health and that of their children, giving then information about the danger signs of pregnancy, what to do if a pregnant woman develop complications, and where to get help, importance of good nutrition, benefits of child spacing, various options of family planning, benefits of breastfeeding to both mother and baby, etc. (Maternal & Neonatal Health (MNH), 2004).

The current WHO guideline for ANC recommends a minimum of eight (8) ANC contacts. The first contact should take place in the first trimester (up to 12 weeks of gestation). Two (2) contacts should be scheduled in the second trimester (at 20 and 26 weeks of gestation), and five (2) contacts are required in the third trimester (at 30, 34, 36, 38 and 40 weeks). Table 1 below compares FANC and the current ANC model.

The word “contact” is used in this new model instead of “visits”. “Contact” connotes an active link between a pregnant woman and a healthcare professional. Specific interventions are delivered at each contact.

Table 1: Comparison between Focused Antenatal Care (FANC) and the recent 2016 WHO ANC model(WHO, 2016)

Focused Antenatal Care (FANC) model		2016 WHO ANC model		Trimesters
Visits	**Duration of Pregnancy (in weeks)**	**Contacts**	**Duration of Pregnancy (in weeks)**	
1	8-12	1	Up to 12	First
2	24-26	2	20	Second
		3	26	
3	32	4	30	Third
		5	34	
4	36-38	6	36	
		7	38	
		8	40	

2.4.2 Delivery care

Delivery is considered safe when performed by Skilled Birth Attendant (SBA) (Bhandari & Dangal, 2013).

The definition of a Skilled Birth attendant (SBA) is given as: "an accredited health professional (such as a midwife, doctor or nurse) who has been educated and trained to proficiency in skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in identification, management and referral of complications in women and newborns"(A joint WHO/UNFPA/UNICEF/World Bank statement, 1999).

The lowest coverage of skilled delivery utilization is in Sub-Saharan Africa (SSA) region. It has been shown that only 45% of women receive services from SBAs in SSA. Access to SBA during childbirth can reduce the risk of preventable death or morbidity. Equipped SBA can prevent or manage life-threatening complications (such as heavy bleeding, Eclampsia, etc.) or refer a patient to a higher level of care(United Nations, 2013).

The proportion of births attended by a SBA is one of the key indicators that was used for monitoring progress toward MDG 5.

Some studies have shown an association between proportion of births attended by SBA and MMR. An increase in the proportion of birth attended by SBA will result in reduction in the MMR. A recent study in low and middle income countries revealed that an increase in the proportion of births attended by a SBA resulted in reduction in maternal mortality(Utz, Adegoke, Utz, Msuya, & Broek, 2014).

2.5 Determinants of maternal health care services utilization

The following socio-demographic and economic factors, amongst others, are known determinants of the utilization of MHC services: age, place of residence, educational level, region, religion, marital status, parity and household wealth index (Chimankar & Sahoo, 2011).

Muchie (2017), also identified the above factors as important determinants of utilization of MHC services in Ethiopia in his work titled "Quality of antenatal care services and completion of four or more antenatal care visits in Ethiopia: A finding based on a demographic and health survey" (Muchie Kindie Fentahun, 2017).

Age of the woman when pregnant is an important determinant of the use of MHC Services. Several studies have shown that younger women (less than 19 years) are less likely to attend ANC (Onyeonoro et al., 2014).

A study carried out in Eritrea however found out that women of younger age were more likely to utilize antenatal care and skilled attendance at delivery compared to those in the older age groups (Kibreab Habtom, 2017).

The wealth index is also an important determinant of utilization of MHC services, especially delivery care services. Women in the fourth and highest quintiles of the wealth index are found to be more likely to use MHC services than those belonging to the lower wealth quintile (Singh, Kumar, & Pranjali, 2014).

It have being shown that the number of ANC visits increased as the wealth index increased, and there is also a clear pattern for the choice of place of delivery among women based on their wealth index quintile. Women in the higher economic strata and living in households with high wealth index are said to seek institutional delivery more than those in the lower household wealth index(Goel et al., 2015).

Similarly, type of place of residence has been shown to influence the utilization MHC services.

Women living in an urban community increases have increase odds of antenatal service utilization compared to those in the rural areas(Babalola & Fatusi, 2009).

Women residing in urban areas are more likely to give birth in a health facility as compared to those living in some rural areas(Abor, Abekah-nkrumah, Sakyi, Adjasi, & Abor, 2011).

Education level of the women is the single most important determinant. Educated women make greater use of MHCS than women with no education. This conclusion is supported by evidences from studies conducted in Uttarakhand (Chimankar & Sahoo, 2011), Ethiopia(Shegaw Mulu Tarekegn, Lieberman, & Giedraitis, 2014) , India(Singh et al., 2014) and Nigeria(Ayo Stephen & Odunayo Joshua, 2016).

A study done in Peru to find out the role of women's education on the utilization of MHC services show a strong positive association between education and the use of maternal health-

care services. The strength of the association was found to be stronger for the utilization of delivery care than antenatal care (Elo, 2016).

Religion has being found to be a determinant of utilization of MHC services in most developing countries in the world. A study carried out in Ghana identified religion of the respondent as a factor that affect the utilization of MHC services (Abor et al., 2011).

In India, it was found out that there was less use of delivery care services among the Muslims women compared to those in other religious denominations (Singh et al., 2014).

A study carried in Nigeria also revealed that women belonging to Islamic religion make less use of skilled ANC provider than those who belong Christianity (Ayo Stephen & Odunayo Joshua, 2016).

Pandey et al. (2013), also found out that education, parity and wealth index, all have highly significant effects on the utilization of MHC services (Pandey, Dhakal, Karki, Poudel, & Pradham, 2013).

Other studies have also shown that parity can influence utilization of MHC Services even more than age. Women who have given birth to only one child are more likely to utilize delivery care services. The likely reason for this is because of fear of developing complications during pregnancy and lack of delivery experience. Women with higher parity tends to deliver more at home due to self-confidence they may have developed(Shegaw Mulu Tarekegn et al., 2014).

Higher parity women are found to be less likely to attend ANC or make their first ANC visit during the first trimester compared to the lower parity women.

Currently married women are found to be more likely to go for ANC compared to those who are not married(Ochako, Fotso, Ikamari, & Khasakhala, 2011).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Country Profile

Republic of Sierra Leone is a small country located in West Africa. It has an area of approximately 72,000 square kilometres (28,000 square miles). Sierra Leone is bordered by two countries; on the north-east it is bordered by the republic of Guinea and on the south-east by the republic of Liberia. The South-west border is formed by the Atlantic Ocean.

Administratively, Sierra Leone can be split into four (4) regions: Western, Northern, Eastern and Southern regions. Each region is further split into districts; and each districts into chiefdoms. There are 14 districts and 149 chiefdoms in total.

Figure 2: Map of Sierra Leone showing the regions and districts

The capital of Sierra Leone is Freetown, located in the Western region.

The country gained independence from Britain on 27 April 1961.

There are fifteen (15) ethnic groups. The Mende, Temne, Limba, Madingo and Creole are the more popular tribes. The official language is English. The main religions are Christianity, Islam and Traditional. Majority of the people are Muslims.

The population of Sierra Leone in 2015 was 7,076,119. Almost three-fourth of the people reside in rural areas. Forty one percent of the population are below age 15(Sierra Leone Statistics, 2015).

Sierra Leone is classified by the United Nation as one of the least developed countries in the world. The 2016 United Nations Development Programme (UNDP) reports on Human Development scored Sierra Leone 0.420 on the Human Development Indices (HDI). This placed the country in the category of low human development with a position of 179 out of 188 countries and territories. These countries have a very low income per capita. Large proportions (70 %) of Sierra Leoneans have low socio-economic status. Life expectancy at birth for female and male are 51.9 and 50.8 respectively(United Nations Development Programme, 2016).

The health indicators of the country are among the worse in the world. The infant mortality rate is 89 per 1,000 live births; under-five mortality rate is 120 per 1,000 live births and MMR 1,360 women per 100,000 births.

Sierra Leone has three levels of health care delivery system. These levels are: (a) Peripheral health units (comprising of community health centres, community health posts, and MCH posts) provides services at community level; (b) district hospitals; and (c) regional or national hospitals.

The providers of health care services are government, religious missions, local and international Non-Governmental Organisations and private individuals or groups.

3.2 Source of data

This study involved analysis of secondary data obtained from the 2013 SLDHS which was carried out for the second time in the country. The first DHS was in 2008.

3.3 Demographic and Health Survey Study Design

Summary of DHS design is discussed in this section. The DHS uses cross-sectional analytic design.

DHS is a national representative survey intended to give reliable estimates for important variables for the entire country, urban and rural areas, the four regions and the fourteen districts.

DHS utilizes two stage sample design in selecting samples. The first stage involves use of 2004 Sierra Leone General Population and Housing Census list for the enumeration areas (EAs) as a master sampling frame to select the primary sampling units or clusters.

The next stage involves selecting households systematically from each cluster to ensure adequate number of completed individual interviews is obtained.

The DHS design is attached as appendix A in this report.

3.4 Data collection tools

The DHS used Standard questionnaires to collect data. The questionnaires are modified to fit specific system, situations and conditions of Sierra Leone.

The three types of questionnaires used by DHS are “Household Questionnaire”, “Women’s Questionnaire”, and “Men’s Questionnaire”.

Women of Reproductive Age (WRA), i.e. those whose age is from 15-49 years in the chosen household were qualified for individual interviews. Similarly, men 15-49 year old in the next household were also qualified for interview.

For the purpose of this study only responses related to Maternal Health Care from the women's questionnaire are used.

The Women's Questionnaire collected information from the WRA on the five year prior to the survey. Information on respondent's Socio-demographic background, reproductive history, use of MHC services, vaccination for under five children, breastfeeding, infant nutrition, sexual activity, respondent's partner, fertility preferences, awareness and knowledge about HIV/AIDS and other Sexually Transmitted Diseases (STDs) and other health related conditions were captured by the questionnaire.

The women's questionnaire is attached as appendix B in this report.

The data utilized in this analysis is limited to responses on the most recent pregnancies during the five years before the 2013 SLDHS.

3.4.1 Inclusion Criteria: All women aged between 15-49 years who had at least one pregnancy within the five years before the 2013 SLDHS.

3.4.2 Exclusion Criteria: Women who were not pregnant within the five years before the 2013 SLDHS. Those with incomplete information on MHC services are also excluded.

Those excluded from this study are 4,306 respondents who were not pregnant during the five years period preceding the survey. For antenatal care, additional 4,080 respondents who have incomplete information on place of antenatal care were further excluded. Similarly for ANC

providers and number of ANC visits, additional 3,923 and 3,874 respondents respectively were excluded because of incomplete information.

For Place of Delivery (PoD) and delivery assistant, 3,906 respondents were excluded because of incomplete information.

3.5 Description and measurement of variables

3.5.1 Dependent variables

Two main variables were used for this study. They are:

1. Antenatal care (ANC) and
2. Delivery care.

Utilization of ANC was measured using the following parameters

a. Place of ANC;
b. Provider of ANC and
c. Number of ANC visits.

Utilization of delivery care was measured using the parameters

a. Place of delivery and
b. Delivery attendants.

3.5.2 Independent variables

Eight socio-demographic characteristics of the respondents were chosen as the independent variables in order to find out their effects on the utilization of MHC services. These variables include age, type of residence, education, parity, wealth index, current marital status, religion and region.

The independent variables were chosen based on Andersen's behavioral model of health service utilization.

Some of the independent variables such as religion, parity, current marital status and education were re-categorized for analysis.

The age variable was dealt with as a categorical variable of five-year age groups.

Place of residence was analysed as a dichotomous variable of urban and rural.

Based on the 2015 Sierra Leone total fertility rate of 4.5 births per woman parity was therefore analysed as a categorical variable. The categories were:

1. Category 1: those who have given birth to one child;
2. Category 2: those who have given birth to two to four children and
3. Category 3: those who have given birth to five or more children.

Education was also analysed as a categorical variable. The categories are: no education; primary; secondary and higher. In the DHS secondary and higher education were separate categories but in this study secondary and higher levels were combined because the proportions of women in the higher education category are small.

Region was analysed as a categorical variable: Western; Northern; Eastern and southern.

Religion was also analysed as a categorical variable of no religion; Christianity; Islam; Traditional and other.

Wealth index was measured as five categories (poorest, poor, middle, richer, richest). The wealth index assesses the economic status of the household. Household wealth index is the average score of some indicators of household ownership of items and facilities such as type of floor,

piped water, toilet, electricity, radio, television and bicycle. The more the composite scores the higher the wealth index.

Current Marital status was re-categorized as never married, married, cohabiting, separated, divorced and widowed.

3.6 Derivation, recoding, labeling and renaming of the outcome variables

The place of antenatal care variable was derived from responses on place of prenatal care. The responses were recoded and labelled as: home, government hospital, government health centre, government health post, private hospital/clinic and others. Place of antenatal care was further categorised into non-health facility and health facility and renamed as type of place of antenatal care.

The provider of antenatal care variable was derived from responses on who provided antenatal care to the respondents. The responses were recoded and labelled as: doctor, nurse or midwife, MCH Aide, TBA, community/village healer, other and no one. This variable was further categorized into unskilled providers and skilled providers and renamed as category of antenatal care provider.

Number of antenatal visits variable was categorised and analyzed as: no antenatal care visit, 1-3 visits and 4 or more visits.

Variable on place of delivery was derived from responses on the various place where respondents delivered. The responses were labelled as: home, government hospital, government health centre, government health post, private health facility and others. This variable further categorized into non-health facility and health facility and renamed as type of place of delivery.

Similarly, the delivery attendant variable was derived from the various responses on attendant at delivery. The responses were labelled as: doctor, nurse or midwife, MCH Aide, TBA, relative/friend, other and no one. This was also further categorized into unskilled attendant and skilled attendants, and renamed as category of delivery assistants.

All missing values and no responses (such as 9, 99 and 999) to the dependent and independent variables of interest were dropped.

3.7 Data Analysis and presentation

Stata SE 14.1 is used for statistical analysis of the data. The data were declared a survey data using the svyset command.

Descriptive statistics of the independent variables was done to determine the distribution of the respondents in terms of frequencies and percentages. This was presented in the form of socio-demographic summary table.

Data on place of antenatal care, provider of ANC, PoD and delivery attendant were presented in the form of bar charts.

Bivariate analysis was done to test for association using Pearson's correlation coefficient and Fisher exact test(for variables with small proportion of responses) in order to find out the relationship between the independent and dependent variables. P-value of less than 0.05 (i.e. $p<0.05$) was set as the significance for the analysis.

Logistic regression model was then applied to find out the strength of the association between the independent and dependent variables. Both simple and multiple logistic regression analysis were performed in order to get the crude and adjusted odd ratios respectively. The strength of the

association for each independent variable was based on the odd ratios and the 95% confidence interval, while holding other factors constant.

Presentations of the results were done in tabular and bar chart form.

3.8 Data limitation

The data are affected by recall bias, non-response rate and inappropriate reporting of some questions relating to maternal health.

Issues like why certain women are not using or are unable to use maternal health care services were not addressed.

3.9 Ethical consideration

The 2013 SLDHS data was downloaded from the MEASURE DHS website for free.

To access the data a written request was submitted to the DHS MACRO, and authorization to use the data for this study was then granted.

CHAPTER FOUR

4.0 RESULTS

4.1 Characteristics of Women Who gave birth during the five year period preceding the 2013 SLDHS

This chapter covers the findings of the determinant of MHC services utilization in Sierra Leone between 2009 and 2013 using the 2013 SLDHS data.

The 2013 SLDHS covered a total of 16,658 women, and 12,352 (74.2%) of them had at least one pregnancy during the five (5) years period preceding the survey. This study analyzed only information on the most recent pregnancies.

The independent variables include: Age, Place of residence, Education, Parity, Wealth Index, Religion, Region and Current marital status.

Only data on respondents who have complete information on each dependent variable were analyzed.

The age of the respondents ranged from 15-49 years. The mean age is 31±8.6 years.

The highest number of children ever born (parity) is 16. The mean number of children is 4±2.5. About 36% of the respondents have given birth to 5 or more children (see table 2).

From table 2, it can be seen that about 43.0% of the respondents are under age 30. Proportions in each age group decline with increasing age, reflecting the comparatively young age structure of the population in Sierra Leone.

There were more respondents in the rural area than urban. Approximately 64.0% of the respondents were living in the rural area.

The educational level indicate that majority (67.4%) of the respondents have no formal education.

Nearly 38.2% of the households were classified as poor (poorest and poorer) based on the indices for the determining the wealth index of a household.

The marital status of the respondents shows that most (78.9%) of them are married, whilst 10.4% have never married, 3.2% cohabiting, and 7.7% have separated, divorced or widowed.

Table 2: Socio-demographic data of women who gave birth during the five (5) year preceding the 2013 SLDHS (N= 12,352)

Socio-demographic		Number of respondents n(%)
Age group	15-19	884(7.2)
	20-24	1,949(15.8)
	25-29	2,482(20.1)
	30-34	2,180(17.7)
	35-39	2,228(18.0)
	40-44	1,290(10.4)
	45-49	1,339(10.8)
place of Residence	Urban	4,451(36.0)
	Rural	7,901(64.0)
Highest Educational level	No education	8,321(67.4)
	Primary	1,540(12.5)
	Secondary	2,191(17.7)
	Higher	300(2.4)
Parity	1	2,462(19.9)
	2-4	5,577(45.2)
	5+	4,313(34.9)
Wealth Index	Poorest	2,486(20.2)
	Poorer	2,237(18.1)
	Middle	2,373(19.2)
	Richer	2,879(23.3)
	Richest	2,377(19.2)
Current marital Status	Never married	1,283(10.4)
	Married	9,739(78.8)
	Cohabiting	382(3.1)
	Separated/Divorced/widowed	948(7.7)
Religious denomination	No religion	39(0.3)
	Christianity	2,525(20.4)
	Islam	9,756(79.0)
	Traditional/others	32(0.3)
Region	Western	1,762(14.3)
	Northern	4,708(38.1)
	Eastern	2,585(20.9)
	Southern	3,297(26.7)
Total		12,352(100)

4.2 Antenatal Care

4.2.1 Place of Antenatal Care

A total of 8,272 (67.0 %) respondents have complete information for the place of antenatal care.

Figure 3 below shows that over 98 % of the respondents attended antenatal care at the health facilities

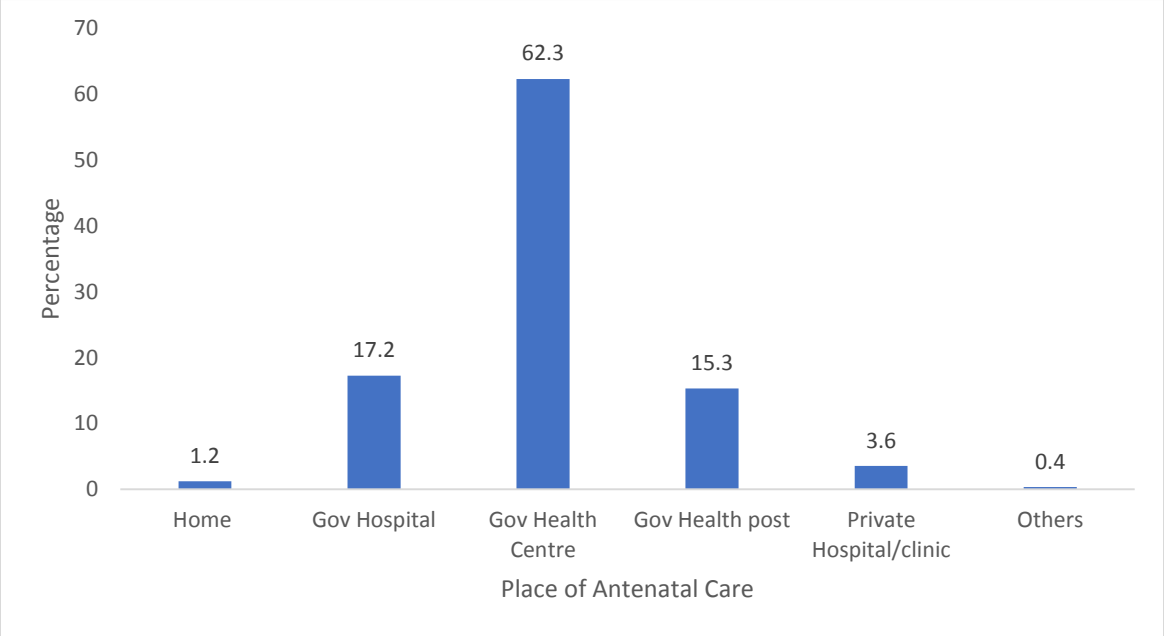


Figure 3: Place of antenatal care for Sierra Leonean women, 2009-2013 (N=8272)

4.2.2 Provider of Antenatal Care

A total of 8,429 ((68.2%) respondents have complete information on provider of antenatal care.

The commonest provider of antenatal care was the nurse or midwife. This is followed by the Maternal and Child Health Aide (MCH Aide). See figure 4 below. Almost 94 % of ANC were provided by skilled providers (nurse or midwife, MCH Aide and doctor).

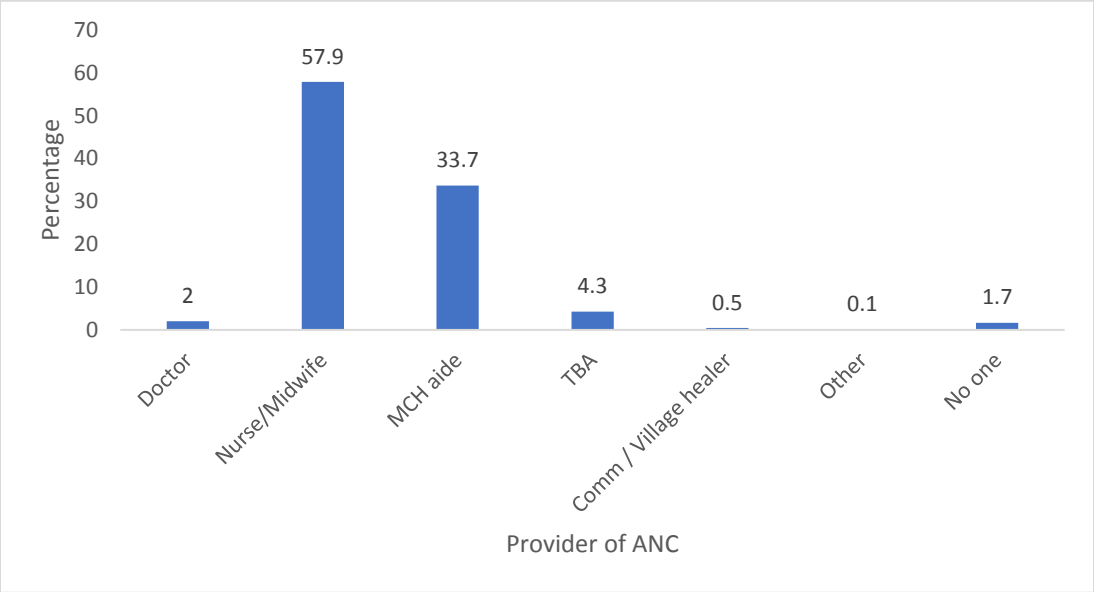


Figure 4: Provider for antenatal care to Sierra Leonean women, 2009-2013 (N=8429)

4.2.3 Number of Antenatal Care Visits

Data on the number of antenatal visits analyzed for the 8,478 (68.6 %) women who have complete information on number of antenatal care visits revealed that only 168 (2%) did not have any antenatal care during their pregnancy. Among those who had antenatal care (98%), about 7,543 (89%) had four or more visits during their pregnancy (table 3).

Table 4 below shows the proportion of women who received the various aspects of routine antenatal care.

The lowest coverage was in the areas of collection of urine sample for test for protein, and anti-malarial prophylaxis. Only 73.8% and 74.7% of women benefited from the urine test and anti-malarial prophylaxis respectively.

Table 3: Classification of respondents based on number of ANC visits

No. of visits	Total n(%)
No ANC	168(2.0)
1-3	767(9.0)
4+	7,543(89.0)
Total	**8,478(100)**

Table 4: Proportion of Sierra Leonean antenatal attendants benefiting from different aspects of routine ANC, 2009-2013

ANC services	Proportion of attendants receiving services (%)
Blood pressure measurement	94.9
Anti-tetanus injection	94.8
Blood sample taken	90.2
Urine Sample taken	73.8
Iron supplementation	93.0
Told about pregnancy complications	89.2
Malaria prophylaxis	74.7

4. 3 Delivery care

A total of 8,446 (68.4 %) respondents with complete information on delivery care was analyzed.

4.3.1 Place of delivery

Figure 5 below shows the different place where the respondents gave birth between 2009- 2013.

About 41% of the deliveries were done in homes, despite the high proportion of antenatal care uptake during pregnancy. Only 59 % of the deliveries were done in health facilities.

The majority (57%) of the health facility deliveries were done in the government health facilities.

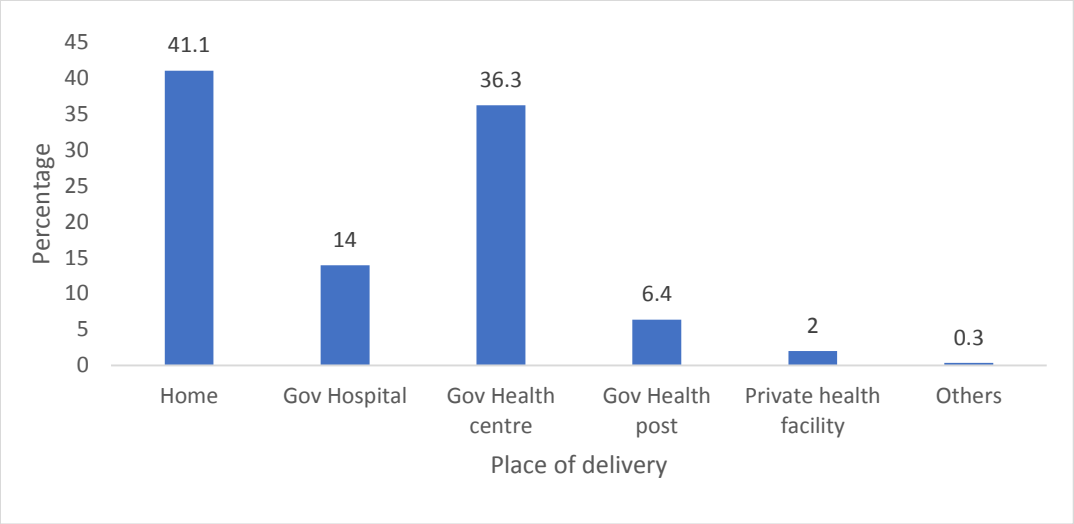


Figure 5: Place of delivery for Sierra Leonean women, 2009-2013

4.3.2 Delivery attendant

The nurse or midwife was the commonest attendant at delivery. The nurse or midwife attended about 48% of the deliveries. In total, only 64% of the deliveries were done by skilled birth attendants (Doctor, Nurse/midwife and MCH Aide). See figure 6 below.

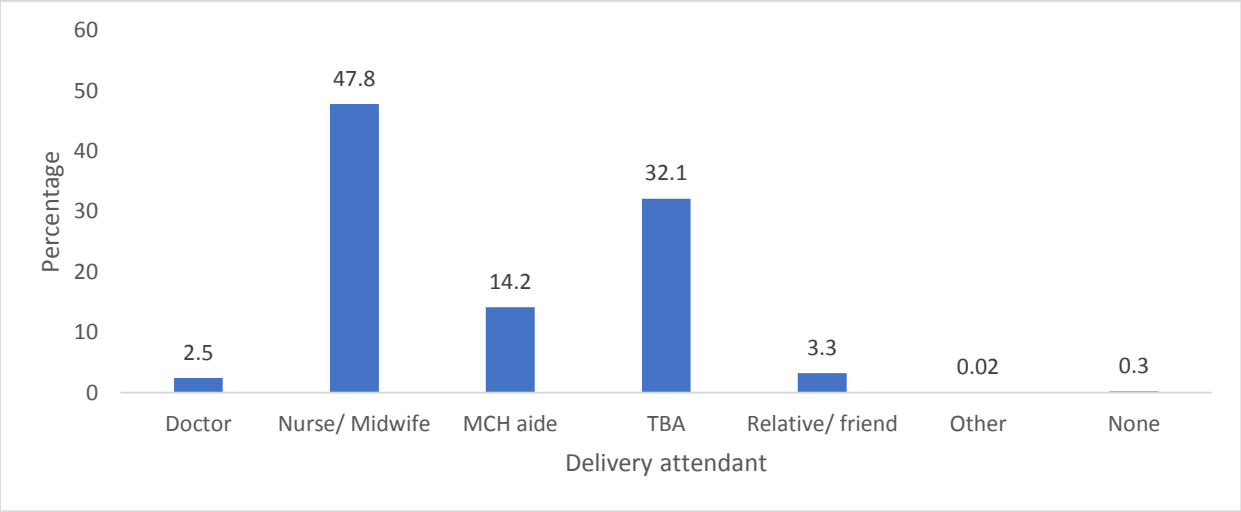


Figure 6: Delivery attendant for Sierra Leonean women, 2009-2013 (N=8446)

4.4 Determinants of utilization of Antenatal care

4.4.1 Bivariate association for place of antenatal care

Table 5: Socio-demographic Characteristics of respondents from the 2013 Sierra Leone Demographic and health survey and association with type of place of antenatal care (N=8,272)

Socio-demographic Characteristics	Total (%)	Type of place of ANC		*X^2	Fisher exact p-value	X^2 P-value
		Non-health facility (%)	Health facility (%)			
Wealth Index						
Poorest	1,681 (20.3)	31 (29.0)	1,650 (20.2)			
Poorer	1,576 (19.1)	19 (17.8)	1,557 (19.2)	5.80		0.22
Middle	1,630 (19.7)	18 (16.8)	1,612 (19.7)			
Richer	1,930 (23.3)	25 (23.4)	1,905 (23.3)			
Richest	1,455 (17.6)	14 (13.0)	1,441 (17.6)			
Religion						
No religion	29 (0.4)	0 (0.00)	29 (0.4)			
Christianity	1,648 (19.9)	19 (17.8)	1,629 (19.9)		0.81	
Islam	6,572 (79.4)	88 (82.2)	6,484 (79.4)			
Traditional/others	23 (0.3)	0 (0.00)	23 (0.3)			
Region						
Western	905(11.0)	13 (12.2)	896 (11.0)			
Northern	3,366 (40.7)	53 (49.5)	3,313 (40.6)	4.68		0.20
Eastern	1,623 (19.6)	15 (14.0)	1,608 (19.7)			
Southern	2,374 (28.7)	26 (24.3)	2,348 (28.7)			
Marital Status						
Never married	845 (10.2)	8 (7.5)	837 (10.3)			
Married	6,521 (78.8)	86 (8.4)	6,435 (78.8)		0.78	
Cohabiting	269 (3.3)	4 (3.7)	265 (3.2)			
Separated/Divorced/ widowed	637 (7.7)	9 (8.4)	628 (7.7)			
Education						
No education	5,590 (67.6)	76 (71.0)	5,514 (67.5)			
Primary	1,045 (12.6)	18 (16.8)	1,027 (12.6)		0.07	
Secondary	1,451 (17.5)	10 (9.4)	1,441 (17.6)			
Higher	186 (2.3)	3 (2.8)	186 (2.3)			
Place of residence						
Urban	2,824 (34.1)	27 (25.2)	2,797 (34.3)	3.82		**0.04
Rural	5,448 (65.9)	80 (74.8)	5,368 (65.7)			
Age						
15-19	619 (7.5)	5 (4.7)	614 (7.5)	2.51		0.87

20-24	1,299 (15.7)	15 (14.0)	1,284 (15.7)		
25-29	1,658 (20.0)	26 (24.3)	1,632 (20.0)		
30-34	1,488 (18.0)	20 (24.3)	1,468 (18.0)		
35-39	1,454 (17.6)	18 (16.8)	1,436 (17.6)		
40-44	853 (10.3)	12 (11.2)	841 (10.3)		
45-49	901 (10.9)	11 (10.3)	890 (10.9)		
Parity					
1	1,658 (20.0)	22 (20.6)	1,636 (20.0)	0.10	0.95
2-4	3,709 (44.8)	49 (45.8)	3,660 (44.8)		
5+	2,905 (35.1)	36 (33.6)	2,869 (35.1)		
Total	8,272(100)	107(100)	8,165(100)		

Source *chi square **p<0.05.

Analysis of the data for type of place of ANC for the 8,272 (67.0 %) respondents in table 5 above shows that the type of place of antenatal care for women was significantly associated with place residence ($p<0.05$). Women who were residing in urban areas were more likely to receive ANC at a health facility ($p=0.04$) than those in the rural areas.

4.4.2 Multivariate logistic regression analysis for place of antenatal care

Table 5 below shows the multivariate logistic regression result for the association between place of ANC and the independent variables. The result showed that women between the age 25-29 years had 74% reduction in the odds of receiving ANC from the health facility (OR 0.26; 95% CI 0.08-0.88) compared to those aged between 15- 19 while controlling for all other variables in the model.

Also, women who were living in rural areas had 35% reduction in the odds of receiving antenatal care from a health facility (OR=0.65 95% CI 0.37-1.10) as compared to women living in urban areas. But after Adjusting for all the other variables in the model the effect place of residence was found not significant.

Table 6: Crude and Adjusted odds ratios showing association between type of place of antenatal care from the 2013 SLDHS and selected socio-demographic characteristics

Socio-demographic characteristics	Crude odds ratio (95% CI)	P-value	Adjusted odds ratio (95% CI)	P-value
age				
15-19 (Ref)	1		1	
20-24	0.49 (0.15 – 1.61)	0.24	0.41 (0.12 – 1.35)	0.14
25-29	0.36 (0.12 – 1.13)	0.08	0.26 (0.08 – 0.88)	**0.03
30-34	0.51 (0.15 – 1.67)	0.26	0.34 (0.10 – 1.18)	0.09
35-39	0.57 (0.18 – 1.85)	0.35	0.35 (0.10 – 1.23)	0.10
40-44	0.51 (0.16 – 1.56)	0.23	0.30 (0.09 – 1.06)	0.06
45-49	0.68 (0.20 – 2.30)	0.54	0.41 (0.10 – 1.70)	0.22
Place of residence				
Urban (Ref)	1		1	
Rural	0.65 (0.37 – 1.10)	**0.04	0.64 (0.26 – 1.56)	0.32
Education				
No education (Ref)	1		1	
Primary	0.65 (0.36 – 1.16)	0.14	0.64 (0.36 – 1.15)	0.14
Secondary and Higher	1.97 (0.94 – 4.12)	0.07	2.00 (0.95 – 4.23)	0.07
Region				
Western (Ref)	1		1	
Northern	0.75 (0.37 – 1.49)	0.41	1.04 (0.50 – 2.19)	0.90
Eastern	1.26 (0.43 – 3.67)	0.67	1.64 (0.55 – 4.84)	0.37
Southern	1.26 (0.56 – 2.79)	0.59	1.70 (0.73 – 3.99)	0.22
Wealth Index				
Poorest (Ref)	1		1	
Poorer	1.07 (0.56 – 2.04)	0.83	1.14 (0.60 – 2.17)	0.69
Middle	1.01 (0.51 – 2.03)	0.97	1.08 (0.53 – 2.17)	0.84
Richer	0.91 (0.44 – 1.95)	0.79	0.77 (0.33 – 1.84)	0.56
Richest	1.43 (0.69 – 2.95)	0.34	0.97 (0.35 – 2.72)	0.96
Parity				
1 (Ref)	1		1	
2-4	1.04 (0.62 – 1.77)	0.88	1.65 (0.93 – 2.91)	0.09
5+	1.30 (0.73 – 2.33)	0.37	2.01 (0.96 – 4.40)	0.06

Source **p<0.05. (Ref)-reference category

4.4.3 Bivariate association for provider of antenatal care

Although majority of the respondents received antenatal care from skilled providers (nurse or midwife, MCH Aide and doctors) during the five (5) years period, table 6 below shows that the difference was not statistically significant for most of the variables. However, women who were living in the urban area had a significant greater chance of being seen by a skilled provider compare to those living in the rural area (P=0.04).

Table 7: Association between the type of provider of antenatal care from then 2013 SLDHS and socio-demographic characteristics

Socio-demographic characteristic	Total (%)	Type of provider of ANC		X^2	Fisher exact p-value	X^2 P-value
		Unskilled provider (%)	Skilled provider (%)			
Wealth Index						
Poorest	1,716 (20.3)	101 (18.6)	1,615 (20.5)			
Poorer	1,599 (19.)	99 (18.3)	1,500 (19.0)	2.70		0.608
Middle	1,651 (19.6)	102 (18.8)	1,549 (19.6)			
Richer	1,965 (23.3)	134 (24.7)	1,831 (23.2)			
Richest	1,498 (17.8)	106 (19.6)	1,392 (17.7)			
Religion						
No religion	29 (0.3)	1 (0.2)	28 (0.3)			
Christianity	1,714 (20.3)	116 (21.4)	1,598 (20.3)		0.91	
Islam	666 (79.1)	424 (72.2)	6,239 (79.1)			
Traditional/others	23 (0.3)	1 (0.2)	22 (0.3)			
Region						
Western	909 (10.8)	69 (12.7)	840 (10.6)			
Northern	3,366 (39.9)	226 (41.7)	3,140 (39.8)	5.84		0.12
Eastern	1,711 (20.3)	112 (20.7)	1,599 (20.3)			
Southern	2,443 (29.0)	135 (24.9)	2,308 (29.3)			
Marital Status						
Never married	865 (10.3)	56 (10.3)	809 (10.3)			
Married	6,651(78.9)	434 (85.1)	6,217 (78.8)	3.50		0.32
Cohabiting	273 (3.2)	21 (3.9)	252 (3.2)			
Separated/Divorced/ widowed	640 (7.6)	31 (5.7)	609 (7.7)			
Education						
No education	5,692 (67.5)	372 (68.6)	5,320 (67.5)			
Primary	1,063 (12.6)	61 (11.3)	1,002 (12.7)	1.65		0.648
Secondary	1,484 (17.6)	94 (17.3)	1,390 (17.6)			
Higher	190 (2.3)	15 (2.8)	175 (2.2)			
Place of residence				4.17		**0.04**

	Urban	2,895 (34.3)	208 (58.4)	2,687 (34.1)		
	Rural	5,534 (65.7)	334 (61.6)	5,200 (65.9)		
Age						
	15-19	262 (7.4)	42 (7.7)	584 (7.4)		
	20-24	1,326 (15.7)	80 (14.8)	1,246 (15.8)		
	25-29	1,694 (20.1)	102 (18.8)	1,592 (20.2)	7.04	0.32
	30-34	1,510 (17.9)	110 (20.3)	1,400 (17.7)		
	35-39	1,484 (17.6)	105 (19.4)	1,397 (17.5)		
	40-44	872 (10.4)	43 (7.9)	829 (10.5)		
	45-49	917 (10.9)	60 (11.1)	857 (10.9)		
Parity						
	1	1,693 (20.1)	100 (18.4)	1,593 (20.2)	1.32	0.57
	2-4	3,780 (44.8)	254 (46.9)	3,526 (44.7)		
	5+	2,956 (35.1)	188 (34.7)	2,768 (35.1)		
Total		8,429(100)	542(100)	7,887(100)		

Source: $^{**}p<0.05$. (Ref)-reference category, x^2: chi square

4.4.4 Multivariate logistic regression analysis for provider of antenatal care

The multivariate logistic regression analysis for the association between type of ANC provider and the independent variables from table 7 below shows that the odds of utilizing skilled ANC provider is 83% less (OR 0.17; 95% CI: 0.04-0.81) for women who were Christians, and 80% less (OR 0.20; 95% CI: 0.04-0.92) for Muslims compared to those who have no religion or belong to other religion, while controlling for other variables in the model.

Table 8: Crude and adjusted odd ratios showing association between ANC provider and socio-demographic characteristics

Socio-demographic characteristics	Crude Odd ratio	P-value	Adjusted Odd Ratio	P-value
Marital Status				
Never married(Ref)	1		1	
Married/Cohabiting	0.98(0.70-1.38)	0.92	0.88(0.60-1.30)	0.53
Separated/Divorced/widowed	1.39(0.85-2.27)	0.19	1.28(0.75-2.18)	0.37
Religion				
No religion/Others(Ref)	1		1	
Christianity	0.17(0.04-0.79)	**0.02**	0.17(0.04-0.81)	**0.03**
Islam	0.19(0.04-0.87)	**0.03**	0.20(0.04-0.92)	**0.04**
Parity				
1(Ref)	1		1	
2-4	0.99(0.77-1.28)	0.94	0.97(0.73-1.29)	0.85
5+	1.08(0.79-1.47)	0.64	1.03(0.69-1.56)	0.87
Region				
Western(Ref)	1		1	
Northern	1.18(0.68-2.05)	0.55	1.02(0.56-1.84)	0.96
Eastern	1.15(0.63-2.10)	0.64	1.05(0.56-1.97)	0.88
Southern	1.29(0.69-2.43)	0.43	1.15(0.57-2.32)	0.69
Wealth index				
Poorest(Ref)	1		1	
Poorer	1.10(0.78-1.54)	0.59	1.11(0.79-1.56)	0.55
Middle	0.96(0.68-1.35)	0.82	0.98(0.70-1.39)	0.92
Richer	0.84(0.59-1.21)	0.35	0.95(0.65-1.38)	0.77
Richest	0.78(0.50-1.23)	0.28	0.98(0.61-1.59)	0.94
Place of residence				
Urban(Ref)	1		1	
Rural	1.35(0.94-1.94)	0.10	1.33(0.88-2.01)	0.17
Education				
No education(Ref)	1		1	
Primary	1.18(0.86-1.63)	0.31	1.25(0.88-1.77)	0.20
Secondary and Higher	0.95(0.72-1.24)	0.68	1.11(0.81-1.52)	0.51
Age				
15-19(Ref)	1		1	
20-24	1.01(0.64-1.59)	0.97	1.06(0.66-1.70)	0.80
25-29	1.09(0.72-1.65)	0.68	1.18(0.76-1.85)	0.46
30-34	0.87(0.58-1.32)	0.52	0.93(0.58-1.51)	0.78

35-39	0.94(0.61-1.45)	0.79	1.00(0.60-2.66)	1.00
40-44	1.40(0.96-2.20)	0.14	1.49(0.83-2.66)	0.18
45-49	1.07(0.68-1.69)	0.77	1.10(0.63-1.92)	0.74

Source: **p<0.05. (Ref)-reference category

4.4.5 Bivariate association and Multivariate logistic regression analysis number of antenatal care visits

The association between the socio-demographic characteristic of the respondents and the number of antenatal visits made during the five (5) years period were found to be statistically not significant by both bivariate and multivariate analysis. Tables 7 & 8 show the results for the analysis.

Table 9: Association between the independent variables and the number of antenatal visits 2009-2013 (N=8,478)

Socio-demographic characteristic		Number of ANC visits		X^2	P value
	Total (%)	0-3 (%)	4+ (%)		
Wealth Index					
Poorest	1,734 (20.4)	182 (19.5)	1,552 (20.6)	2.16	0.71
Poorer	1,600 (18.9)	183 (19.6)	1,417 (18.8)		
Middle	1,660 (19.6)	174 (18.6)	1,486 (19.7)		
Richer	1,977 (23.3)	231 (24.7)	1,746 (23.1)		
Richest	1,507 (17.8)	165 (17.6)	1,342 (17.8)		
Religion					
No religion/Others	53 (0.6)	8 (0.9)	45 (0.6)	2.06	0.36
Christianity	1,722 (20.3)	177 (18.9)	1,545 (20.5)		
Islam	6,703 (79.1)	750 (80.2)	5,953 (78.9)		
Region					
Western	909 (10.7)	94 (10.1)	815 (10.8)	0.96	0.81
Northern	3,366 (39.7)	367 (39.2)	2,999 (39.8)		
Eastern	1,760 (20.8)	203 (21.7)	1,557 (20.6)		
Southern	2,443 (28.8)	271 (29.0)	2,172 (28.8)		
Marital Status					
Never married	870 (10.3)	92 (9.8)	778 (10.3)	0.94	0.63
Married/Cohabiting	6,963 (82.1)	765 (81.8)	6,198 (82.2)		
Separated/Divorced/ widowed	645 (7.6)	78 (8.3)	567 (7.5)		
Education					
No education	5,727 (67.5)	627 (67.1)	5,100 (67.6)	0.30	0.86
Primary	1,067 (12.6)	116 (12.4)	951 (12.6)		
Secondary and Higher	1,684 (19.9)	1192 (20.5)	1,492 (19.8)		
Place of residence					
Urban	2,919 (34.4)	325 (34.8)	2,594 (34.4)	0.05	0.82
Rural	5,559 (65.6)	610 (65.2)	4,949 (65.6)		
Age					
15-19	631 (7.4)	71 (7.6)	560 (7.4)	1.68	0.95
20-24	1,331 (15.7)	146 (15.6)	1,185 (15.7)		
25-29	1,702 (20.1)	197 (21.1)	1,505 (19.9)		
30-34	1,519 (17.9)	163 (17.4)	1,356 (18.0)		
35-39	1,493 (17.6)	162 (17.3)	1,331 (17.6)		
40-44	876 (10.3)	89 (9.5)	787 (10.4)		
45-49	926 (10.9)	107 (11.4)	819 (10.9)		
Parity					
1-2	1,700 (20.0)	190 (20.3)	1,510 (20.0)	0.79	0.68
3-4	3,803 (44.9)	407 (43.5)	3,396 (45.0)		
5+	2,975 (35.1)	338 (36.2)	2,637 (35.0)		
Total	8,478(100)	935(100)	7,543(100)		

Table 10: Crude and Adjusted Odds Ratio showing association between the socio-demographic characteristics and number of ANC visits from the 2013 Sierra Leone Demographic and health survey

Background characteristics	Crude odds ratio (95% CI)	P-Value	Adjusted odds ratio (95% CI)	P-value
age				
15-19 (Ref)				
20-24	0.97 (0.69 – 1.35)	0.84	0.95 (0.67 – 1.33)	0.75
25-29	0.95 (0.70 – 1.30)	0.74	0.92 (0.65 – 1.29)	0.63
30-34	1.09 (0.79 – 1.52)	0.60	1.09 (0.73 – 1.61)	0.68
35-39	1.00 (0.73 – 1.40)	0.96	1.02 (0.69 – 1.52)	0.90
40-44	1.24 (0.85 – 1.80)	0.26	1.29 (0.85 – 1.09)	0.24
45-49	1.03 (0.70 – 1.53)	0.88	1.10 (0.71 – 1.73)	0.66
Place of residence				
Urban (Ref)				
Rural	1.04 (0.80 – 1.36)	0.75	1.09 (0.78 – 1.53)	0.60
Education				
No education (Ref)				
Primary	1.09 (0.86 – 1.39)	0.45	1.11 (0.87 – 1.42)	0.40
Secondary and Higher	0.91 (0.73 – 1.13)	0.39	0.91 (0.73 – 1.13)	0.38
Region				
Western (Ref)				
Northern	0.91 (0.63 – 1.29)	0.59	0.90 (0.59 – 1.38)	0.62
Eastern	0.97 (0.64 – 1.47)	0.89	0.97 (0.60 – 1.56)	0.90
Southern	0.83 (0.56 – 1.24)	0.36	0.82 (0.51 – 1.31)	0.40
Wealth Index				
Poorest (Ref)				
Poorer	0.84 (0.65 – 1.07)	0.16	0.82 (0.64 – 1.6)	0.13
Middle	1.00 (0.76 – 1.30)	0.99	0.99 (0.76 – 1.30)	0.95
Richer	0.91 (0.69 – 1.19)	0.48	0.94 (0.71 – 1.27)	0.73
Richest	0.97 (0.68 – 1.39)	0.86	1.03 (0.65 – 1.61)	0.91
Parity				
1-2 (Ref)				
3-4	1.10 (0.89 – 1.35)	0.38	1.05 (0.83 – 1.32)	0.69
5+	1.07 (0.86 – 1.32)	0.55	0.94 (0.70 – 1.27)	0.69
Marital Status				
Never married (Ref)				
Married/Cohabiting	1.06 (0.82 – 1.38)	0.64	0.98 (0.73 – 1.30)	0.86
Separated/Divorced/ widowed	0.89 (0.63 – 1.26)	0.50	0.79 (0.56 – 1.18)	0.18

Religion				
No religion/Other (Ref)	1		1	
Christianity	1.46 (0.63 – 3.38)	0.38	1.40 (0.61 – 3.23)	0.43
Islam	1.46 (0.63 – 3.37)	0.37	1.38 (0.60 – 3.16)	0.45

4.5 Determinants of utilization of Delivery care

4.5.1 Bivariate association for place of delivery

Result from the bivariate analysis on table 9 below shows a significant strong association between place of delivery and the following independent variables: wealth index, religion, region and marital status ($p<0.05$).

There was no association between place of delivery and the variables age, parity, place of residence and education ($p>0.05$).

Table 11: Socio-demographic Characteristics of delivery care users from the 2013 Sierra Leone Demographic and health survey and association with place of delivery (N=8,446)

Socio-demographic characteristic		Place of Delivery		X^2	P value
	Total (%)	Health facility (%)	Non health facility (%)		
Wealth Index					
Poorest	1,729 (20.5)	1,072 (21.6)	657(18.8)		
Poorer	1,600 (18.9)	955 (19.3)	645 (18.5)	13.39	**0.01
Middle	1,653 (19.6)	949 (19.2)	704 (20.2)		
Richer	1,966 (23.3)	1,126 (22.7)	840 (24.0)		
Richest	1,498 (17.7)	851 (17.2)	647 (18.5)		
Religion					
No religion	29 (0.3)	14 (0.3)	15 (0.4)		
Christianity	1,716 (20.3)	1,004 (20.3)	712 (20.4)	11.45	**0.01
Islam	6,678 (79.1)	3,929 (79.3)	2,749 (78.7)		
Traditional/others	23 (0.3)	6 (0.1)	17 (0.5)		
Region					
Western	909 (10.8)	510 (10.3)	399 (11.4)		
Northern	3,366 (39.8)	1,931 (39.0)	1,435 (41.1)	9.59	**0.02
Eastern	1,728 (20.5)	1,053 (21.3)	675 (19.3)		
Southern	2,443 (28.9)	1,459 (29.4)	984 (28.2)		
Marital Status				8.42	**0.04

Never married	865 (10.2)	472 (9.5)	393 (11.3)		
Married	6,668 (79.0)	3,924 (79.2)	2,744 (78.6)		
Cohabiting	273 (3.2)	163 (3.3)	110 (3.1)		
Separated/Divorced/widowed	640 (7.6)	394 (8.0)	246 (7.0)		
Education					
No education	5,704 (67.5)	3,364 (67.9)	2,340 (67.0)	4.71	0.10
Primary	1,065 (12.6)	642 (13.0)	423 (12.1)		
Secondary and Higher	1,677 (19.9)	947 (19.1)	730 (20.9)		
Place of residence					
Urban	2,895 (34.3)	1,666 (33.6)	1,229 (35.2)	2.18	0.14
Rural	5,551 (65.7)	3,287 (66.4)	2,264 (64.8)		
Age					
15-19	628 (7.4)	366 (7.4)	262 (7.5)		
20-24	1,330 (15.8)	791 (16.0)	539 (15.4)		
25-29	1,697 (20.1)	958 (19.3)	739 (21.2)	6.93	0.33
30-34	1,511 (17.9)	902 (18.2)	609 (17.4)		
35-39	1,487 (17.6)	891 (18.0)	596 (17.1)		
40-44	872 (10.3)	496 (10.0)	376 (10.8)		
45-49	921 (10.9)	549 (11.1)	372 (10.6)		
Parity					
1	1,695 (20.1)	975 (19.7)	720 (20.6)	1.86	0.40
2-4	3,787 (44.8)	2,214 (44.7)	1,573 (45.0)		
5+	2,964 (35.1)	1,764 (35.61)	1,200 (34.4)		
Total	8,446(100)	4,953(100)	3,493(100)		

Source: $^{**}p<0.05$.

4.5.2 Multivariate logistic regression analysis for place of delivery

The result of multivariate analysis of place of delivery and it association with socio-demographic characteristics is shown in table 10.

Women who marital status were categorized as separated/divorced/widowed used had 38% higher odds of delivery in a health facility (OR 1.38; 95% CI 1.04-1.82) as compared to those who were categorized as never married while controlling for other variables.

Religion was also related with use of health facility for delivery. The result is statistically significant for women who practice traditional/other religion. They have 25% less odds of delivery in a health facility (OR 0.25; 95% CI 0.07- 0.92) compared to those with no religion while controlling for other variables.

The result for parity for those having five (5) or more children was found significant when unadjusted, but after controlling for other variables it was found statistically not significant.

Similarly, the result was not statistically significant for the remaining other socio-demographic characteristics.

Table 12: Crude and Adjusted Odds Ratio showing association between place of delivery from the 2013 Sierra Leone Demographic and health survey and background characteristics

Socio-demographic characteristics	Crude odds ratio (95% CI)	P-Value	Adjusted odds ratio (95% CI)	P-value
age				
15-19 (Ref)	1		1	
20-24	1.07 (0.86 – 1.32)	0.54	1.01 (0.81 – 1.27)	0.91
25-29	0.91 (0.72 – 1.14)	0.40	0.80 (0.62 – 1.03)	0.09
30-34	1.06 (0.85 – 1.33)	0.62	0.88 (0.68 – 1.15)	0.36
35-39	1.10 (0.89 – 1.37)	0.37	0.89 (0.67 – 1.17)	0.40
40-44	1.02 (0.80 – 1.29)	0.90	0.80 (0.59 – 1.09)	0.15
45-49	1.08 (0.85 – 1.38)	0.52	0.84 (0.61 – 1.14)	0.26
Place of residence				
Urban (Ref)	1		1	
Rural	1.01 (0.79 – 1.30)	0.94	0.98 (0.75 – 1.28)	0.87
Education				
No education (Ref)	1	1	1	
Primary	1.09 (0.91 – 1.29)	0.38	1.08 (0.91 – 1.30)	0.38
Secondary and Higher	0.91 (0.75 – 1.10)	0.31	0.94 (0.78 – 1.13)	0.51
Region				
Western (Ref)	1		1	
Northern	0.99 (0.64 – 1.52)	0.96	0.94 (0.60 – 1.50)	0.80
Eastern	1.03 (0.66 – 1.60)	0.89	0.98 (0.62 – 1.55)	0.93
Southern	1.01 (0.66 – 1.55)	0.97	0.97 (0.61 – 1.52)	0.88
Parity				
1-2 (Ref)	1		1	
3-4	1.05 (0.91 – 1.22)	0.51	1.10 (0.89 – 1.27)	0.53
5+	1.18 (1.02 – 1.38)	**0.03**	1.21 (0.96 – 1.52)	0.10

Marital Status				
Never married (Ref)	1		1	
Married	1.20 (0.98 – 1.47)	0.08	1.19 (0.96 – 1.48)	0.12
Cohabiting	1.05 (0.75 – 1.48)	0.77	1.04 (0.74 – 1.47)	0.81
Separated/Divorced/ widowed	**1.38 (1.06 – 1.79)**	****0.02**	**1.38 (1.04 – 1.82)**	****0.02**
Religion				
No religion (Ref)	1		1	
Christianity	0.97 (0.42 – 2.25)	0.95	1.03 (0.45 – 2.36)	0.95
Islam	0.95 (0.41 – 2.22)	0.91	0.97 (0.43 – 2.23)	0.95
Traditional/others	**0.24 (0.06 – 0.88)**	****0.03**	**0.25 (0.07 – 0.92)**	****0.04**

Source: **p<0.05. (Ref)-reference category

4.5.3 Bivariate association for delivery attendant

In analysis of the determinants of "utilization of attendant" during delivery, an additional variable called "use of antenatal care" was included. This is because this variable can serve as a strong positive predictor for use of assistance during delivery.

Results from the bivariate analysis are shown on table 11 below.

Women who utilized skilled attendant at delivery were different statistically from those who utilized unskilled attendant by wealth index, religion, use of antenatal care and region ($p<0.05$).

No significant differences were observed by marital status, education, place of residence, age and parity ($p>0.05$).

Table 13: Socio-demographic Characteristics of delivery care users from the 2013 Sierra Leone Demographic and health survey and association with category of delivery attendant (N=8,446)

Socio-demographic characteristic	Total (%)	Category of delivery attendant		Chi square	P value
		*SBA(%)	*UBA(%)		
Wealth Index					
Poorest	1,729 (20.5)	1,168 (21.5)	561 (18.6)	14.220	**0.01
Poorer	1,600 (18.9)	1,052 (19.4)	548 (18.2)		
Middle	1,653 (19.6)	1,040 (19.1)	613 (20.4)		
Richer	1,966 (23.3)	1,229 (22.6)	737 (24.5)		
Richest	1,498 (17.7)	948 (17.4)	550 (18.3)		
Religion					
No religion	29 (0.3)	16 (0.3)	13 (0.4)	9.992	**0.02
Christianity	1,716 (20.3)	1,112 (20.5)	604 (20.1)		
Islam	6,678 (79.1)	4,301 (79.1)	2,377 (79.0)		
Traditional/others	23 (0.3)	8 (0.1)	15 (0.5)		
Antenatal care					
No	168(2.0)	88(1.6)	809(26.9)	10.75	**<0.01
Yes	8,278(98.0)	5,437(98.4)	2,929(73.1)		
Region					
Western	909 (10.8)	5,571 (10.5)	338 (11.2)	12.337	**0.01
Northern	3,366 (39.8)	2,113 (38.9)	1,435 (41.6)		
Eastern	1,728 (20.5)	1,166 (21.4)	562 (18.7)		
Southern	2,443 (28.9)	1,587 (29.2)	856 (28.5)		
Marital Status					
Never married	865 (10.2)	534 (9.8)	331 (11.0)	5.05	0.17
Married	6,668 (79.0)	4,293 (79.0)	2,375 (78.9)		
Cohabiting	273 (3.2)	184 (3.4)	89 (3.0)		
Separated/Divorced/widowed	640 (7.6)	426 (7.8)	214 (7.1)		
Education					
No education	5,704 (67.5)	3,691 (67.9)	2,013 (66.9)	2.99	0.22
Primary	1,065 (12.6)	696 (12.8)	369 (12.3)		
Secondary and Higher	1,677 (19.9)	1,050 (19.3)	627 (20.8)		
Place of residence					
Urban	2,895 (34.3)	1,830 (33.7)	1,065 (35.4)	2.59	0.11
Rural	5,551 (65.7)	3,607 (66.3)	2,264 (64.6)		
Age					
15-19	628 (7.4)	408 (7.5)	220 (7.3)	5.64	0.47
20-24	1,330 (15.8)	869 (16.0)	461 (15.3)		
25-29	1,697 (20.1)	1,073 (19.7)	624 (20.7)		
30-34	1,511 (17.9)	993 (18.3)	518 (17.2)		
35-39	1,487 (17.6)	968 (17.8)	519 (17.2)		
40-44	872 (10.3)	540 (9.9)	332 (11.0)		

45-49	921 (10.9)	586 (10.8)	335 (11.1)		
Parity					
1	1,695 (20.1)	1,084 (19.9)	611 (20.3)	0.74	0.69
2-4	3,787 (44.8)	2,427 (44.6)	1,360 (45.2)		
5+	2,964 (35.1)	1,926 (35.4)	1,038 (34.5)		
Total	8,446(100)	5,437(100)	3,009(100)		

Source: **p<0.05. (Ref)-reference category

*SBA: Skilled Birth Attendant (Doctors, Nurse or midwife and MCH Aide)

*UBA: Unskilled Birth Attendant (TBA, Relative/Friends, CHO)

4.5.4 Multivariate logistic regression analysis for delivery attendant

The result of multivariate analysis in table 12 below shows that women who used antenatal care service had a 72% higher odds of utilizing a skilled attendant during delivery (OR 1.72; 95% CI 1.17-2.51) as compared to those who did not use antenatal care services while controlling for other variables.

Household wealth was also related with used of skilled attendant during delivery. The result is statistically significance for women in the middle wealth group, having 29% less odds of utilizing a skilled attendant during delivery (OR 0.71; 95% CI 0.56- 0.90).

The result was not statistically significant for the other socio-demographic characteristics.

Table 14: Crude and Adjusted Odds Ratio showing association between category of delivery attendant from the 2013 Sierra Leone Demographic and health survey and background characteristics

Background characteristics	Crude odds ratio (95% CI)	P-Value	Adjusted odds ratio (95% CI)	P-value
age				
15-19 (Ref)	1		1	
20-24	0.98 (0.78 – 1.23)	0.84	0.95 (0.74 – 1.21)	0.67
25-29	0.88 (0.70 – 1.13)	0.34	0.81 (0.61 – 1.07)	0.13
30-34	0.96 (0.76 – 1.22)	0.74	0.84 (0.62 – 1.10)	0.19
35-39	0.98 (0.78 – 1.24)	0.90	0.83 (0.61 – 1.11)	0.21
40-44	0.88 (0.68 – 1.14)	0.34	0.73 (0.53 – 1.01)	0.06
45-49	0.93 (0.71 – 1.21)	0.58	0.76 (0.54 – 1.05)	0.10
Place of residence				

Urban (Ref)	1		1	
Rural	1.04 (0.80 – 1.35)	0.77	1.04 (0.76 – 1.43)	0.78
Education				
No education (Ref)	1	1	1	1
Primary	1.10 (0.92 – 1.31)	0.29	1.10 (0.92 – 1.31)	0.30
Secondary and Higher	0.97 (0.79 – 1.18)	0.76	1.01 (0.84 – 1.22)	0.93
Region				
Western (Ref)	1		1	
Northern	0.91 (0.58 – 1.42)	0.68	0.88 (0.55 – 1.43)	0.61
Eastern	1.07 (0.67 – 1.73)	0.77	1.02 (0.62 – 1.67)	0.95
Southern	0.95 (0.60 – 1.51)	0.34	0.89 (0.54 – 1.45)	0.64
Wealth Index				
Poorest (Ref)	1		1	
Poorer	0.81 (0.64 – 1.04)	0.10	0.81 (0.64 – 1.03)	0.08
Middle	**0.70 (0.56 – 0.89)**	**<0.01**	**0.71 (0.56 – 0.90)**	****0.01**
Richer	0.81 (0.62 – 1.06)	0.13	0.83 (0.63 – 1.11)	0.22
Richest	0.81 (0.60 – 1.10)	0.18	0.84 (0.60 – 1.21)	0.36
Antenatal care				
No(Ref)	1		1	
Yes	**1.76(1.20-2.60)**	****<0.01**	**1.72(1.17-2.51)**	****0.01**
Parity				
1 (Ref)	1		1	
2-4	1.00 (0.87 – 1.16)	0.95	1.04 (0.88 – 1.26)	0.59
5+	1.10 (0.93 – 1.29)	0.26	1.21 (0.96 – 1.55)	0.11
Marital Status				
Never married (Ref)	1		1	
Married	1.11 (0.89 – 1.37)	0.36	1.14 (0.90 – 1.44)	0.26
Cohabiting	1.08 (0.74 – 1.56)	0.70	1.08 (0.74 – 1.58)	0.68
Separated/Divorced/ widowed	1.25 (0.94 – 1.65)	0.12	1.32 (0.98 – 1.79)	0.06
Religion				
No religion (Ref)	1		1	
Christianity	1.17 (0.50 – 2.74)	0.73	1.14 (0.48 – 2.76)	0.77
Islam	1.12 (0.48 – 2.64)	0.86	1.10 (0.47 – 2.58)	0.82
Traditional/others	0.30 (0.08 – 1.06)	0.06	0.31 (0.09 – 1.13)	0.08

Source: **p<0.05. (Ref)-reference category

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This chapter focus on the discussion of the findings of this study with respect to the determinants of utilization antenatal and delivery care services.

This study has identified a number of factors that had significant influence on utilization of maternal health care services in Sierra Leone during the five year period before the 2013 SLDHS.

5.2 Determinants of utilization of ANC services

Findings from this study show that Sierra Leonean women utilize ANC services far more than delivery care services. It was found out that a greater proportion of the women made use of the ANC services during pregnancy.

Seen from the results of number of ANC visits during pregnancy, about 98.0 % of the women made at least one ANC visit. Almost 89 % of those that used ANC services completed the WHO recommended four or more ANC visits that were in use at that time. Comparing this finding to a recent study conducted in Ethiopian which also analyzed data from the 2014 Ethiopian Mini Demographic and Health Survey, only 33.0 % of women completed the four or more ANC visits. The finding of the Ethiopian study also shows that variables such as age, education, region, residence (urban or rural), and household wealth index were significant predictors for completing four or more ANC. However, in this study, these socio-demographic variables were not significant determinants of the four or more ANC visits (Muchie Kindie Fentahun, 2017).

The use of ANC in Sierra Leone during the five year period before the survey was also much higher compare to the 42.9 % use of ANC services for at least one visit in Ethiopian(Shegaw M. Tarekegn, Lieberman, & Giedraitis, 2014), and 60.3 % in Nigeria(Babalola & Fatusi, 2009).

In this study, it was found out that the government health facilities were the most common place were women went for ANC. This a case for almost 98% of the women who had at least one ANC visits. The reason for this can be attributed to the availability and accessibility of the government health facilities for minimal costs or for free of charge following implementation of the free maternal and under five children health care in 2010.

This study also reveals that about 94 % of the ANC services were provided by skilled providers (Nurse or midwife, MCH Aide and Doctors). The proportion of the pregnant women that were seen by these skilled providers includes: doctors 2%, Nurse or midwife 58% and MCH Aid 34%. This finding is comparable to the finding from a similar study done in Ghana which also reveals that majority of the pregnant women are seen by nurse or midwife (doctors provided 17.8%, Nurse or Midwife 83% and Auxiliary Midwife 2.2%). The proportion of women who received antenatal care from unskilled providers was 6% in this study, whereas the proportion in the Ghana study was 1.2% (Adanu, 2017).

The significant determinants of utilization of ANC identified in this study are place of residence, age and religion.

More women in the urban areas had ANC in health facilities compared to those in the rural area.

However, the use of skilled ANC provider was more common among those in the rural areas (65%) than those in urban area (35%). This finding is contrary to the findings of the Ethiopian

study where 76% and 24 % of the urban and rural women respectively used skilled ANC provider (Shegaw M. Tarekegn et al., 2014).

The reason for the higher rural proportion of skilled ANC provider users can be attributed to the greater rural population of Sierra Leone. Nearly 70% of the population of Sierra Leone are found in the rural areas.

Christians and Muslims women were found to utilize the non-health facilities for ANC more than the health facilities, compared to those with no religion or other religion.

Women between the ages 25-29 years were also found to utilize the non-health facilities for ANC more than the health facilities compared those aged between 15-19 years.

Even though there were variations in the proportion of women who utilized ANC services with respect to their socio-demographic characteristics, this study, however, found some these characteristics (wealth index, region, religion, education and parity) not significant in determining the use of ANC services. This finding contradict the findings of a similar study conducted in Ghana which show that the use of ANC improves with wealth index and level of education; and reduce with increase parity of the women (Arthur, 2012).

In this study, more than two third of the respondents have no education.

About 3 in 5 of the women residing in the rural areas (especially those in the southern, eastern and northern regions of the country) are found in households labelled as poorer and poorest.

The Ghana study also shows that women utilize antenatal care more than delivery care. However, in this Ghanaian study, education, region and place of residence were found to be significant determinants of utilization of ANC services (Adanu, 2017).

Other findings contradicting the findings of this study were also got from a study conducted in Eritrea. The Eritrea study shows that the use of ANC services were determined by education, age and wealth index (Kibreab Habtom, 2017).

Similar contradicting finding was also got from a study done Nigeria. Education was identified a positive predictor for use of ANC services (Umar, 2017).

This increase in utilization of antenatal care in Sierra Leone irrespective of the socio-demographic characteristic of the respondents can be attributed to a great increase in antenatal care coverage most probably due to the free maternal health care initiative.

Analysis of data on the proportion of women who benefited from the essential components of antenatal care shows the quality of routine ANC coverage in the country during the five years period before the survey. In this study the components were whether a woman's blood pressure measurement was done, took iron/folic acid supplementation, was told about the signs of pregnancy complications, took drugs to prevent malaria, took tetanus toxoid injection and had urine and blood samples taking for screening tests. Although the proportion of women who benefited from antimalarial prophylaxis (75%) and those told about the signs of pregnancy complications (89%) were low, these proportion of women are higher compared to that reported in the Ghana study were the proportion for antimalarial prophylaxis and told about the signs of pregnancy complications were 55% and 59% respectively (Adanu, 2017).

5.3 Determinant of utilization of delivery care services

The utilization of delivery care services was found to be lower despite high use of ANC services.

Data analysed for delivery care revealed that only 59 % of the deliveries were institutional deliveries. The remaining 41% were done in the respondent's home or other homes. This is figure comparable to the 49% home deliveries revealed in the Ghana study (Adanu, 2017).

Analysis of data for delivery attendant revealed that only 64 % of the deliveries were done by skilled birth attendants and 37 % by unskilled attendants such TBAs, relatives/friends, community health officers and traditional healers.

The determinants of utilization of delivery care identified in this study are household wealth index, religion, region, marital status and use of antenatal care services.

Women from households with middle wealth index were found to utilize delivery care services more than those from households with lower wealth index (poorest and poorer). The higher the socio-economic status of the household the higher the utilization of delivery care services.

This finding is compatible with the finding of a study done in Rwanda which reported that a higher proportion of health facility deliveries where from among households in the higher and highest wealth classes (Jayaraman, Anuja chandrasekhar, s Gebreselassie, 2008).

Another study in Uttarakhand confirms this finding that women from household with higher socio-economic status uses delivery care services more than those from households with lower socio-economic status (Chimankar & Sahoo, 2011).

The religious denomination of the women was found to be a significant determinant of utilization of delivery care in this study. Christian and Muslim women were more likely to utilize delivery

care services than traditional and other religion. The possible reason for this is that women belonging to the traditional or other religion may not be more modern and they are rooted to traditional beliefs. However, home delivery was found more common among the Muslims.

This finding is consistent with findings from the Ethiopia study which revealed that religious denomination of women is an important predictor of Utilization of skilled birth attendant(Shegaw Mulu Tarekegn et al., 2014).

Disparity in the use of delivery care services in the four regions of the country was observed in this study. A very significant association was found between region and utilization of delivery care services. Women in the western region made use of delivery care services more than those who were in the other regions. This could be attributed to the differences in the number of maternal health care facilities and skilled providers available in the various regions. Freetown, the capital of Sierra Leone, which is found in the western region have a much higher number of skilled providers than other regions.

Similar regional disparity in the use of delivery care services was observed in the Ethiopia study(Shegaw Mulu Tarekegn et al., 2014).

The marital status of the women was also a significant determinant of utilization of delivery care services in this study.

Separated, divorced or widowed women had institutional delivery more than those categorised as married, cohabiting or never married women. However, the effect of marital status on the utilization of skilled attendant at delivery was found not significant in this study. This finding is consistent with another findings from studies done in Haiti and Kenya (Babalola SO, 2014; Ochako et al., 2011).

This study also found out a very significant association between use antenatal care utilization of delivery care services. Women who had ANC visit were found to utilize ANC services more than those with no ANC visit. This confirms the opinion that the use of ANC is important for the use of delivery care as women who had ANC were more likely to have institutional deliveries and use of SBA. This finding is in line with findings of studies done in Kenya, Ethiopia and Haiti (Babalola SO, 2014; Ochako et al., 2011; Shegaw M. Tarekegn et al., 2014).

CHAPTER SIX

6.1 CONCLUSION AND RECOMMENDATIONS

Generally, this study has shown that Sierra Leonean women made used of ANC more than institutional delivery and SBA.

More women made the WHO recommended minimum of four ANC visits practice at that time.

Although some variations in the utilization of ANC were observed among the women, however, these variations were not significantly associated with the socio-demographic characteristics of the women considered in this study.

The health facilities, especially the government health facilities, were more utilized for ANC than the private health facilities. The nurse or midwife and MCH Aide were the main providers of ANC to the women, especially for those in the rural areas. This shows that Sierra Leone has an alarming shortage of obstetrician/gynaecologists or medical doctors that are skilled providers.

Also, substantial improvement in the coverage of some essential ANC services was observed, more especially in the aspect early detection of pregnancy induced hypertension and prevention of neonatal tetanus and anaemia in pregnancy. However, much improvement is needed in the aspect of malaria prevention and awareness on danger signs during pregnancy. Provision of quality ANC services is expected to lead to more utilization of delivery care services.

This study reveals that, despite the high proportion of ANC users, the utilization of delivery care was generally low during the five year period.

The socio-economic status of the women (wealth index), region, religious denomination marital status and use of ANC were identified as the predictors of utilization of delivery care services.

It could be concluded that poverty, traditional and religious beliefs, lack of autonomy to use MHC services, region of residence, unavailability, inaccessibility, and inequitable distribution quality MHC services were some of the problems that affected the utilization of MHC services.

Based on the findings from this study the following recommendations are therefore made:

1) Multi sectoral approach to be used to tackle this problem. Other ministries, not just the Ministry of Health and sanitation, should be actively involved. Examples of such ministries include: Education, Youth, Gender and Children's affairs, Agriculture, Transportation, Labour, Information, etc.
2) Religious and traditional leaders should be pro-active in promoting the utilization of MHCS.
3) Improvement of the socio-economic status of the women through improvement on female education in all the four regions and provision of job opportunities.
4) Training of more health care workers especially in the field of maternity care.
5) Expansion and strengthening of MHC programmes in all the regions (especially in the rural areas). Information, education and communication campaign programmes should be provided also. These programmes should be culturally acceptable, need focused and youth friendly. Creating awareness about the effects of harmful traditional beliefs and practices should be incorporated into the programmes because some of these beliefs can negatively influence the pregnant women on the choice of place of delivery and the type of delivery assistant.
6) Initiating programmes that target men in order to create awareness about the importance of utilizing MHC services.

7) The need for further research on the knowledge of communities about birth preparedness and the importance of delivery at a health facility.

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APPENDICES

8.1 Appendix A: Sample design for the 2013 sierra Leon demographic and health survey

SAMPLE DESIGN — Appendix A

A.1 OBJECTIVES OF THE SURVEY

The 2013 Sierra Leone Demographic and Health Survey (SLDHS) is the second population and health survey that Sierra Leone has conducted. Based on a nationally representative sample of 13,006 households and 16,500 completed interviews of women, the main objectives of the 2013 SLDHS were to provide up-to-date information on fertility and childhood mortality levels; fertility preferences; awareness, approval, and use of family planning methods; maternal and child health; knowledge and attitudes towards HIV/AIDS and other sexually transmitted infections (STI); and prevalence of HIV/AIDS. All women age 15-49 who slept in the selected households the night before the survey were eligible for the survey. The survey results are representative for the country as a whole, for the urban and rural areas separately, for each of the four geographical regions, and for each of the 14 administrative districts.

Apart from the women's survey, a survey among men was conducted in one of every two households selected for the women's survey. All men age 15-59 who slept in the households selected for the men's survey were interviewed with the Man's Questionnaire. All eligible men age 15-59 and all eligible women age 15-49 in the households selected for men's survey were eligible for HIV testing.

A.2 SAMPLING FRAME

Administratively, Sierra Leone is divided into four geographical regions. Each region is subdivided into districts, each district into chiefdoms, and each chiefdom into sections. In total, there are 14 districts, 149 chiefdoms, and 1320 sections. In addition to these administrative units, during the 2004 Sierra Leone Population and Housing Census (SLPHC 2004), each section was subdivided into convenient area units called Enumeration Areas (EAs). An electronic file of a complete list of all EAs is available. The list contains census information on household, population, urban-rural specification, and administrative belongings for every EA. The census EA was used as the primary sampling unit (PSU), also called cluster, for the 2013 SLDHS. The samples of the 2013 SLDHS were selected from the frame of PSUs provided by Statistics Sierra Leone (SSL). The frame excluded the population living in collective housing units, such as hotels, hospitals, work camps, prisons, and the like. Table A.1 below gives the distribution of residential households, by districts and by urban-rural residence. In Sierra Leone, 36 percent of the households are in urban areas, according to the sampling frame.

Table A.1 Distribution of residential households by district and type of residence

	Residential households			Percentage distribution	
District	Urban	Rural	Total	Urban	District
Kailahun	9,353	55,573	64,926	14.4	7.9
Kenema	30,783	57,773	88,556	34.8	10.8
Kono	19,642	39,184	58,826	33.4	7.2
Bombali	15,503	46,408	61,911	25.0	7.6
Kambia	6,793	30,346	37,139	18.3	4.5
Koinadugu	3,714	39,986	43,700	8.5	5.3
Port Loko	10,552	55,038	65,590	16.1	8.0
Tonkolili	9,058	43,803	52,861	17.1	6.4
Bo	28,932	46,868	75,800	38.2	9.2
Bonthe	3,701	21,784	25,485	14.5	3.1
Moyamba	3,857	41,366	45,223	8.5	5.5
Pujehun	3,712	31,927	35,639	10.4	4.3
Western Area Rural	17,617	12,443	30,060	58.6	3.7
Western Area Urban	134,138		134,138	100.0	16.4
Sierra Leone	297,355	522,499	819,854	36.3	100.0

*Sampling frame from the 2004 Population and housing census.

In total, there are 9,671 EAs in Sierra Leone. Table A.2 gives the distribution of EAs and their average size in number of households by district and by urban-rural residence. There are 2,903 EAs located in urban areas and 6,768 EAs located in rural areas. On average, a census EA has 102 households in the urban areas and 77 households in the rural areas, with an overall average of 85 households per EA.

Table A.2 Population EAs and their average size in number of households by district and by type of residence

District	Residential households			Average EA size		
	Urban	Rural	Total	Urban	Rural	Total
Kailahun	86	618	704	109	90	92
Kenema	312	691	1003	99	84	88
Kono	109	496	605	180	79	97
Bombali	166	644	810	93	72	76
Kambia	84	422	506	81	72	73
Koinadugu	41	468	509	91	85	86
Port Loko	124	767	891	85	72	74
Tonkolili	122	703	825	74	62	64
Bo	251	586	837	115	80	91
Bonthe	53	310	363	70	70	70
Moyamba	67	549	616	58	75	73
Pujehun	49	428	477	76	75	75
Western Area Rural	90	86	176	196	145	171
Western Area Urban	1,349		1,349	99		99
Sierra Leone	2,903	6,768	9,671	102	77	85

*Sampling frame from the 2004 Population and housing census.

A.3 Sample Allocation and Sample Selection

The sample for the 2013 SLDHS was a stratified sample selected in two stages from the 2004 census frame. Stratification was achieved by separating each district into urban and rural areas. The West Urban Area has only urban areas. In total, 27 sampling strata had been constructed. Samples had been selected independently in each stratum, by a two-stage selection process. By sorting the sampling frame according to administrative orders and by using a probability proportional to size selection at the first stage's sampling, an implicit stratification and proportional allocation would have been achieved at each of the administrative levels.

The sample allocation took the precision consideration at domain level into account. The DHS surveys in the other countries show that in order to get a reasonable precision for most of the DHS indicators at domain level, at least 800 completed interviews of women age 15-49 are needed for each study domain. This would require at least about 800 households selected for each of the 14 districts. With a decision to interview 30 households per each cluster, Table A.3 below shows the detailed sample allocation clusters and households by district and by residence type.

Table A.3 Sample allocation of EAs and households by district and by type of residence

District	Number of clusters allocated			Number of households allocated		
	Urban	Rural	Total	Urban	Rural	Total
Kailahun	7	25	32	210	750	960
Kenema	15	18	33	450	540	990
Kono	13	18	31	390	540	930
Bombali	11	22	33	330	660	990
Kambia	7	22	29	210	660	870
Koinadugu	4	26	30	120	780	900
Port Loko	8	25	33	240	750	990
Tonkolili	7	24	31	210	720	930
Bo	16	17	33	480	510	990
Bonthe	6	21	27	180	630	810
Moyamba	4	25	29	120	750	870
Pujehun	5	24	29	150	720	870
Western Area Rural	18	10	28	540	300	840
Western Area Urban	37		37	1,110		1,110
Sierra Leon	158	277	435	4,740	8,310	13,050

In the first stage of selection, 435 EAs were selected with probability proportional to size (PPS) with the size of the EA being the number of residential households residing in the EA according to the 2004 population census. Before the main survey, a household listing operation was carried out in all of the selected EAs, and the resulting lists of households served as the sampling frame for the selection of households in the second stage. Some of the selected EAs were large in size. To minimise the task of household listing, the selected EAs with more than 200 households were segmented, and only one segment was selected for the survey with probability proportional to the segment size. Household listing was conducted only in the selected segment. Therefore, a 2013 SLDHS cluster is either an EA or a segment of an EA.

A.4 SELECTION PROBABILITY AND SAMPLING WEIGHT

Due to the non-proportional allocation of the sample to the different districts and to their urban-rural areas, sampling weights are required for any analysis using 2013 SLDHS data to ensure the actual representativeness of the survey results at the national as well as district level. Because the 2013 SLDHS sample was a two-stage stratified cluster sample, sampling weights were calculated based on sampling probabilities separately for each sampling stage and for each cluster. We use the following notations:

P_{1hi}: first-stage sampling probability of the i^{th} cluster in stratum h
P_{2hi}: second-stage sampling probability within the i^{th} cluster (household selection)

Let a_h be the number of clusters selected in stratum h, M_{hi} the number of households according to the sampling frame in the i^{th} cluster, and $\sum M_{hi}$ the total number of households in the stratum. The probability of selecting the i^{th} cluster in the 2013 SLDHS sample is calculated as follows:

$$\frac{a_h M_{hi}}{\sum M_{hi}}$$

Let b_{hi} be the proportion of households in the selected segment compared with the total number of households in the EA and i in stratum h if the EA is segmented; otherwise $b_{hi} = 1$. Then the probability of selecting cluster i in the sample is:

$$P_{1hi} = \frac{a_h M_{hi}}{\sum M_{hi}} \times b_{hi}$$

Let L_{hi} be the number of households listed in the household listing operation in cluster i in stratum h, and let g_{hi} be the number of households selected in the cluster. The second stage's selection probability for each household in the cluster is calculated as follows:

$$P_{2hi} = \frac{g_{hi}}{L_{hi}}$$

The overall selection probability of each household in cluster i of stratum h is therefore the product of the two stages of selection probabilities:

$$P_{hi} = P_{1hi} \times P_{2hi}$$

The design weight for each household in cluster i of stratum h is the inverse of its overall selection probability:

$$W_{hi} = 1 / P_{hi}$$

Next, the design weight is adjusted for household non-response and individual non-response to get the sampling weights for households and for women and men respectively. Non-response is adjusted at the

sampling stratum level. For the household sampling weight, the household design weight is multiplied by the inverse of the household response rate, by stratum. For the women's individual sampling weight, the household sampling weight is multiplied by the inverse of the women's individual response rate, by stratum. For the men's individual sampling weight, the household sampling weight for the male sub-sample is multiplied by the inverse of the men's individual response rate, by stratum. After adjusting for non-response, the sampling weights are normalised to get the final standard weights that appear in the data files. The normalisation process is done to obtain a total number of unweighted cases equal to the total number of weighted cases at the national level, for the total number of households, women, and men separately. Normalisation is done by multiplying the sampling weight by the estimated sampling fraction obtained from the survey for the household weight, the individual woman's weight, and the individual man's weight. The normalised weights are relative weights that are valid for estimating means, proportions, ratios, and rates, but they are not valid for estimating population totals or pooled data. The sampling weights for HIV testing are calculated in a similar way, but the normalisation of the HIV weights is different. The individual HIV testing weights are normalised at the national level for women and men together so that HIV prevalence estimates calculated for women and men together are valid.

A.5 SURVEY RESULTS

Tables A.4 and A.5 present the results of the sample implementation for women and men, respectively. Tables A.6 to A8 show HIV testing coverage among men and women, respectively, according to social, demographic, and sexual behaviour characteristics.

Table A.4 Sample implementation: Women

Percent distribution of households and eligible women by results of the household and individual interviews, and household, eligible women and overall women response rates, according to urban-rural residence and region (unweighted), Sierra Leone 2013

	Residence		Region				District													
Result	Urban	Rural	Eastern	Northern	Southern	Western	Kailahun	Kenema	Kono	Bombali	Kambia	Koina-dugu	Port Loko	Tonkolili	Bo	Bonthe	Mo-yamba	Pujehun	Western Area Rural	Western Area Urban	Total
Selected households																				
Completed (C)	96.4	97.5	97.1	97.2	97.4	96.3	96.2	98.2	96.9	95.4	98.5	98.0	97.5	96.9	98.6	94.9	97.4	98.4	97.4	95.5	97.1
Household present but no competent respondent at home (HP)	0.6	0.3	0.2	0.4	0.2	0.7	0.4	0.0	0.2	0.9	0.3	0.1	0.7	0.1	0.0	0.6	0.2	0.0	0.6	0.8	0.4
Postponed (P)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Refused (R)	0.2	0.0	0.1	0.0	0.0	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.2	0.4	0.1
Dwelling not found (DNF)	0.4	0.2	0.2	0.1	0.4	0.5	0.2	0.2	0.1	0.0	0.1	0.2	0.0	0.3	0.0	0.7	0.5	0.3	0.1	0.8	0.3
Household absent (HA)	1.1	1.3	1.3	1.6	1.0	0.6	1.9	1.0	0.9	3.6	0.5	1.1	0.3	2.3	0.8	1.9	0.5	0.9	0.4	0.8	1.2
Dwelling vacant/address not a dwelling (DV)	0.8	0.2	0.3	0.4	0.4	0.9	0.0	0.5	0.4	0.0	0.5	0.4	1.0	0.2	0.2	0.5	0.8	0.0	0.6	1.1	0.5
Dwelling destroyed (DD)	0.3	0.4	0.6	0.1	0.5	0.2	0.7	0.1	1.1	0.0	0.0	0.1	0.2	0.2	0.1	1.2	0.6	0.2	0.5	0.0	0.3
Other (O)	0.2	0.1	0.2	0.1	0.1	0.5	0.4	0.0	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.1	0.1	0.2	0.6	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of sampled households	4,739	8,267	2,853	4,668	3,534	1,951	950	982	921	989	870	900	987	922	990	804	870	870	840	1,111	13,006
Household response rate (HRR)[1]	98.8	99.5	99.5	99.4	99.3	98.4	99.2	99.8	99.6	99.1	99.5	99.7	99.2	99.6	99.7	98.5	99.3	99.7	99.0	98.0	99.3
Eligible women																				
Completed (EWC)	96.8	97.5	97.3	98.5	96.9	95.0	97.5	97.5	97.0	98.7	99.4	98.3	98.9	96.8	98.6	95.2	95.5	97.4	97.3	93.2	97.2
Not at home (EWNH)	1.8	1.3	1.3	0.9	1.4	3.2	1.4	1.6	0.9	1.0	0.3	0.7	0.8	1.8	0.5	0.8	3.0	1.7	1.8	4.2	1.5
Postponed (EWP)	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1
Refused (EWR)	0.7	0.5	0.5	0.2	0.9	0.9	0.1	0.3	1.0	0.1	0.0	0.9	0.0	0.1	0.0	3.4	0.5	0.1	0.2	1.5	0.6
Partly completed (EWPC)	0.2	0.1	0.2	0.0	0.1	0.3	0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.4	0.1
Incapacitated (EWI)	0.3	0.4	0.4	0.3	0.5	0.4	0.6	0.3	0.2	0.1	0.2	0.1	0.2	1.0	0.6	0.4	0.5	0.5	0.6	0.2	0.4
Other (EWO)	0.2	0.2	0.3	0.0	0.2	0.2	0.2	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.5	0.2	0.1	0.2	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	6,996	10,136	3,462	6,329	4,494	2,847	976	1,183	1,303	1,305	1,272	1,119	1,440	1,193	1,539	1,030	1,004	921	1,243	1,604	17,132
Eligible women response rate (EWRR)[2]	96.8	97.5	97.3	98.5	96.9	95.0	97.5	97.5	97.0	98.7	99.4	98.3	98.9	96.8	98.6	95.2	95.5	97.4	97.3	93.2	97.2
Overall women response rate (ORR)[3]	95.7	97.0	96.9	97.8	96.2	93.5	96.8	97.3	96.6	97.8	98.9	98.0	98.1	96.4	98.3	93.8	94.8	97.1	96.3	91.3	96.5

[1] Using the number of households falling into specific response categories, the household response rate (HRR) is calculated as:

$$\frac{100 * C}{C + HP + P + R + DNF}$$

[2] The eligible women response rate (EWRR) is equivalent to the percentage of interviews completed (EWC)
[3] The overall women response rate (OWRR) is calculated as:
OWRR = HRR * EWRR/100

Table A.5 Sample implementation: Men

Percent distribution of households and eligible men by results of the household and individual interviews, and household, eligible men and overall men response rates, according to urban-rural residence and region (unweighted), Sierra Leone 2013

	Residence		Region				District														
Result	Urban	Rural	Eastern	Northern	Southern	Western	Kailahun	Kenema	Kono	Bombali	Kambia	Koinadugu	Port Loko	Tonkolili	Bo	Bonthe	Moyamba	Pujehun	Western Area Rural	Western Area Urban	Total
Selected households																					
Completed (C)	96.2	97.8	97.2	97.3	97.5	96.3	96.4	98.2	97.0	96.6	98.4	98.2	96.6	97.2	99.0	94.5	97.7	98.4	96.9	95.9	97.2
Household present but no competent respondent at home (HP)	0.6	0.2	0.1	0.3	0.2	1.0	0.2	0.0	0.2	0.4	0.5	0.0	0.6	0.2	0.0	0.5	0.2	0.0	1.2	0.9	0.4
Postponed (P)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0
Refused (R)	0.3	0.0	0.1	0.0	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.5	0.4	0.1
Dwelling not found (DNF)	0.2	0.2	0.0	0.1	0.4	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.7	0.5	0.5	0.2	0.4	0.2
Household absent (HA)	1.3	1.1	1.2	1.5	0.9	0.8	2.1	1.0	0.4	3.0	0.2	1.6	0.4	2.2	0.4	2.2	0.2	0.9	0.2	1.3	1.2
Dwelling vacant/address not a dwelling (DV)	0.8	0.3	0.3	0.6	0.4	0.6	0.0	0.6	0.2	0.0	0.5	0.2	1.8	0.2	0.2	0.5	0.9	0.0	0.2	0.9	0.5
Dwelling destroyed (DD)	0.4	0.3	0.9	0.0	0.5	0.1	0.8	0.2	1.7	0.0	0.0	0.0	0.2	0.0	0.0	1.2	0.5	0.2	0.2	0.0	0.4
Other (O)	0.3	0.1	0.2	0.1	0.0	0.4	0.2	0.0	0.4	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of sampled households	2,369	4,132	1,426	2,333	1,767	975	475	491	460	494	435	450	493	461	495	402	435	435	420	555	6,501
Household response rate (HRR)[1]	98.9	99.5	99.8	99.5	99.3	98.2	99.6	100.0	99.8	99.6	99.3	100.0	99.2	99.6	99.6	98.4	99.3	99.5	98.1	98.3	99.3
Eligible men																					
Completed (EMC)	95.0	97.3	97.0	97.1	97.4	92.5	97.3	96.9	96.9	95.4	98.3	97.6	97.1	97.2	98.1	95.5	98.0	97.8	93.6	91.6	96.4
Not at home (EMNH)	3.2	1.7	1.3	2.2	1.3	5.1	1.0	1.7	1.1	4.1	1.1	1.2	2.1	2.6	0.9	1.1	1.6	1.8	5.5	4.8	2.3
Postponed (EMP)	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1
Refused (EMR)	0.7	0.5	0.6	0.2	0.8	0.7	0.2	0.7	0.8	0.4	0.0	0.4	0.4	0.0	0.5	2.7	0.0	0.3	0.3	1.0	0.5
Partly completed (EMPC)	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.1
Incapacitated (EMI)	0.2	0.2	0.5	0.1	0.2	0.1	0.7	0.2	0.8	0.0	0.0	0.4	0.0	0.2	0.3	0.2	0.2	0.0	0.2	0.1	0.2
Other (EMO)	0.7	0.2	0.4	0.2	0.2	1.3	0.7	0.5	0.0	0.0	0.6	0.4	0.2	0.0	0.2	0.4	0.0	0.0	0.3	1.9	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of men	3,137	4,400	1,513	2,685	1,982	1,357	408	583	522	540	540	499	561	545	645	445	492	400	579	778	7,537
Eligible men response rate (EMRR)[2]	95.0	97.3	97.0	97.1	97.4	92.5	97.3	96.9	96.9	95.4	98.3	97.6	97.1	97.2	98.1	95.5	98.0	97.8	93.6	91.6	96.4
Overall men response rate (ORR)[3]	94.0	96.9	96.8	96.7	96.7	90.8	96.9	96.9	96.7	95.0	97.6	97.6	96.3	96.8	97.7	94.0	97.3	97.3	91.8	90.1	95.7

[1] Using the number of households falling into specific response categories, the household response rate (HRR) is calculated as:

$$\frac{100 * C}{C + HP + P + R + DNF}$$

[2] The eligible men response rate (EMRR) is equivalent to the percentage of interviews completed (EMC)
[3] The overall men response rate (OMRR) is calculated as:
OMRR = HRR * EMRR/100

Table A.6 Coverage of HIV testing by social and demographic characteristics: Women

Percent distribution of interviewed women age 15-49 by HIV testing status, according to social and demographic characteristics (unweighted), Sierra Leone 2013

Characteristic	Testing status				Total	Number
	DBS Tested[1]	Refused to provide blood	Absent at the time of blood collection	Other/missing[2]		
Marital status						
Never married	94.9	3.8	0.4	0.9	100.0	2,323
Ever had sexual intercourse	94.7	4.0	0.3	1.0	100.0	1,611
Never had sexual intercourse	95.4	3.5	0.6	0.6	100.0	712
Married/living together	96.0	2.9	0.3	0.9	100.0	5,393
Divorced or separated	94.2	4.7	0.0	1.0	100.0	295
Widowed	95.4	3.7	0.5	0.5	100.0	217
Type of union						
In polygynous union	96.4	2.4	0.2	1.0	100.0	1,915
In non-polygynous union	95.8	3.1	0.3	0.8	100.0	3,387
Not currently in union	94.9	3.9	0.4	0.8	100.0	2,835
DK/missing	93.4	4.4	0.0	2.2	100.0	91
Ever had sexual intercourse						
Yes	95.6	3.2	0.3	0.9	100.0	7,505
No	95.4	3.5	0.6	0.6	100.0	713
Missing	70.0	20.0	10.0	0.0	100.0	10
Currently pregnant						
Pregnant	98.1	1.7	0.0	0.1	100.0	688
Not pregnant or not sure	95.4	3.4	0.3	0.9	100.0	7,540
Times slept away from home in past 12 months						
None	95.5	3.4	0.3	0.8	100.0	5,033
1-2	95.7	3.0	0.4	0.9	100.0	1,592
3-4	96.1	2.6	0.5	0.8	100.0	871
5+	95.2	3.4	0.0	1.4	100.0	727
Missing	80.0	20.0	0.0	0.0	100.0	5
Time away in past 12 months						
Away for more than 1 month	95.1	3.6	0.2	1.1	100.0	1,321
Away for less than 1 month	96.2	2.5	0.4	0.8	100.0	1,853
No away	95.5	3.4	0.3	0.8	100.0	5,033
Missing	85.7	9.5	0.0	4.8	100.0	21
Ethnic group						
Creole	91.4	7.1	1.4	0.0	100.0	70
Fullah	91.8	7.9	0.0	0.4	100.0	280
Kono	94.4	4.3	0.8	0.5	100.0	391
Limba	93.8	3.1	0.2	2.9	100.0	550
Loko	95.1	1.9	0.0	2.9	100.0	206
Mandingo	96.4	3.2	0.4	0.0	100.0	251
Mende	95.5	3.4	0.3	0.7	100.0	2,755
Sherbro	93.1	6.0	0.5	0.5	100.0	217
Temne	96.9	2.3	0.3	0.5	100.0	2,735
Koranho	97.7	1.3	0.3	0.7	100.0	304
Other Sierra Leone	94.3	3.3	0.5	1.9	100.0	423
Other Foreign	90.9	9.1	0.0	0.0	100.0	33
Missing	92.3	7.7	0.0	0.0	100.0	13
Religion						
Christian	94.8	3.3	0.4	1.5	100.0	1,829
Islam	95.8	3.2	0.3	0.7	100.0	6,352
Other	95.7	4.3	0.0	0.0	100.0	23
None	100.0	0.0	0.0	0.0	100.0	3
Missing	90.5	9.5	0.0	0.0	100.0	21
Total	95.6	3.2	0.3	0.9	100.0	8,228

[1] Includes all Dried Blood Samples (DBS) tested at the lab and for which there is a result, i.e., positive, negative, or indeterminate. Indeterminate means that the sample went through the entire algorithm, but the final result was inconclusive.
[2] Includes: 1) other results of blood collection (e.g., technical problem in the field), 2) lost specimens, 3) non corresponding bar codes, and 4) other lab results such as blood not tested for technical reason, not enough blood to complete the algorithm, etc.

Table A.7 Coverage of HIV testing by social and demographic characteristics: Men

Percent distribution of interviewed men 15-59 by HIV testing status, according to social and demographic characteristics (unweighted), Sierra Leone 2013

Characteristic	Testing status				Total	Number
	DBS Tested[1]	Refused to provide blood	Absent at the time of blood collection	Other/missing[2]		
Marital status						
Never married	92.5	5.9	0.6	1.1	100.0	2,869
Ever had sexual intercourse	93.1	5.6	0.5	0.8	100.0	1,916
Never had sexual intercourse	91.2	6.3	0.7	1.8	100.0	953
Married/living together	93.1	5.6	0.4	0.8	100.0	4,127
Divorced or separated	88.6	7.7	0.9	2.7	100.0	220
Widowed	93.5	4.3	0.0	2.2	100.0	46
Type of union						
In polygynous union	93.8	5.0	0.4	0.8	100.0	923
In non-polygynous union	92.9	5.8	0.4	0.9	100.0	3,204
Not currently in union	92.2	6.0	0.6	1.2	100.0	3,135
Ever had sexual intercourse						
Yes	93.0	5.7	0.4	0.9	100.0	6,300
No	91.2	6.3	0.7	1.8	100.0	950
Missing	91.7	0.0	0.0	8.3	100.0	12
Male circumcision						
Circumcised	92.8	5.7	0.5	1.0	100.0	7,213
Not circumcised	83.9	9.7	0.0	6.5	100.0	31
DK/missing	83.3	11.1	0.0	5.6	100.0	18
Times slept away from home in past 12 months						
None	92.3	6.0	0.4	1.3	100.0	3,497
1-2	93.1	5.7	0.5	0.6	100.0	1,137
3-4	94.3	4.9	0.3	0.5	100.0	1,058
5+	92.4	5.9	0.6	1.0	100.0	1,564
Missing	83.3	0.0	0.0	16.7	100.0	6
Time away in past 12 months						
Away for more than 1 month	94.4	4.7	0.4	0.5	100.0	1,830
Away for less than 1 month	92.1	6.4	0.6	0.9	100.0	1,923
No away	92.3	6.0	0.4	1.3	100.0	3,497
Missing	75.0	8.3	0.0	16.7	100.0	12
Ethnic group						
Creole	88.5	7.7	1.3	2.6	100.0	78
Fullah	87.1	12.2	0.0	0.7	100.0	303
Kono	93.2	5.9	0.3	0.6	100.0	323
Limba	91.2	5.5	0.4	2.9	100.0	452
Loko	94.1	5.3	0.0	0.6	100.0	169
Mandingo	94.1	5.0	0.0	0.9	100.0	222
Mende	93.1	5.4	0.5	0.9	100.0	2,384
Sherbro	88.8	9.5	0.0	1.7	100.0	232
Temne	93.8	4.9	0.6	0.6	100.0	2,449
Koranho	97.6	2.4	0.0	0.0	100.0	246
Other Sierra Leone	89.1	7.8	0.6	2.5	100.0	357
Other Foreign	87.5	12.5	0.0	0.0	100.0	32
Missing	73.3	13.3	0.0	13.3	100.0	15
Religion						
Christian	91.0	7.2	0.3	1.5	100.0	1,494
Islam	93.3	5.4	0.5	0.9	100.0	5,742
Other	85.7	14.3	0.0	0.0	100.0	14
None	75.0	0.0	0.0	25.0	100.0	4
Missing	75.0	12.5	0.0	12.5	100.0	8
Total	92.7	5.8	0.5	1.0	100.0	7,262

[1] Includes all Dried Blood Samples (DBS) tested at the lab and for which there is a result, i.e., positive, negative, or indeterminate. Indeterminate means that the sample went through the entire algorithm, but the final result was inconclusive.
[2] Includes: 1) other results of blood collection (e.g., technical problem in the field), 2) lost specimens, 3) non corresponding bar codes, and 4) other lab results such as blood not tested for technical reason, not enough blood to complete the algorithm, etc.

Table A.8 Coverage of HIV testing by sexual behaviour characteristics: Women

Percent distribution of interviewed women age 15-49 who ever had sexual intercourse by HIV test status, according to sexual behaviour characteristics (unweighted), Sierra Leone 2013

Sexual behaviour characteristic	Testing status				Total	Number
	DBS Tested[1]	Refused to provide blood	Absent at the time of blood collection	Other/missing[2]		
Age at first sexual intercourse						
<16	95.8	3.0	0.2	1.0	100.0	3,368
16-17	96.0	3.0	0.3	0.7	100.0	2,055
18-19	95.1	3.6	0.4	0.9	100.0	950
20+	94.7	4.1	0.0	1.3	100.0	393
Missing	95.4	3.7	0.4	0.5	100.0	739
Multiple sexual partners and partner concurrency in past 12 months						
0	96.5	2.4	0.2	1.0	100.0	1,137
1	95.4	3.3	0.3	0.9	100.0	5,889
2+	96.5	3.3	0.0	0.2	100.0	457
Had concurrent partners[3]	95.2	4.4	0.0	0.3	100.0	294
None of the partners were concurrent	98.8	1.2	0.0	0.0	100.0	163
Missing	90.9	4.5	0.0	4.5	100.0	22
Condom use at last sexual intercourse in past 12 months						
Used condom	90.8	6.1	0.0	3.1	100.0	196
Did not use condom	95.6	3.3	0.3	0.8	100.0	6,137
No sexual intercourse in last 12 months	96.4	2.4	0.2	1.0	100.0	1,159
DK/missing	100.0	0.0	0.0	0.0	100.0	13
Number of lifetime partners						
1	93.9	4.3	0.3	1.4	100.0	2,394
2	95.8	2.8	0.3	1.1	100.0	2,213
3-4	97.0	2.5	0.2	0.3	100.0	2,031
5-9	97.1	2.5	0.5	0.0	100.0	647
10+	96.7	1.6	0.0	1.6	100.0	61
Missing	95.6	3.8	0.0	0.6	100.0	159
Prior HIV testing						
Ever tested	95.8	3.0	0.4	0.8	100.0	4,101
Received results	95.7	3.1	0.4	0.8	100.0	3,165
Did not received results	96.0	2.9	0.3	0.7	100.0	936
Never tested	95.5	3.4	0.1	1.0	100.0	3,342
Missing	91.9	4.8	0.0	3.2	100.0	62
Total	95.6	3.2	0.3	0.9	100.0	7,505

[1] Includes all Dried Blood Samples (DBS) tested at the lab and for which there is a result, i.e., positive, negative, or indeterminate. Indeterminate means that the sample went through the entire algorithm, but the final result was inconclusive.
[2] Includes: 1) other results of blood collection (e.g., technical problem in the field), 2) lost specimens, 3) non corresponding bar codes, and 4) other lab results such as blood not tested for technical reason, not enough blood to complete the algorithm, etc.
[3] A respondent is considered to have had concurrent partners if he or she had overlapping sexual partnerships with two or more people during the 12 months before the survey

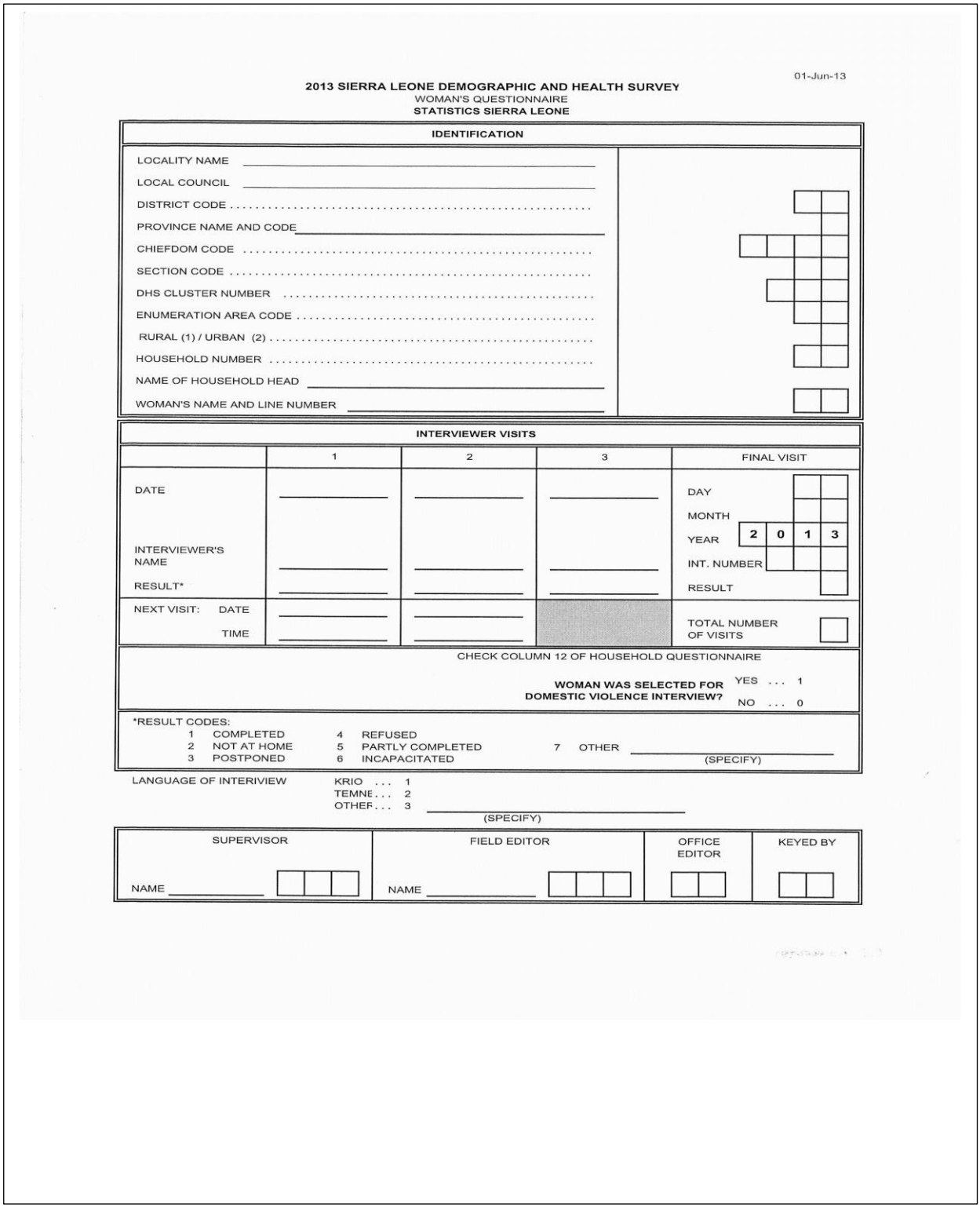
Table A.9 Coverage of HIV testing by sexual behaviour characteristics: Men

Percent distribution of interviewed men age 15-59 who ever had sexual intercourse by HIV test status, according to sexual behaviour characteristics (unweighted), Sierra Leone 2013

Sexual behaviour characteristic	Testing status					
	DBS Tested[1]	Refused to provide blood	Absent at the time of blood collection	Other/missing[2]	Total	Number
Age at first sexual intercourse						
<16	93.1	5.2	0.6	1.1	100.0	1,567
16-17	93.6	5.4	0.3	0.6	100.0	1,731
18-19	93.3	5.4	0.4	0.8	100.0	1,572
20+	92.2	6.4	0.4	1.1	100.0	1,327
Missing	85.4	13.6	0.0	1.0	100.0	103
Multiple sexual partners and partner concurrency in past 12 months						
0	93.7	5.1	0.2	1.0	100.0	414
1	92.4	6.3	0.4	0.9	100.0	4,017
2+	94.1	4.6	0.6	0.8	100.0	1,866
Had concurrent partners[3]	94.0	4.8	0.5	0.7	100.0	1,221
None of the partners were concurrent	94.3	4.2	0.8	0.8	100.0	645
Missing	66.7	33.3	0.0	0.0	100.0	3
Condom use at last sexual intercourse in past 12 months						
Used condom	90.2	8.5	0.6	0.8	100.0	532
Did not use condom	93.3	5.4	0.4	0.9	100.0	5,333
No sexual intercourse in last 12 months	93.5	5.3	0.2	1.0	100.0	417
DK/missing	72.2	16.7	5.6	5.6	100.0	18
Paid for sexual intercourse in past 12 months						
Yes	90.3	8.9	0.4	0.4	100.0	257
Used condom	91.9	7.3	0.0	0.8	100.0	123
Did not use condom	88.8	10.4	0.7	0.0	100.0	134
No (No paid sexual intercourse/no sexual intercourse in last 12 months)	93.1	5.6	0.4	0.9	100.0	6,043
Number of lifetime partners						
1	90.3	8.0	0.3	1.4	100.0	691
2	94.7	4.6	0.4	0.4	100.0	856
3-4	92.5	5.9	0.6	1.0	100.0	1,449
5-9	94.3	4.8	0.2	0.7	100.0	1,326
10+	94.2	4.6	0.4	0.9	100.0	1,009
Missing	90.9	7.2	0.7	1.1	100.0	969
Prior HIV testing						
Ever tested	92.1	6.6	0.3	1.0	100.0	1,208
Received results	92.3	6.4	0.3	1.0	100.0	994
Did not received results	91.1	7.5	0.5	0.9	100.0	214
Never tested	93.2	5.5	0.5	0.9	100.0	5,091
Missing	100.0	0.0	0.0	0.0	100.0	1
Total	93.0	5.7	0.4	0.9	100.0	6,300

[1] Includes all Dried Blood Samples (DBS) tested at the lab and for which there is a result, i.e., positive, negative, or indeterminate. Indeterminate means that the sample went through the entire algorithm, but the final result was inconclusive.
[2] Includes: 1) other results of blood collection (e.g., technical problem in the field), 2) lost specimens, 3) non corresponding bar codes, and 4) other lab results such as blood not tested for technical reason, not enough blood to complete the algorithm, etc.
[3] A respondent is considered to have had concurrent partners if he or she had overlapping sexual partnerships with two or more people during the 12 months before the survey. (Respondents with concurrent partners includes polygynous men who had overlapping sexual partnerships with two or more wives.)

8.2 Appendix B: 2013 Sierra Leone demographic and health survey woman's questionnaire



01-Jun-13

2013 SIERRA LEONE DEMOGRAPHIC AND HEALTH SURVEY
WOMAN'S QUESTIONNAIRE
STATISTICS SIERRA LEONE

IDENTIFICATION

LOCALITY NAME _____
LOCAL COUNCIL _____
DISTRICT CODE .....
PROVINCE NAME AND CODE _____
CHIEFDOM CODE .....
SECTION CODE .....
DHS CLUSTER NUMBER .....
ENUMERATION AREA CODE .....
RURAL (1) / URBAN (2) .....
HOUSEHOLD NUMBER .....
NAME OF HOUSEHOLD HEAD _____
WOMAN'S NAME AND LINE NUMBER _____

INTERVIEWER VISITS

	1	2	3	FINAL VISIT
DATE				DAY / MONTH / YEAR (2013)
INTERVIEWER'S NAME				INT. NUMBER
RESULT*				RESULT
NEXT VISIT: DATE				TOTAL NUMBER OF VISITS
TIME				

CHECK COLUMN 12 OF HOUSEHOLD QUESTIONNAIRE

WOMAN WAS SELECTED FOR DOMESTIC VIOLENCE INTERVIEW? YES ... 1 / NO ... 0

*RESULT CODES:
1 COMPLETED
2 NOT AT HOME
3 POSTPONED
4 REFUSED
5 PARTLY COMPLETED
6 INCAPACITATED
7 OTHER _____ (SPECIFY)

LANGUAGE OF INTERIVIEW
KRIO ... 1
TEMNE ... 2
OTHER ... 3 _____ (SPECIFY)

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	KEYED BY
NAME _____	NAME _____		

SECTION 1. RESPONDENT'S BACKGROUND

INTRODUCTION AND CONSENT

INFORMED CONSENT

Hello. My name is _____. I am working with Statistics Sierra Leone. We are conducting a survey about health all over Sierra Leone. The information we collect will help the government to plan health services. Your household was selected for the survey. The questions usually take about 30 to 60 minutes. All of the answers you give will be confidential and will not be shared with anyone other than members of our survey team. You don't have to take part in the survey, but we hope you will agree to answer the questions since your views are important. If I ask you any question you don't want to answer, just let me know and I will go on to the next question or you can stop the interview at any time.

In case you need more information about the survey, you may contact the person listed on the card that has already been given to your household.
Do you have any questions? May I begin the interview now?

SIGNATURE OF INTERVIEWER:_____ DATE: _____

RESPONDENT AGREES TO BE INTERVIEWED . . . 1 ↓ RESPONDENT DOES NOT AGREE TO BE INTERVIEWED . . . 2 → END

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	RECORD THE TIME.	HOUR . . . . . ☐☐ MINUTES . . . . . ☐☐	
102	In what month and year were you born?	MONTH . . . . . ☐☐ DON'T KNOW MONTH . . . . . 98 YEAR . . . . . ☐☐☐☐ DON'T KNOW YEAR 9998	
103	How old were you at your last birthday? COMPARE AND CORRECT 102 AND/OR 103 IF INCONSISTENT.	AGE IN COMPLETED YEARS ☐☐	
104	Have you ever attended school?	YES . . . . . 1 NO 2	→ 108
105	What is the highest level of school you attended: primary, secondary, or higher?	PRIMARY . . . . . 1 JUNIOR SECONDARY . . . . . 2 SENIOR SECONDARY . . . . . 3 VOCATIONAL / COMMERCIAL / NURSING TECHNICAL / TEACHING . . . . . 4 HIGHER 5	
106	What is the highest (grade / form / year) you **completed** at that level? IF COMPLETED LESS THAN ONE YEAR AT THAT LEVEL, RECORD '00'.	GRADE / FORM / YEAR . . . . . ☐☐	
107	CHECK 105: PRIMARY ☐ ↓ JUNIOR SECONDARY OR HIGHER ☐		→ 110

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
108	Now I would like you to read this sentence to me. SHOW CARD TO RESPONDENT IF RESPONDENT CANNOT READ WHOLE SENTENCE, PROBE: Can you read any part of the sentence to me?	CANNOT READ AT ALL ..... 1 ABLE TO READ ONLY PARTS OF SENTENCE ..... 2 ABLE TO READ WHOLE SENTENCE 3 NO CARD WITH REQUIRED LANGUAGE _____ 4 (SPECIFY LANGUAGE) BLIND/VISUALLY IMPAIRED 5	
109	CHECK 108: CODE '2', '3' OR '4' CIRCLED ☐ ↓ CODE '1' OR '5' CIRCLED ☐ →		111
110	Do you read a newspaper or magazine at least once a week, less than once a week or not at all?	AT LEAST ONCE A WEEK ..... 1 LESS THAN ONCE A WEEK ..... 2 NOT AT ALL 3	
111	Do you listen to the radio at least once a week, less than once a week or not at all?	AT LEAST ONCE A WEEK ..... 1 LESS THAN ONCE A WEEK ..... 2 NOT AT ALL 3	
112	Do you watch television at least once a week, less than once a week or not at all?	AT LEAST ONCE A WEEK ..... 1 LESS THAN ONCE A WEEK ..... 2 NOT AT ALL 3	
113	What is your religion?	CHRISTIAN ..... 1 ISLAM ..... 2 BAHAI ..... 3 TRADITIONAL ..... 4 NONE ..... 5 OTHER _____ 6 (SPECIFY)	
114	What is your ethnicity?	CREOLE ..... 11 FULLAH ..... 12 KONO ..... 13 LIMBA ..... 14 LOKO ..... 15 MANDINGO ..... 16 MENDE ..... 17 SHERBRO ..... 18 TEMNE ..... 19 OTHER SIERRA LEONE _____ 95 (SPECIFY) OTHER FOREIGN _____ 96 (SPECIFY)	
115	In the last 12 months, how many times have you been away from home for one or more nights? IF NUMBER OF TIMES IS 95 OR MORE, WRITE '95'.	NUMBER OF TIMES ..... ☐☐ NONE ..... 00 →	201
116	In the last 12 months, have you been away from home for more than one month at a time?	YES ..... 1 NO 2	

SECTION 4. PREGNANCY AND POSTNATAL CARE

401	CHECK 224: ONE OR MORE BIRTHS IN 2008 OR LATER ☐ / NO BIRTHS IN 2008 OR LATER ☐ → 556			
402	CHECK 215: ENTER IN THE TABLE THE BIRTH HISTORY NUMBER, NAME, AND SURVIVAL STATUS OF EACH BIRTH IN 2008 OR LATER. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS. BEGIN WITH THE LAST BIRTH. (IF THERE ARE MORE THAN 3 BIRTHS, USE LAST 2 COLUMNS OF ADDITIONAL QUESTIONNAIRES). Now I would like to ask some questions about your children born in the last five years. (We will talk about each separately.)			
403	BIRTH HISTORY NUMBER FROM 212 IN BIRTH HISTORY	LAST BIRTH BIRTH HISTORY NUMBER ☐☐	NEXT-TO-LAST BIRTH BIRTH HISTORY NUMBER ☐☐	SECOND-FROM-LAST BIRTH BIRTH HISTORY NUMBER ☐☐
404	FROM 212 AND 216	NAME _____ LIVING ☐ DEAD ☐	NAME _____ LIVING ☐ DEAD ☐	NAME _____ LIVING ☐ DEAD ☐
405	When you got pregnant with (NAME), did you want to get pregnant at that time?	YES . . . . . 1 (SKIP TO 408) NO 2	YES . . . . . 1 (SKIP TO 430) NO 2	YES . . . . . 1 (SKIP TO 430) NO 2
406	Did you want to have a baby later on, or did you not want any (more) children?	LATER . . . . . 1 NO MORE . . . . . 2 (SKIP TO 408)	LATER . . . . . 1 NO MORE . . . . . 2 (SKIP TO 430)	LATER . . . . . 1 NO MORE . . . . . 2 (SKIP TO 430)
407	How much longer did you want to wait?	MONTHS . .1 ☐☐ YEARS . . 2 ☐☐ DON'T KNOW . . . 998	MONTHS . .1 ☐☐ YEARS . . 2 ☐☐ DON'T KNOW . . . 998	MONTHS . .1 ☐☐ YEARS . . 2 ☐☐ DON'T KNOW . . . 998
408	Did you see anyone for antenatal care for this pregnancy?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 415)		
409	Whom did you see? Anyone else? PROBE TO IDENTIFY EACH TYPE OF PERSON AND RECORD ALL MENTIONED.	HEALTH PERSONNEL DOCTOR . . . . . A NURSE/MIDWIFE . B MCH AIDE . . . . . C OTHER PERSON TRADITIONAL BIRTH ATTENDANT D COMMUNITY/ VILLAGE HEALTH WORKER . . . E OTHER_____ X (SPECIFY)		

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____	SECOND-FROM-LAST BIRTH NAME _____
410	Where did you receive antenatal care for this pregnancy? Anywhere else? PROBE TO IDENTIFY EACH TYPE OF SOURCE. IF UNABLE TO DETERMINE IF PUBLIC OR PRIVATE SECTOR, WRITE THE NAME OF THE PLACE. _____ (NAME OF PLACE(S))	HOME YOUR HOME . . . A OTHER HOME . . . B PUBLIC SECTOR GOVT. HOSPITAL C GOVT. HEALTH CENTER . . . . . D GOVT. HEALTH POST . . . . . E OTHER PUBLIC SECTOR _____ F (SPECIFY) PRIVATE MED. SECTOR PVT. HOSPITAL/ CLINIC . . . . . G OTHER PRIVATE MED. SECTOR _____ H (SPECIFY) OTHER_____ X (SPECIFY)		
411	How many months pregnant were you when you first received antenatal care for this pregnancy?	MONTHS . . . ☐☐ DON'T KNOW 98		
412	How many times did you receive antenatal care during this pregnancy?	NUMBER OF TIMES ☐☐ DON'T KNOW 98		
413	As part of your antenatal care during this pregnancy, were any of the following done at least once: Was your blood pressure measured? Did you give a urine sample? Did you give a blood sample?	YES NO BP . . . . . 1 2 URINE . . . . . 1 2 BLOOD . . . 1 2		
414	During (any of) your antenatal care visit(s), were you told about things to look out for that might suggest problems with the pregnancy?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8		
415	During this pregnancy, were you given an injection in the arm to prevent the baby from getting tetanus, that is, convulsions after birth?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 418) ← DON'T KNOW 8		

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____	SECOND-FROM-LAST BIRTH NAME _____
416	During this pregnancy, how many times did you get a tetanus injection?	TIMES . . . . . ☐☐ DON'T KNOW 8		
417	CHECK 416:	2 OR MORE TIMES ☐ → (SKIP TO 421) OTHER ☐ →		
418	At any time before this pregnancy, did you receive any tetanus injections?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 421) ← DON'T KNOW . . . 8		
419	Before this pregnancy, how many times did you receive a tetanus injection? IF 7 OR MORE TIMES, RECORD '7'.	TIMES . . . . . ☐☐ DON'T KNOW 8		
420	How many years ago did you receive the last tetanus injection before this pregnancy?	YEARS AGO . . . . . ☐☐		
421	During this pregnancy, were you given or did you buy any iron tablets or iron syrup? SHOW TABLETS/SYRUP.	YES . . . . . 1 NO . . . . . 2 (SKIP TO 423) ← DON'T KNOW 8		
422	During the whole pregnancy, for how many days did you take the tablets or syrup? IF ANSWER IS NOT NUMERIC, PROBE FOR APPROXIMATE NUMBER OF DAYS.	DAYS ☐☐☐ DON'T KNOW . . . 998		
423	During this pregnancy, did you take any drug for intestinal worms?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8		
424	During this pregnancy, did you take any drugs to keep you from getting malaria?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 430) ← DON'T KNOW 8		
425	What drugs did you take? RECORD ALL MENTIONED.	SP/FANSIDAR . . . . . A CHLOROQUINE . . . B OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z		

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME ______	NEXT-TO-LAST BIRTH NAME ______	SECOND-FROM-LAST BIRTH NAME ______
426	CHECK 425: SP/FANSIDAR TAKEN FOR MALARIA PREVENTION.	CODE 'A' CIRCLED [ ] ↓ CODE 'A' NOT CIRCLED [ ] (SKIP TO 430)		
427	How many times did you take (SP/Fansidar) during this pregnancy?	TIMES ..... [ ][ ]		
428	CHECK 409: ANTENATAL CARE FROM HEALTH PERSONNEL DURING THIS PREGNANCY	CODE 'A', 'B' OR 'C' CIRCLED [ ] ↓ OTHER [ ] (SKIP TO 430)		
429	Did you get the (SP/Fansidar) during any antenatal care visit, during another visit to a health facility or from another source?	ANTENATAL VISIT .. 1 ANOTHER FACILITY VISIT .... 2 TRADITIONAL BIRTH ATTEND. . 3 OTHER SOURCE 6		
430	When (NAME) was born, was he/she very large, larger than average, average, smaller than average, or very small?	VERY LARGE ..... 1 LARGER THAN AVERAGE ..... 2 AVERAGE .... 3 SMALLER THAN AVERAGE ..... 4 VERY SMALL ..... 5 DON'T KNOW 8	VERY LARGE ..... 1 LARGER THAN AVERAGE ..... 2 AVERAGE .... 3 SMALLER THAN AVERAGE ..... 4 VERY SMALL ..... 5 DON'T KNOW 8	VERY LARGE ..... 1 LARGER THAN AVERAGE ..... 2 AVERAGE .... 3 SMALLER THAN AVERAGE ..... 4 VERY SMALL ..... 5 DON'T KNOW 8
431	Was (NAME) weighed at birth?	YES .... 1 NO .... 2 (SKIP TO 433) DON'T KNOW 8	YES .... 1 NO .... 2 (SKIP TO 433) DON'T KNOW 8	YES .... 1 NO .... 2 (SKIP TO 433) DON'T KNOW 8
432	How much did (NAME) weigh? RECORD WEIGHT IN KILOGRAMS FROM HEALTH CARD, IF AVAILABLE.	KG FROM CARD 1 [ ] . [ ][ ][ ] KG FROM RECALL 2 [ ] . [ ][ ][ ] DON'T KNOW 99998	KG FROM CARD 1 [ ] . [ ][ ][ ] KG FROM RECALL 2 [ ] . [ ][ ][ ] DON'T KNOW 99998	KG FROM CARD 1 [ ] . [ ][ ][ ] KG FROM RECALL 2 [ ] . [ ][ ][ ] DON'T KNOW 99998
433	Who assisted with the delivery of (NAME)? Anyone else? PROBE FOR THE TYPE(S) OF PERSON(S) AND RECORD ALL MENTIONED. IF RESPONDENT SAYS NO ONE ASSISTED, PROBE TO DETERMINE WHETHER ANY ADULTS WERE PRESENT AT THE DELIVERY.	HEALTH PERSONNEL DOCTOR ..... A NURSE/MIDWIFE . B MCH AIDE ..... C OTHER PERSON TRADITIONAL BIRTH ATTENDANT .. D RELATIVE/FRIEND . E OTHER ______ X (SPECIFY) NO ONE ASSISTED Y	HEALTH PERSONNEL DOCTOR ..... A NURSE/MIDWIFE . B MCH AIDE ..... C OTHER PERSON TRADITIONAL BIRTH ATTENDANT .. D RELATIVE/FRIEND . E OTHER ______ X (SPECIFY) NO ONE ASSISTED Y	HEALTH PERSONNEL DOCTOR ..... A NURSE/MIDWIFE . B MCH AIDE ..... C OTHER PERSON TRADITIONAL BIRTH ATTENDANT .. D RELATIVE/FRIEND . E OTHER ______ X (SPECIFY) NO ONE ASSISTED Y

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____	SECOND-FROM-LAST BIRTH NAME _____
434	Where did you give birth to (NAME)? PROBE TO IDENTIFY THE TYPE OF SOURCE. IF UNABLE TO DETERMINE IF PUBLIC OR PRIVATE SECTOR, WRITE THE NAME OF THE PLACE. _____ (NAME OF PLACE)	HOME YOUR HOME ... 11 (SKIP TO 438) ← OTHER HOME ... 12 PUBLIC SECTOR GOVT. HOSPITAL 21 GOVT. HEALTH CENTER ..... 22 GOVT. HEALTH POST ..... 23 OTHER PUBLIC SECTOR _____ 26 (SPECIFY) PRIVATE MED. SECTOR PVT. HOSPITAL/ CLINIC ..... 31 OTHER PRIVATE MED. SECTOR _____ 36 (SPECIFY) OTHER_____ 96 (SPECIFY) (SKIP TO 438) ←	HOME YOUR HOME ... 11 (SKIP TO 448) ← OTHER HOME ... 12 PUBLIC SECTOR GOVT. HOSPITAL 21 GOVT. HEALTH CENTER ..... 22 GOVT. HEALTH POST ..... 23 OTHER PUBLIC SECTOR _____ 26 (SPECIFY) PRIVATE MED. SECTOR PVT. HOSPITAL/ CLINIC ..... 31 OTHER PRIVATE MED. SECTOR _____ 36 (SPECIFY) OTHER_____ 96 (SPECIFY) (SKIP TO 448) ←	HOME YOUR HOME ... 11 (SKIP TO 448) ← OTHER HOME ... 12 PUBLIC SECTOR GOVT. HOSPITAL 21 GOVT. HEALTH CENTER ..... 22 GOVT. HEALTH POST ..... 23 OTHER PUBLIC SECTOR _____ 26 (SPECIFY) PRIVATE MED. SECTOR PVT. HOSPITAL/ CLINIC ..... 31 OTHER PRIVATE MED. SECTOR _____ 36 (SPECIFY) OTHER_____ 96 (SPECIFY) (SKIP TO 448) ←
434A	How long after (NAME) was delivered did you stay there? IF LESS THAN ONE DAY, RECORD HOURS. IF LESS THAN ONE WEEK, RECORD DAYS.	HOURS 1 ☐☐ DAYS 2 ☐☐ WEEKS 3 ☐☐ DON'T KNOW ... 998		
435	Was (NAME) delivered by caesarean, that is, did they cut your belly open to take the baby out?	YES ..... 1 NO 2		
435A	What was used to cut the umbilical cord?	BLADE FROM DELIVERY BAG . 1 OTHER BLADE ... 2 RAZOR ..... 3 SCISSORS ..... 4 OTHER _____ 6 (SPECIFY) DON'T KNOW 8		
435B	Was (NAME) wiped dry when he was born?	YES ..... 1 NO ..... 2 (SKIP TO 436) ← DON'T KNOW 8 (SKIP TO 436) ←		
435C	How soon after birth was (NAME) wiped dry?	HOURS ... ☐☐ IMMEDIATELY / LESS THAN 1 HOUR ... 00 24 HRS OR MORE 24 DON'T KNOW 98		