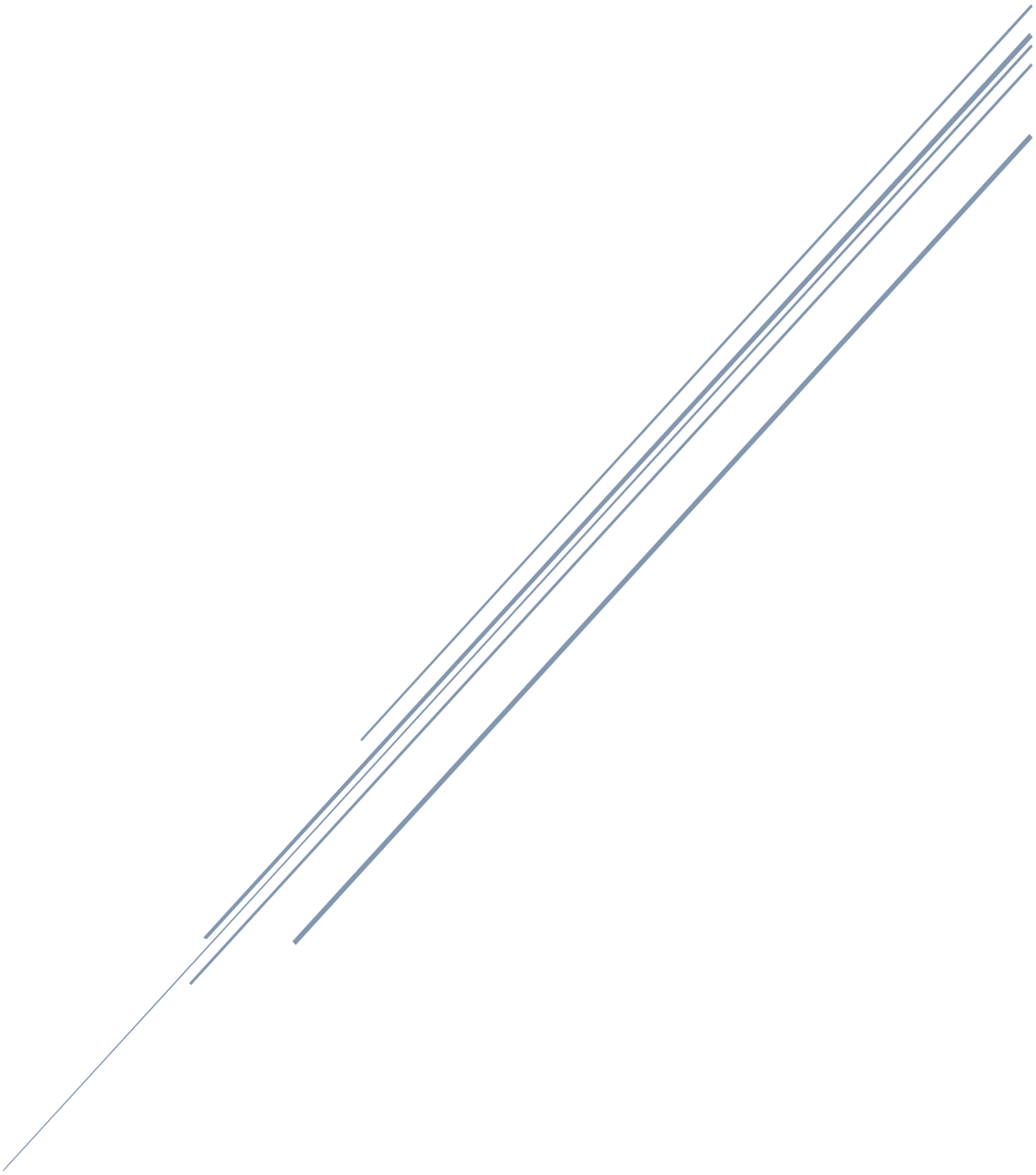
FACTORS INFLUENCING MATERNAL MORTALITY IN SIERRA LEONE

Kelfala Mbady Bangura



KIT Royal Tropical Institute
August, 2022

Factors Influencing Maternal Mortality in Sierra Leone

A thesis submitted in partial fulfilmennt of the requirement for the degree of Master of Science in Public Health

By

Kelfala Mbady Bangura

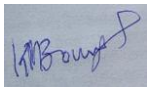
Sierra Leone

Declaration:

Where other people's work has been used (from either a printed or virtual source, or any other source), this has been carefully acknowledged and referenced in accordance with the academic requirements.

The thesis "Factors Influencing Maternal Mortality in Sierra Leone" is my own work

Recoverable Signature

X 

Kelfala M. Bangura

Signature: Signed by: 585efa0b-2e4f-491d-8d6a-d96d517ddc68

58th Master of Public Health/International Course in Health Development (MPH/ICHD)

13th September 2021 – 2nd September 2022

KIT (Royal Tropical Institute)

Amsterdam, The Netherlands

In Cooperation with:

Vrije Universiteit Amsterdam(VU)

Amsterdam, The Netherlands

Abstract

Background: Sierra Leone remains one of the most affected countries by the high prevalence of maternal mortality as the country is still recording one of the highest maternal mortality rate (MMR) in the world. The leading cause of MMR in the country includes haemorrhages, hypertensive disorders, sepsis, and obstructed labour. All these causes are preventable by using skilled birth attendants.

Objectives: The study aims to explore the factors influencing maternal mortality in Sierra Leone to develop evidence-based recommendations for programmes and policies to be shared with key stakeholders.

Method: A combination of secondary data analysis and literature review was used in this write-up using Thaddeus and Mane's three delays analytical framework.

Study findings: The following results were identified. For the first delay, Lower educational status, poverty, insufficient knowledge about pregnancy-related complications, and lack of women's involvement in household decisions were the factors leading to the delay in seeking care at the health facility. In the second delay, inequitable distribution of health facilities, especially in rural communities, long travelling distances, poor road networks, problems with transportation, and delay in referral from lower-level facility to higher-level facility.

For the third delay, attitude of health staff, maldistribution of health staff, uncertainty in the recruitment process of health staff, stock out of drugs and medical supplies, poor quality of training in some health training institutions, quality of care and disease outbreak situations were some of the findings identified during the review.

Conclusion: Low awareness, cultural or behavioural patterns, distance, poverty, and inadequate and low-quality services are some barriers that contributed to delays that restrict women from receiving or seeking treatment before, during, and after pregnancy and childbirth. Actions must be taken now and in the future at the personal, family, societal, and county levels to modify the health status of mothers and enhance health outcomes. These initiatives include health education, providing high-quality healthcare services, and focusing on vulnerable groups and gender-related concerns.

Keywords: maternal mortality, pregnancy, haemorrhage, childbirth, Sierra Leone

Word Count: 11567

Table of Contents

List of figures and tables

List of tables

List abbreviation

ANC	Antenatal Care
BPEHS	Basic Package of Essential Health Services
CHA	Community Health Assistance
CHC	Community Health Officer
CHP	Community Health Post
CMO	Chief Medical Officer
DMO	District Medical Officer
FBO	Faith-Based Organizations
FGM	Female Genital Mutilation
FHCI	Free Health Care Initiatives
GDP	Gross Domestic Product
GHE	Government Health Expenditure
HIV	Human Immunodeficiency Virus
HRH	Human Resource for Health
ICD10	International Classification of Diseases 10
INGO	International Non-Governmental Organizations
LMIC	Low and Middle-Income Countries
MCH Aide	Maternal and Child Health Aide
MCHP	Maternal and Child Health Post
MDG	Millennium Development Goals
MDSR	Maternal Death Surveillance and Response
MMR	Maternal Mortality Rate
MNCH	Maternal Neonatal and Child Health
MOHS	Ministry of Health and Sanitation
NEMS	National Emergency Medical Services
PHC	Primary Health Care
PHU	Peripheral Health Unit
PNC	Postnatal Care
PPE	Personal Protective Equipment
RMNCAH	Reproductive, Maternal, Neonatal, Child, and Adolescent Health

SDG	Sustainable Development Goals
SECHN	State Enrolled Community Health Nurse
SRHR	Sexual and Reproductive Health and Rights
TBA	Traditional Birth Attendant
UNICEF	United Nations Children Emergency Funds
US$	United State Dollars
WHO	World Health Organization

Key terms:

Maternal mortality

“Maternal mortality refers to the death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (1).

Pregnancy-related death

Pregnancy-related death is the death of a woman during pregnancy or within 42 days after the end of pregnancy, regardless of the cause of death (obstetric and non-obstetric) (1).

Late Maternal death

Late Maternal death is the "death of a woman from either direct or indirect obstetric causes, more than 42 days, but less than one year after the termination of pregnancy" (1).

Direct maternal death

Direct maternal death is defined as maternal deaths due to obstetric complications (for example, eclampsia, postpartum haemorrhage), interventions (for example, complications of Caesarean Section), omissions or incorrect treatment (1).

Indirect maternal death

Indirect maternal death is the number of maternal deaths that result from the deterioration of a condition that is already present, such as renal or cardiac disease, or from the development of a condition, such as diabetes, which is made worse by the physiological changes that occur during pregnancy (1).

Lifetime Risks of maternal death

Lifetime Risks A new measure of maternal mortality called lifetime risks takes into account a woman's reproductive years and her chances of getting pregnant and dying from that pregnancy. (1)

Maternal mortality ratio

Maternal mortality ratio refers to the number of maternal deaths during a given period per 100 000 live births during the same period (2). Mathematically it is expressed as:

$$\text{Maternal mortality ratio} = \frac{\text{Total number of maternal deaths}}{\text{Total number of live births}} \times 100{,}000$$

Maternal mortality rate

Maternal mortality rate is the total maternal deaths within a specific period per 100,000 women of childbearing age, or per 100,000 woman-years of risk exposure during the same period (2). Mathematically, it is expressed as:

$$\text{Maternal mortality rate} = \frac{\text{Total number of maternal deaths in a year}}{\text{Total number of women in their reproductive age}} \times 100{,}000$$

Proportionate mortality ratio

Proportionate mortality ratio refers to maternal mortality as a proportion of all female deaths over a given period, which is commonly defined as 15 to 49 years for women of reproductive age (2).

Acknowledgements

I thank the almighty God for his unchanging grace and absolute sustenance in my life. Furthermore, I am incredibly thankful to the Government of the Netherlands for providing me with the scholarship to fulfil my public health goal.

A special thanks to KIT Royal Tropical Institute for empowering my knowledge and skills in the field of public health. Let me also acknowledge with deep appreciation all academic staff of KIT for impacting their knowledge in me. I will also extend my special thanks and appreciation to my thesis advisor Lisa Juanola for her assistance, guidance and constructive criticisms throughout the thesis writing process.

My profound thanks also go to my wife, Mrs Martha Baindu Jaward and my kids, Jesse K. Bangura, Kelfala M. Bangura Jr and Edward M. Bangura, for their love and unlimited support throughout my studies.

My final thanks and appreciation go to all my colleague's students who supported me in diverse ways during my course.

Chapter 1 Background Information

1.1 Background

According to the World Health Organization (WHO) International Classification of Diseases (ICHD10). Maternal mortality is defined as "The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (3). The two main causes of maternal mortality include Direct causes; which occur as a result of the complications of pregnancy; like bleeding, pregnancy-induced hypertension, complications of unsafe abortion, and medical interventions which may result in the death of the pregnant woman (3)(4), while indirect causes occur as the direct effect of non-communicable diseases like; mental disorders, diabetes, HIV etc. precipitated by pregnancy (3).

Globally, 500,000 mothers die in pregnancy and childbirth each year; even though there has been a 24% decrease in the maternal mortality rate worldwide over the past decade, 810 women of childbearing age die every day from preventable causes related to pregnancy and childbirth (5). These numbers are extremely high even though substantial progress has been made in the last two decades.

Pregnancy and delivery complications are the primary causes of death among all women in low and middle income countries, but adolescent females aged 15 to 19 years are the most affected resulting in thousands of deaths each year in low- and middle-income nations, including Sierra Leone. Moreover, compared to older women, the risk of maternal mortality is higher for adolescent girls, especially those under the age of fifteen (6).

Maternal mortality reduction has been a priority for the international community, as both the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) included specific targets for the reductions in the maternal mortality ratio (MMR) (7).

Maternal mortality has been a significant public health problem in Sierra Leone, accounting for 1,360 deaths per 100,000 population as of 2017 (8). More of the country's efforts, including policies like Reproductive, Maternal, Neonatal, Child, and Adolescent Health (RMNCAH) policy (9), and introducing the Free Health Care Initiative (FHCI)(10), implementation of safe motherhood initiatives at all levels of the health facilities, and improving access to universal Sexual and Reproductive Health and Right (SRHR) services (11), have been in place with the aims of improving the health outcomes of the country including maternal and child health outcomes (10). But amidst all this effort, little progress has been made in reducing maternal mortality in the country (26), and the progress is not in line with meeting the SDGs target set for 2030.

1.2 Country profile

Sierra Leone is a country found in West Africa bordering Liberia and Guinea. The country is growing rapidly, with an estimated population of 8,306,436 million as of 2022, up from 5.5 million in 2008. It is within 27,699 square miles of area, ranking the country 103rd in terms of population and 120th in terms of size. Current Sierra Leone's population density is 273 people per square mile, ranking it 87th in the world (12).

The country is divided into north, south, east, and western administrative regions, which are further divided into fourteen districts. The southern province comprises four districts (Bo, Bonthe, Moyamba, and Pujehun), the eastern province with three districts (Kailahun, Kenema, and Kono), the northern province with six districts (Tonkolili, Bombali, Port Loko, Koinadugu,

Kambia and Karene) and the western region with two districts (western urban and western rural districts). Each district is further divided into chiefdoms, towns, and villages.

Figure 1: Map of Sierra Leone (13)

Sierra Leone has 35 per cent of its population residing in urban areas (12). Thus, there are not too many significant cities in the country. The Western Area Urban Area population density, including Freetown, is 1,224 people per square mile. In contrast, the Koinadugu district in the north has a population density of 21 people per square mile. Bo, the country's second most populated city, is in the south and has a population of 233,684. Bo is a cosmopolitan city with some of the country's most respected colleges. Kenema and Makeni are the only other cities with populations above 100,000 (12).

1.3 Health services organization

The key providers of health services in Sierra Leone include the Government, the private sectors, Faith Based Organizations (FBOs) and International Non-Governmental Organizations (INGOs). They all work together to provide health services for the people of Sierra Leone. But the Ministry of Health and Sanitation (MOHS) is the parent body responsible for delivering health services in the country. The minister of health and sanitation, who happens to be the political head, is the head of the health ministry, assisted by two deputy ministers.

Apart from the political leaders, the Chief Medical officer (CMO) serves as a professional head assisted by two deputies. The ministry also has Directors, Deputy Directors, and Program managers who all report to the CMO and work at the national level.

Because there was no official data available on the number of privately operated hospitals and clinics in the district, I called my colleagues working in every districts across the country to provide me with information on the number of health facilities in every district. The information collected was used in the paragraph below.

There is currently a total of eighty-two government-owned secondary health care facilities and179 private clinics/hospitals across the country. Also, there are currently a total of 2007 Primary health care facilities in the country, of which 259 are Community Health Centers (CHCs), 657 are Community Health Post (CHPs), and 1091 are Maternal and Child Health Post (MCHPs). All the primary health care facilities are government-owned, although some are supported by NGOs and faith-based organizations (FBOs).

The District Medical Officer (DMO) is the head of the district and is responsible for the primary health care services and plays an oversight role at the district hospital. At the same time, the Medical Superintendent is the head of the secondary health care services in all district headquarters towns.

Each district is equipped with a district referral hospital except for Bo, Kenema and Makeni, whose district hospitals also serve as regional referral hospitals, and they all operate under secondary health care services.

The Maternal and Child Health Post (MCHP) is the village's and grassroots level's initial point of contact for patients. At these sites, one or more MCH Aides will live and conduct their duties. Within a 3-mile radius, an MCH Post should ideally serve a population of 500 to 5,000 people (14).

A Community Health Post (CHP) is typically found in a small town, serving a population of 5000 to 10,000 people within a 5-mile radius. These posts perform identical duties to the MCHP, but with the addition of curative capabilities (14)

The Community Health Center (CHC) is a resource for prevention, promotion, and treatment. Within a 5–10-mile radius, it should have a catchment size of 10,000 to 30,000 people. Aside from helping with routine deliveries, CHCs can also manage various clinical duties, such as severe childhood illness, malaria treatment, and inpatient and outpatient physiotherapy for handicaps. Inpatient care, as well as some laboratory services (14).

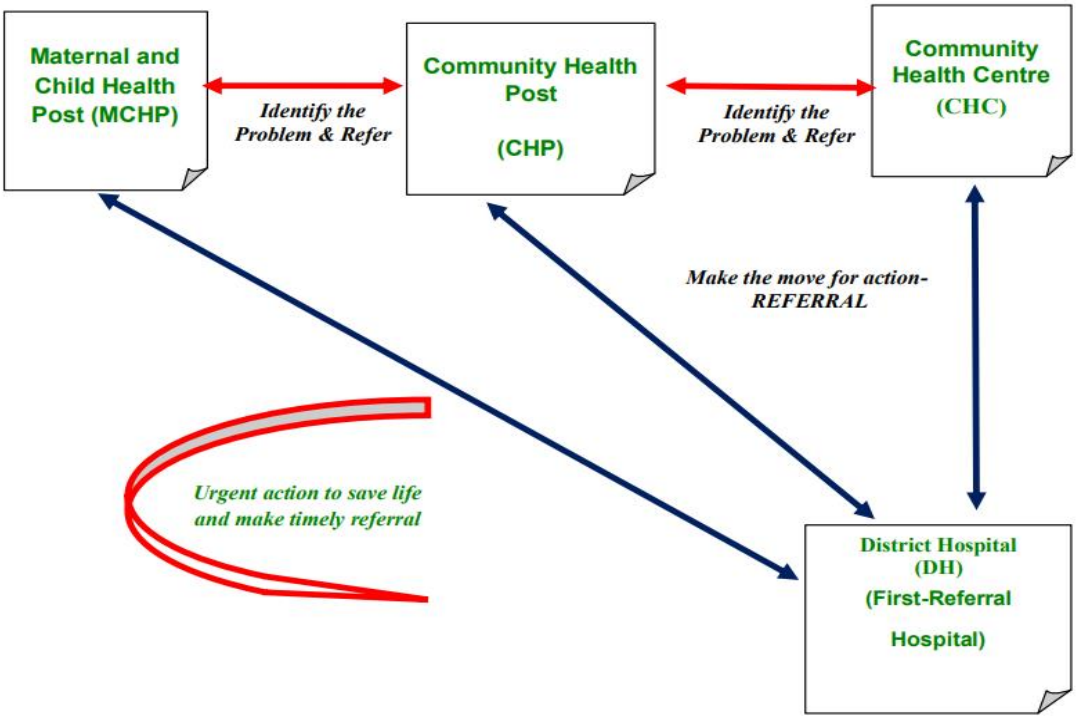


Figure 2: REFERAL PATHWAY OF PATIENT IN SIERRA LEONE (14).

The district hospital must have two resident doctors and a bed capacity of no less than 45. It is the first referral centre and ought to manage all services, including the Basic Package of Essential Health Services (BPEHS), holistically. Major surgery under general anaesthesia, X-rays, complete emergency obstetric treatment, including Caesarean sections, and family planning techniques appropriate for Sierra Leone are cases that will be referred to the district hospital level (14).

1.4 Health expenditure

Sierra Leone's health care delivery system has been donor-dependent, as the government expenditure remains to be fluctuating from the year 2000 to 2022 (15). Since the implementation of the FHCI in 2010, the initiative has remained donor driven. However, GOSL made a commitment to spend 16% of its GDP in line with the Abuja commitment made by heads of states in the subregion (16). The government allocation of funds covers all services, including maternal and child health services being the government's most priority areas.

Details of the current health expenditure of Sierra Leone are shown in the table 1 below.

Table 1: PERCENTAGE OF HEALTH FINANCING EXPENDITURE, SIERRA LEONE (15)

	2000	2006	2012	2019
Health spending US$ per Capita (CHE)	23	34	60	46
Government health spending % health spending (GGHE-D %CHE)	18.0%	10.4%	9.0%	14.0%
Out-of-pocket spending % health spending (OOPS % CHE)	75.7%	68.6%	73.2%	55.2%
Priority of health (GGHE-D GGE)	12.7%	6.5%	4.7%	5.8%
GDP US$ per capita	202	323	566	528

1.5 Major health problems in Sierra Leone

In Sierra Leone, maternal deaths remain a major cause of death for women of childbearing age 15 -49 years (17)(33). But overall, infectious diseases remain the leading cause of illness and death, with malaria being the main killer and responsible for 38% of all health facility admissions. Another prominent public health issue is tuberculosis, which is thought to cause three new cases per one thousand individuals per year. The countrywide HIV prevalence rate is 1.5%. Maternal mortality remains another public health problem in the country, accounting for 1360/100,000 live births (18), Under-fives mortality at 122/1000 livebirths, infant mortality is 75/1000 livebirths and neonatal mortality at 31/1000 livebirths (19). In addition, the importance of non-communicable diseases and injuries is growing. In Sierra Leone, illnesses like cardiovascular disease, cancer, diabetes, and respiratory illness, along with injuries, are becoming increasingly common causes of early mortality and disability, adding to the country's dual burden of communicable and non-communicable diseases (18). the table below gives more data about the top ten leading causes of death in Sierra Leone.

Table 2: CAUSES OF DEATHS IN SIERRA LEONE, 2019 (20).

No	Name of disease	Percentage (%)
1	Malaria	17.4
2	Neonatal disorders	12.88
3	Lower respiratory infection	9.83
4	Congenital birth defects	4.98
5	Diarrhoea disease	4.54
6	HIV/AIDS	3.24
7	Meningitis	2.53
8	Tuberculosis	2.49
9	stroke	2.27
10	Protein Energy Malnutrition (PEM)	1.98

Chapter 2: Problem statement and justification and objectives

2.1 Problem statement

Sub-Sahara Africa remains the region most affected by maternal mortality accounting for 66% of the global maternal mortality (1) Sierra Leone is one of the worst affected countries in sub-Sahara Africa, with 1360/100,000 maternal deaths (21)(22)(23)s a result; Sierra Leone is at risk of not achieving the targets set in the SDG for all countries to reduce their maternal mortality rate to less than 70/100000 live births by 2030 (24)(25)(26). In Sierra Leone, about 73% of births take place in rural areas among the poorer populations with less equipped health facilities; therefore, pregnancy care is typically restricted, and maternal healthcare does not always result in favourable outcomes as it does in large cities (27). Even where delivery assistants are present, they only serve as helpers who lack the ability to perform life-saving functions. As a result, many women who require lifesaving interventions like the cesarian section at PHUs will end up being referred to hospitals (27).

Also, the levels of child marriage and adolescent pregnancy is high. Adolescent pregnancies account for 28% of all pregnancies and 40% of all maternal deaths (28). In addition, there are high incidences of home deliveries done by unskilled birth attendants compared to health facility deliveries, especially in most rural areas (27), with high fertility rates, especially among families with poor socioeconomic status (29).

Maternal mortality has a negative effect on the family, community, and the country as it affects the nutritional status of the growing children in the household, altering the socioeconomic status of the family, household, and the community at large (30).

There was a minimal decline of 4.4% in the number of maternal deaths recorded in the country from 2000 to 2015. Following the implementation of the Free Health Care Initiative (FHCI) in 2010, launched by the government of Sierra Leone, targeting pregnant women, lactation mothers, and under-five children have free medical care services in all Government-owned health facilities across the country (26). Reasons for the introduction of the FHCI by the government was to increase access to service delivery by the most vulnerable population of women and children in the country, which was also believed to play a pivotal role in reducing the high infant and maternal mortalities in the country (31)(32). But despite the efforts, many women do not have timely access to quality maternal health care (19).

Evidence suggests that socio-economic and socio-cultural factors combined with aspects of the health system, lack of information among expectant mothers, and a delay in household decision-making to seek care could be potential contributory factors that require direct investigation (17)(23). This study, therefore, aims to explore the factors influencing maternal mortality in Sierra Leone.

2.2 Justification.

Maternal mortality remains to be a public health problem in Sierra Leone, as maternal deaths alone account for 36% of the death of women between child beating ages of 15 to 49 years (33). The leading causes of maternal passing in the country include: Obstetric haemorrhage 46%, hypertensive disorders 22%, obstructed labour 21%, and sepsis 11% (4)(33). All are related to direct causes of maternal mortality (34). Currently, in Sierra Leone, all government-owned health facilities provide free services for pregnant, lactating and UFC, but despite the benefits, 22% of pregnant women do not want to go for antenatal care services (19); some use the ANC services at 28 weeks of pregnancy, and some do not use the services throughout their pregnancy. According to studies, 30-80% of maternal deaths due to direct causes can be prevented through institutional delivery by a skilled birth attendant (35)(36). Studies in other LMICs have

implicated poverty, cultural, socio-economic, and religious factors to be contributing to delays in seeking care, thereby leading to maternal deaths (37)(38)(39).

There is diverse literature about many various factors contributing to maternal mortality both in Sierra Leone as well as in other African countries. However, there is not enough thorough analysis of all the contributing factors mentioned in the different articles and relating those dealing with the different types of delays. Therefore, this study aims to compile diverse evidence about contributing factors to maternal mortality to make a comprehensive analysis using the three delays model. The findings from this study will provide evidence-based information that will allow stakeholders to sort an informed decision that may be of help in reducing maternal mortality in Sierra Leone.

2.3 General objective

Main Objective

To explore the factors contributing to maternal mortality in women of reproductive age and to develop evidence-based recommendations for tackling maternal mortality in Sierra Leone.

2.3.1 Specific objectives

1. To assess the trend of maternal mortality in Sierra Leone.
2. To explore the sociocultural/economic factors contributing to maternal mortality in Sierra Leone.
3. To explore the health system factors contributing to maternal mortality in Sierra Leone.
4. Develop evidence-based recommendations for tackling maternal mortality to be shared with key stakeholders.

Chapter 3: Methodology

This study is an exploratory qualitative study conducted from the 1st of June to the 10th of August 2022. This study focuses on Sierra Leone to explore the factors influencing maternal mortality in Sierra Leone. The study involves two key methods: A secondary quantitative data analysis which will look at Maternal Death Surveillance and Response (MDSR) data in Sierra Leone, and a literature review.

3.1. Secondary quantitative data analysis

The secondary quantitative data analysis was done using the Maternal Death Surveillance and Response data obtained from the Ministry of Health and Sanitation (MOHS) Sierra Leone. The secondary data analysis used in this study retrospectively looked at the MDSR data from 2016 - 2021 to compare the trend in maternal deaths in all districts and regions across Sierra Leone. This period was considered because there was a report of inconsistencies in the 2015 MDSR data reported from the district. Also, maternal deaths were underreported in some communities in the hard-to-reach areas of the country (40). The MDSR data obtained from MOHS was cleaned to rule out any data entry errors before starting my analysis. The data was analyzed using the Microsoft Excel version available in office 365. Finally, the analyzed data result was presented using a table to present the findings on the trend in maternal deaths in Sierra Leone, in line with the first objective of the study.

The MDSR system was designed by the MOHS and Partners to track, investigate and review all maternal deaths occurring in the country to identify the causes and how to address them. To prevent maternal mortality in health institutions, the MOHS began conducting ad hoc maternal death reviews in 2015 (40). Maternal death surveillance officers were trained in every district in the country to visit and investigate any maternal deaths happening in their districts.

3.2. Literature review

The literature review will look at published scientific journals from Sierra Leone, sub-Sahara African countries and other LMICs to carefully examine the relationship between maternal mortality and socioeconomic, sociocultural and health system-related factors contributing to the high prevalence of maternal mortality in Sierra Leone. The analysis in the literature review was done by carefully reading through the result sections of the various scientific papers during the literature search, and analyzing the findings, to get evidenced-based information used to address the remaining three objectives of my study.

3.3. Search strategy

The following combination of keywords was used together with the AND, OR Boolean operators to conduct the literature search. "Maternal death" OR "Maternal mortality" OR "death of pregnant women" OR "maternal passing" "AND" "delay in seeking care" OR "health system factors" OR "community factors" OR "socioeconomic factors" OR "cultural factors" OR Geographical factors" OR Gender OR "Religion" OR "religious factors" OR "education factors" OR "policy" OR distance OR "decision making" AND "worldwide" OR "low and middle-income countries" OR Africa OR Asia OR "sub-Sahara Africa" OR "Sierra Leone". The literature search was done to get the relevant information from published and unpublished papers, grey literature and reports from MOHS and partners, including WHO, UNICEF, UNFPA and other relevant partners. The literature search was done using PubMed, Google scholar, VU library, and WHO HENRI to get the required papers for this thesis. Also, snowballing method of the literature search was done to get additional literature from the papers, reports, and grey literature that were red.

3.4. Inclusion criteria

A literature search was done using Google Scholar database, PubMed database, and VU library using the following key terms; maternal deaths, maternal mortality, death of pregnant women, and maternal passing were combined using the Boolean operators with delay in seeking care, socioeconomic factors, sociocultural factors, cultural factors, religious factors, geographical factors, educational factors, distance and decision making. It was done for LMICs first, followed by sub-Saharan Africa and then Sierra Leone, which yielded many papers. I then skimmed through the abstracts of the various articles to identify the ones required for my thesis, looking for the key search terms listed above. All the papers whose abstracts cantained the search terms above and written in the English language were selected for the thesis.

3.5. Exclusion criteria

Only articles, reports, websites, and grey literature written in the English language were used in this thesis. Articles, reports, and grey literature written in other languages will not be considered for this thesis. Also, articles written within the past fifteen years will be considered, and those older than fifteen years will not be considered

3.6. Analytical framework

The Thaddeus and Mines three delay conceptual framework (41) was used in this study to explore the factors influencing the high maternal mortality rate in Sierra Leone. This is because the model will better explain the interconnections between the contributing factors to the increased maternal deaths in the country, as its design looks at investigating the associated factors ranging from decision making when the woman is at home to the time of intervention in the health facility when the pregnant woman presents with obstetric complication. Below is the list of the three delays:

3.6.1. The first delay

Delay in dealing with the decision to seek medical care at the health facility (41). This is the delay that occurs at the community level, which is related to decision-making at community levels involving the pregnant woman, her spouse, and other family members.

3.6.2. The second delay

Delay in reaching the health facility for services. This delay deals with issues related to distance and road network/conditions to reach the health facility as both serve as an obstacle when it comes to decisions to seek health services in rural locations; a woman in labour may find the nearest clinic only equipped for minimal treatments and instruction. She may have no method of getting to a regional centre with more resources (41).

3.6.3. The third delay:

Delay in receiving the required care at the facility is related to health services factors, as coming to the facility may not result in therapy starting right away. Lack of skilled personnel, critical drugs, and supplies, as well as administrative delays and clinical mismanagement (41).

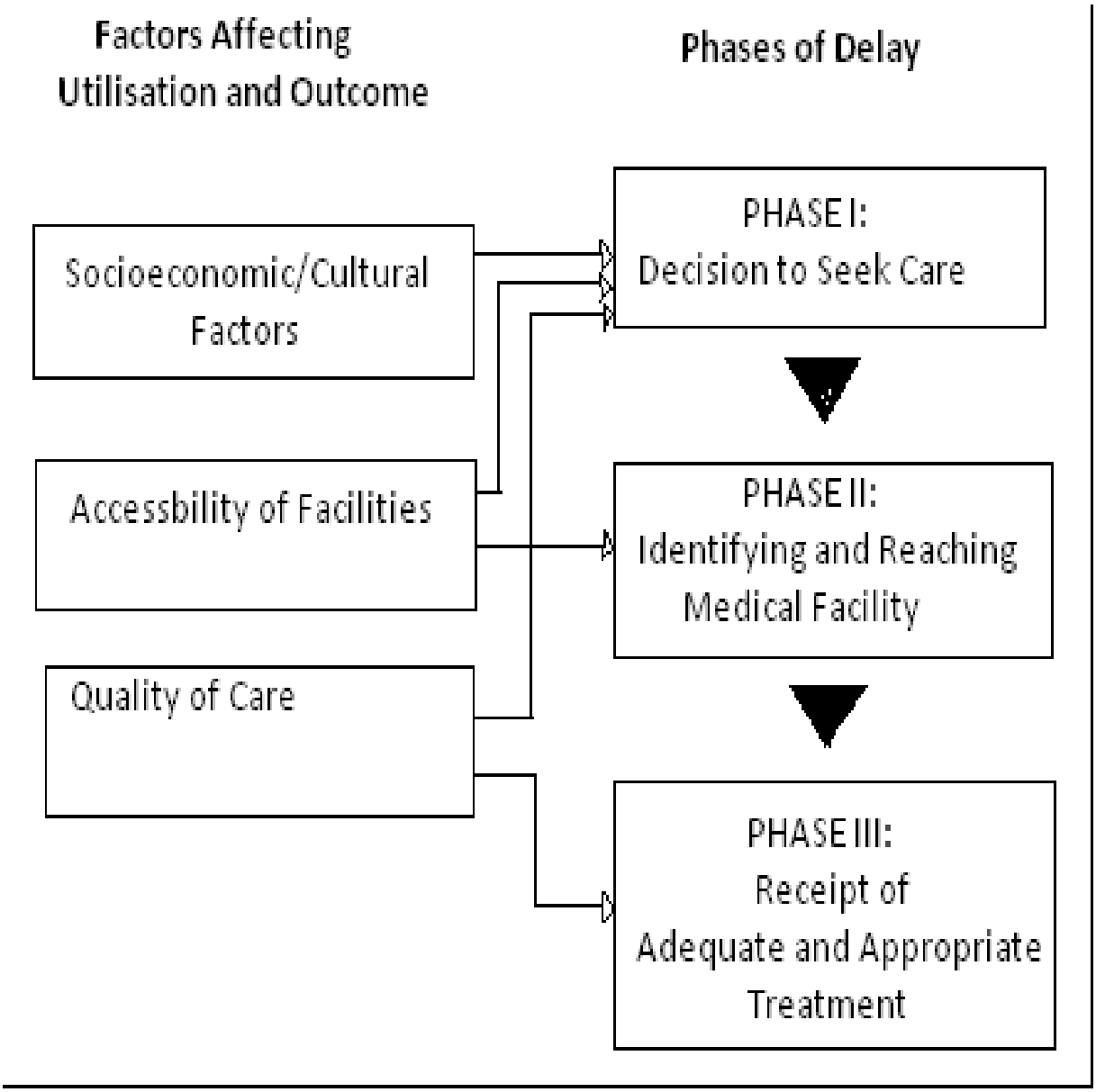


Figure 3: THADDEUS AND MINES THREE DELAY CONCEPTUAL FRAMEWORK (41)

Chapter 4. Results

This chapter aims to present the result of the assessment of the MDSR data and the literature review for the period under review to determine the trend in maternal mortality in the country and to present the findings from published and unpublished scientific literature grey literature, reports, and websites. The presentation of the result was structured in line with the study objectives. I will first present the results of the assessment of the mortality trends got from the MDSR data from 2016 and 2021 and then follow the presentation of the main results about the contributing factors to maternal mortality following the three delay model.

4.1 The trend in maternal mortality in Sierra Leone from 2016 to 2021

Within the period under review, Sierra Leone recorded a cumulative total of 12721 maternal deaths, according to the MDSR data. The Northern region recorded the highest (42%) of all maternal deaths, followed by the Western area (27%), Eastern region (19%) and Southern region (12%). Therefore the analysis by region shows that maternal deaths were highest in the north.

Analysis of data disaggregated by districts shows that; Western Area Urban (20.29%) reported the highest number of maternal deaths nationwide, followed by Tonkolili (13.85%) and Port Loko (10.50%). All these districts are part of the north-western region. Kenema ((9.66%) and Kono district in the East also bear a high burden of maternal death in the eastern province. In the South, Moyamba (4.68%) and Pujehun district (3.47%) had the lowest burden. Therefore from the analysis by district, it is in the western area urban district where maternal death is highest. Detailed information about the trend in maternal mortality in Sierra Leone is shown in the table below.

Table 3: TREND OF MATERNAL MORTALITY, SIERRA LEONE, 2016-2021

DISTRICT/AGE	10yrs - 14yrs n (%)	15yrs - 19yrs n (%)	20yrs - 24yrs n (%)	25yrs and Above n (%)	Total n (%)
Bo	22(7.03)	83(26.52)	79(25.24)	129(41.21)	313(3.05)
Bonthe	30(9.23)	59(18.15)	82(25.23)	154(47.38)	325(3.17)
Bombali	51(10.67)	99(20.71)	142(29.71)	186(38.91)	478(4.66)
Falaba	3(2.46)	21(17.21)	50(40.98)	48(39.34)	122(1.19)
Kailahun	20(15.04)	25(18.80)	42(31.58)	46(34.59)	133(1.30)
Kambia	7(2.66)	49(18.63)	76(28.90)	131(49.81)	263(2.56)
Karena	45(7.20)	175(28.00)	178(28.48)	227(36.32)	625(6.09)
Kenema	87(8.18)	277(26.06)	322(30.29)	377(35.47)	1063(10.36)
Kono	57(6.60)	185(21.41)	238(27.55)	384(44.44)	864(8.42)
Koinadugu	12(3.91)	67(21.82)	102(33.22)	126(41.04)	307(2.99)
Port Loko	67(10.44)	82(12.77)	215(33.49)	278(43.30)	642(6.26)
Moyamba	4(1.17)	79(23.17)	109(31.96)	149(43.70)	341(3.32)
Pujehun	32(9.04)	60(16.95)	112(31.64)	150(42.37)	354(3.99)
Tonkolili	107(6.82)	359(22.89)	465(29.66)	637(40.63)	1568(15.28)
Western Area Rural	25(4.57)	121(22.12)	191(34.92)	210(38.39)	547(5.33)
Western Area Urban	115(4.97)	681(29.40)	731(31.56)	789(34.07)	2316(22.57)
Total					10261

The fluctuating trend of maternal deaths was observed in all the districts nationwide. For example, in the Western urban area, a drastic reduction in maternal death was seen from 2.36% in 2016 to 0.46% in 2017. Two years following the introduction of MDSR in the country. It nevertheless had an exponential increase from 8.99% in 2018 to 34.10% in 2020 and then dropped significantly to 20.29% in 2021. This was, however, consistent with other districts in the country.

4.2. Phases of the three delays

4.2.1. Phase one delay

4.2.1.1. Decision-making to seeking health care services

This delay deals with factors/barriers that prevent pregnant women from going for health services at the available health facilities. From the review findings, the factors that contributed to phase one delay include socioeconomic factors, level of education, low perception of complication, sociocultural/religious beliefs, household/community decision-making power at home, and harmful traditional practices. Most of the pregnant women who arrived with complications at the health facilities are because of some of the factors listed above; this may be the most demanding situation to address in the chain of obstetric care (42).

4.2.1.2 Socio- economic status

The financial power of women, their lack of access to wealth and economic resources, and their difficulty finding well-paying employment are all social and economic variables that affect timely decisions to seek care, thereby contributing to maternal mortality. When women attain wealth, especially financially, they can prioritize their health and their families (43). Maternal mortality disparities between nations have been seen to be influenced by women's social and economic standing, as studies have shown that maternal death rates are significantly greater in

rural than in urban areas and among lower income groups than among higher income groups (44). Also, further study findings show that maternal mortality negatively affects the GDP of LMICs, as the higher the maternal mortality in the country, the more it affects the GDP, which will result in an extreme economic loss for the country (45)(46). The economic loss of the country will affect the most vulnerable (women and children) in the rural communities. As a result, they are prone to delays in seeking health services.

Also, the current global economic crisis due to COVID 19 has made many people's situation worse by driving up the cost of healthcare services and facilities and underfunding the health sector by the government, as most of the government resources mend for health implementation projects were redirected to COVID 19 prevention (47), with LMIC countries including Sierra Leone are still suffering from its effect. Low government spending on health because of COVID 19 prevention had a negative effect on the normal functioning of the health facilities (47). As most health facilities were not well functioning, stock out of drugs and medical supplies were reported due to the international travel restrictions and people afraid of not being infested by covid were identified as factors which contributed to delay in seeking and receiving adequate care at the health facilities (47).

Findings from another study in Sierra Leone reported that despite the Sierra Leonean government's 2010 implementation of the Free Healthcare Initiative, which in theory makes healthcare "free" for pregnant and lactating women, giving birth can still be an extremely expensive process, as expenses for supplies or treatments not entirely covered (drugs not on the essential list) by the government plan are frequently incurred by women giving birth in public hospitals (32). As a result, men face considerable financial obligations not only during pregnancy and childbirth but also during the actual delivery (32). As a result, leads to delays in seeking care at the health facilities.

4.2.1.3. Level of education

Although no evidence was found in Sierra Leone during the review about this factor, the positive effect of women's education greatly influences their health-seeking behaviours, especially during pregnancy and childbirth, as it was reported in a study that among uneducated women In Zaria, northern Nigeria, pregnant women who did not attend ANC services reported MMR of 2900/100,000 live births as compared to educated women with records of ANC attendance recorded 250/100,000 livebirths of MMR (48). This same information was supported in the Nigerian demographic health survey, where striking regional variations in the connection between educational attainment and maternal mortality ratio. Further supporting these findings, there were 6.3 per cent and 6.0 per cent, respectively, of women in the southeast and southwest geopolitical zones who had no formal education, as opposed to 68.1 per cent and 74.3 per cent of women in the northeast and northwest. This available data indicates that MMR was higher in Northern Nigeria than in Southern Nigeria, particularly among women with low levels of education are mostly linked with delay in seeking care. A significant sociocultural element that contributes to maternal mortality is a lack of education (48).

4.2.1.4. Low perception of complication

Most maternal deaths occur due to the low awareness among mothers and their society members (51), inadequate understanding of danger signs in pregnancy and labour, and preparation for a future emergency should it occur during and after delivery (49)(50). A study done in the western urban region of Sierra Leone identified that many women lack adequate knowledge about the courses of anaemia and other dangerous signs of pregnancy complications in the western area (51)(52). As a result, pregnant women suffering from early signs/ symptoms of anaemia and other dangerous signs in pregnancy, like bleeding, convulsions, high blood pressure etc., had

delayed treatment, which results in complications that may later affect the woman and her fetus, leading to maternal mortality.

The presence of Traditional Birth Attendants (TBAs), ability to raise funds for referrals, referral of complicated deliveries, understanding of the course of illness and the ability to understand the severity of symptoms were all found to jeopardize the pregnant women's health, thereby causing delays leading to mortality (50). Another research findings in Sierra Leone show that giving birth in the villages is a private, even secret affair. Those who had never given birth were not permitted to participate in or help with the delivery. This included young ladies who have not yet given birth to their children as well as males and children. The implication was that a woman (or girl) expecting her first kid frequently had little knowledge of what would take place throughout the childbirth process. This ignorance of what to anticipate and what to do extended to how she handled the initial stages of labour and the degree of autonomy and power she had over the decision-making process (23). This also promotes delays in visiting the health facility.

4.2.1.5. Sociocultural factors/Religious beliefs

Different countries across Africa exhibit different sociocultural, religious, and traditional beliefs that negatively influence the health-seeking behaviours of pregnant women, thereby promoting delays in seeking health services (21). Studies conducted in Sierra Leone show that access to healthcare was a social bargaining practice influenced by a variety of factors (21), including cultural norms and beliefs about the causes of disease ware sociocultural factors contributing to delay in the utilization of health services, thereby promoting home deliveries by unskilled TBAs, (22)

In another study from Tanzania, it was reported that teenagers and younger, unmarried women often conceal their pregnancies to avoid potential issues, including expulsion from school, stigma, and rumours. They postpone attending ANC as a result. Due to their fears of witchcraft, several women were hesitant to announce their pregnancy (39). Therefore, postponing ANC visits will lead to a delay in identifying complications during pregnancy.

Also, another study in Nigeria reported the refusal of some women to be examined by male healthcare professionals and restricting the pregnant women's movement to keep them from being seen by men other than their spouses was noted as a challenge in Nigeria and Burkina Faso. Therefore, pregnant women delay attending ANC services which may predispose them to maternal deaths (53)(54).

Again from another study in Malawi, women were stigmatized because vaginal delivery failure was considered a reproductive failure. As a result, a woman's status in her family and community is impacted by how she manages pregnancy and childbirth (55). The woman who walks courageously and comes out unharmed is well regarded by her society as one who had no troubles and needed no help. Although the conditions are beyond her control, a woman who goes through a complicated pregnancy and requires hospitalization, an episiotomy, or a caesarean section was not respected and was referred to as a lazy woman. Such beliefs are harmful to the health of pregnant women and promote delayed referrals to health facilities during complicated deliveries leading to maternal deaths (55). Also, reviewing findings in Nigeria and Malawi, many participants associated maternal death with the will of God by clarifying that if God destined you to die due to pregnancy-related causes, it makes no difference where you gave birth or who assisted you; you cannot stop death (56)(23). As a result, they delay seeking care even when there are obstetric complications.

4.2.1.6. Decision-making power at the household and community level

Lack of decision-making power in the homes or households by women was found in the review as a factor contributing to delay in seeking care. Gender roles play a significant impact on

healthcare decisions; traditionally, men make the majority of the decisions when it comes to paying for treatment for their wives and kids before leaving the house to seek health services when sick (47)(22). These gender roles promote delay in seeking care by pregnant women as they would have to wait for their husband's approval before going for health services.

Decision-making and power issues were also reported in most sub-Sahara Africa and other LMICs, including Sierra Leone, gender power relations within families have an impact on health outcomes, with men frequently in charge of making decisions regarding their family's health, including whether to use medical services (47)(52)(8). Although husbands are the sole decision-makers for their families, when they are absent, decisions can be taken by either a brother, mother-in-law or other elderly neighbourhood members (50). This consultation processes between family and community members contribute to delay in leading to maternal death. Also, with decisions related to bleeding during or after pregnancy, the husband is usually not involved as the elderly women, and TBAs usually take the decisions (50). Decisions involving elderly women and TBAs in their villages usually involve delays.

In another study in Sierra Leone, the concept of power was connected to women's ability to generate income, achieve financial independence, and be heard in social interactions. Women's economic empowerment was said to reduce marital conflict and improve household decision-making, as women with the better socioeconomic standard will decide about their health as compared to those with lower socioeconomic status; although men continued to occupy positions of authority in the home, notably in matters of health (8). And the finding in this research was supported by another study in Nigeria. This is believed to play a significant role in the first delay expressed by Thaddeus and Mane regarding the decision to seek care at the health facility (48).

4.2.1.7. Harmful traditional practices

According to findings, harmful traditional practices contribute to delays in seeking care. For instance, some traditional practices like the insertion of native herbs into the vagina to induce labour to contribute to the delayed referral of pregnant women to the health facility and also predispose the woman to infections leading to sepsis (48). Also, delaying the referral of pregnant women with eclampsia and referring to the condition as a spiritual problem were all factors identified contributing to delay in seeking care which will lead to further complications and maternal deaths (48).

4.2.2. Phase Two delay:

4.2.2.1. Delay in reaching the health services

Delay in reaching the health facility for services. This delay deals with issues related to distance and road network/conditions to get to the health facility, as both serve as obstacles when deciding to seek health services in rural locations (57). Studies indicate that when a woman decides to seek care at the right time, she may encounter obstacles like challenges with transportation or long distance to the health facility, and lack of access to health care frequently causes phase II delays (42). Barriers in the form of money, organizations, and how often people use services. And health facility location, travel time, cost, and distance will impact access (42). In certain circumstances, clients and their relatives described how they had to save or borrow money to pay the high transportation costs to get medical attention. Women also expressed anxiety about leaving their families and fear of travelling alone, especially at night. Women who went into labour at night claimed they had no choice but to give birth at home. Some claim to have delivered by the side of the road while travelling to a medical facility; therefore, women encountering complications amidst such challenges are at risk of dying before delivering their babies (58).

4.2.2.2. Distance to the health facilities

According to literature, this was identified as one of the barriers contributing to the second delay (delay in seeking health services), as women in the rural communities stayed far away from the health facilities, they walked for more than 5 to 10 miles to reach the nearest health facility amongst transportation challenges (59)(52). As a result, some patients arrived at the medical centre in a lot less time, but there was often an initial delay that made things more complex. As a result, pregnant women travelling long distances will delay in arrival at the health facility leading to maternal deaths.

4.2.2.3. Challenges with transportation

This was identified as a barrier to health service utilization among the poor in the rural communities; although there is FHCI providing free services for the eligible populations across Sierra Leone, transportation cost to visit health facilities remains an obstacle; the country operates weak ambulance services. Therefore, most women depend on motorbikes as the easiest means of transportation (57)(60). Although motorbikes are unsafe to be used by pregnant women, it remains their only choice. As a result, they will attend ANCs and postnatal care (PNCs) at the health facility, but during labour, they prefer the TBAs to conduct their deliveries (60). In urgent and time-limited circumstances like haemorrhage and other primary causes of maternal death, transportation difficulties become incredibly crucial. As a result, women who experience obstetric complications like haemorrhages are at risk of dying en route to the health facility or before arriving at the health facility for care (52)(22). In the case of referral from the PHUs to the referral hospitals, most women would find it challenging to honour the referral because of transportation costs and poor road network (59)(56). Also, health personnel assigned to remote locations were burdened even more by the absence of transportation as most healthcare facilities lack ambulance service, which, combined with inadequate transportation systems, made it difficult to reach patients at primary health centres (PHUs) (61).

4.2.2.4. Delay in referral between health facilities.

Delay in referral from one health facility to another (lower-level health facility to higher level health facility) and/or referral from a less equipped higher level to a better-equipped health facility was also identified as contributing factor causing a delay in reaching the health facility. Also, before and during the Ebola outbreak in Sierra Leone, there were few ambulances within the MOHS strictures, and most of the ambulances were donated by/or supported by NGOs (62)(63). But since the ambulances were inadequate, there was a delay in arriving at the health facility for treatment leading to maternal deaths.

4.2.3. Phase three delay: Delay in receiving adequate care

The third delay (delay in receiving adequate care at the health facility) occurs when the patient arrives at the health facility for treatment but does not receive timely and adequate treatment. The number of pregnant women who come to the health facilities in a critical state is influenced by the long-term impact of phase I and II delays (42). Many factors may contribute to this delay in Sierra Leone, but some of the most commonly identified in the review that will be discussed in this section include the attitude of health staff, stock out of drugs and medical supplies, staff absenteeism from work, inadequate number of staff in the health facility etc.

4.2.3.1. Infrastructural problems:

In Sierra Leone, just 10% of hospitals and community health centres have access to reliable electricity, 60% have access to safe water supply, and only 44% and 67% of both have flowing water and functional toilets, respectively (67). A comparable situation was reported in

a study in Nigeria, where most health facilities lacked a reliable power supply when they had obstetric emergencies (68). Adequate clean water and electricity supply are essential as specific medical procedures cannot be done without water and electricity supplies. As a result, it will contribute to delays in providing services as doctors will delay caesarian sections because of power supply leading to maternal deaths (68).

4.2.3.2. Challenges with human resources for health (HRH)

HRH remains a big problem in the country as there are not enough health professionals who can correctly identify and manage obstetric complications. It is also a severe problem in primary health care facilities. For example, a study in Sierra Leone identified that skilled birth attendants were in short supply in the country's medical facilities. Instead, many facility births were conducted by traditional birth attendants, maternal and child health aides (MCH Aids), and state-enrolled community health nurses (SECHN) who are not adequately trained enough to manage obstetric complications at their levels (67). Another study in Nigeria supported that insufficiently trained staff was another typical human resources-related impediment where there were not enough nurses and midwives to manage all the obstetric cases that were present in some hospitals (53). As a result, the health professional is usually overwhelmed with work; some work for long hours, which will affect their performance, thereby leading to delays in providing adequate care (53)(67).

Also, the presence of technical volunteers at the health facilities was identified as an HRH challenge in Sierra Leone during the review. There were trained and unemployed health professionals working in the health facilities as volunteers who were not paid by the government. These voluntary staffs engage in private agreements with patients and their loved ones; they receive informal payments for their services. Even though the national policy indicates that MCH services are free, there are several costs associated with pregnant women and sick children visiting medical institutions. Patients and their families could not foresee their out-of-pocket expenses since fees varied between facilities and were arbitrary or unpredictable (67). This will cause a delay in a subsequent delay in providing adequate care, as these volunteer health workers will delay providing services, especially to patients whose relatives failed to comply with the volunteer's demand.

4.2.3.3. The Attitude of health staff

According to the findings during the literature review in Sierra Leone, the unfriendly Attitude of health services providers was also identified as a barrier to health services utilization in the country, as hostile attitudes from care providers prevent women from attending ANC services and preventing them from going for institutional deliveries (69). Furthermore, pregnant women were required to pay costs that varied depending on the healthcare facility (53). Although families could not anticipate their out-of-pocket expenses since the fees were random, amidst national policy indicating that mother and children's health services are free, payments were still imposed on clients (53). As a result, pregnant women who visit the health facilities without money are not treated or will be delayed by the health staff to be treated. Such delays lead to complications which will further lead to maternal deaths.

Numerous healthcare facilities in low-resource nations are understaffed, undersupplied, and overburdened with patients, creating tense situations where, despite the right intentions, proper care cannot be given (55). This later led to a delay in responding to the patient's needs, including pregnant women visiting the health facilities. These delays will result in complications further leading to maternal deaths. In one study in rural India, respondents noted that the medical personnel failed to treat obstetric issues promptly, provide appropriate care, and make referrals by stating that some ladies were sent to other facilities unnecessarily without explaining the

reason for referral to their family members (52). This also contributes to delays in providing adequate care for pregnant women leading to maternal deaths.

Also, findings from a study in Gabon reported that women seeking care for abortion complications had a much higher risk of dying than those seeking care for other obstetric emergencies. This finding was related to the fact that abortion complications took 20 times longer to diagnose and treat than postpartum haemorrhage or eclampsia. The authors blamed the medical staff's cultural stigmatization of patients on the delay in treatment and the high case fatality rate (55).

4.2.3.4. Health system weaknesses and delays

Research in northern Sierra Leone reported that; the cost of services, stockout of drugs and medical supplies and the use of native herbs during labour were identified as a cause of delay in receiving adequate care at health facilities (58). Also, more women in the rural health facilities reported stockout of drugs and medical supplies than in those facilities in the urban areas (58). This is because the supplies were inadequate at the PHUs levels where the demand is high; this causes a delay in attending to pregnant women who go for services in those facilities.

Also, the provision of services round-the-clock was a question that data gatherers posed during a study where 94% of hospitals and CHCs, had regular delivery services offered around the clock. The least common services were anaesthesia (11%) and laboratory services (19%) (67). Since there are few laboratory staff and anaesthetists in the hospitals, they are excluded from night duties (67). Therefore pregnant women requiring surgeries at night would have to wait till the morning hours. This causes a delay in receiving care which leads to complications and deaths.

In addition to the above, research in Uganda reported a weakness in the primary health care system as; an inadequate number of health facilities providing obstetric emergency services, a flaw in the referral system, long distances with poor road network, maldistribution of health workers; especially in hard to reach areas, staff absenteeism from work, immigration of health professional to work in other countries or for INGOs, to name but few wares all factors contributing either directly or indirectly to delay in providing services leading to poor maternal and child health outcomes (70)(56).

Again**,** a study in Gabon found that women seeking care for abortion complications had a much higher case fatality rate than those seeking care for other labour and delivery emergencies. This finding was related to the fact that abortion complications took twenty times longer to diagnose and treat than postpartum haemorrhage or eclampsia. The authors blamed the cultural stigmas of patients by medical staff for the delay in treatment and the high case fatality rate. Disrespect for patients in several circumstances proved to be disastrous (55).

Also, the health professional can misdiagnose certain obstetric conditions, especially at the PHUs level. This occurs because of a lack of medical equipment at the facility to be used in the diagnosis and treatment or a lack of the appropriate skills to identify certain complicated cases leading to maternal death. Issues such as anaemia in pregnancy, ectopic pregnancy, tumours, and multiple pregnancies, can be easily misdiagnosed by health care workers at lower-level facilities. As a result, mismanagement of such cases or late referral of such medical conditions is a high possibility leading to delay in getting adequate treatment (71).

4.2.3.5. Quality of care

According to review findings in Sierra Leone, there was an increase in skilled birth attendants from 61% in 2013 to 93% in 2017. However, increased service use has not resulted in

improved health outcomes, which raised questions about the quality of care provided at all health care system levels (33). Also, another study in SL identified having to wait a long time to see a doctor or being turned away. Less frequently, bad or unfriendly service, a shortage of staff, medication, or supplies were also reported as factors contributing to poor quality of care, thereby promoting delay in seeking and receiving services (72). This was supported by a study in Nigeria as a significant barrier was the absence of trained care providers at PHCs and some hospitals, understaffing difficulties from posted nurses and doctors skipping shifts at the facility, and Community members unable to receive expert medical care because there were no nurses or doctors present. This resulted in a delay in both the demand and the supply sides within the health facilities (56)(73).

Another finding identified different perceptions about the quality of care as some pregnant women and their relatives perceived good quality of care based on treatment outcome. For example, if the patient's management went well by early resolving symptoms, they refer to it as good quality. Still, when there is a delay in resolving the symptoms or the client dies, they refer to it as poor quality of care and negligence of the health staff (74). This will prevent the women from subsequently using the facility, leading to delay

Another contributing factor found during the review was "moral boosting",; A situation where an informal payment is made to health services providers to serve as a motivation to provide better care. This is a widespread practice in the country, especially during delivery services where patients and their families give "gifts" to service providers to encourage better care (32). Nurses were unemployed and were rendering free personnel services. As a result, "encouraging" a nurse to give women high-quality care to pregnant women when giving birth (through financial tokens) has become a common practice (32). This is believed to play a role in the delay in decision-making to seek care, especially for the poor living in rural areas, as the informal payments predispose them to catastrophic spending.

4.2.3.6. Disease outbreak situations

According to findings from the review, during disease outbreak situations, people refuse to use health services because they fear infecting themselves. And health workers also are afraid of infecting themselves due to a lack of personal protective equipment (PPEs) (75). Another study also identified that the location of a health facility, worry about getting Ebola, not wanting to travel alone, and worries about being disrespected by health professionals caused a significant percentage of women, especially those in remote areas, to postpone accessing health centres. As a result, the pregnant women who developed complications died in their communities (58).

Evidence reported during the Ebola outbreak in Sierra Leone suggests that 50% of the deaths during the episode would have occurred due to Malaria, Tuberculosis and HIV/AIDS rather than the Ebola itself (75). Also, before the identification of the Ebola outbreak, in Sierra Leone, there was increased utilization of RMNCH services as facility deliveries increased from 25 to 54%, there was a 97% increase in antenatal clinic attendance, postnatal check-ups rose from 56 to 73% between 2008 to 2013 respectively (75). But during the Ebola outbreak, there was a decreasing trend in all RMNCH. As a result, pregnant women ended up delivering at home, and those who developed complications during labour ended up as maternal deaths in the country (75).

Chapter 5: Discussion

By the objectives of this thesis, an effort is now made to summarize the problems found in the three delays from the prior findings. These delays are not independent of one another, following the framework developed by Thaddeus and Maine; thus, this explanation will relate them in some way for a better understanding. And according to the findings from the literature review, all three delays in the analytical framework were relevant in the context of Sierra Leone. However, the first and the third delay factors were the most appropriate among the three.

The trend has shown that maternal mortality occurs in every region and district in Sierra Leone. But for the period under review, the northern province reported the highest maternal deaths. Followed by the western area and the east and southern regions. According to districts, the western urban had the highest number of maternal deaths, followed by Tonkolili. At the same time, the Pujehun district in the southern province had the lowest number of maternal deaths. This may be because there are more districts in the north of the region (6 districts) than in the southern province (4 districts), the eastern province (3 districts) and the western area (3 districts). Also, the northern province has a poor road network and fewer health facilities than the other three regions. In addition, the northern region perhaps had a better MDSR system that captures more maternal deaths than the other regions, which can also be true for the urban areas. There is nothing known about the reasons behind the fluctuating trend in maternal mortality in the different districts.

Based on the findings from the review, the level of education, socioeconomic status, and the perception of people about complications were all significant factors contributing to the first delay (delay in the decision to seek care). These said factors are all interrelated to each other. The level of education is linked to socioeconomic status. The higher the level of education of the pregnant woman or her spouse, family, or community members, the more the possibility of having stable jobs which will empower them to take care of their families and utilize the health services when the need arises. According to research, women with higher educational levels used ANC service compared to their fellows with little or no education (44). An educated woman or her spouse can be gainfully employed, empowering them to take care of their families; as a result, they can quickly identify and take care of their household problems, including health-related problems. Also, an educated woman can identify danger signs of pregnancy through regular or adhering to her ANC appointment visits to the health facilities. At the same time, pregnant women with a low level of education will not easily understand the dangerous signs and symptoms of pregnancy. As a result, it will go unnoticed, leading to further complications and even death. Also, she may lack the money to visit the health facility for her appointment, waiting for her husband or other family members to decide on when to visit the health facility. Educated women can decide for themselves when their spouses are away. Therefore, this can prevent the first delay (delay in seeking health services) as she may be aware of her health status and any complication that may arise during pregnancy.

Currently, the GOSL is implementing free primary and secondary education launched in 2019 to empower the school-going pupils through education that will improve the socioeconomic status of future generations. What is not known is how the free education for school pupils will continue in a change of government occurs.

According to findings from the review, sociocultural, religious, and household/community decisions about deliveries and women's autonomy were factors contributing to delays in seeking care at the health facility. Sierra Leone is a patriarchal society where the men serve as decision-

makers in their families, households, and the community, especially in the hard-to-reach communities. Sociocultural and religious factors are linked to household decision-making because most people in the country highly believe in their religion and cultures, which holds for most other sub-Saharan African countries. Also, in Sierra Leone, the over-reliance of women on men is another reason for poor household decision among women, as the Sierra Leonean culture see men as the key providers for their families and households. As a result, families and household decisions remain challenging, mainly when the husband is not around; they would have to wait for him, which courses a considerable delay in seeking health services.

Decision-making related to deliveries is considered the women's business, which explains why decision-making can be based on gender-related issues. As a result, decisions related to obstetric complications excluding the spouses will result in delays which leads to poor maternal health outcomes. Because obstetric complication decisions usually involve the TBAs in their settings who are not technical enough to identify complications during pregnancy.

Also, most reviewed papers have prevalent cultural barriers and harmful traditional practices. According to findings during the review, in most rural areas and some urban settings, communities that practice the Islamic faith have specific values prohibiting women from mingling with other people when pregnant, as pregnancy is considered holy. Such beliefs and practices delay pregnant women from using health facilities. As a result, those women with early, mid, or late pregnancy complications will go unnoticed. They will miss the benefits like; treatment of malaria during pregnancy, anaemia prevention, folic acid administration in the prevention of neural tube defect and many other interventions women receive during ANC services.

According to this study, distance to the health facility is directly linked to the poor road network and transportation challenges. Because some communities are hard to reach, and vehicles get frequent breakdowns due to poor road networks, transportation costs are also costly, especially for the poor. During the rainy season, there are roads cut off to most hard-to-reach communities. As a result, there is considerable delay in reaching the health facility for treatment.

According to the Basic Package of Essential Health Services (BPEHS) of Sierra Leone, primary health care facilities should be within a three to five miles radius to increase the accessibility of health services (14) in principle. But in practice, most health facilities cannot be found within this radius. For example, a referral from some PHUs to the district referral hospital takes an entire day journey and is considered a serious challenge to the health system. As a result, the referral of patients with obstetric complications like bleeding during pregnancy or after delivery from these hard-to-reach facilities to the district hospitals causes considerable delay, which can sometimes be fatal. Some women will use commercial motorbikes as their only means of transportation. Although most communities are aware of the dangers of pregnant women using commercial motorbikes for transportation, they use them as there are no other options available to them. The pregnant women who refuse to use the commercial motorbike choice will go to TBAs for services.

In 2018, MOHS started implementing ambulance services across Sierra Leone, as each district received ambulances (66). In addition, staff were trained as paramedics and employed by the government to work in various locations in the country. Their sustainability is not known in the ambulance services, as most MOHS projects are donor-driven. And nothing is known about what happens when the ambulances get old.

Infrastructural problems, challenges in human resources, Attitude of health staff, technical volunteers at health facilities, lack of drugs and medical supplies, weaknesses in the health

system, quality of care and disease outbreak situations were all health systems factors contributing to the third delay in the health facilities.

According to the findings, the attitude of staff is linked with the quality of care. And both can be directly linked to HRH because unfriendly attitudes of health professionals can lead to poor health services utilisation. Staff attitudes and lack of drugs and medical supplies are also connected because some health professionals misuse medicines and medical supplies. Finally, the presence of technical volunteers in the health facilities is linked to HRH. Human resources-related impediments, particularly personnel shortages, poorly trained staff, a lack of equipment, a lack of friendly staff, poor care, and defective drugs and medical supplies, were the most often mentioned hindrances in the studies. The most significant staffing shortages are in doctors and midwives. Numerous factors, including inputs from training, migration, and employment; employment status; and outflows from death, retirement, and emigration, all affect the number of employees and the quality of care in Sierra Leone. At the primary health care level, where 73% of deliveries occur in Sierra Leone (27), most PHC facilities are understaffed and overwhelmed with work as they work twenty-four hours a day. Midwives and MCH Aides are the ones responsible for deliveries at community levels. Still, the midwives are found only in the referral hospitals of less equipped health facilities at chiefdom headquarters towns, while the MCH Aides are found in more remote villages. The MCH Aides who received only two years of training are not technical enough to identify specific pregnancy-related complications like anaemia in pregnancy, ectopic pregnancy, multiple pregnancies etc. Most MCHPs have only one or two staff. When the staff are called for training at the district level or travel to address their problems, the community and the pregnant women will remain vulnerable due to their absence as only the TBAs will be around to respond to maternal health issues in the community.

Additionally, the rural health facilities where most of the population in the country resides suffer from a lack of skilled health professionals due to the desire of the health workers to work in urban areas due to better social amenities like electricity, good water, education for their children, and better job opportunities. Unfortunately, there was nothing put in place by MOHS to motivate health workers in the urban areas to work in the rural areas. Therefore, the untrained care providers in these regions will have to employ trial and error techniques in emergencies, and by the time they decide to move the patient to the next level, it may be too late and result in death.

The Attitude of health staff is a problem affecting most sub-Saharan African and other LMICs worldwide. In Sierra Leone, the negative Attitude of health staff toward their clients is another factor contributing to the delay in services utilization, leading to maternal deaths. Pregnant women in the rural areas, who are unemployed and poor and should benefit from free health care services, were asked by the care providers to pay for services. This promoted low health services utilization. As a result, the women who cannot afford to pay will seek care from the TBAs. The latter lacks the technical skills to identify, manage, or refer pregnancy-related complications to get appropriate treatment.

The quality of care was another critical finding identified during the review. Quality of care is a factor cut across both the first and the third delays according to the three delay model. And interlinkages were found between the elements. For instance, stock out of drugs and medical supplies, negative attitude of health staff, absenteeism of health staff from their duty stations, perception of pregnant women about sound quality, and the standard of health training received by the health professional can all affect the quality of care. For example, in Sierra Leone, there was an increase in service utilization as most deliveries were done in health facilities. But yet, many maternal deaths occur in health facilities, raising significant concern about the quality of

care at facility levels. Quality of care contributes to first and third delays according to the analytical framework and is also linked to HRH.

What is known in Sierra Leone about the quality of care and the other interlinked factors is the introduction of FHCI for pregnant women, lactating mothers, children under five years of age and now disabled persons. However, the sustainability mechanism of FHCI is not well known when there is donor fatigue as government spending on health remains minimal.

Thaddeus and Mane's analytical framework was found to be very useful in the analysis of the factors influencing maternal mortality in Sierra Leone. All the factors identified during the review were relevant and discussed according to the framework. I, therefore, adopt the framework and recommend its use in investigations related to maternal deaths.

Study limitation

Only articles, reports, websites, and grey literature written in the English language were used in this thesis. Articles, reports, and grey literature written in other languages will not be considered for this thesis. Also, articles written within the past fifteen years will be considered, and those older than fifteen years will not be considered except the article written by Thaddeus and Mane about the three delays model, which is the framework for this thesis. Articles, reports, and grey literature written in other languages were not considered because there is limited time allocated to the thesis writing, and there is not enough time to translate the said documents into the English language.

Chapter 6: Conclusion and recommendations.

6.1. Conclusion

Maternal mortality remains high in most districts across the country, with the Western area urban district reporting the highest number of deaths and the Pujehun district reporting the lowest number of deaths for the period under review. However, there remains a fluctuating trend occurring among districts according to the MDSR data reviewed.

The following conclusions can be drawn from the above findings and discussions. First, maternal mortality remains challenging even though the government and its partners have made frantic efforts to reduce it. The review shows that many factors contribute to delay, which further leads to maternal mortality order than the direct and indirect causes. And most of these factors were linked to the three delays analytical framework used in this study.

From the review, The perception of the pregnant woman, her family and household members about risk/complication in pregnancy, poor socioeconomic status of the pregnant woman and her family, lack of or low level of education of the woman, her spouse and other family members, women's lack the decision making powers in their households and informal payment by pregnant women and children at the PHUs even though they are the primary beneficiaries of the FHCI were among the key factors identified in the review that are responsible for the delay in seeking care at the health facilities in the country.

Regarding the second delay, long distances travelling on a poor road network coupled with a lack of adequate road-worthy vehicles, poor ambulance services, and poor referral mechanism between the PHUs and the hospitals were among the critical factors identified as responsible for the delay in accessing health facilities. Therefore, walking long distances and using commercial motorcycles were the commonest means of transportation in many communities across Sierra Leone. But since the latter was found to be dangerous means of transportation for pregnant women, most families prefer to avoid the risk of travelling on commercial motorcycles by staying home to make use of the services of the TBAs.

For the third delay, stock out of drugs and medical supplies, inadequately trained medical staff at PHU level, inequitably distributed health facilities, especially in the hard-to-reach communities, negative Attitude of health staff, presence of technical volunteers working at the health facilities, general weaknesses in the health system, infrastructural problems, quality of care and disease outbreak situation were among the factors identified contributing to the delay in receiving appropriate care in the health facilities in the country.

In addition, the results of the study demonstrate that maternal mortality in Sierra Leone is influenced by a number of interrelated factors. These elements represent health services, geographic, economic, and sociocultural limitations. Women in rural areas appear to have been greatly affected by the above factors compared to their counterparts living in the urban areas. Also, health services barriers like the quality of care were found among both the first and the third delays

Research findings demonstrate numerous examples of countries that were successful in reducing maternal mortality through the use of various sets of cost-effective interventions. In Sierra Leone, FHCI launched by GOSL saw an increase in health services utilization across the country. And currently, GOSL and partners are closely working together to support the training of midwives to work at the PHUs level, thereby supporting deliveries by skilled birth attendants.

6.2. Recommendations

The following are my recommendations to the GOSL through the MOHS based on the findings and conclusion made from the study.

1. Promoting and supporting community sensitisation on women's empowerment to make decisions about their health and the health of other family members in their households. This can be achieved through stakeholders' engagement meetings at community levels.

2. To promote livelihood support programs at the community level through community loan schemes and entrepreneurship projects to empower women financially in their communities as a means of supporting spouses. In addition, this will enable women to seek health services without their spouses.

3. As the saying goes, " when you educate a girl child, you educate the nation" I will recommend to the government to promote and support girls and women's education in all societies across the country as educated women are well informed about their health and daily happenings in their communities.

4. To promote equitable distribution of health facilities, especially in hard-to-reach communities, to improve access to health services. And to provide adequate and timely distribution of drugs and medical supplies to all health facilities in the country.

5. To recommend to the government through the ministry of education and MOHS to strengthen health training institutions to improve the quality of training of the health professionals among all caders across the country.

6. Promote the prompt recruitment of health staff following their training to prevent the services of technical volunteers at the health facilities.

7. Government to strengthen ambulance services across the country to facilitate easy referral of patients from the PHUs to the hospitals, as recent evidence following the implementation of the NEMS project improved referral of patients from PHUs to the hospitals by 43% in the country.

8. MOHS to allocate special allowance to health professionals working in hard-to-reach communities across the country. This has proven to be a motivating factor for PHC workers working in hard-to-reach areas.

9. To strengthen monitoring and supportive supervision and mentoring at all levels of health services delivery across the country as evidence has shown that monitoring, supportive supervision and mentoring of staff by their superiors will help to improve the quality of care.

10. MOHS to design intervention measures to reduce maternal mortality in Sierra Leone with special attention to the northern province.

References

1. WHO. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division: executive summary. *Sexual and Reproductive Health*. 2019; 1–12. https://www.who.int/reproductivehealth/publications/maternal-mortality-2000-2017/en/

2. Ronsmans C, Graham WJ. Maternal Survival 1 Maternal mortality: who, when, where, and why Panel 1: Key messages. *www.thelancet.com*. 2006;368. https://doi.org/10.1016/S0140.

3. World Health Organization. Trends in Maternal Mortality: 1990 to 2013 Estimates by WHO, UNICEF, UNFPA. 2014; 1–68.

4. Carshon-Marsh R, Aimone A, Ansumana R, Swaray IB, Assalif A, Musa A, et al. Child, maternal, and adult mortality in Sierra Leone: nationally representative mortality survey 2018–20. *The Lancet Global Health*. 2022;10(1): e114–e123. https://doi.org/10.1016/S2214-109X(21)00459-9.

5. IHME. *Maternal Health Atlas*. Helping mothers survive: Different countries, different stories. https://maternalhealthatlas.org/ [Accessed 31st July 2021].

6. United Nations Population Fund (UNFPA) This Fact Sheet was prepared in January 2013 for the Summit of CARMMA (Campaign on Accelerated Reduction of Maternal NB and CM in A in AA. *MATERNAL HEALTH IN AFRICA for the Summit of CARMMA (Campaign on Accelerated Reduction of Maternal, New Born and Child Mortality in Africa) in Addis Ababa*. 2013. www.unfpa.org

7. WHO UUWBGAUNPD. 726 PDR 42(4). *Trends in Maternal Mortality: 1990 to 2015*. 2015; https://doi.org/10.1111/padr.12033.

8. Cornish H, Walls H, Ndirangu R, Ogbureke N, Bah OM, Tom-Kargbo JF, et al. Women's economic empowerment and health related decision-making in rural Sierra Leone. *Culture, Health and Sexuality*. 2021;23(1): 19–36. https://doi.org/10.1080/13691058.2019.1683229.

9. Government of Sierra Leone Ministry of Health and Sanitation. Sierra Leone national reproductive, maternal, newborn, child and adolescent health policy. 2017; iv–14.

10. Witter S, Brikci N, Harris T, Williams R, Keen S, Mujica A, et al. *The Sierra Leone Free Health Care Initiative (FHCI): process and effectiveness review Preface Executive summary*. 2016.

11. *THE MATERNAL AND NEWBORN HEALTH THEMATIC FUND Saving lives and mitigating the impact of COVID-19 on mothers and newborns*.

12. *Sierra Leone Population 2022 (Demographics, Maps, Graphs)*. https://worldpopulationreview.com/countries/sierra-leone-population [Accessed 14th May 2022].

13. *provinces-of-sierra-leone-map.png (3000×3250)*. https://www.worldatlas.com/upload/ee/25/5c/provinces-of-sierra-leone-map.png [Accessed 14th May 2022].

14. Leone S. *Basic Package of Essential Health Services for Sierra Leone-2010*. 2010.

15. *Global Health Expenditure Database*. https://apps.who.int/nha/database/country_profile/Index/en [Accessed 24th June 2022].

16. African Union Commission. The Abuja Declaration : Ten Years On. *Health (San Francisco)*. 2001;(September 2000): 1–4.

17. Kangbai DM, Bandoh DA, Manu A, Kangbai JY, Kenu E, Addo-Lartey A. Socio-economic determinants of maternal health care utilization in Kailahun District, Sierra Leone, 2020. *BMC Pregnancy and Childbirth*. 2022;22(1). https://doi.org/10.1186/S12884-022-04597-Z.

18. *HEALTH SITUATION*. 2017. www.who.int/countries/en/

19. Government S leone. Demographic_Health_Survey_2019_SL. *Demographic health survey*. 2019;

20. *GBD Compare | IHME Viz Hub*. https://vizhub.healthdata.org/gbd-compare/ [Accessed 28th July 2022].

21. van Duinen AJ, Kamara MM, Hagander L, Ashley T, Koroma AP, Leather A, et al. Caesarean section performed by medical doctors and associate clinicians in Sierra Leone. *British Journal of Surgery*. 2019;106(2): e129–e137. https://doi.org/10.1002/bjs.11076.

22. Witter S, Brikci N, Harris T, Williams R, Keen S, Mujica A, et al. The free healthcare initiative in sierra leone: Evaluating a health system reform, 2010-2015. *International Journal of Health Planning and Management*. 2018;33(2): 434–448. https://doi.org/10.1002/hpm.2484.

23. Treacy L, Sagbakken M. Exploration of perceptions and decision-making processes related to childbirth in rural Sierra Leone. *BMC Pregnancy and Childbirth*. 2015;15(1). https://doi.org/10.1186/s12884-015-0500-9.

24. McInnes RJ. Sustainable development goals. In: *The Wetland Book: I: Structure and Function, Management, and Methods*. 2018. p. 631–636. https://doi.org/10.1007/978-90-481-9659-3_125. [Accessed 7th August 2021].

25. Alkema L, Chou D, Hogan D, Zhang S, Moller AB, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: A systematic analysis by the un Maternal Mortality Estimation Inter-Agency Group. *The Lancet*. 2016;387(10017): 462–474. https://doi.org/10.1016/S0140-6736(15)00838-7.

26. Yaya S, Anjorin SS, Adedini SA. Disparities in pregnancy-related deaths: Spatial and Bayesian network analyses of maternal mortality ratio in 54 African countries. *BMJ Global Health*. 2021;6(2): e004233. https://doi.org/10.1136/bmjgh-2020-004233.

27. *Maternal Mortality in Sierra Leone - The Borgen Project*. https://borgenproject.org/maternal-mortality-in-sierra-leone/ [Accessed 8th July 2022].

28. Labat A, Medina M, Elhassein M, Karim A, Jalloh MB, Dramaix M, et al. Contraception determinants in youths of Sierra Leone are largely behavioral. *Reproductive Health*. 2018;15(1). https://doi.org/10.1186/s12978-018-0504-9.

29. Assaf S, Winter R. Trends in maternal health indicators in Sierra Leone, 2008-2013. *DHS Further Analysis Report*. 2015;(97): xi-pp. http://dhsprogram.com/pubs/pdf/FA97/FA97.pdf

30. Kirigia JM, Oluwole D, Mwabu GM, Gatwiri D, Kainyu LH. *Effects of maternal mortality on gross domestic product (GDP) in the WHO African region**. African Journal of Health Sciences.

31. Koroma MM, Kamara SS, Bangura EA, Kamara MA, Lokossou V, Keita N. The quality of free antenatal and delivery services in Northern Sierra Leone. *Health Research Policy and Systems*. 2017;15(1): 13–20. https://doi.org/10.1186/s12961-017-0218-4.

32. McLean KE. Men's experiences of pregnancy and childbirth in Sierra Leone: Reexamining definitions of "male partner involvement." *Social Science and Medicine*. 2020;265. https://doi.org/10.1016/j.socscimed.2020.113479.

33. UNICEF. *Maternal, neonatal and child health | UNICEF Sierra Leone*. https://www.unicef.org/sierraleone/maternal-neonatal-and-child-health [Accessed 13th May 2022].

34. *Maternal, neonatal and child health | UNICEF Sierra Leone*. https://www.unicef.org/sierraleone/maternal-neonatal-and-child-health [Accessed 11th July 2022].

35. Nove A, Friberg IK, de Bernis L, McConville F, Moran AC, Najjemba M, et al. Potential impact of midwives in preventing and reducing maternal and neonatal mortality and stillbirths: a Lives Saved Tool modelling study. *The Lancet Global Health*. 2021;9(1): e24–e32. https://doi.org/10.1016/S2214-109X(20)30397-1.

36. *Hunter's Tropical Medicine and Emerging Infectious Disease: Expert Consult ... - Alan J. Magill, MD, FACP, FIDSA, Edward T Ryan, David R Hill, Tom Solomon - Google Books*. https://books.google.nl/books?hl=en&lr=&id=UgvdM8WRld4C&oi=fnd&pg=PP1&dq=Van+den+Broek+NR.+Maternal+and+Newborn+Health.+In+Hunter%E2%80%99s+Tropical+Medicine++and+Emerging+Infectious+Disease:+Ninth+Edition.+2012%3B135%E2%80%9340.+Available+from:++www.unicef.org&ots=kvTwSg1DfK&sig=fRXxTdlGWhhEDBYqqiG4C_KB_Ps&redir_esc=y#v=onepage&q&f=false [Accessed 14th July 2022].

37. Awusi VO, Anyanwu EB, Okeleke V. *DETERMINANTS OF ANTENATAL CARE SERVICES UTILIZATION IN EMEVOR VILLAGE, NIGERIA*.

38. 06_oa_determinants-with-cover-page-v2. *Determinants of Antenatal Care Utilization in Three Rural Areas of Vietnam*. 56, No 1: 47–52.

39. Mgata S, Maluka SO. Factors for late initiation of antenatal care in Dar es Salaam, Tanzania: A qualitative study. *BMC Pregnancy and Childbirth*. 2019;19(1). https://doi.org/10.1186/s12884-019-2576-0.

40. Putra PM. Table of content. *Journal of Business on Hospitality and Tourism*. 2019;5(1). https://doi.org/10.22334/jbhost.v5i1.162.

41. Thaddeus S, Maine D. Too far to walk: Maternal mortality in context. *Social Science and Medicine*. 1994;38(8): 1091–1110. https://doi.org/10.1016/0277-9536(94)90226-7.

42. Pacagnella RC, Cecatti JG, Osis MJ, Souza JP. The role of delays in severe maternal morbidity and mortality: Expanding the conceptual framework. *Reproductive Health Matters*. 2012;20(39): 155–163. https://doi.org/10.1016/S0968-8080(12)39601-8.

43. Olonade O, Olawande TI, Alabi OJ, Imhonopi D. Maternal mortality and maternal health care in Nigeria: Implications for socio-economic development. *Open Access Macedonian Journal of Medical Sciences*. 2019;7(5): 849–855. https://doi.org/10.3889/oamjms.2019.041.

44. Jithesh V, Ravindran TKS. Social and health system factors contributing to maternal deaths in a less developed district of Kerala, India. *Journal of Reproductive Health and Medicine*. 2016;2(1): 26–32. https://doi.org/10.1016/j.jrhm.2015.12.003.

45. Mantzari E, Vogt F, Marteau TM. The effectiveness of financial incentives for smoking cessation during pregnancy: Is it from being paid or from the extra aid? *BMC Pregnancy and Childbirth*. 2012;12. https://doi.org/10.1186/1471-2393-12-24.

46. Lalthapersad-Pillay P. The Association between Maternal Mortality and Non-Medical factors in African Countries. *Journal of Economics and Behavioral Studies*. 2014;6(5): 351–362. https://doi.org/10.22610/jebs.v6i5.498.

47. Olonade O, Olawande TI, Alabi OJ, Imhonopi D. Maternal mortality and maternal health care in Nigeria: Implications for socio-economic development. *Open Access Macedonian Journal of Medical Sciences*. 2019;7(5): 849–855. https://doi.org/10.3889/oamjms.2019.041.

48. Ogu RN, Agholor KN, Okonofua FE. *Engendering the Attainment of the SDG-3 in Africa: Overcoming the Socio Cultural Factors Contributing to Maternal Mortality*. African Journal of Reproductive Health. 2016.

49. Ogunjimi Lucas Olusegun. Curbing maternal and child mortality: The Nigerian experience. *International Journal of Nursing and Midwifery*. 2012;4(3). https://doi.org/10.5897/ijnm11.030.

50. Sharma V, Leight J, AbdulAziz F, Giroux N, Nyqvist MB. Illness recognition, decision-making, and care-seeking for maternal and newborn complications: a qualitative study in Jigawa State, Northern Nigeria. *Journal of health, population, and nutrition*. 2017;36: 46. https://doi.org/10.1186/s41043-017-0124-y.

51. M'cormack FAD, Drolet JC. *Assessment of Anemia Knowledge, Attitudes and Behaviors Among Pregnant Women in Sierra Leone*.

52. Jat TR, Deo PR, Goicolea I, Hurtig AK, Sebastian MS. Socio-cultural and service delivery dimensions of maternal mortality in rural central India: A qualitative exploration using a human rights lens. *Global Health Action*. 2015;8(1). https://doi.org/10.3402/gha.v8.24976.

53. Gunawardena N, Bishwajit G, Yaya S. *Facility-Based Maternal Death in Western Africa: A Systematic Review*. Frontiers in Public Health. 2018. https://doi.org/10.3389/fpubh.2018.00048.

54. Ovaioza M, Rhoda M. *Journal of March*. Journal of Environmental Design and Construction Mgt. 2021.

55. Mantzari E, Vogt F, Marteau TM. The effectiveness of financial incentives for smoking cessation during pregnancy: Is it from being paid or from the extra aid? *BMC Pregnancy and Childbirth*. 2012;12. https://doi.org/10.1186/1471-2393-12-24.

56. Fantaye AW, Okonofua F, Ntoimo L, Yaya S. A qualitative study of community elders' perceptions about the underutilization of formal maternal care and maternal death in rural Nigeria. *Reproductive Health*. 2019;16(1). https://doi.org/10.1186/s12978-019-0831-5.

57. D'Ambruoso L, Byass P, Qomariyah SN, Ouédraogo M. A lost cause? Extending verbal autopsy to investigate biomedical and socio-cultural causes of maternal death in Burkina Faso and Indonesia. *Social Science and Medicine*. 2010;71(10): 1728–1738. https://doi.org/10.1016/j.socscimed.2010.05.023.

58. Elston JWT, Danis K, Gray N, West K, Lokuge K, Black B, et al. Maternal health after Ebola: Unmet needs and barriers to healthcare in rural Sierra Leone. *Health Policy and Planning*. 2020;35(1): 78–90. https://doi.org/10.1093/heapol/czz102.

59. Groen RS, Solomon J, Samai M, Kamara TB, Cassidy LD, Blok L, et al. Female health and family planning in Sierra Leone. *Obstetrics and Gynecology*. 2013;122(3): 525–531. https://doi.org/10.1097/AOG.0b013e31829a2808.

60. Sharkey A, Yansaneh A, Bangura PS, Kabano A, Brady E, Yumkella F, et al. Maternal and newborn care practices in Sierra Leone: A mixed methods study of four underserved districts. *Health Policy and Planning*. 2017;32(2): 151–162. https://doi.org/10.1093/heapol/czw104.

61. Wurie HR, Samai M, Witter S. Retention of health workers in rural Sierra Leone: Findings from life histories. *Human Resources for Health*. 2016;14(1). https://doi.org/10.1186/s12960-016-0099-6.

62. *Ambulance Services | World Hope International*. https://worldhope.org/project/ambulance-services/ [Accessed 27th July 2022].

63. *No Ambulance Service in Sierra Leone's Rural Clinics – Sierra Express Media*. https://sierraexpressmedia.com/?p=81696 [Accessed 27th July 2022].

64. Ragazzoni L, Caviglia M, Rosi P, Buson R, Pini S, Merlo F, et al. Designing, Implementing, and Managing a National Emergency Medical Service in Sierra Leone. *Prehospital and Disaster Medicine*. 2021;36(1): 115–120. https://doi.org/10.1017/S1049023X20001442.

65. Caviglia M, Putoto G, Conti A, Tognon F, Jambai A, Vandy MJ, et al. Association between ambulance prehospital time and maternal and perinatal outcomes in Sierra Leone: A countrywide study. *BMJ Global Health*. 2021;6(11). https://doi.org/10.1136/bmjgh-2021-007315.

66. Caviglia M, Dell'aringa M, Putoto G, Buson R, Pini S, Youkee D, et al. Improving access to healthcare in sierra leone: The role of the newly developed national emergency medical service. *International Journal of Environmental Research and Public Health*. 2021;18(18). https://doi.org/10.3390/ijerph18189546.

67. Oyerinde K, Harding Y, Amara P, Kanu R, Shoo R, Daoh K. The status of maternal and newborn care services in Sierra Leone 8 years after ceasefire. 2011; https://doi.org/10.1016/j.ijgo.2011.05.006.

68. Erim DO, Kolapo UM, Resch SC. A Rapid Assessment of the Availability and Use of Obstetric Care in Nigerian Healthcare Facilities. https://doi.org/10.1371/journal.pone.0039555.

69. Preslar JP, Worrell MC, Kaiser R, Cain CJ, Samura S, Jambai A, et al. Effect of Delays in Maternal Access to Healthcare on Neonatal Mortality in Sierra Leone: A Social Autopsy Case–Control Study at a Child Health and Mortality Prevention Surveillance (CHAMPS) Site. *Maternal and Child Health Journal*. 2021;25(8): 1326–1335. https://doi.org/10.1007/s10995-021-03132-4.

70. Ackers L, Ioannou E, Ackers-Johnson J. The impact of delays on maternal and neonatal outcomes in Ugandan public health facilities: The role of absenteeism. *Health Policy and Planning*. 2016;31(9): 1152–1161. https://doi.org/10.1093/heapol/czw046.

71. Aden JA, Ahmed HJ, Östergren PO. Causes and contributing factors of maternal mortality in Bosaso District of Somalia. A retrospective study of 30 cases using a Verbal Autopsy approach. *Global Health Action*. 2019;12(1). https://doi.org/10.1080/16549716.2019.1672314.

72. Preslar JP, Worrell MC, Kaiser R, Cain CJ, Samura S, Jambai A, et al. Effect of Delays in Maternal Access to Healthcare on Neonatal Mortality in Sierra Leone: A Social Autopsy Case–Control Study at a Child Health and Mortality Prevention Surveillance (CHAMPS) Site. *Maternal and Child Health Journal*. 2021;25(8): 1326–1335. https://doi.org/10.1007/s10995-021-03132-4.

73. Adeoye IA, Ijarotimi OO, Fatusi AO. What Are the Factors That Interplay From Normal Pregnancy to Near Miss Maternal Morbidity in a Nigerian Tertiary Health Care Facility? *Health Care for Women International*. 2015;36(1): 70–87. https://doi.org/10.1080/07399332.2014.943839.

74. Lama TP, Khatry SK, Katz J, LeClerq SC, Mullany LC. Illness recognition, decision-making, and care-seeking for maternal and newborn complications: a qualitative study in Sarlahi District, Nepal. *Journal of health, population, and nutrition*. 2017;36: 45. https://doi.org/10.1186/s41043-017-0123-z.

75. Sochas L, Channon AA, Nam S. Counting indirect crisis-related deaths in the context of a low-resilience health system: The case of maternal and neonatal health during the Ebola epidemic in Sierra Leone. *Health Policy and Planning*. 2017;32: iii32–iii39. https://doi.org/10.1093/heapol/czx108.