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THE SOCIO-ECONOMIC DETERMINANTS OF MATERNAL HEALTH CARE UTILIZATION IN KAILAHUN DISTRICT, SIERRA LEONE, 2020

BY

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DECLARATION

I, Desmond Maada Kangbai, declare that except for other people's work which has been duly acknowledged, this thesis is the result of my original research undertaken under the supervision and that it has neither in whole nor in part been presented for another degree in this university or elsewhere.

14/10/2020

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We hereby certify that this thesis was supervised in accordance with the procedures laid down by the University of Ghana.

OCTOBER 21,2020

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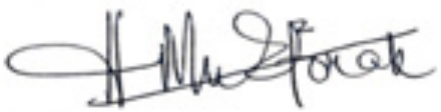

24th October 2020

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DEDICATION

This thesis is firstly dedicated to the Almighty Father for strengthening me throughout this period of studies, to my sisters; Fattykay, Mariama and, Babyjoe, my lovely wife; Dr. Nella Clemens-Kangbai, my children; Dessie and Daisy for their unending support and love.

I also dedicate it to my parent; Hon. P.C. and Madam Joe Kangbai Macavoray 3.

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ABSTRACT

BACKGROUND: Ascertaining the key determinants of maternal healthcare service utilization and their relative importance is critical to priority setting in policy development. Sierra Leone has one of the world's highest maternal death ratios in the context of a weak health system with poor health facilities. The objectives of this study were to determine; the level of utilization of Antenatal Care (ANC), Skilled Birth Attendants (SBA), Postnatal Care (PNC) services, and factors that influence the utilization of these services.

METHODS: A retrospective community-based cross-sectional study involving 554 women of reproductive age between 15-49 years who had at least one delivery in the last 3 years before this study in Kailahun District, Sierra Leone. The outcome variables were the utilization of skilled ANC, skilled birth attendants, and postnatal care services. The independent variables were categorized as enabling and predisposing factors. Data were analyzed using Excel 2018 and Stata IC 15.0. Bivariate, multivariate, and multinomial regression models were used in the analysis. The study was carried out from November 2019 to October 2020.

RESULTS: The median age of respondents was 25 years (Q1=17 years, Q3=30 years). Seventy-eight percent (78%) of women had ANC from a skilled provider. Fifty-five percent (55%) made their first ANC visit in the first trimester, 88.63% had 4 or more ANC visits. Only 35.92% of women were delivered by a skilled birth attendant. Education of women, residence, parity, occupation of women, husband's education, and proximity to the health facility was significantly associated with the use of maternal healthcare service. Women that live in the city (AOR 6.20, 95% CI 3.61-10.63, P=<0.001) and women whose husbands completed primary education (AOR 2.38, 95% CI 1.30-4.35, P=0.005) were more likely to use skilled birth attendant. Women that walked 30-60 minutes to seek healthcare were more likely to use a

skilled birth attendant than those that walked <30 (AOR 2.98, 95% CI 1.67-5.33, P=<0.001). Women who had a secondary/vocational level of education had 2.35 times increased odds of utilizing the standard PNC category as compared to those with no education (OR=2.35, 95% CI=1.19-4.63, P=0.013).

CONCLUSION: The majority had 4 or more ANC visits yet the use of skilled birth attendants was low. Urban residence and education were significantly associated with the use of the standard PNC category. Education level and occupation of women, Husband's education, urban residence, and distance to health facilities were significant determinants of SBA use. To improve the utilization of maternal health care services, national healthcare policies should target the advancement of education, rural infrastructure, and the empowerment of women

Keywords: Determinants, Maternal Healthcare, Skilled Birth attendant, Antenatal care, Postnatal care, Kailahun, Sierra Leone

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LIST OF ABBREVIATIONS

PNS	Postnatal Services
ANC	Antenatal Care
SSA	Sub-Saharan Africa
MCHA	Maternal and Child Health Aide
CHO	Community Health Officer
SECHN	State Enrolled Community Health Nurse
UN	United Nations
WHO.	World Health Organization
UNDP	United Nation Development Programme
UNFPA	United Nation Population fund
ICD	International Classification of Diseases
NGO	Non-Governmental Organization
CHC	Community Health Centre
CHP	Community Health Post
MCHP	Maternal and Child Health Post
PSU	Primary Sampling Unit
EAs	Enumeration Areas
BP	Blood Pressure
HIV	Human Immunodeficiency Virus
CI	Confidence Interval
AOR	Adjusted Odds Ratio
COR	Crude Odds Ratio
HH	Household

r	Random Number
k	Sampling Interval
DHS	Demographic and Health Survey

DEFINITION OF TERMS

SKILLED BIRTH ATTENDANT: professionals with midwifery skills including Doctors, midwives, community health officers.

ANTENATAL CARE: This is the routine health control of presumed healthy pregnant women without symptoms, to diagnose diseases or complicating obstetric conditions without symptoms, and to provide information about lifestyle, pregnancy, and delivery. Pregnancy services provided by health professions (Nurses, Doctors, CHOs, and Midwives).

POSTNATAL CARE: services provided to women within 42 days after delivery by health professionals (Nurses, Doctors, CHOs, and Midwives).

MATERNAL MORTALITY RATIO: defined as the number of maternal deaths occurring in a given year per 100,000 live births within the same period.

DETERMINANTS OF MATERNAL HEALTH CARE UTILIZATION: these are factors that influence the utilization of maternal health care services; ANC, delivery care, and PNC.

CHAPTER 1

INTRODUCTION

1.1 Background

Accessible healthcare services for women play a significant role in influencing the health and wellbeing of women during pregnancy, childbirth, and after delivery (Ovikuomagbe, 2017). As indicated in Ovikuomagbe (2017) maternal health care utilization is very essential for women's survival around childbirth and the well-being of the mother and child. This involves the care a woman receives throughout her pregnancy, labor, and postnatally (Ovikuomagbe, 2017)

The World Health Organisation (2020) has set a goal in alignment with the 3rd Sustainable Development Goals (SDG) which aim to reduce the global maternal mortality ratio (MMR) to less than 70 per 100,000 live births by 2030". Ascertaining the core determining factors of maternal health care utilization and how these factors affect the livelihood of mothers is critical and must be a priority in policy development. Nonetheless, there are only a few studies that quantify the role of such determinants (Cameron, Suarez, & Cornwell, 2019a) and certainly not in Sierra Leone. Researches have shown that there is a high prevalence of maternal, neonatal, and child death rates which are linked to non- or poor availability of quality maternal healthcare services (WHO, 2017).

Besides, the available scarce evidence has revealed that accessing skilled care before, throughout pregnancy, and after delivery saves the lives of mothers and their new-born child (S.M., L.S., & V., 2014). Studies have shown that, if mothers have access to healthcare facilities that provide interventions and preventive measures to treat obstetric complications, especially in an emergency an estimated 74% of maternal mortality could be prevented (S.M.,

L.S., & V., 2014). Therefore, it is important to make use of the ANC, skilled delivery attendants, and postnatal care, as they are identified as key providers to improve health outcomes for mothers and their babies (S.M. et al., 2014).

In Sub-Saharan Africa (SSA), maternal mortality is high (Figueroa, Linhart, Beckley, & Pardosi, 2018). The factors that influence the increase in death rate were also associated with prenatal care coverage and skilled attendance at delivery. Also, the inability to utilize these maternal healthcare services was another predictor of perinatal mortality (World Health Organisation, 2017).

It is important for initial and regular antenatal care (ANC) attendance throughout the pregnancy. The reason being, through these regular visits the healthcare providers will have a better chance to detect and reduce any risk factors associated with adverse pregnancy outcomes and to advise the mothers' to have a skilled attendant at delivery (Rutaremwa, Wandera, Jhamba, Akiror, & Kiconco, 2015). According to Rutaremwa et al., (2015), the use of PNC improves the health and wellbeing of the mother and the newborn baby. It has been documented that Sub-Saharan Africa has the lowest coverage of skilled delivery utilization It is estimated that approximately, only 45% of women used skilled delivery attendants at delivery (S.M. et al., 2014).

In Sierra Leone, based on data from the past five years, approximately, 54% of births occurred in an institution; 52% occurred in government healthcare centers; 2% in a private health setting; 44% at home (Figueroa et al., 2018). Approximately, 49% of mothers between the ages of 35-49 years, 50% of their babies were delivered at home (DHS, 2013). Six out of ten deliveries are attended by a skilled provider, and 44% were attended by a nurse/midwife; 14% by an MCH Aide, and 2% by a doctor (DHS, 2013). On the other hand, 36% of childbirths are supervised by traditional birth attendants and 3% by family members or other people. Data also

shows that 73% of mothers received postnatal care within 2 days after the birth of their last child; 57% received postnatal care within four hours; 7% received care within 4-23 hours, and 10 % were seen one to two days after the birth. Also, 20% of mothers did not receive any postnatal check-ups (DHS, 2013).

Globally, 800 women die per day owing to pregnancy-related complications (Uzabakiriho & Maswime, 2019). Maternal death remains a great concern with virtually 99% of all maternal deaths happening in developing nations, but the prevalence is higher in Sub-Saharan Africa (Apanga & Awoonor-Williams, 2018a). As indicated in Apanga and Awoonor-Williams (2018), 1 in 180 pregnant women died during delivery in developing countries while 1 in 4,900 in advanced nations. Also, 75% of maternal mortality occurs as a result of pregnancy and its related complications (Apanga et al., 2018). As reported in the most recent UN data, it has been recorded that "Sierra Leone has one of the world's highest maternal death ratios at 1360 deaths per 100 000 babies born. Based on these figures, it is estimated that up to 6% of women in Sierra Leone will die from maternal causes during their reproductive life" (World Health Organisation, 2017).

This research seeks to investigate the individual-, household- and community-level factors that affect women's use of maternal healthcare services in Eastern Sierra Leone with a focus on prenatal, delivery care, and postnatal care. It will provide a further understanding of factors influencing uptake of maternal health services in Eastern Sierra Leone, thus help in implementing policies that would reduce maternal death.

1.2 Problem Statement

Maternal death remains a major Public Health challenge despite the several approaches adopted by the global community to control it. Sierra Leone has poor healthcare facilities and is one of the poorest countries in the world (Directorate of Reproductive & Child Health, 2016). This county's healthcare was further decimated by catastrophes such as the protracted civil war (1991-2000) and the Ebola virus disease outbreak in 2014 (Figueroa et al., 2018). Having access to good and quality healthcare services remains a major public health challenge and this is attributed to insufficient human resources for health, limited health expenditure, and problems linked with the breakdown of the drug and medical supply chain (Directorate of Reproductive & Child Health, 2016). The World Health Organisation recommends a critical threshold of 23 skilled healthcare providers (doctors, nurses, and midwives) per 10,000 populations. On the contrary, Sierra Leone suffers from an extreme lack of qualified healthcare workers, with the current statistics suggesting 2 skilled providers per 10,000 populations (Directorate of Reproductive & Child Health, 2016).

Sierra Leone is listed as one of the poorest countries and has a high maternal mortality ratio with poor medical facilities. An average Sierra Leonean lives far below the national minimum wage, this greatly impacts their ability to afford the resources to pay for their medical bills. Taking all these factors into consideration, the Government of Sierra Leone implemented the "Agenda for Change and Health Sector Strategic Plan, the Free Health Care Initiative" from 2010 to deliver free health care services to pregnant women, lactating mothers, and children under the age of 5 years (Government of Sierra Leone, 2013). In addition to this, in 2018, the government further provided free emergency ambulance services. Yet this has not solved the problem of maternal mortality across the country.

Data from the United Nations estimated that approximately 6% of women in Sierra Leone will die as a result of maternal-related causes during their reproductive lifespan since, 1360 maternal death per 100 000 babies born (WHO, 2017).

This has been on-going for a while, where six out of ten deliveries are supervised by a skilled provider, mainly a nurse/midwife 44%; an MCH Aide 14%, and 2% by a doctor. There are still risks as a high number of women 36% of deliveries are supervised by a traditional birth attendant, and 3% by relatives or some other person. It is considerably high to report that one in every five mothers did not receive any postnatal check-ups (DHS, 2013). As indicated in Rutaremwa et al. (2015), the use of postnatal care (PNC) services is influenced by the level of awareness about the services provided, women's occupation, ethnic group, the number of pregnancies and children, the husband/partner' socioeconomic grade, occupation, and education.

Studies have shown that the high prevalence of maternal, neonatal, and child death rates are strongly linked to inadequate and poor-quality maternal healthcare facilities (WHO, 2017). However, if all women have access to good and quality healthcare at facilities, it is estimated that 74% of maternal mortalities could be prevented (WHO, 2017). As a result, the use of ANC, skilled delivery attendants, and PNC are known to be key maternal health services to improve health outcomes for mothers and their kids. What we do not fully know is how service utilization is affected by socio-demographic and economic factors within which the women live especially in Sierra Leone and particularly in the Kailahun district which is one of the farthest from the national capital and the hub of the civil conflict in 1991.

1.3 Justification

Maternal mortality and the use of maternal healthcare facilities are public health concerns in developing nations. Sierra Leone is among the poorest countries in the world and has the highest maternal mortality ratio. The uptake of maternal healthcare services; antenatal care, skilled birth attendant, and postnatal care services is very low across the country. The Level of maternal mortality in Sierra Leone has been excessively high, estimated at 1360 deaths per 100 000 births. The medical and social causative factors of maternal mortality are well recognized. Yet, little or no attention has been giving to the causative factors of maternal mortality in the country. On the other hand, to prevent or reduce maternal deaths in Sierra Leone, it is essential to explore the causative factors and put measures in place which this research aims to achieve. This study seeks to examine the individual, community, and household factors that influence the utilization of maternal healthcare services in Kailahun District, Eastern Sierra Leone.

For Sierra Leone to work in line with the "Sustainable Development Goal by 2030", it is imperative to identify the key determinants that influence maternal healthcare utilization. The identification of these determining factors will influence the decision and priority setting in policy development.

1.4 Conceptual framework

For this study, we adopted Andersen's behavioral model of the determinants of health care utilization. (Fig. 1)

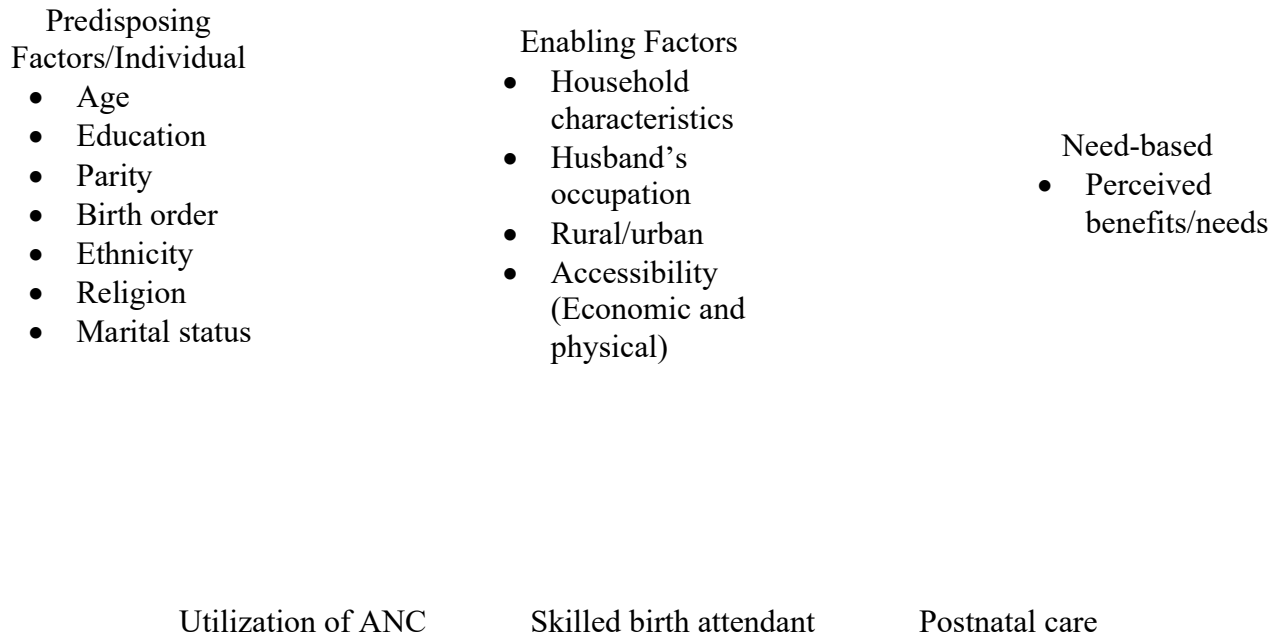

Figure 1: Conceptual framework of the determinants of maternal health care utilization

Andersen's behavioral model "examines the impact of individuals' demographic characteristics and health delivery system variables on utilization patterns. It hypothesizes that the decision to seek medical help is a function of three sets of variables" (S.M. et al., 2014):

1. Predisposing Factors: These are individual characteristics. Example age, education, birth order, ethnicity, religion, parity, marital status.
2. Enabling factors: includes husband's occupation, household income, household characteristics, accessibility (physical and economic), rural/urban.
3. The need to use service factor: perceived need, for example, "How people view their general health and functional state, as well as how they experience symptoms of illness, pain, and worries about their health and whether or not they judge their problems to be of sufficient importance and magnitude to seek professional help". (S.M. et al., 2014).

The figure above illustrates the connection between the independent variables and their effects on the utilization of maternal health care. This study will focus on the predisposing/individual factors and the enabling factors (physical, Household characteristics).

1.5 Research questions

The study focused primarily on answering the following questions to address the specific objectives

1. What is the level of utilization of ANC services in Kailahun District?
2. What is the level of utilization of postnatal care services in Kailahun District?
3. What is the level of utilization of skilled birth attendants in Kailahun District?
4. Which sociodemographic factors (such as age, education, parity, ethnicity, religion, household characteristics, and community factors) are related to maternal health service utilization in Kailahun District?

1.6 Study Objectives

1.6.1 General objective

To evaluate the Sociodemographic determinants of maternal health care utilization in Kailahun District, Eastern Sierra Leone.

1.6.2 Specific objectives

1. To determine the level of utilization of ANC services in Kailahun District
2. To determine the level of utilization of Postnatal care services in Kailahun District
3. To determine the level of utilization of skilled birth attendant in Kailahun District
4. To determine the socio-demographic factors (enabling and individual) that influences the utilization of maternal healthcare services

CHAPTER 2

2.1 Literature Review

This chapter explores all relevant literature that covers the determinants of maternal care utilization globally. However, the research is limited to Kailahun District, Eastern Sierra Leone, West Africa. To access appropriate information for the research, a relevant electronic database search was conducted. Search terms that are significant to the aims and objectives of the research were utilized. Relevant journals were searched with no time limit, language limited to English, and no limitation to geography for the researcher to access a varied variety of resources.

Journal articles were sort electronically via an online database searching these includes;

SAGE JOURNALS, PSCYINFO, PUBMED, and MEDLINE. Bearing in mind the nature of the research topic which is evidence-based, further information was sorted from World Health Organisation (WHO), United Nations Population Fund (UNFPA), and United Nations Development Programme (UNDP). Grey literature (unpublished literature) was also used. The reason being it will give the researcher a wider range of resources that are not published but still relevant to the study. These include policies and interventions. The use of grey literature in this research has helped in minimizing the publication unfairness as researches with unsound findings are less likely to be published in peer-review journals. Also, as stated in Adams et al., (2016), it helped in guiding the researcher regarding the interventions that already exist for a specific problem.

2.1.1 Maternal Mortality: An overview

World Health Organization (2015) "A maternal death is defined as the death of a woman as a result of the process of pregnancy, from the first stages of gestation up to 42 days after the termination of pregnancy, irrespective of duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management" (WHO UNICEF, UNFPA, 2015).

Maternal Mortality is classified into two groups; Direct Obstetric Deaths and Indirect Obstetric Deaths (WHO UNICEF, UNFPA, 2015). "Direct obstetric deaths are classified as a death resulting from the obstetric complications of pregnancy, interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above" (Schad & Skoner, 2008; van den Akker, Bloemenkamp, van Roosmalen, & Knight, 2017). "Indirect obstetric deaths are classified as a death resulting from a previous existing disease, or disease that developed during pregnancy that was not due to direct obstetric causes, but was aggravated by physiological effects of pregnancy" (Schad & Skoner, 2008; van den Akker et al., 2017).

These classifications into direct and indirect deaths were first counted in the ninth revision of the International Classification of Diseases (ICD) in 1975. The key reason was to focus on interventions. Nevertheless, decades on, numerous maternal mortalities are still not identified or misclassified (van den Akker et al., 2017). Instead of finding out the key causes of these deaths, most nations became hooked on grouping deaths as direct or indirect (van den Akker et al., 2017). Over the past years, these classifications in some way have led lots of practitioners to believe that direct maternal deaths ought to receive greater consideration than indirect maternal deaths. van den Akker et al (2017) argue that the separation concerning direct and indirect has become less meaningful and in some cases misleading.

2.1.2 Medical Causes of Maternal Mortality

The causation of maternal death can be characterized as follow; medical, socioeconomic, cultural, behavioral, and political (Aden, Ahmed, & Östergren, 2019). Considering the medical aspect, this is easily identified as one of the causes of maternal mortality. However, according to Oye-Adeniran et al (2014); WHO, (2016) maternal death usually consists of hemorrhage, infection, unsafe abortion, hypertensive diseases of pregnancy, and obstructed labor. These causes are consistent globally especially in Sub-Sahara Africa (Thorsen, Meguid, Sundby, &

Malata, 2014). Although most of these incidences are foreseen during routine prenatal care, however, most occur unexpectedly without warning signs (Thorsen et al., 2014). Pregnant women must be considered at risk of these complications (Oye-Adeniran et al., 2014). All pregnant women especially in Sub-Saharan Africa should be considered at risk of these complications throughout their pregnancy (Fawole et al., 2012; Ijadunola, Ijadunola, Esimai, & Abiona, 2010; Thorsen et al., 2014). High risk in pregnancy might be anticipated in women during prenatal care; for example: if they have high blood pressure, diabetes mellitus, pre-term rupture of the membranes, gestation of greater than 42 weeks, or vaginal bleeding (Fawole et al., 2012). Other health problems contribute to high-risk pregnancy and maternal death; these include women over the age of 35years, AIDS/ HIV infection, malaria, and anemia (Oye-Adeniran et al., 2014).

2.1.3 Factors Inclusive of Maternal Care Service

This is the inclusive wellbeing of women at the point of pregnancy and for children below the age of five years old. Maternal healthcare is all-inclusive which includes; education, social, nutritional services as well as medical care during and posts pregnancy (Aluko-Arowolo & Ademiluyi, 2015; Olonade, Olawande, Joseph Alabi, & Imhonopi, 2019). Studies have shown that though pregnant women should adhere to all-inclusive maternal healthcare. However, some explanations have been attributed as to why a lot of pregnant and nursing mothers chose not to make use of appropriate antenatal and postnatal care (Aluko-Arowolo & Ademiluyi, 2015; Olonade, Olawande, Alabi, & Imhonopi, 2019). Most of the listed reasons are being cultural, hereditarily related to social, economic, and political factors. This indicates that the natural environment, biological, and social environment performs major and critical functions in healthcare utilization and the behavior of women across most African societies. Cultural factors are considered as one of the key determining factor that influences health care

utilization behavior of pregnant women (Aluko-Arowolo & Ademiluyi, 2015; Olonade, Olawande, Alabi, et al., 2019).

2.1.4 Antenatal Care

Antenatal care is an important aspect of a pregnant woman's life, throughout pregnancy. The mother's health and well-being are greatly influenced and determined by the level of access to antenatal care through the accessibility of healthcare centers and qualified professionals that provide examinations and identify risk associated with the pregnancy (Aluko-Arowolo & Ademiluyi, 2015; Olonade, Olawande, Alabi, et al., 2019; Thorsen et al., 2014). Having the right to access specialized care and a referral system will allow the women to receive appropriate and personalized treatment throughout her pregnancy and birth (Aluko-Arowolo & Ademiluyi, 2015; Thorsen et al., 2014)

2.1.5 Delivery Care

Delivery care is very crucial for the expectant mother, to reduce maternal morbidity and mortality it is therefore recommended that every single child is delivered with the support of a skilled birth attendant which mostly consists of a medical doctor, nurse, or midwife (WHO, 2017). The availability of a skilled professional at every birth can minimize the risk of stillbirth and be able to identify any complications (Aluko-Arowolo and Ademiluyi, 2015; Thorsen et al., 2014).

2.1.6 Postnatal Care

The key reason for providing the best postnatal care is to prevent both maternal and neonatal mortality, as well as long-term complications (WHO, 2016). To be effective, the care provider must be able to know and identify the main causes of mortality in the postnatal period (WHO,

2016). In doing so, the care provider can provide quality and timely postnatal care at the local and health post level (Aluko-Arowolo and Ademiluyi, 2015; Thorsen et al., 2014).

2.1.7 Maternal Health Care in Sierra Leone

The estimated population in Sierra Leone is approximately 7 million with an annual growth rate of 3.5% (DHS, 2013). The life expectancy has moved from 43 to 50.9 (Figueroa et al., 2018; WHO, 2017). Within the Sub-Saharan African countries, Sierra Leone is one of the poorest with almost half of the working-age (61%) people are involved in agriculture to survive (Directorate of Reproductive & Child Health, 2016). Economic growth has been driven by mining. However, the Ebola outbreak triggered a significant loss, combined with the falling of global commodities prices (MOHS, 2016). This event contributed to a significant reduction of the economy and activities in all the regions (Figueroa et al., 2018).

There is a high prevalence of Maternal Mortality Ratio (MMR) of 1,165 (95% CI: 951- 1379) mortality per 100,000 live births (Directorate of Reproductive & Child Health, 2016). In 2015, the UN projected, that the MMR was 1,360 (95% CI: 999- 1980) deaths per 100,000 live births. Women have a 1 in 17 lifespan risk of dying due to complications related to pregnancy or childbirth (Directorate of Reproductive & Child Health, 2016; Figueroa et al., 2018). Maternal mortality accounts for 36% of all deaths amongst women aged 15-49 years (WHO, 2015). Sierra Leone is listed as one of the nations with the highest maternal death with poor healthcare facilities. This situation got worsen when the country was hit by the Ebola outbreak from 2014 – 2016 (Figueroa et al., 2018). This further diminished the existing health system (WHO, 2017) Even after this crisis, access to a good and quality healthcare system remains a concern for the Government and the people of Sierra Leone. Some of the causes of high maternal deaths include; inadequate human resources for health, limited health expenditure, and problems related to the breakdown of the drug and medical supply chain (Directorate of Reproductive &

Child Health, 2016; Figueroa et al., 2018). Considering the economic and extreme poverty in Sierra Leone, WHO recommends a critical threshold of 23 skilled healthcare professionals (doctors, nurses, and midwives) per 10,000 populations. Still, the country is experiencing an extreme shortage of qualified healthcare workers, merely able to provide 2 skilled professionals for 10,000 populations (Directorate of Reproductive & Child Health, 2016).

2.1.8 Social Determinants of Maternal Death

The social determinants of maternal death are multifaceted and interrelated (WHO, 2015). These determinants include; gender, geographical location, lack of education, poverty, unemployment, and socio-economic are grossly contributing factors to maternal death (Thorsen et al., 2014). Though poverty is reducing in other parts of the world, there is a high prevalence of poverty especially in Sub-Saharan Africa (Asongu & Le Roux, 2019). The rate of poverty has impacted the health and wellbeing of pregnant women and prevented them from attending prenatal care and hospital deliveries to due cost involvement (Piane, 2019; Piane & Clinton, 2014). Poverty does not only prevent pregnant women from paying for their treatment but also being able to afford good and healthy nutritional intake which occasionally leads to anemia (Piane, 2019).

The possibility of maternal mortality is negatively connected with the education of the family head and the head being in employment. Research conducted by Cameron, Contreras, and Cornwell (2019), mentioned that a household that has a head who has completed high school education is 63% less to die from maternal causes compared with a pregnant woman whose household head has no education. The education of a pregnant woman can reduce maternal death. Similarly, if a pregnant woman does not have the basis of education, this increases the complications and risks of maternal death (Cameron, Suarez, & Cornwell, 2019b; Fawole et al., 2012). When women are disadvantaged when it comes to education, they have limited

capacity to make decisions in the home (Piane, 2019). Therefore, it will affect their ability to make effective and adequate decisions to seek medical help when faced with high-risk situations (Piane, 2019). Educated women are well equipped and aware of the pregnancy-related risk, good communication skills, use of contraceptive, and they tend to end up having fewer children as compared to women that are not educated (Piane, 2019).

CHAPTER 3

METHODS

3.1 Study design

A retrospective community-based cross-sectional study involving women of reproductive age, between the ages of 15-49 years in Kailahun District, Eastern Sierra Leone. Thus, women who have given birth in the last three years were sampled for this study, and information on their experiences in accessing maternal healthcare facilities during pregnancy, delivery, and postnatal period was collected. Quantitative data was collected using a pretested questionnaire. The study was carried out from November 2019 to October 2020.

3.2 Study Area

Kailahun District is located in the Eastern Province of Sierra Leone. Its capital and largest city is the town of Kailahun. Kailahun is divided into 15 chiefdoms each ruled by a Paramount Chief (PC) and 29 wards with a total of 29 elected councilors. The second most populous city in the region is Segbwema (Njaluahun Chiefdom) with a population of 61,216 (Statistics Sierra Leone, 2015b). Other main towns in Kailahun District include koindu, Pendembu, and Daru. The District of Kailahun shares borders with Kenema District to the West and Kono District to the North, the Republic of Liberia to the East, and the Republic of Guinea to the North. The border of the district with Guinea is shaped by a section of the Moa River (Statistics Sierra Leone, 2015a). The total area of the district is 4,859 km^2 (1,876 sq. mil). The inhabitants of the Kailahun District are mostly made up of the Mende ethnic group. The estimated population is 625,500 (DHS, 2013). The total fertility rate is estimated at 6 children per woman (DHS, 2013). The ANC attendance for ANC1 and ANC4+ was 15,656 and 13,785 respectively (Directorate of Reproductive & Child Health, 2016). The population in the district is predominantly Muslim. Kailahun has a diversified economy with small-scale mining and agricultural

production of coffee, cacao, and rice. Rainfall in this area is 2,001 to 3,000 mm per year and vegetation is a mix of savanna, forest, and secondary growth" (Statistics Sierra Leone, 2015)

Health services are predominantly provided by the Government, Private and Non-Governmental Organizations (NGOs) (Ministry of Health and Sanitation, Sierra Leone, 2017). The Ministry of Health and Sanitation (MOHS) regulates healthcare and is mainly responsible for providing healthcare in Sierra Leone. Succeeding the civil war in 2002, the MOHS changed to a decentralized structure to increase coverage and more access to healthcare facilities (MOHS-SL, 2017). In Kailahun, healthcare facilities are divided into 15 community health centers (CHC), 52 community health posts (CHP), 17 maternal child health posts (MCHP), 3 government hospitals, and 2 private clinics (Ministry of Health and Sanitation, Sierra Leone, 2017). In addition to this, traditional medicine forms an integral part of the primary health care system. The most common widespread diseases in these communities are commonly Lassa fever and Malaria. (See table 1) (Fig. 2).

Table 1: Type of Health Facilities, Kailahun District, 2020

Facility type	**Public**	**Private/FBO**	**Total**
Hospital	3	0	3
CHC	15	0	15
CHP	52	2	54
MCHP	17	0	17
Clinic	0	2	2
Total	87	4	91

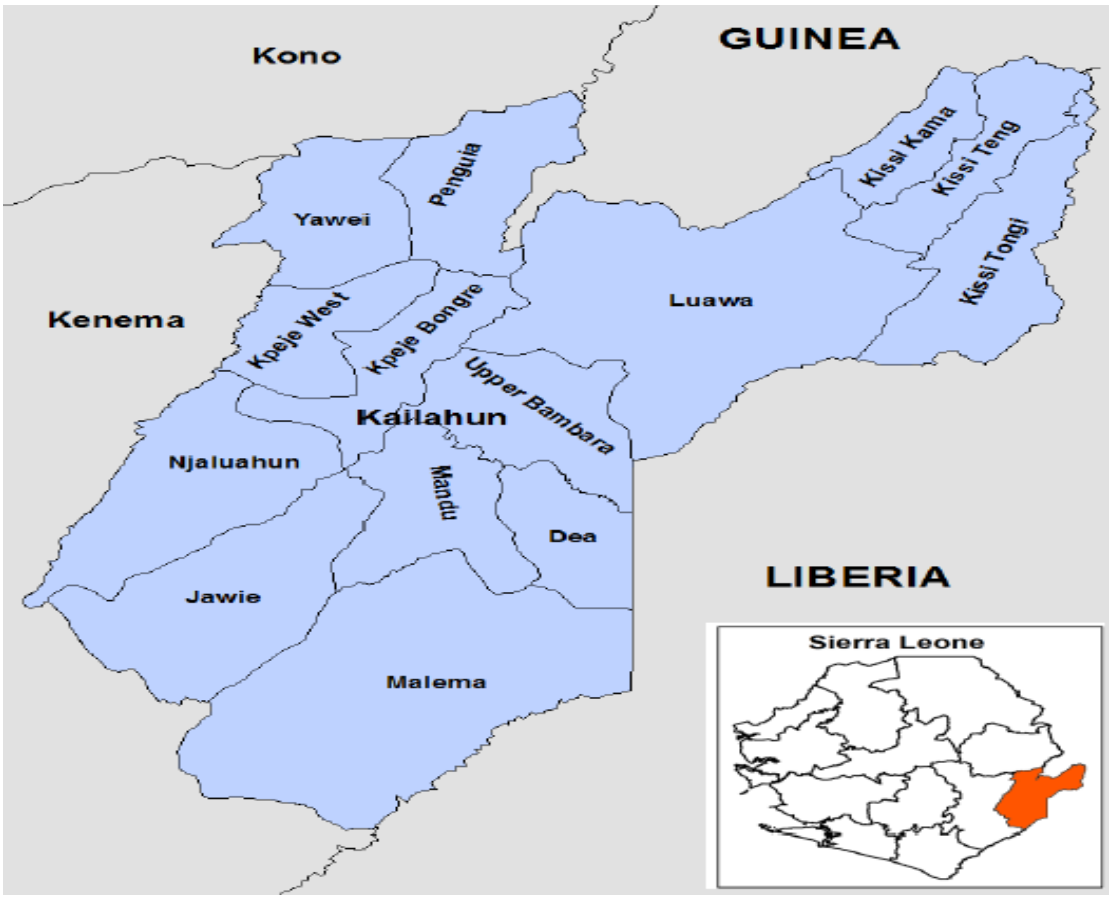

Figure 2: Map of Kailahun District

3.3 Study population

The study population included all women of reproductive age (15 to 49 years) who gave birth in the last 3 years in the Kailahun District before this study.

3.3.1 Inclusion Criteria

Any household with a woman of reproductive age between 15-49 years, who has given birth at least once in the last three years in Kailahun District.

3.3.2 Exclusion Criteria

1. Any household with a woman of reproductive age between 15-49 years who had any of the MHC services (ANC, delivery care, and PNC) in another district or country.
2. Population living in Hospitals, Hotels, etc.

3.4 Analysis of the sample frame/ Sampling Method

Kailahun District was purposively selected. Administratively, Kailahun is divided into 15 Chiefdoms. Each Chiefdom is subdivided into sections. Each section is subdivided further into Enumeration Areas (EAs). EAs are in administrative sections without overlapping into other sections. The unique identifier is the EA code. The domain of this study is the Urban and Rural areas of Kailahun District.

The 2015 census EAs were used as the Primary Sampling Unit (PSU). The sample was selected from the frame of PSUs. Kailahun district has 891 EAs of which 276 are urban and 615 rural. The total number of households in the Kailahun district was 83,348, of which 57,316 are rural and 26,032 are urban The average number of households per urban and rural EAs are 94 and 93 respectively. The proportional allocation of households in the Kailahun District concerning the domain was 69% rural and 31% urban.

3.4.1 Sample Size Determination

Sample size determination is the technique of selecting the number of observations to include in a sample. The sample size is an important feature of any research or investigation in which the aim is to make inferences about the population from a sample (Singh & Masuku, 2014). Three principles generally need to be specified to determine the appropriate sample size: these include; the level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured.

Cochran (1963, 1975) developed the equation to yield a representative sample for proportions of large samples. (see table 2)

$$n = \frac{z^2 pq}{d^2} \text{ X DEFF}$$

Table 2: Description of formula parameters

Parameter	Description	Value
n	Number of participants	554
p	The estimated proportion of births by a skilled attendant	0.6
q	The estimated proportion of births by an unskilled attendant (1-p)	0.4
d	Level of precision (5%)	0.05
z	Standard score for 95% confidence interval	1.96
DEFF	Design effect	1.5

Assumption:

1. According to the Sierra Leone Demographic and health survey, six out of ten deliveries are attended by a skilled provider, mostly a nurse/midwife 44% or MCHA 14%, and 2% of cases by a doctor. One-third of births 36% are attended by a traditional birth attendant, and 3% by relatives or some other person (DHS, 2013). This means that 60% of all deliveries are done by a skilled birth attendant.
2. This study was intended to interview one woman that delivered in the past three years per household thus a total of 554 households.
3. To determine sample size in terms of EAs, the study used a sample taken of 10 households per EA/cluster thus gave a sample size of 55.4 EAs.

3.4.2 Allocation of sample

To allocate the sample, the author must consider the precision of the domain level into account, and that is the urban and rural areas of Kailahun. To have a safe weighting sample, the author must allocate the 554 households proportionately to the urban and rural areas as shown in table 3.

Table 3: Allocation of sample EAs to Rural and Urban areas in Kailahun District, 2020

DOMAIN	Sum of HOUSE-HOLDS(HH)	PROPORTIONS	SAMPLE HH	SAMPLE EAs	Adjusted SAMPLE EAs
Rural	57316	0.69	380.97	38.10	38
Urban	26032	0.31	173.03	17.30	17
Total	83348	1	554	55.4	55

3.4.3 Selection of EAs using Probability to Proportion Size (PPS)

The EAs are selected using Probability to Proportion size as shown in Table 4 below. The first sampling number is the product of the random number (r) and the sampling interval. The sampling interval is the total households divided by the number of EAs to be selected. The first sampling number is used in selecting the EAs using PPS. Find attached in Appendix 5 and 6 the steps in selecting the EAs using PPS.

Table 4: Selection of EAs in Rural and Urban areas, Kailahun District, 2020

	Urban	**Rural**
Total Households	26032	57316
No of PSUs to select	17	38
Random number (r)	0.4468	0.9755
Sampling interval (k)	1531.2941	1508.3158
First sampling number	684.1218	1471.3361

3.4.4 Selection of Households and Respondents

A Random-walk technique was used in selecting households/respondents. I walked into the center of the EA and randomly select the third house from my right-hand side with a definite pattern of selecting the 3, 6, 9, etc till we achieved the required number of households. The choice of selecting the intervals 3, 6, and 9 depends on the size of the EA. The smaller the EA, the shorter the interval vice versa. Upon arrival in the household, only one eligible female 15-49 years that have given birth in the past 3 years was targeted for interview.

3.5 Outcome variables

The questionnaire included a set of questions on maternal healthcare, these include; the number of ANC visits, The timing of first ANC, Blood pressure check, urine sample test, body weight check, Tetanus injection, malaria prophylaxis, place of ANC, place of delivery, mode of delivery, delivery outcome, delivery attendant, place of PNC, PNC attendant, the timing of the first postnatal visit, follow-up after discharge and place of follow-up after discharge. The above was used to construct the outcome variables. (See table 5)

Table 5: Characteristics of outcome variables, Kailahun District, 2020

Outcome variable	Description	Code	Variable Type
ANC from a skilled provider	No Yes	0 1	Binary
Skilled birth attendant	No Yes	0 1	Binary
Postnatal care	Standard category Average category Undesirable category	1 2 3	Nominal

Postnatal care categories:

1. Standard category: PNC from a skilled provider in a health facility within 1 hour after delivery; had at least one follow-up after discharge.
2. Average category: PNC from a non-skilled provider in a health facility within 1 hour after delivery and had at least one follow-up after discharge or PNC from a skilled provider but did not receive any of the other components- health facility delivery; no follow-up after discharge.
3. Undesirable category: Postnatal care from a non-skilled provider in a non-health facility, no follow-up after discharge.

3.6 Independent Variables

Andersen's behavioral model was adopted to determine the influence or effect of the independent variables (predisposing and enabling factors) on the utilization of maternal health services. (see table 6 and 7)

3.6.1 Predisposing/individual factors

Table 6: Characteristics of predisposing/individual variable, Kailahun District, 2020

Variable	Description	Code	Source of data	Type of variable
Age	10-19 20-24 25-35 >35	1 2 3 4	Interview	Continuous/ categoric
Educational level attainment	Primary Junior Secondary Senior Secondary Vocational/ Higher	1 2 3 4	Interview	Ordinal
Parity	1 2 to 4 5+	1 2 3	Interview	Discrete
Ethnicity	Mende Kissi Others	1 2 3	Interview	Nominal
Religion	Christian Islam	1 2	Interview	Nominal
Marital status	Single Married/ living together Divorced/ Separated/ Widow	1 2 3	Interview	Nominal
Number of Children alive	0-2 3-5 6+	1 2 3	Interview	Discrete
Occupation	Unemployed Employed	0 1	Interview	Binary
Number of births in the last five years	1 2+	1 2	Interview	Discrete

3.6.2 Enabling Factors

Table 7: Characteristics of enabling variables, Kailahun District, 2020

Variable	Description	Code	Source of data	Variable Type
Husbands' Occupation	Unemployed Employed	0 1	Interview	Binary
Residence	Rural Urban	0 1	Interview	Binary
Distance to health facility (minutes)	<30 30-60 >60	1 2 3	Interview	Continuous
Type of floor	Natural Modern	0 1	Interview	Binary
Type of Toilet	Flush Pit and Others	0 1	Interview	Binary

3.7 Data collection technique and tools

The primary data was collected from Kailahun District using a structured and pre-tested questionnaire. The study included women of fertility age who have delivered in the past 3 years before this study. The questionnaire was written in English and was adapted from the Standard Sierra Leone DHS Questionnaires (DHS, 2013).To ensure quality data, interviewers were trained, a pre-test was performed before the actual data collection. The interviewers were frequently supervised by the principal data collector during data collection and interviews were done in local languages. Discrepancies were resolved by referring to the original questionnaire. The trained data collectors visited the selected households early in the morning as per schedule, team members were introduced and the purpose of the survey was explained to the household members to seek permission for the commencement of the interview. The questionnaire comprised of the following sections; Individual/personal characteristics, Household/community characteristics, and Prenatal and postnatal care. It took 10-15 minutes for a questionnaire to be completed.

3.8 Data Management and Analysis

The variables were coded for the data analysis. Each response was allocated a numeric code. Editing was done on the field to ensure the questions were complete. Respondents who did not comply were replaced by another respondent to avoid missing values. The data was entered into Excel 2018 and cleaned. The analysis was done using Stata 15.0 IC. Some variables were further recoded using Stata 15.0 IC for ease of analysis.

For descriptive statistics; Individual and household characteristics of respondents for example; age, marital status, educational level, parity, occupation, etc were presented in frequencies, tabulations, and proportions. Maternal health service utilization taking into consideration ANC, Skilled delivery attendant, and postnatal care use were presented in frequency tables and percentages. Normality was tested for continuous variables (age and parity) and the median (IQR) was estimated if the distribution was not normal.

Description of the Predisposing and Enabling characteristics was first done, followed by a description of the components of antenatal care, perinatal care/skilled birth attendant, and postnatal care. Bivariate analysis was done to determine the level of utilization of Maternal Healthcare services (Antenatal care, Skilled birth attendant, and Postnatal care services).

To estimate the effect of predisposing and enabling factors on maternal health service utilization, three dependent variables were constructed for this study: Use of antenatal care from a trained provider, use of skilled delivery attendant, and postnatal care.

3.8.1 Bivariate logistic analysis of background characteristics affecting the utilization of ANC services

A binary/dichotomous logistic regression model was formulated. The outcome variable was categorized as the use of ANC from a skilled provider (YES/NO). A significant association

level was set, P-value < 0.05. The crude odds ratio (COR), 95% confidence interval (CI), and P-value were estimated.

In the case of an antenatal and skilled birth attendant, a dichotomous dependent variable was constructed to indicate whether or not the woman used services from a skilled provider. Because the indicator is dichotomous, a logistic regression model will be used. Bivariate and multivariate analysis techniques were used to estimate the nature of association and magnitude between dependent variables and independent variables (Individual and Enabling factors).

$$\log\left[\frac{pi2}{pi1}\right] = \beta_0 + \beta_1 X_{ij} + \beta_2 Y_{ij} + \cdots . + \epsilon 1_{ij} \qquad 1$$

The outcome variable is the log odds that individual i chose alternative j relative to 1, where alternative 1 is non-use of antenatal care or birth attendant from a skilled provider, and 2 is the use of a skilled provider. The independent variables are classified into individual and enabling factors represented by X and Y respectively. $\epsilon 1$ follows a logistical distribution and represents the unobserved determinants of antenatal care or postnatal care.

3.8.2 Bivariate and Multivariate logistic regressions of background characteristics affecting the use of a skilled birth attendant

Similar to the use of ANC services, a binary logistic regression model was formulated for the outcome variable. The outcome variable was categorized as the use of skilled birth attendants (YES/NO). Initially, a simple binary logistic model was run for each independent variable against the outcome variable. All independent variables that showed a significant association were included in the multivariate binary regression model. The P-value, crude odds ratios (COR), and 95% confidence interval for the bivariate analysis and the P-value, adjusted odds ratios (AOR), and 95% confidence interval for the multivariate were estimated.

3.8.3 Multinomial logistic regression of background characteristics influencing the use of postnatal care services

For postnatal care services as a dependent variable, a trichotomous variable was constructed; the standard PNC service category, average PNC service category, and the undesirable PNC service category. Since the variable is trichotomous, the multinomial logistical regression model was estimated.

$$\log\left[\frac{pij}{pi1}\right] = \alpha_0 + \alpha_{1j}X_{ij} + \alpha_{2j}Y_{ij} + \cdots + \epsilon_{2ij} \qquad 2$$

The outcome variable is the log odds that individual i chose PNC service alternative j (j=2,3) relative to 1, where alternative 1 is the standard PNC service category, 2 is the average PNC service category and 3 is the undesirable PNC service category. The independent variables are classified into individual and enabling factors represented by X and Y respectively. $\epsilon 2$ represents the unobserved determinants of birth delivery alternative.

For this analysis, the education of respondents was recoded (No education, Primary and Secondary/Vocational). Independent variables like the husband's occupation and type of toilet were not included in the multinomial model because they showed a CI of zero.

3.9 Quality Control

Trained data collectors were used to ensure quality data. The tasks of the principal investigator were to supervise the data collectors, check the data for completeness and correctness. The data was entered into an Excel 2018 data template prepared by the principal investigator. The original data collection tool was used as a reference to check for discrepancies. Data validation checks were done to ensure accuracy during data entry.

3.9.1 Training of interviewers

The interviewers were trained before the administration of the questionnaires. They were thought to understand the aims of the research, its objectives, and how to use the questionnaire. Simulation exercises were conducted during the training. Pre-testing of the data collection tool was carried out in Buedu and Daru Chiefdoms both in Kailahun District. It was pre-tested to ensure that data collectors understand the content of the tool and are capable of communicating it clearly to the respondents, and as well as the respondent understanding it. All necessary modifications were done after testing.

3.10 Ethical clearance

Ethical approval was sort from the Sierra Leone Ethics and Scientific Committee. Permission was also sorted from the Kailahun Regional Health Directorate. Informed consent was sort from the respondents. For respondents below 18 years, consent was sort from their parents. They were assured of confidentiality and informed on the purpose of the study. For participants who cannot read, the consent was read and explained to them in the presence of an impartial witness or stakeholder in the community. The information was stored without the names of the respondents in a folder that is only accessible to the research team.

CHAPTER 4

RESULTS

4.1 Enabling and Predisposing/individual characteristics of respondents

Five hundred and fifty-four (554) women aged between 15-49 years, who had at least a delivery/birth 3 years before this study commenced were interviewed using a semi-structured questionnaire. The median age of respondents was 25 years (Q1=17 years, Q3=30 years) with minimum and maximum ages of 15 and 49 years respectively (Table 1). Taking into consideration parity, the median parity was 3 (Q1=1 parity, Q3=4 parities) with a minimum and maximum parity of 1 and 9 respectively.

The percentages of the participant are as follows; forty-six percent (46%) of respondents in this survey were between the ages of 25-35, thirty-one (31%) aged 20-24 years and nine-point four (9.4%) were aged more than 35 years. Taking into consideration the level of education attained, 37.9% had no educational level, primary and junior secondary level of education represented 25.6% and 25.6% respectively and only 0.7% of them attained vocational/higher education. The majority (60.8%) of respondents were Muslims. The Mende and Kissi ethnic groups were predominant, representing 72.0% and 22.4% respectively. With regards to the number of Children alive, 41.7% of respondents had 3-5 children alive, 8.7% had 6 or more alive. With parity, 52.7% of respondents had 2-4 births, 23.8%, and 23.5% of them had 1 and 5 or more births respectively. Fifty-two percent of respondents have had 2 or more births in the past five years before this survey. The majority (89.5%) of respondents were either married or living together with a partner, 6.7% were single and 3.8% were divorced/Separated/widowed. Most of the respondents (68.8%) were rural residents. Forty-one percent of respondents had to walk more than 60 minutes from home to the health facility, 23.8% walked between 30-60 minutes and 35.4% walked less than 30 minutes. Concerning the husband's educational level, 43.0% of respondents had a husband with no level of education and only 9.6% had a vocational/higher educational level. The majority of respondents 71.1% and 97.5% stayed in

houses with natural floor and pit toilets respectively. Table 8 shows the enabling and predisposing characteristics of respondents who had at least one delivery in the 3 years before the study.

Table 8: Enabling and predisposing characteristics of respondent who had at least one delivery in the 3 years before the study, Kailahun District, 2020

Predisposing/Enabling Characteristics	Number (n=554)	Percent(%)
Age		
10-19	76	13.7
20-24	172	31.0
25-35	254	45.9
>35	52	9.4
Schooling		
No	210	37.9
Yes	344	62.1
Education level attainment		
None	210	37.9
Primary	142	25.6
Junior Secondary	142	25.6
Senior Secondary	56	10.1
Vocational/Higher	4	0.7
Religion		
Christian	217	39.2
Islam	337	60.8
Ethnicity		
Mende	399	72.0
Kissi	124	22.4
Others	31	5.6
Number of Children Alive		
0-2	275	49.6
3-5	231	41.7
6+	48	8.7
Parity		
1	132	23.8
2-4	292	52.7
5+	130	23.5

Predisposing/Enabling Characteristics	Number (n=554)	Percent(%)
Number of Births in the past 5 years		
1	265	47.8
2+	289	52.2
Marital Status		
Single	37	6.7
Married/Living Together	496	89.5
Divorced/separated/Widowed	21	3.8
Occupation		
Unemployed	121	21.8
Employed	433	78.2
Distance to Health Facility (Minutes)		
<30	196	35.4
30-60	132	23.8
>60	226	40.8
Husband's Occupation		
Unemployed	78	14.1
Employed	476	85.9
Husband's Education level attainment		
None	238	43.0
Primary	72	13.0
Junior Secondary	109	19.7
Senior Secondary	82	14.8
Vocational/Higher	53	9.6
Residence		
Rural	381	68.8
Urban	173	31.2
Type of Floor		
Natural	394	71.1
Modern	160	28.9
Type of Toilet		
Flush	14	2.5
Pit/Others	540	97.5

4.2 Description of Antenatal Care Services

Hundred percent (100%) of women included in this survey had at least one ANC from a skilled provider or non-skilled provider. The majority of women (77.6%) have had ANC from a skilled provider. Most of the women (57.9%) received ANC from a State Enrolled Community Health

Nurse (SECHN), 17.7% from a Maternal and Child Health Aide (MCHA), 18.1% from a Midwife, 0.4% from a Medical Doctor, and 1.7% from a Community Health Officer. Regarding the timing of the first ANC visit, 54.5% of respondents attended their first ANC visit in the first trimester, 42.2% attended in the second trimester, 0.5% in the third trimester, and only 2.7% of respondents that could not account for the timing of first ANC visit.

The majority of respondents (88.6%) had 4 or more ANC visits in their last pregnancy before this study. Regarding regular Blood Pressure and urine sample check during pregnancy, 98.6% of them had at least one BP check and 75.6% had at least one urine sample test. Most of the respondents received Malaria prophylaxis during pregnancy. Table 9 shows the characteristics of ANC service utilization by respondents who had at least one delivery in the 3 years before the study.

Table 9: Characteristics of ANC service utilization by respondents who had at least one delivery in the 3 years before the study, Kailahun District, 2020

Variable	Number (n=554)	Percent(%)
At least one ANC from Skilled Provider		
No	124	22.4
Yes	430	77.6
ANC Provider		
Traditional Birth Attendant	26	4.7
Nurse(SECHN)	321	57.9
MCHA	98	17.7
Midwife	100	18.1
Doctor	2	0.4
CHO	7	1.3
Place of ANC		
MCHP	61	11.0
CHP	225	40.6
CHC	221	39.9
Hospital	39	7.04
Private Facility	8	1.44
Timing of First ANC		
Don't Know	15	2.7
<4 months	302	54.5
4-6 months	234	42.2
7-9 months	3	0.5

Variable	Number (n=554)	Percent(%)
Number of ANC visit		
Do not know	5	0.9
Once	4	0.7
2 times	11	2.0
3 times	43	7.8
4 or more	491	88.6
At least one BP check		
Yes	546	98.6
No	8	1.4
At least one Urine sample test		
Yes	419	75.6
No	135	24.4
At least one Bodyweight check		
Yes	547	98.7
No	7	1.3
At least tested once for HIV/Malaria		
Yes	465	83.9
No	89	16.1
Fansidar during pregnancy		
Don't Know	7	1.3
Yes	546	98.6
No	1	0.2

4.3 Description of Perinatal Care Services/ Skilled Birth Attendant

Only 35.9% of women were delivered by a skilled birth attendant. The majority of respondents (57.6%) were delivered by Maternal and Child Health Aide, 32.0% were delivered by a Midwife, 4.0% by Doctors, 4.2% by Traditional Birth Attendant (TBA), and 2.4% by SECHN. With regards to the place of delivery, only 13.5% of them delivered in a Hospital, the majority delivered in Community Health Centres (CHC), and Community Health Post (CHP). Of all the respondents included in this survey, 94.2% had a spontaneous vaginal delivery and 99.6% had a good delivery outcome (Baby born alive). (Table 10)

Table 10: Characteristics of perinatal care service utilization by respondents who had at least one delivery in the 3 years before the study, Kailahun District, 2020

Variable	Number (n=554)	Percent(%)
Skilled Birth Attendant		
No	355	64.1
Yes	199	35.9
Birth Attendant		
TBA	23	4.2
Nurse	13	2.4
MCHA	319	57.6
Midwife	177	32.0
Doctor	22	4.0
Place of Delivery		
MCHP	58	10.5
CHP	199	35.9
CHC	198	35.7
Hospital	75	13.5
Private Facility	20	3.6
Home	3	0.5
Ambulance/Transit	1	0.2
Duration of Stay at the facility after delivery		
<24hrs	53	9.6
1-3 days	421	76.0
4-6 days	43	7.8
≧7 days	37	6.7
Mode of Delivery		
Spontaneous Vaginal Delivery	522	94.2
Caesarean Section	19	3.4
Assisted Vaginal Delivery	13	2.4
Outcome of delivery		
Born Alive	552	99.6
Born Dead	1	0.2
Died a few days later	1	0.2

4.4 Description of Postnatal Care Services

The majority of respondents (97.5%) received postnatal care from either skilled or non-skilled providers. Most (58.1%) of them received PNC from MCHAs, 28.0% from Midwives, 1.8% from TBA, 2.2% from Doctors, and 2.5% did not receive PNC services. Most of the respondents (67.0%) had at least one follow-up after discharge. With regards to the timing of

the first postnatal care services, 50.2% of them received their first postnatal service 60 minutes post-delivery, 41.0% received it within 1-24 hours and 6.3% received it after 24 hours. (Table 11)

Table 11: Characteristics of postnatal care service utilization by respondents who had at least one delivery in the 3 years before the study, Kailahun District, 2020

Variable	Number (n=554)	Percent(%)
Postnatal Care		
Yes	540	97.5
No	14	2.5
Postnatal Care Provider		
Non	14	2.5
TBA	10	1.8
MCHA	322	58.1
Nurse	41	7.4
Midwife	155	28.0
Doctor	12	2.2
At least one follow-up after discharge		
Yes	371	67.0
No	183	33.0
Timing of 1st postnatal care		
within 1 hr	278	50.2
>1hr-24 hrs	227	41.0
>24 hrs	35	6.3
None	14	2.5

4.5 Bivariate analysis of the level of utilization of ANC, Skilled birth attendant, PNC services

Table 12 below shows a bivariate analysis of the level of utilization of ANC, skilled birth attendant, and PNC services by respondent's background characteristics (Enabling and predisposing factors). It displays the effect of each independent variable on the outcome variables.

4.5.1 Level of the utilization of ANC

The level of utilization of skilled ANC attendants is more common among respondents aged >35 years compared to the other age groups. In general, the use of skilled ANC attendants is more than 75.0% in all age groups. Respondents of urban areas used more skilled ANC attendants than respondents of rural areas. Eight-one-point five percent (81.5%) of respondents living in urban areas used skilled ANC compared with 75.9% in rural areas.

Taking into consideration marital status, skilled ANC attendant use is higher among divorced/separated/widowed (85.7%) compared with 78.4% of single, and 77.2% of married/living together. Skilled ANC used was found to be slightly higher among Christian respondents (79.7%) compared with (76.3%) of Islam respondents. With regards to parity, as the parity increased the use of skilled ANC attendant decreased, women with one parity used more skilled ANC attendant: 79.6% of women with one parity used skilled attendant compared with 77.4% of women with 2 to 4 births and 76.2% of women with 5 or more births. Skilled ANC attendant use was found to be more common among unemployed women than employed.

Eight-two percent (82%) of unemployed women used skilled ANC attendants compared with 76.4% of the employed women. Women with vocational/higher educational level have a higher proportion of skilled ANC use; 88.3% of women with secondary/vocational level of education used skilled ANC attendant compared with 78.6% of women with no education, 77.5% of women with primary education, and 71.8% of women with junior secondary educational level. The use of skilled ANC attendants decreases as the number of deliveries in the past 5 years increased; 80.4% of those with one birth in the past 5 years used Skilled ANC compared with 71.1% of those with 2 or more births in the past 5 years before this study. Women with unemployed husbands used skilled ANC than those with employed husbands. With regards to distance to the health facility, women who stayed more than an hour walk to a health facility

used skilled ANC attendant than those who stayed less: 79.7% of those who stayed more than an hour walk used skilled ANC attendant compared with 77.0% of those that stayed less than 30 minutes and 75.0% of those that stayed between 30-60 minutes away. Skilled ANC attendant use is slightly higher in those that stay in a house with a modern floor than those in houses with a natural floor. Similarly, skilled ANC use is higher in those that stay in a house with a flush toilet than those with a pit toilet.

4.5.2 Level of the utilization of skilled birth attendants

As the age of a woman increases the level of utilization of skilled birth attendants decreases. The use of skilled birth attendant was found to be higher (42.1%) amongst women in the age group of 10-19 years old compared with 36.1% of women in the age group 20-24 years old, 35.43% of those in the age group 25-35 years old, and 28.9 % in those older than 35 years. Skilled birth attendant use is common in women in urban areas than those in rural areas; 57.8% of women in the urban area used skilled birth attendants compared with only 26.0% of those in rural areas. About religion, 37.3% of Christian women used skilled birth attendants compared with 35.0% of Muslim women. The percentage of women who used skilled birth attendants is higher in those that are single than the other categories, 48.7% of single women used skilled birth attendants compared with 34.7% of those that are married and 42.9% of those that are divorced/separated. Similar to ANC use, the use of skilled birth attendants decreases as the parity increases: 43.2% of women who had 1 parity used skilled birth attendants compared with 37.3% of those who had 2-4 parities and 25.4% of those who had 5 or more births. Skilled birth attendant use was found to be more common among unemployed women than those employed. Forty-nine percent of unemployed women used skilled ANC attendants compared with 32.3% of employed women. Skilled birth attendant use was higher in women with senior secondary or vocational level of education than the other categories of education: 53.3% of women with secondary/vocational level of education used skilled ANC attendant

compared with 31.0% of women with no education, 38.0% of women with primary education, and 33.8% of women with junior secondary educational level. Skilled birth attendant use decreased as the number of births in the past 5 years increased. Women whose husbands are unemployed, husbands with a higher or vocational level of education, women who lived in houses with modern floors, and a pit toilet, with distance to health facility between 30-60 minutes had a higher proportion of skilled birth attendant use compared with their categories.

4.5.3 Level of the utilization of PNC

The utilization of PNC services was slightly higher amongst women in the age group 20-24 years compared with the other age groups. In contrast to ANC and skilled birth attendant use, PNC service use is slightly higher (97.9 %) among respondents in rural areas than urban respondents (96.5%). In general, the use of PNC services was found to be high regarding all the individual background categories. Single and divorced women, Christians, Kissi ethnic groups, those with 2-4 parities, unemployed women had a higher proportion of PNC service use than their different individual categories. (Table 12)

Table 12: Percentage of respondents who had at least one delivery in the 3 years before the study who received skilled ANC, delivery care, and PNC services, by background characteristics, Kailahun District, 2020

Background Characteristics	Number (n=554)	Percentage who received at least one ANC	Percentage who received SBA	Percentage who received PNC services
Age				
10-19	76	76.3	42.1	97.4
20-24	172	77.9	36.1	98.3
25-35	254	76.4	35.4	97.2
>35	52	84.6	28.9	96.2
Residence				
Urban	173	81.5	57.8	96.5
Rural	381	75.9	26	97.9
Marital Status				
Single	37	78.4	48.7	100
Married/Living Together	496	77.2	34.7	97.2
Divorced/Separated/Widowed	21	85.7	42.9	100

Religion				
Christian	217	79.7	37.3	98.6
Islam	337	76.3	35	96.7
Ethnicity				
Mende	399	76.2	35.3	97.5
Kissi	124	80.7	37.9	98.4
Others	31	83.9	35.5	93.5
Parity				
1	132	79.6	43.2	97.7
2-4	292	77.4	37.3	97.9
5+	130	76.2	25.4	96.2
Occupation				
Employed	433	81.8	48.8	99.2
Unemployed	121	76.4	32.3	97
Education level attainment				
None	210	78.6	30.9	96.7
Primary	142	77.5	38	98.6
Junior Secondary	142	71.8	33.8	96.5
Senior Secondary/Vocational	60	88.3	53.3	100
Number of Births in the past 5 years				
1	265	80.4	39.6	97.7
2+	289	75.1	32.5	97.2
Husband's Occupation				
Unemployed	78	79.5	44.9	100
Employed	476	77.3	34.5	97.1
Husband's Education level attainment				
None	238	75.2	30.3	97.9
Primary	72	79.2	44.4	97.2
Junior Secondary	109	80.7	37.6	98.2
Senior Secondary	82	78.1	30.5	97.6
Vocational/Higher	53	79.3	54.7	94.3
Distance to Health Facility (Minutes)				
<30	196	77	35.7	96.4
30-60	132	75	47	98.5
>60	226	79.7	29.7	97.8
Type of Floor				
Natural	394	77.4	34	97.2
Modern	160	78.1	40.6	98.1
Type of Toilet				
Flush	14	85.7	35.7	100
Pit and Others	540	77.4	35.9	97.4

4.6 Bivariate logistic analysis of background characteristics affecting the utilization of ANC services

Maternal age was not significantly linked with the use of skilled ANC providers (P>0.05). Women aged >35 years were more likely to use a skilled ANC attendant than women aged 10-19 years which was found not to be significant (COR 1.71, 95% CI 0.68-4.28, P=0.255). There was no significant association between marital status and the use of a skilled ANC provider (P>0.05). The odds of a skilled ANC attendant use were 1.66 times higher in divorced/separated/widowed compared to single women which were not statistically significant (COR 1.71, 95% CI 0.68-4.28, P=0.255). There was no significant association between parity and the use of skilled ANC providers (P>0.05). The odds of a skilled ANC attendant use were 0.82 times higher in women with 2-4 births compared to those with one birth which was not statistically significant (COR 0.82, 95% CI 0.53-1.46, P=0.621). Similarly, the odds of a skilled ANC attendant use were 0.88 times higher in women with 5 or more births compared to those with one birth which was not statistically significant (COR 0.88, 95% CI 0.46-1.47, P=0.509). There was no significant association between religion, ethnicity, occupation, education, number of births in the past 5 years, and the use of skilled ANC providers.

There was no significant relationship between the enabling factors (Household characteristics: Type of floor and toilet, husband's education and occupation, and distance to a health facility) and the use of skilled ANC providers. Women residing in urban areas were more likely to use skilled ANC attendants than those in rural areas which was found not to be statistically significant (COR 1.40, 95% CI 0.89-2.20, P=0.140). Women who stayed in houses with a flush toilet were more likely to use a skilled birth attendant than those in the house with a pit/another

toilet which was found not to be statistically significant (COR 1.75, 95% CI 0.39-7.93, P=0.467). (Table 13).

Table 13: Crude odds ratios for the association of background characteristics that determine ANC use, Kailahun District, 2020

Variable	Number (554)	Use of Skilled ANC Provider COR (95% CI)	P-Value
Age			
10-19	76	1.00	
20-24	172	1.09(0 .58 2.08)	0.782
25-35	254	1.00(0.55 1.83)	0.991
>35	52	1.71(0.68 4.28)	0.255
Residence			
Rural	381	1.00	
Urban	173	1.40(0 .89 2.20)	0.140
Religion			
Christian	217	1.00	
Islam	337	0.82(0.54 1.24)	0.34
Ethnicity			
Others	31	1.00	
Mende	399	0.62(0.23 1.65)	0.334
Kissi	124	0.80(0.28 2.30)	0.681
Parity			
1	132	1.00	
2-4	292	0.82(0.53 1.46)	0.621
5+	130	0.88(0 .46 1.47)	0.509
Occupation			
Unemployed	121	1.00	
Employed	433	0.72(0.43 1.20)	0.211
Education level attainment			
None	210	1.00	
Primary	142	0.94(0.56 1.57)	0.805
Junior Secondary	142	0.70(0.43 1.14)	0.148
Senior Secondary/Vocational	60	2.06(0.43 1.14)	0.096
Number of Births in the past 5 years			
1	265	1.00	
2+	289	0.74(0.49 1.10)	0.136
Husband's Occupation			
Unemployed	78	1.00	
Employed	476	0.88(0.49 1.59)	0.669

Variable	Number(554)	Use of Skilled ANC Provider COR (95% CI)	P-Value
Husband's Education level attainment			
None	238	1.00	
Primary	72	1.25(0.66 2.38)	0.491
Junior Secondary	109	1.38(0.79 2.42)	0.258
Senior Secondary	82	1.17(0.64 2.14)	0.604
Vocational/Higher	53	1.25(0.61 2.60)	0.535
Distance to Health Facility (Minutes)			
<30	196	1.00	
30-60	132	0.89(0.53 1.50)	0.670
>60	226	1.17(0.73 1.86)	0.517
Type of Floor			
Natural	394	1.00	
Modern	160	1.04(0.67 1.62)	0.855
Type of Toilet			
Pit and Others	540	1.00	
Flush	14	1.75(0.39 7.93)	0.467

4.7 Bivariate and Multivariate logistic regressions of background characteristics affecting the use of a skilled birth attendant

Maternal age was not significantly associated with the use of a skilled birth attendant (COR 0.86, 95% CI 0.70-1.06, P=0.164). There was no significant association between marital status and the use of skilled birth attendants (COR 0.78, 95% CI 0.46-1.34, P=0.373). There was no significant association between religion and the use of skilled birth attendants (COR 0.90, 95% CI 0.63-1.29, P=0.580). Ethnicity was not significantly associated with the use of a skilled birth attendant (COR 1.90, 95% CI 0.77-1.53, P=0.647). At the bivariate level, parity was significantly associated with the use of skilled birth attendants. Women who had given birth 5 or more times were more likely to use a skilled birth attendant than women who had given birth once which was found to be statistically significant (COR 0.45, 95% CI 0.27-0.76, P=0.003).

At the multivariate level, after controlling for the effect of other variables, parity was not significantly associated with the use of skilled birth attendants.

At the bivariate level, there was a significant association between respondent's occupation and the use of skilled birth attendants. Employed women were more likely to use skilled birth attendants than unemployed women (COR 0.50, 95% CI 0.33-0.76, P=0.001). At the multivariate level, after controlling for the effect of other variables, the occupation was not significantly associated with the use of skilled birth attendants. The odds of a skilled birth attendant use were 0.67 times higher in women who are employed compared to those who are unemployed which was not statistically significant (AOR 0.67, 95% CI 0.40-1.13, P=0.131).

There was a significant association between the education of a woman and a skilled birth attendant at the bivariate level. Women who had a senior secondary and vocational level of education were more like to use skilled birth attendants than women who had no education (COR 2.25, 95% CI 0.1.42-4.58, P=0.002). At the multivariate level, education was found not to be significantly associated with the use of a skilled birth attendant. Women who had a senior secondary and vocational level of education were more like to use skilled birth attendant than women who had no education which was found not to be statistically significant (AOR 1.22, 95% CI 0.57-2.59, P=0.609)

The odds of using a skilled birth attendant were 0.73 times less likely in women with 2 or more births in the past 5 years than women with 1 birth in the past 5 years which was found not to be significant (COR 0.73, 95% CI 0.52-1.04, P=0.082). The residence was significantly related to the use of a skilled birth attendant. Women residing in urban areas were more likely to use skilled birth attendants than women in rural areas (COR 3.90, 95% CI 2.67-5.70), P=<0.001). At the multivariate level after controlling for the effect of other variables, the residence was significantly associated with the use of skilled birth attendants. Women in the urban areas were

more likely to use skilled birth attendants than women in rural areas (AOR 6.20, 95% CI 3.61-10.63, P=<0.001).

The husband's education was significantly associated with the use of skilled birth attendants at the bivariate level. Women whose husbands were educated to primary education level were more likely to use skilled birth attendants than those with no education (COR 1.84, 95% CI 1.07-3.77), P=0.027). Similarly, women whose husbands were educated to vocational/higher education levels were more likely to use skilled birth attendants than those with no education (COR 2.79, 95% CI 1.52-5.11, P=0.001). At the multivariate level, women whose husbands were educated to primary education were more likely to use skilled birth attendants than those whose husbands were not educated after controlling for the effect of other variables in the model (AOR 2.38, 95% CI 1.30-4.35, P=0.005). The husband's occupation was not significantly associated with the use of a skilled birth attendant. Women who had employed husbands were less likely to use skilled birth attendants than those unemployed which was found not to be statistically significant (COR 0.65, 95% CI 0.40-1.05, P=0.077).

The type of floor was not significantly associated with the use of a skilled birth attendant. Women who stayed in houses with modern floors were more likely to use skilled birth attendants than those that stayed in houses with the natural floor which was found not to be statistically significant (COR 1.33, 95% CI 0.91-1.94, P=0.142). There was no significant association between the type of toilet in a house and the use of skilled birth attendants. Women who stayed in houses with a flush toilet were less likely to use skilled birth attendants than those that stayed in houses with a pit toilet which was found not to be statistically significant (COR 0.99, 95% CI 0.33-3.00, P=0.987). Distance to the health facility was significantly associated with the use of skilled birth attendants after controlling for the effect of the other variables in the model. Women who had to walk 30-60 minutes to seek healthcare were more

likely to use a skilled birth attendant than those who had to walk <30 minutes (AOR 2.98, 95% CI 1.67-5.33, P=<0.001). similarly, women who had to walk >60 minutes to seek healthcare were more likely to use a skilled birth attendant than those who had to walk <30 minutes (AOR 2.37, 95% CI 1.33-4.24, P=0.004. (see table 14)

Table 14: Crude odds ratios and adjusted odds ratios for receiving delivery care, Kailahun District, 2020

	Use of Skilled Birth Attendant			
Variable	COR (95% CI)	P-Value	AOR (95% CI)	P-Value
Age				
10-19	1.00			
20-24	0.78(0.45 1.35)	0.365	.	.
25-35	0.75(0.45 1.27)	0.291	.	.
>35	0.56(0.26 1.18)	0.128	.	.
Residence				
Rural	1.00		1.00	
Urban	3.90(2.67 5.70)	<0.001*	6.20(3.61 10.63)	<0.001*
Religion				
Christian	1.00		.	.
Islam	0.90(0.63 1.29)	0.58	.	.
Marital Status				
Single	1.00		.	.
Married/Living Together	0.56(0.29 1.10)	0.091	.	.
Divorced/Separated/Widowed	0.79(0.27 2.33)	0.671	.	.
Ethnicity				
Others	1.00		.	.
Mende	0.99(0.46 2.13)	0.987	.	.
Kissi	1.11(0.49 2.52)	0.803	.	.
Occupation				
Unemployed	1.00		1.00	
Employed	0.50(0.33 0.756)	0.001*	0.67(0.40 1.13)	0.131
Education level attainment				
None	1.00		1.00	
Primary	1.37(0.87 2.14)	0.169	0.97(0.58 1.62)	0.907
Junior Secondary	1.14(0.72 1.79)	0.574	0.91(0.53 1.58)	0.743
Senior Secondary/Vocational	2.25(1.42 4.58)	0.002*	1.22(0.57 2.59)	0.609
Number of Births in past 5 years				
1	1.00		.	.
2+	0.73(0.52 1.04)	0.082	.	.
Husbands Occupation				
Unemployed	1.00		.	.
Employed	0.65(0.40 1.05)	0.077	.	.

	Use of Skilled Birth Attendant			
Variable	COR(95% CI)	P-Value	AOR(95% CI)	P-Value
Husbands Education level attainment				
None	1.00		1.00	
Primary	1.84(1.07 3.17)	0.027*	2.38(1.30 4.35)	0.005*
Junior Secondary	1.39(0.86 2.24)	0.175	1.34(0.79 2.29)	0.280
Senior Secondary	1.01(0.59 1.74)	0.968	0.67(0.35 1.25)	0.205
Vocational/Higher	2.79(1.52 5.11)	0.001*	1.85(0.93 3.72)	0.082
Distance to Health Facility (Minutes)				
<30	1.00		1.00	.
30-60	1.59(1.02 2.50)	0.042*	2.98(1.67 5.33)	<0.001*
>60	0.76(0.50 1.14)	0.185	2.37(1.33 4.24)	0.004*
Type of Floor				
Natural	1.00		.	.
Modern	1.33(0.91 1.94)	0.142	.	.
Type of Toilet				
Pit and Others	1.00		.	.
Flush	0.99(0.33 3.00)	0.987	.	.

*Significant association at P<0.05

4.8 Multinomial logistic regression of background characteristics influencing the use of postnatal care services

The level of education of a respondent, residence, and husband's education was significantly associated with the use of the standard PNC category relative to the average category after controlling for the effect of the other variables in the model as shown in table 15. Women who had a secondary/vocational level of education had 2.35 times increased odds of utilizing the standard PNC category as compared to those with no education relative to the average PNC category (OR=2.35, 95% CI=1.19-4.63, P=0.013). Women's residence was significantly associated with the use of the standard PNC category relative to the average category. Women residing in urban areas had 2.29 times increased odds of utilizing the standard PNC category as compared to those residing in rural areas (OR=2.29, 95% CI=1.21-4.32, P=0.011). Husband's education was significantly associated with the use of the standard PNC category

relative to the average category. Women whose husbands had a primary level of education had 2.36 times increased odds of utilizing the standard PNC category as compared to those whose husbands had no education relative to the average PNC category (OR=2.36, 95% CI=1.10-5.05, P=0.027). Similarly, women whose husbands had a vocational/higher level of education had 2.29 times increased odds of utilizing the standard PNC category as compared to those whose husbands had no education relative to the average PNC category (OR=2.29, 95% CI=1.03-5.12, P=0.042).

Table 15: Multinomial logistic regression results on the determinants of PNC services, Kailahun District, 2020

Variables	Number (n=554)	Standard PNC		Undesirable PNC	
		OR(95% CI)	P-Value	OR(95% CI)	P-Value
Age (Continuous)	554	1.04(0.98 1.10)	0.199	0.99(0.88 1.12)	0.923
Parity	554	0.69(0.38 1.24)	0.215	1.15(0.34 3.90)	0.818
Residence					
Rural	381	1.00		1.00	
Urban	173	2.29(1.21 4.32)	0.011*	1.59(0.37 6.79)	0.535
Marital Status	554	0.82(0.38 0.76)	0.617	1.09(0.15 7.80)	0.933
Religion					
Christian	217	1.00		1.00	
Islam	337	0.71(0.41 1.23)	0.220	1.99(0.43 9.14)	0.375
Ethnicity					
Others	399	1.00		1.00	
Mende	124	1.23(1.23 0.67)	0.720	0.31(0.05 1.91)	0.207
Kissi	31	0.62(0.18 2.13)	0.453	0.26(0.02 2.76)	0.263
Occupation					
Employed	433	1.00		1.00	
Unemployed	121	1.13(0.61 2.11)	0.689	4.04(0.46 35.88)	0.210
Education level attainment					
None	210	1.00		1.00	
Primary	142	1.10(0.55 2.22)	0.780	0.35(0.06 1.90)	0.224
Secondary/Vocational	202	2.35(1.19 4.63)	0.013*	0.89(0.21 0.69)	0.872
Number of Births in past 5 years					
1	265	1.00		1.00	
2+	289	1.02(0.56 1.84)	0.958	0.90(0.26 3.10)	0.867
Husband's Education level attainment					
None	238	1.00		1.00	
Primary	72	2.36(1.10 5.05)	0.027*	1.73(0.30 9.97)	0.537
Junior Secondary	109	1.88(0.96 3.69)	0.064	1.09(0.20 6.06)	0.923
Senior Secondary	82	0.81(0.35 1.85)	0.610	1.27(0.20 8.06)	0.802
Vocational/Higher	53	2.29(1.03 5.12)	0.042*	4.07(0.77 21.51)	0.098
Distance to Health Facility (Minutes)					
<30	196	1.00		1.00	
30-60	132	1.36(0.71 2.62)	0.357	0.61(0.10 3.55)	0.580
>60	226	1.42(0.72 2.81)	0.312	0.82(0.19 3.66)	0.802
Type of Floor					
Natural	394	1.00		1.00	
Modern	160	1.35(0.80 2.27)	0.266	0.49(0.12 1.99)	0.318

*Significant association at P<0.05, n=554, pseudo R^2=8.81%, LR Chi2=54.37 Prob. Chi2=0.025 Base model= Average category

CHAPTER 5

5.1 DISCUSSION

Chapter five examines the findings of this study concerning the objectives and literature review. It discussed the level of utilization of MHC services, the determinants of MHC service utilization, and how these factors have influenced the uptake of the different packages of MHC services.

5.1.1 Level of the Utilization of ANC services

This study showed 100% of women received ANC services, of which 77.6% of them sought at least one ANC visit from a skilled ANC provider and 88.6% made 4 or more ANC visits as recommended by the World Health Organization. This research is inconsistent with the Uganda Demographic and Health Survey UDHS 2011, which showed that 95% of women received ANC from a skilled provider but only 48% of the women made 4 or more ANC visits (Rutaremwa et al., 2015). The majority (57.9%) received ANC from a state enrolled community health nurse (SECHN). This might be due to the high number of trained SECHN and many SECHN training schools in the country compared to other cadres of nursing training programs. With regards to the timing of the first ANC, 54.5% sought their first ANC in the first trimester of pregnancy which was higher than the one obtained in the Sierra Leone Demographic and Health Survey 2013, were 44.5%wheree their first visit in the first trimester (DHS, 2013). This might be because the demographic survey had a larger coverage area compared to this study. It is recommended that all pregnant women should start their ANC in the first trimester.

The findings of this research have revealed that the use of ANC services was higher among urban residents (81.5%), which is similar to a study in Holeta Town, Ethiopia where 86.7% of urban residents used ANC (Birmeta, Dibaba, & Woldeyohannes, 2013). According to the

Sierra Leone Demographic Survey (2013), 79.9% of women in urban areas made 4 or more ANC visits. The high use of ANC services in urban areas may be because, Kailahun District has 87 peripheral health units and 3 hospitals, of which all the hospitals and most of the PHUs are in urban areas thus increasing access. Increase awareness, better understanding, and information sharing might also be related to the economic status of urban residents. Women residing in urban areas have more physical and economic access to health facilities. Single and divorced/separated women were more likely to use ANC services. Women with a history of birth are more likely to use ANC services than women with 2 or more births. As parity increases the use of ANC services decreases, mothers with births consider themselves experience and thus seek less ANC and may consider regular ANC services less important. Similarly, unemployed women and women whose husbands are unemployed were more likely to use ANC services. This might be related to the fact that unemployed women have no formal job, thus make use of their ample time to attend ANC services. They might attend more ANC even when they are not scheduled for one. Also, the majority of the unemployed women were uneducated and might also use ANC services to seek further understandings of their status and hormonal changes that do occur during pregnancy.

The findings of this study showed that the enabling (maternal age, marital status, ethnicity, parity, respondent education, occupation, and religion) and predisposing factors (residence, distance to the health facility, husband's education, and occupation) were non-predictor of ANC service utilization. A study conducted in Holeta Town, Central Ethiopia found maternal age and education as predictors of ANC service utilization (Birmeta et al., 2013). In another study in Ghana, residence and education were major predictors of ANC services (Arthur, 2012).

5.1.2 Level of the Utilization of Skilled Birth Attendant

This research has shown that the use of skilled birth attendants was low. Only 35.9% of women who had at least one delivery in the 3 years before this study used a skilled birth attendant. The majority, 57.6%, and 4.2% were delivered by Maternal and Child Health Aide (MCHA) and Traditional Birth Attendant (TBA) respectively, who are considered non-skilled. Kailahun District is one of the most remote areas in Sierra Leone, physical accessibility is a major challenge due to the bad road network, thus most healthcare workers find it difficult to travel, work and stay in the district which creates opportunities for non-skilled workers. The 10 years of civil war which ended in 2002 and the 2014 Ebola epidemic, all started in Kailahun and left a huge impact on health service delivery in the district. Sierra Leone is among the world's highest maternal death ratios at 1360 mortality per 100000 births (WHO, 2017) because most women are not delivered by a skilled birth attendant, and most ANC services are provided by non-skilled providers.

It further found that 10.5% and 36.0% of deliveries took place at Maternal and Child Health Post (MCHP) and Community Health Post (CHP) respectively, which are facilities manned by non-skilled attendants. In general, 99.0% of all deliveries took place in health facilities. In contrast to a study in Ethiopia where 38.4% of births had taken place at home (Birmeta et al., 2013). The proportion of deliveries by Caesarean Sections (CS) was found to be at 3.4%, which is below the World Health Organization guidelines for obstetric care, that between 5 to 15.0% of deliveries should be by CS (Maine et al., 1997). This means that obstetric coverage in Kailahun District is low and that fewer women are receiving CS than is required. The findings are similar to a study in Ghana, where 3,7% of deliveries were done through CS (Adanu, 2010). The low CS rate might be associated with the limited number of qualified medical staff that are capable of performing a CS. The WHO recommended that there should

be a critical threshold of 23 skilled healthcare workers (doctors, nurses, and midwives) per 10,000 population.

Nevertheless, it has been very difficult for Sierra Leone to cope with such recommendations due to severe scarcities of qualified healthcare workers, thereby providing merely 2 skilled workers per 10,000 populations (MOHS-SL, 2017, 2016; Surveillance n.d.). Only four medical doctors per 526,379 inhabitants in Kailahun. As the age of a woman and parity increased, the use of skilled birth attendants decreased. These are two factors that are mostly related, Kailahun is a district known for teenage pregnancy and early marriages due to its cultural practices. Therefore, a woman in this region tends to have more children compared to other regions.

This study revealed that residence is a major determinant of skilled birth attendant utilization. The use of skilled birth attendants was higher among urban residents than rural. These findings are consistent with other studies (S.M. et al., 2014)(Rutaremwa et al., 2015). The disparity in the utilization of MHC services may be due to the concentration of health facilities in urban areas combined with the high number of qualified birth attendants in urban areas and also the economic status of the urban resident. In the Kailahun district, there is an uneven distribution of health workers, most are found in urban areas.

Distance to the health facility was considerably connected with the use of a skilled birth attendant. Women that walked 30-60 minutes or more than 60 minutes to access health care services were more likely to use skilled birth attendant than those that walked less than 30 minutes. In another study conducted in Kenya, although distance was cited as a barrier to MHC service utilization 18.0% of women did not visit the nearest facility (Van Eijk et al., 2006). The husband's education was significantly associated with the use of a skilled birth attendant. Women whose husbands had a primary education were more inclined to use skilled birth attendants than those whose husbands had no education which is consistent with other studies

(S.M. et al., 2014). Similarly, in another study conducted in Nigeria, education played a key role in the utilization of skilled birth attendants (Ovikuomagbe, 2017). In general, education increases health awareness and knowledge on the significance of MHC services and improves on other forms of learning, this could be through; radio, internet, written information, and a better cultural understanding. Educated husbands may provide more autonomy to their wives (S.M. et al., 2014).

5.1.3 Level of Utilization of PNC

The study has found that the majority of women received PNC services and 58.1% of them received it from a non-skilled provider (MCHA). The 2013 Sierra Leone Demographic and Health Survey found that 13.0% of PNC services were delivered by MCHA (DHS, 2013). The disparity between the national and district figures may be related to the fact that the Demographic Survey was done in the entire 16-district taking into consideration the major urban areas where good healthcare services are concentrated compared with Kailahun being one of the most remote districts. Also, due to the limited number of skilled providers in the district, most PNC services are provided by MCHA.

Data analyzed with regards to the timing of the first PNC services found that half of the women received PNC within 60 minutes post-delivery and 67.0% had at least one follow-up after discharge from the health facility. The findings are inconsistent with the Ugandan Demographic and Health survey where only 2.0% of women received PNC with 1 hour (Rutaremwa et al., 2015). The high proportion of follow-ups might be related to the regular outreaches provided by MCHA and CHWs. This study further revealed that the utilization of PNC services was more than 95% taking into consideration all the background characteristics (age, residence, Marital status, education, occupation, etc).

Furthermore, 16.3% of women used the standard PNC package compared with 81.2% and 2.5% of the average and undesirable packages respectively. Residence, education of respondents, and husband's education are significant predictors of the utilization of the standard PNC package. The findings of this study are consistent with other studies. A study in Ethiopia found a significant influence of respondent education and urban residence on the utilization of MHC services (S.M. et al., 2014). Another study in Ethiopia found that education played a key role in increasing the utilization of PNC services (Ovikuomagbe, 2017).

5.1.4 Limitation of study

Women seem to have difficulty in the recollection of events that had happened during the last 3 years before the study. Women had difficulties in recalling or identifying the nature of healthcare services they received or the trained healthcare worker that provided the service. As a way of minimizing this challenge, the interviewers requested for respondent ANC cards to proof check their responses. Although our use of a cross-sectional study design precludes causal inferences, we believe that the present study is generalizable and externally valid as the sample accurately represents the population. The households were proportionately distributed to urban and rural areas. We did not assess the healthcare facility and the health workers' related-factors that affect antenatal, postnatal, and skilled delivery utilization, all of which are known to be key determinants of maternal health care utilization. Future research on the influence of these factors in health care utilization may be warranted.

5.2 CONCLUSION AND RECOMMENDATIONS

This study assessed the level of utilization and determinants of ANC, skilled birth attendants, and uptake of the different packages of PNC services in Kailahun District, Sierra Leone. It shows that PNC service utilization is much higher compared to skilled ANC and birth attendant utilization, even though the uptake of the standard PNC package was low. It further revealed

that the utilization of skilled birth attendants was low and urban residents seemed to be using more of the skilled birth attendants.

As recommended by WHO, the majority of women had 4 or more ANC visits and the components of ANC services such as BP check, urine test, body weight, malaria prophylaxis, were highly undertaken. In general, Maternal and Child Aides and State Enrolled Community Health Nurses were the major providers of MHC services. Community Health Post and Community Health Centres were mostly utilized for MHC services than hospitals. The findings of this study showed that the proportion of deliveries by cesarean sections is below the WHO recommended target (5-15%), which means that obstetric coverage is low and thus women that need a section are not getting it leading to an increase in maternal and infant morbidity and mortality.

Education of women, residence, parity, occupation, husband's education, and distance to health facility had a significant relationship with the use of skilled birth attendants. Finally, the findings show that urban residence and higher/vocational education are significantly associated with the uptake of the standard PNC package.

The following recommendations are made based on the findings of this study:

The Ministry of Health and Sanitation/ Central Government should:

- Work with relevant stakeholders to formulate policies and design programs that target women with low education and rural residence.
- Ensure the training of skilled maternal and child health providers and facilitate the even distribution to rural and urban areas.
- Develop a multidisciplinary approach to tackle issues related to the poor utilization of maternal health care services such as infrastructural development, poor road network,

healthcare facility-related issues, etc. The ministry of health, social welfare, local government, non-governmental organizations and other relevant should be involved.

- Engage the research and scientific committee to undertake or facilitate further research programs to determine the healthcare factors that influence the uptake of MHC services.

District Health Management Team and District Council should:

- Engage and sensitize communities and stakeholders on the importance of maternal health care service utilization.
- Improve on existing outreach services that will target defaulters in the uptake of MHC services.
- Work with relevant stakeholder to upgrade the MCHA training program in the district to skilled MCH providers

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APPENDICES

APPENDIX 1: CONSENT FORM

Study topic: Socio-economic Determinants of Maternal Healthcare Service Utilization, Kailahun District, Eastern Sierra Leone.

Principal investigator: Desmond Maada Kangbai, School of Public Health, University of Ghana, Legon.

Study purpose: To determine the determinant of maternal healthcare service utilization.

Study procedure: If you decide to participate in this study, we expect you to respond to an interview which will be conducted by a trained interviewer. It will involve answering questions about you, your household, and your last pregnancy, delivery, and postnatal period.

Risk: No risk will be posed to your life neither family

Reimbursement: you will not be paid for participating in this study

Right to refuse or withdraw participation: You can decide to withdraw from the interview at any time you wish. You are free to respond or not respond to any particular question.
Confidentiality: The information you provide us will be kept strictly confidential and it won't be shared with anyone except members of this team. Your name will not appear on any of the forms.

APPENDIX 2: STATEMENT OF CONSENT

I……. have been explained the purpose, risk, and benefits involved in this study. I understand that my decision to participate is voluntary and will not alter my access to health services in any way. I'm aware that I may withdraw from the study at any time and I may also respond or fail to respond to a particular question if I so wish. By signing this consent, I don't waiver any of my legal rights but merely indicates that I have been informed about the study in which I'm voluntarily agreeing to participate.

Signature Interviewee: Date and time:

Signature of interviewer:

APPENDIX 3: Individual, Household, and Pregnancy & Postnatal care Questionnaire

Introduction and Consent

Hello. My name is…….…….. I am working with a resident from the University of Ghana. We are surveying the Utilization of Maternal Healthcare Services in Kailahun District, Eastern Sierra Leone. The purpose of the study is to determine the utilization of maternal healthcare services. The information we collect will be used for Thesis work and will help the government to plan health services. Your household was selected for this survey. The questions usually take about 10-15 minutes. Whatever you say here will be confidential and will not be shared with anyone except members of our survey team. No risk will be posed to your life neither family and you will not be paid for participating in this study. You don't have to be in this survey, but we hope you agree to respond to the questions since your opinions are important. If I ask any question you don't want to respond to, let me know and I will proceed to the next or you can decide to stop the interview at any time.

For more information, kindly contact: 0023278626923

Do you have any questions?

May I start the interview now?

Signature of interviewer: Date and time:

Identification

Locality Name:

Local council:

District:

Province:

Chiefdom:

Section:

Enumeration area code:

Rural/Urban:

Section 1. Individual Characteristics

1. How long have you been living continuously at this address?
   Years…… Months….. Always…..
2. How old are you? ……Years
3. How old were you at your last birth? …….Years
4. Have you ever attended school? Yes No
5. What is the highest level of school you attended?
   Primary
   Junior Secondary
   Senior Secondary
   Vocational/commercial/Nursing/Teaching
   Higher
6. What is your religion?
   Christian Islam Bahai Traditional
   Others(specify)……..
7. What is your ethnic group?
   Creole Fullah Kono Limba Loko Manding Mende Sherbro
   Temne Others……
8. How many children do you have? ……..
9. The number of births in the past 5 years? …….
10. What is your Marital status?
    Single Married Divorced Widow Separated Living together
11. What is your occupation? .....

Section 2. Household/Community characteristics

1. Distance to the health facility.
   <30 minutes 30-60 minutes >60 minutes
2. Husband's education
   Primary
   Junior Secondary
   Senior Secondary
   Vocational/commercial/Nursing/Teaching
   Higher

3. Husband's occupation ……

4. Urban-rural status. Urban-Rural

5. Type of floor? Natural Modern

6. Type of toilet? Flush Pit & others

Section 3: Pregnancy and Postnatal Care

1. Did you see anyone for antenatal care for this pregnancy? Yes No

2. Whom did you see?

   Health personnel: Doctor Nurse Midwife

   Traditional Birth attendant

   Other (Specify) …….

3. Where did you receive antenatal care for this pregnancy?

   Her home Other Home Government hospital CHP CHC MCHP

   Private health facility Others(specify)…….

4. How many months pregnant were you when you first received antenatal care for this pregnancy? Months Don't Know

5. How many times did you receive antenatal care during this pregnancy? ……..

6. As part of your antenatal care during this pregnancy, were any of the following done at least one:

   - Was your blood pressure measured? Yes No
   - Did you give a urine sample? Yes [ ] No [ ]
   - Was your body weight taken? Yes [ ] No [ ]
   - Did you give a blood sample? Yes No

7. During this pregnancy how many times did u receive Tetanus injection? Times…….

   Don't Know

8. During this pregnancy, did you take SP/Fansidar to keep you from Malaria?

Yes, Don't Know

9. Were you delivered by a skilled birth attendant? Yes No

10. Who assisted with the delivery?

Health Personnel: Doctor Nurse/midwife MCH Aide

Another Person: TBA Relative/friend Other(specify)……

11. Where did you give birth?

Her home Other Home Government hospital CHP CHC MCHP

Private health facility Others(specify)……

12. How long after delivery did you stay there?

Hours…… …. Days…….. Weeks ……

13. What was the outcome of the delivery?

Baby born Alive Born dead Dieda few days after delivery

14. What was the mode of delivery?

Cesarean section Normal delivery Assisted vaginal delivery

15. I would like to talk to you about checks on your health after delivery. Did anyone check on your health while you were still in the facility? Yes No

16. How long after delivery did the first check take place?

Hours Days Weeks

17. Who checked on your health at that time?

Health Personnel: Doctor Nurse/midwife MCH Aide

Another Person: TBA Relative/friend Other(specify)

18. Now I want to talk to you about what happened when you left the facility. Did anyone check on your health? Yes No

19. How long after delivery did that check take place?

Hours Days Weeks

20. Who checked on your health at that time?

Health Personnel: Doctor Nurse/midwife MCH Aide

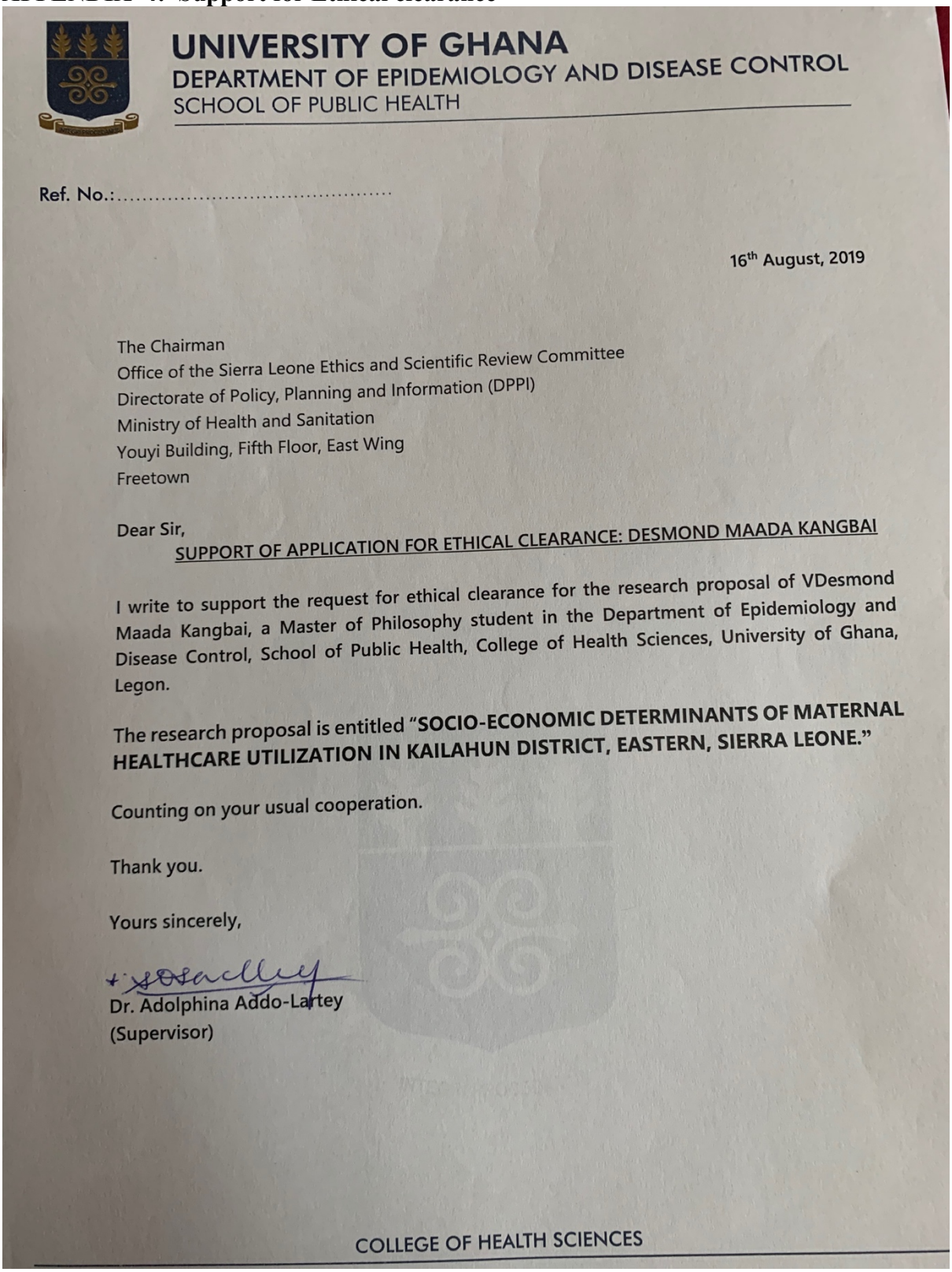
Another Person: TBA Relative/friend Other(specify)

21. Where did the check take place?

Her home Other Home Government hospital CHP CHC MCHP

Private health facility Others(specify)……

APPENDIX 4: Support for Ethical clearance



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

Ref. No.:.....

16th August, 2019

The Chairman
Office of the Sierra Leone Ethics and Scientific Review Committee
Directorate of Policy, Planning and Information (DPPI)
Ministry of Health and Sanitation
Youyi Building, Fifth Floor, East Wing
Freetown

Dear Sir,

SUPPORT OF APPLICATION FOR ETHICAL CLEARANCE: DESMOND MAADA KANGBAI

I write to support the request for ethical clearance for the research proposal of VDesmond Maada Kangbai, a Master of Philosophy student in the Department of Epidemiology and Disease Control, School of Public Health, College of Health Sciences, University of Ghana, Legon.

The research proposal is entitled "**SOCIO-ECONOMIC DETERMINANTS OF MATERNAL HEALTHCARE UTILIZATION IN KAILAHUN DISTRICT, EASTERN, SIERRA LEONE.**"

Counting on your usual cooperation.

Thank you.

Yours sincerely,

Dr. Adolphina Addo-Lartey
(Supervisor)

COLLEGE OF HEALTH SCIENCES

APPENDIX 5: Ethical Approval

GOVERNMENT OF SIERRA LEONE
Office of the Sierra Leone Ethics and Scientific Review Committee
Directorate of Training and Research
5th Floor, Youyi Building Brookfields, Freetown
Ministry of Health and Sanitation

To: **Dr Desmond Kangbai** (MPhil Candidate) **Principal Investigator**
District Medical Officer
Kenema District
desmakay@yahoo.com
078-626923

Study Title: **Socio-Economic Determinants of Maternal Healthcare Utilization in Kailahun District, Eastern Sierra Leone**

Version: 14 October 2019

Supervisor: **Dr Adolphina Addo-Lartey**
Department of Epidemiology and Disease Control
University of Ghana, Legon
sph.epdc@ug.edu.gh

Submission Type: First protocol version submitted for review

Committee Action: Expedited Review

Approval Date: 31 October 2019

The Sierra Leone Ethics and Scientific Review Committee (SLESRC) having conducted an expedited review of the above study protocol and determined that it presents minimal risk to subjects, **hereby grants ethical and scientific approval for it to be conducted in Sierra Leone.** The approval is valid for the period, **31 October, 2019 – 30 October, 2020.** It is your responsibility to obtain re-approval/extension for any on-going research prior to its expiration date. The request for re-approval/extension must be supported by a progress report.

For further enquiries please contact: efoday@health.gov.sl

GOVERNMENT OF SIERRA LEONE
Office of the Sierra Leone Ethics and Scientific Review Committee
Directorate of Training and Research
5th Floor, Youyi Building Brookfields, Freetown
Ministry of Health and Sanitation

Review Comments:

- **Amendments:** Intended changes to the approved protocol such as the informed consent documents, study design, recruitment of participants and key study personnel, must be submitted for approval by the SLESRC prior to implementation.

- **Termination of the study:** When study procedures and data analyses are fully complete, please inform the SLESRC that you are terminating the study and submit a brief report covering the protocol activities. Individual identifying information should be destroyed unless there is sufficient justification to retain, approved by the SLESRC. All findings should be based on de-identified aggregate data and all published results in aggregate or group form. A copy of any publication be submitted to the SLESRC for its archive.

Professor Hector G. Morgan
Chair

For further enquiries please contact: efoday@health.gov.sl

APPENDIX 6: PPS for urban EAs

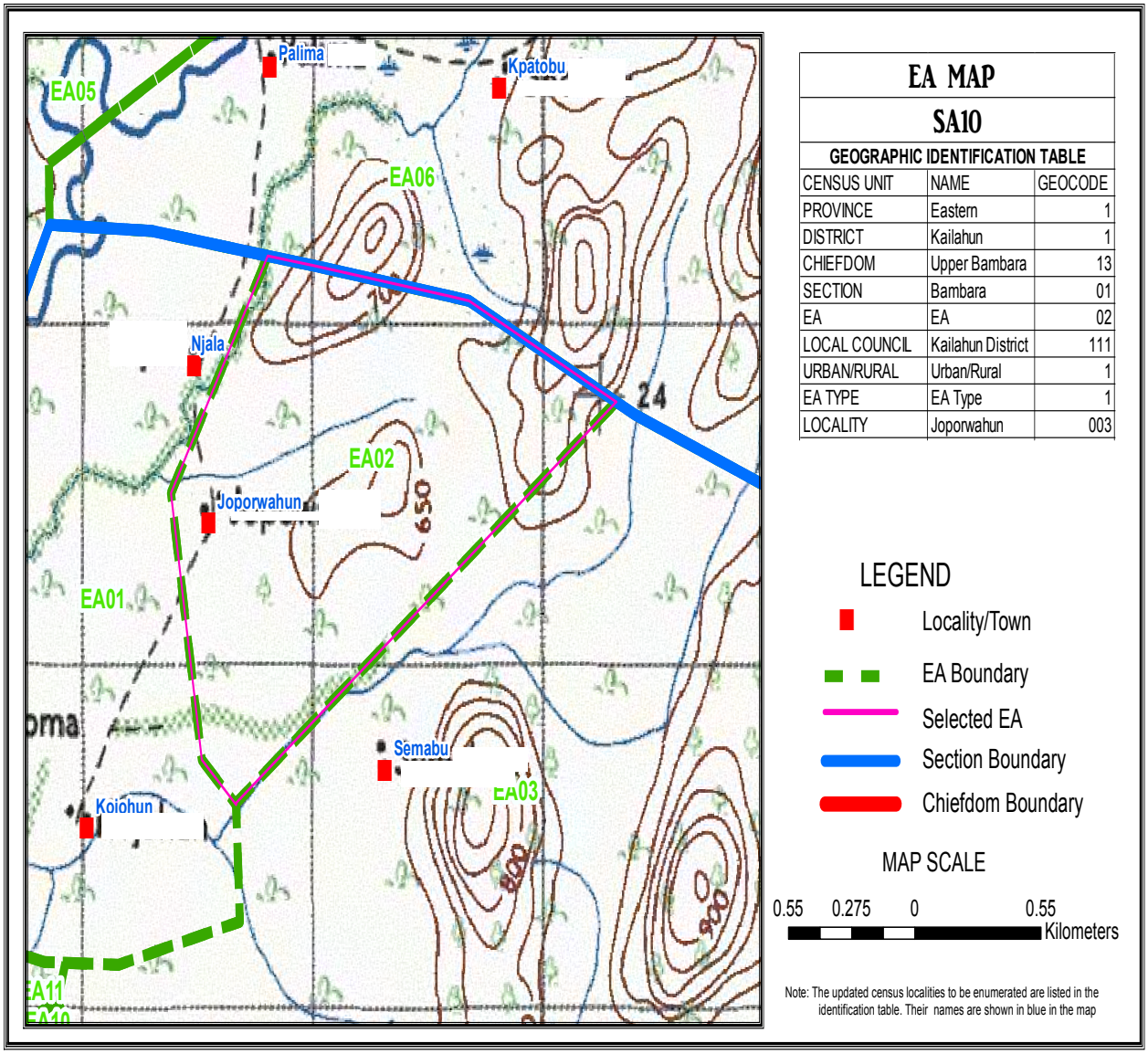
Total HH	26032		Random number (r)		0.446760528		
No of PSUs to select	17		Sampling interval (k)		1531.294118		0.846422
First sampling number	684.1217683						
		PSU NO					
		1	684.1217683	685			
		2	2215.415886	2216			
		3	3746.710004	3747			
		4	5278.004121	5279			
		5	6809.298239	6810			
		6	8340.592357	8341			
		7	9871.886474	9872			
		8	11403.18059	11404			
		9	12934.47471	12935			
		10	14465.76883	14466			
		11	15997.06294	15998			
		12	17528.35706	17529			
		13	19059.65118	19060			
		14	20590.9453	20591			
		15	22122.23942	22123			
		16	23653.53353	23654			
		17	25184.82765	25185			

APPENDIX 7: PPS for rural EAs

Total HH	57316		Random number (r)		0.975482807	0.777870889
No of PSUs to s	38		Sampling interval (k)		1508.315789	
First sampling n	1471.336121					
		PSU NO				
		1	1471.336121	1472		
		2	2979.65191	2980		
		3	4487.9677	4488		
		4	5996.283489	5997		
		5	7504.599279	7505		
		6	9012.915068	9013		
		7	10521.23086	10522		
		8	12029.54665	12030		
		9	13537.86244	13538		
		10	15046.17823	15047		
		11	16554.49402	16555		
		12	18062.8098	18063		
		13	19571.12559	19572		
		14	21079.44138	21080		
		15	22587.75717	22588		
		16	24096.07296	24097		
		17	25604.38875	25605		
		18	27112.70454	27113		
		19	28621.02033	28622		
		20	30129.33612	30130		
		21	31637.65191	31638		
		22	33145.9677	33146		
		23	34654.28349	34655		
		24	36162.59928	36163		
		25	37670.91507	37671		
		26	39179.23086	39180		
		27	40687.54665	40688		
		28	42195.86244	42196		
		29	43704.17823	43705		
		30	45212.49402	45213		
		31	46720.8098	46721		

APPENDIX 8: EA Map

2015 SIERRA LEONE POPULATION AND HOUSING CENSUS



APPENDIX 9: Urban EAs

OLD_EACODE	New_EACOD	New_Provinc	New_District	New_Chiefdc	New_CCODE	SECTION	New_SCODE	URBRUR	TOTPOPN	MALES	FEMALES	HOUSEHOLD
11020603	11030603	Eastern	Kailahun	Jawie	1103	Sowa	110306	Urban	677	346	331	125
11020618	11030618	Eastern	Kailahun	Jawie	1103	Sowa	110306	Urban	525	277	248	89
11040506	11050506	Eastern	Kailahun	Kissi Teng	1105	Torli	110505	Urban	739	415	324	118
11050210	11060210	Eastern	Kailahun	Kissi Tongi	1106	Lower Konio	110602	Urban	780	378	402	121
11070204	11080204	Eastern	Kailahun	Kpeje West	1108	Kimaya	110802	Urban	738	333	405	77
11080206	11090205	Eastern	Kailahun	Luawa	1109	Gao	110902	Urban	443	214	229	77
11080402	11090402	Eastern	Kailahun	Luawa	1109	Giehun	110904	Urban	856	423	433	140
11080631	11090631	Eastern	Kailahun	Luawa	1109	Luawa Fogui	110906	Urban	421	206	215	89
11080646	11090646	Eastern	Kailahun	Luawa	1109	Luawa Fogui	110906	Urban	806	378	428	155
11080663	11090663	Eastern	Kailahun	Luawa	1109	Luawa Fogui	110906	Urban	198	103	95	46
11081011	11091011	Eastern	Kailahun	Luawa	1109	Upper Kpom	110910	Urban	671	324	347	106
11100104	11110104	Eastern	Kailahun	Mandu	1111	Gbongre	111101	Urban	552	285	267	105
11100404	11110404	Eastern	Kailahun	Mandu	1111	Upper Kuiva	111104	Urban	659	329	330	133
11110707	11120607	Eastern	Kailahun	Njaluahun	1112	Kargbu	111206	Urban	435	202	233	80
11111023	11120923	Eastern	Kailahun	Njaluahun	1112	Sei I	111209	Urban	615	303	312	92
11130208	11140408	Eastern	Kailahun	Upper Bamb	1114	Guma	111404	Urban	629	296	333	112
11130617	11140617	Eastern	Kailahun	Upper Bamb	1114	Naiahun	111406	Urban	897	421	476	143

APPENDIX 10: Rural EAs

OLD_EACODE	New_EACOD	New_Provinc	New_District	New_Chiefdc	New_CCODE	SECTION	New_SCODE	URBRUR	TOTPOPN	MALES	FEMALES	HOUSEHOLD
11010403	11010403	Eastern	Kailahun	Dea	1101	Sienga	110104	Rural	439	196	243	99
11110605	11020205	Eastern	Kailahun	Jahn	1102	Jonga	110202	Rural	1589	839	750	187
11020204	11030204	Eastern	Kailahun	Jawie	1103	Kaio	110302	Rural	436	191	245	65
11020403	11030403	Eastern	Kailahun	Jawie	1103	Lower Luyengeh	110304	Rural	460	232	228	108
11020633	11030633	Eastern	Kailahun	Jawie	1103	Sowa	110306	Rural	497	246	251	75
11030101	11040101	Eastern	Kailahun	Kissi Kama	1104	Dakaleley	110401	Rural	701	366	335	105
11030301	11040301	Eastern	Kailahun	Kissi Kama	1104	Kama Toh	110403	Rural	1011	476	535	131
11040102	11050102	Eastern	Kailahun	Kissi Teng	1105	Bumasadu	110501	Rural	1292	718	574	141
11040205	11050205	Eastern	Kailahun	Kissi Teng	1105	Konio	110502	Rural	933	522	411	91
11040405	11050405	Eastern	Kailahun	Kissi Teng	1105	Lela	110504	Rural	784	375	409	107
11050101	11060101	Eastern	Kailahun	Kissi Tongi	1106	Bende Bengu	110601	Rural	1043	537	506	121
11050403	11060403	Eastern	Kailahun	Kissi Tongi	1106	Lower Tongi Tingi	110604	Rural	796	400	396	99
11050508	11060508	Eastern	Kailahun	Kissi Tongi	1106	Upper Konio	110605	Rural	757	379	378	96
11050704	11060704	Eastern	Kailahun	Kissi Tongi	1106	Upper Tongi Tingi	110607	Rural	773	412	361	98
11060201	11070201	Eastern	Kailahun	Kpeje Bongre	1107	Borkou	110702	Rural	735	352	383	93
11060604	11070604	Eastern	Kailahun	Kpeje Bongre	1107	Marwei	110706	Rural	411	203	208	68
11070107	11080107	Eastern	Kailahun	Kpeje West	1108	Golama	110801	Rural	848	474	374	100
11070502	11080502	Eastern	Kailahun	Kpeje West	1108	Kpindima	110805	Rural	589	328	261	71
11080301	11090301	Eastern	Kailahun	Luawa	1109	Gbela	110903	Rural	263	133	130	56
11080503	11090503	Eastern	Kailahun	Luawa	1109	Lower Kpombali	110905	Rural	577	275	302	104
11080615	11090615	Eastern	Kailahun	Luawa	1109	Luawa Foguiya	110906	Rural	503	248	255	87
11080903	11090903	Eastern	Kailahun	Luawa	1109	Mofindor	110909	Rural	717	352	365	142
11081017	11091017	Eastern	Kailahun	Luawa	1109	Upper Kpombali	110910	Rural	472	229	243	94
11090203	11100203	Eastern	Kailahun	Malema	1110	Lower Sami	111002	Rural	1082	561	521	142
11090306	11100306	Eastern	Kailahun	Malema	1110	Njagbla	111003	Rural	908	423	485	174
11090501	11100501	Eastern	Kailahun	Malema	1110	Upper Sami	111005	Rural	767	361	406	103
11100307	11110307	Eastern	Kailahun	Mandu	1111	Lower Kuiva	111103	Rural	548	255	293	123
11100414	11110414	Eastern	Kailahun	Mandu	1111	Upper Kuiva	111104	Rural	1286	636	650	199
11110502	11120502	Eastern	Kailahun	Njaluahun	1112	Gboo	111205	Rural	627	305	322	125
11110806	11120706	Eastern	Kailahun	Njaluahun	1112	Keimaya	111207	Rural	991	479	512	193
11111102	11121002	Eastern	Kailahun	Njaluahun	1112	Sei II	111210	Rural	524	283	241	95
11120105	11130105	Eastern	Kailahun	Penguia	1113	Bulima	111301	Rural	606	292	314	99
11120405	11130405	Eastern	Kailahun	Penguia	1113	Lombama	111304	Rural	291	138	153	50
11130102	11140102	Eastern	Kailahun	Upper Bamb	1114	Bambara	111401	Rural	413	210	203	69
11130401	11140301	Eastern	Kailahun	Upper Bamb	1114	Golu	111403	Rural	817	383	434	181
11140111	11150111	Eastern	Kailahun	Yawei	1115	Bendu	111501	Rural	683	334	349	100
11140401	11150401	Eastern	Kailahun	Yawei	1115	Kuiva Mende	111504	Rural	1000	510	490	118
11140503	11150603	Eastern	Kailahun	Yawei	1115	Kuivawa Njawoma	111506	Rural	703	348	355	88