

FACTORS INFLUENCING MATERNAL MORTALITY IN THE NORTHERN REGION OF GHANA

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51st International Course in Health Development/Master of Public Health
(ICHD/MPH)

September 22, 2014 – September 11, 2015

KIT (ROYAL TROPICAL INSTITUTE)
Development, Policy and Practice
Vrije Universiteit Amsterdam
Amsterdam, The Netherlands

Factors Influencing Maternal Mortality In The Northern Region of Ghana

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

By

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Ghana

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

The thesis "**Factors Influencing Maternal Mortality in The Northern Region of Ghana**" is my own work.

Signature:-



51st International Course in Health Development (ICHHD)
September 22, 2014 - September 11, 2015
KIT (Royal Tropical Institute)/ Vrije Universiteit Amsterdam,
Amsterdam, The Netherlands

September 2015

Organised by:

KIT (Royal Tropical Institute), Development Policy & Practice
Amsterdam, The Netherlands

In co-operation with:

Vrije Universiteit Amsterdam/Free University of Amsterdam (VU)

Amsterdam, The Netherlands

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Abstract.

Background: Women in Ghana continue to die from preventable obstetric complications. The MMR in the country in 2013 was 380/100,000LBs. In Northern Region, 105 maternal deaths occurred in 2013 representing an unacceptable MMR of 194/100,000LBs. Several factors influence the occurrence of these deaths.

Objective: Analyze the factors influencing maternal mortality in Northern Region of Ghana and identify best practices that would help reduce them. Based on the findings, make recommendation for better programming and decision making.

Methodology: Literature review using the three delay model by Thaddeus and Maine, 1994, to analyze the socio-economic, socio-cultural, accessibility and health system related factors influencing maternal deaths. A few personal observations were cited as well.

Findings: Economic status, cost and socio-cultural factors were identified as first delay factors that contribute to maternal deaths. For the second delay factors, travel time/distance, inadequate transports, nature of road/terrain and mal distribution of health facilities stand out. The third delay factors are those related to inadequate competent staff, worsened by inadequate services characteristics for example EmOC services and equipment, poor staff attitude and lack of privacy and confidentiality.

Conclusion: Socio-economic, socio-cultural, accessibility and health system related factors influence maternal deaths in Northern region of Ghana.

Recommendation:

- Scale up the CHPS implementation in Northern Region.
- Include ambulatory services in the benefit package of the NHIS.
- Procure and equitably distribute BEmOC and CEmOC services.
- Encourage communities to form income generating groups.

Key Words: Maternal mortality, three delays, health system, health service utilization, Northern Region, Ghana.

Word Count: 12,294

List of Abbreviations

AIDS	Acquired Immuno Deficiency Syndrome
ANC	Ante Natal Care
BEmOC	Basic Emergency Obstetric Care
BCC	Behavior Change Communication
CBOs	Community Based Organizations
CBRHP	Community Based Reproductive Health Project
CEmOC	Comprehensive Emergency Obstetric Care
CHAG	Christian Health Association of Ghana
CHN	Community Health Nurse
CHPS	Community Health Planning and Services
C/S	Caesarian Section
CWC	Child Welfare Clinics
DAs	District Assemblies
DHMT	District Health Management Team
DHIMS	District Health Information Management System
ECOWAS	Economic Community Of West African States
EmOC	Emergency Obstetric Care
FGD	Focus Group Discussion
FCI	Family Care International
GDHS	Ghana Demographic Health Survey
GDP	Gross Domestic Product
GHS	Ghana Health Service
GoG	Government of Ghana
GPRS	Ghana Poverty Reduction Strategy
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System

ICD-10	International statistical classification of diseases and related health problems, 10th revision
ICHD	International Course in Health Development
IMMR	Institutional Maternal Mortality Ratio
KIT	Royal Tropical Institute
LSS	Life Saving Skills
LSTM	Liverpool School of Tropical Medicine
MDGs	Millennium Development Goals
M&E	Monitoring and Evaluation
M-Health	Mobile Health
MM	Maternal Mortality
MMR	Maternal Mortality Ratio
MoH	Ministry Of Health
MoTeCH	Mobile Technology for Community Health
NICU	Newborn Intensive Care Unit
NUFFIC	Netherlands Universities Foundation For International Cooperation
NR	Northern Region
NRHD	Northern Region Health Directorate
PMM	Prevention of Maternal Mortality
PMTCT	Prevention of Mother to Child Transmission
PNC	Post Natal Care
RCH	Reproductive and Child Health
RTI	Reproductive Tract Infection
SBA	Skilled Birth Attendance
STAR-Ghana	Strengthening Transparency, Accountability and Responsiveness - Ghana
STI	Sexually Transmitted Infection
TBA	Traditional Birth Attendance

TFR	Total Fertility Rate
T4MH	Technology for Maternal Health
UNFPA	United Nations Population Fund
UNICEF	United Nations International Children Emergency Fund
VHW	Village Health Worker
VU	Free University of Amsterdam
WHO	World Health Organization

Definitions of Terms and Concepts.¹

Maternal mortality/Maternal death: In ICD-10, WHO defines maternal death/mortality as “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”.

Institutional Maternal Mortality: Maternal deaths that occur at the health facility level.

Skilled Birth Attendance (skilled care/provider): The latest definition was formulated in 2004 and SBA is defined “as an accredited health professional – such as midwife, doctor or nurse – who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns”

Traditional Birth Attendant: A community level health provider during pregnancy and delivery. They lack the training to manage obstetric complications, however most mothers see them as solace to their delivery options because of several reasons. TBAs services are not considered as SBAs according to WHO.

Direct causes of Obstetric complications: Complications that occur due to pregnancy state (i.e. pregnancy, delivery and postpartum) interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above. WHO states that, the main direct complications that result in maternal deaths are hemorrhage, sepsis, eclampsia and pre-eclampsia, unsafe abortion obstructed labor and embolism.

Indirect causes of obstetric complications: Those complications resulting from previous existing diseases or diseases that develop during pregnancy and that were not due to direct obstetric causes but were aggravated by the physiological effects of the pregnancy.

¹ All these operational definitions are sourced from official guideline documents including WHO, UNICEF, UNFPA, WB, UNPD Trends in maternal mortality 1990 to 2013, WHO Monitoring of Obstetric Care hand book, Ghana CHPS policy document 2005, Adegoke A, van den Broek N. BJOG 2009 and Sey L et al, Lancet global health 2014.

Community Health Planning and Services (CHPS): “The mobilization of community leadership, decision making systems and resources in a defined catchment area known as a zone, and placing a reoriented frontline health worker, who is a trained community health nurse, a midwife or any other cadre of nurse (known as Community Health Officer) with logistic support and community volunteer system to provide services according to the PHC close to client service delivery system”.

Maternal mortality ratio: The number of maternal deaths during a given time period per 100, 000 live births during that same time period.

Emergency obstetric care: Those services for the treatment of obstetric complications that arise during pregnancy and childbirth. These services should be available, accessible and of quality to ensure optimal performance. There should be at least five emergency obstetric care facilities (including at least one comprehensive facility and 4 Basic facility services) for every 500 000 population.

Signal functions of EmOC: Key medical interventions that are used to treat the direct obstetric complications that cause the maternal deaths.

Basic Emergency Obstetric Care (BEmOC) facility: A facility in this category performs all seven **signal functions:** administer parental antibiotics, uterotonic drugs, parental anticonvulsants, manual removal of placenta, removal of retained products, perform assisted vaginal delivery and basic neonatal resuscitation.

Comprehensive Emergency obstetric care (CEmOC) facility: Should perform **all seven signal functions** plus caesarean section and blood transfusion.

Acknowledgement:

Ebenezer! This is how far you have brought me. I want to glorify and appreciate God for his strength, protection and wisdom throughout the course to its successful end.

I want to extend my gratitude similarly to the Netherlands government for granting me the scholarship to study for this Master's degree.

Also, special thanks to the whole Royal Tropical Institute (KIT) staff for imparting into me the knowledge and skills deserved. My Thesis advisor and the back stopper, I salute you for your constructive guidance, feedbacks, encouragement and support devoid of which this thesis would not have been completed.

I equally extend my gratitude to Ghana Health Service for releasing me to come for this course; a special ups to my colleagues at the Northern Regional health directorate.

Mention should also be made of my friends from the 51st batch of ICHD; Bob, Prince, Temesgan, Lorena and a special one to Prerana. It was wonderful being with you in this course.

To the head Pastor and all church members of Pentecost Revival-Amsterdam District, God richly bless you for the love you showed me.

Finally I dedicate this thesis to the Dagoë family and wholeheartedly to God who opened this window of opportunity for me to study in the Netherlands. GOD, TAKE ALL YOUR GLORY!

How This Thesis is organized:

In **Chapter One**, the general overview of Ghana in relation to geography, demography, economy and the organization of health services are presented. Added to this, the overviews of the Northern region in addition to health services available are given. **Chapter Two** highlights the problem statement and justification, presents the objectives, describes the methodology used for the literature review of this thesis and then ends with the explanation of the three delay model (Thaddeus and Maine, 1994) which is the conceptual framework for analyzing the MM in Northern Region. **Chapter Three** describes the study results and findings influencing MM in Northern Region of Ghana. **Chapter Four** highlights best practices/interventions that have been tried in Ghana and elsewhere that has helped to reduce MM and look at their applicability in NR. **Chapter Five** discusses the study findings and tries to look at the implications of the findings to the occurrence/prevention of maternal deaths in NR of Ghana. The adaptability of some of the best practices are equally discussed here. Finally, **Chapter Six** gives the conclusion of the study and gives some recommendations to the concerning health authorities and stakeholders in order to reduce the occurrence of maternal deaths in Northern Region of Ghana.

Introduction:

Women all over the world continue to die every day due to complications of pregnancy and childbirth. Evidence has shown that these conditions are preventable even in poor resourced countries. The death of a woman while giving life does not only affect her immediate family but the society as a whole; hence the inclusion in the MDGs goals.

Ghana's MMR in 2013 was 380/100,000LBs and by projection; it will be 358/100,000LB in 2015 which is considerably higher than the MDG 2015 goal of 190/100,000LB (1).

Maternal deaths continue to occur in all regions in Ghana. This is particularly so in the three northern regions which are considered the poorest in the country.

I work as a Deputy Regional Health Information officer in the Northern Regional Health Directorate, Tamale. As a focal data manager for the Regional Reproductive and Child health unit, the issue of maternal deaths has been a torn in our flesh over the years despite a lot been done. My encounter with a woman in labor during field visit whom I helped to reach a facility after driving for hours and trying 2 facilities, made me think of the severity of the barriers to safe motherhood and childbirth.

My thesis on "Factors influencing maternal mortality in the Northern Region" is an attempt to contribute to the answer of the forever demanding question – what contributes to the occurrence of maternal deaths? This thesis has helped me understand the diverse factors that can contribute towards safe motherhood, but are often forgotten and maybe neglected. I intend to further probe and analyze the possibilities of intervening to ensure that pregnancy and childbirth remain a blessing and not an area of fearful implications.

CHAPTER I: BACKGROUND

1.1 Geography and Demography.

Ghana is a South Saharan country located in West Africa and lies between latitudes 4° N and 12°N, and longitudes 4°W and 2°E. Ghana covers an estimated land area of 238,537 square kilometers, sharing boundaries to the north with Burkina Faso, to the south with the Gulf of Guinea, to the east with Togo and to the West with Cote d'Ivoire (2). Ghana is tropical in nature having warm and dry weather along the southeast coast regions, hot and humid in the southwest regions and hot and dry in the northern regions (3). The rains in the northern part of the country begin in April up until September. The Annual rainfall ranges between 1,100 mm (about 43 in) in the northern parts to about 2,100 mm (about 83 in) in the southern part (4).

As can be seen in Figure 1 (5), Ghana is divided into ten (10) administrative regions with its administrative and political capital being Accra. The administrative regions are further divided into 216 municipal metropolitan and, district assemblies (6).



Ghana's 2013 estimated

Figure1. Map of Ghana (5)

population stands at 25 million and has a growth rate of 2.2% with a life expectancy of 56 years which is drawn from about over hundred ethnic groups speaking different languages. The age and sex distribution of the population shows that the population in the age group (0-24 years) is (57.8%) and that of the age group (25-60+ years – 42.2%). Sex distribution also shows marginal increase in the females population within the age group (15-49 years) compared to their male counterparts (7).

Majority of the population are gradually drifting to urban areas (50.9%) of the country, compared to 49.1% who are rural dwellers. Christians account for 70% of the population, 17.6% is Islam and 5.2% traditionalist (7).

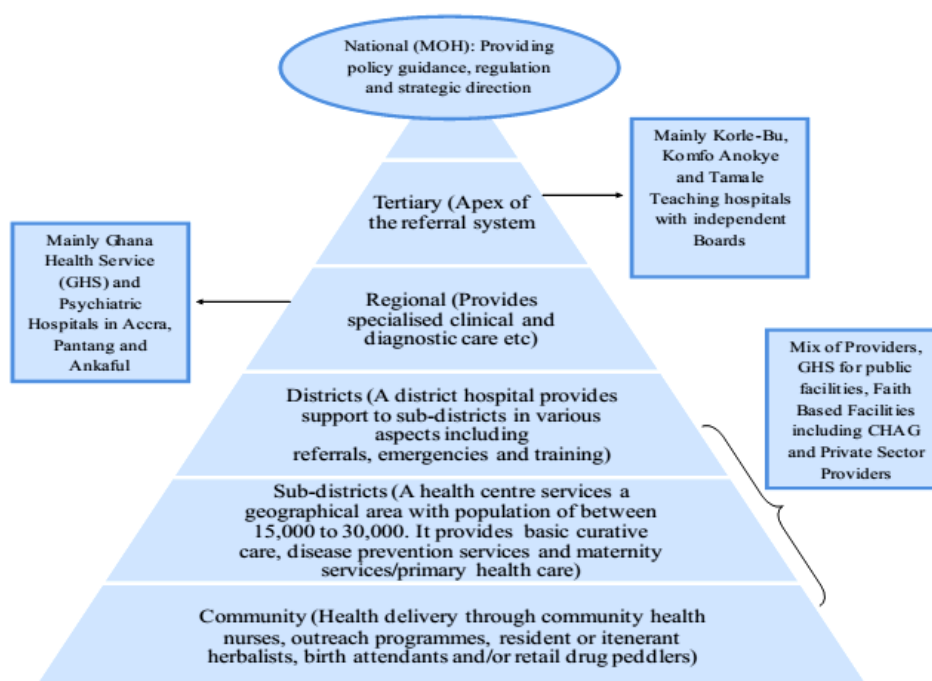
1.2 Economy

Predominantly an agricultural country, her GDP per capita is estimated at \$1,570 and total health expenditure purged at 5.2% of GDP. The Agricultural sector employs approximately 60% of the national work force accounting for 37 % of GDP (8, 9). Ghana is also endowed with mineral resources thus Gold, Diamond, Bauxite, Manganese, timber and Oil. These resources notwithstanding, the country depends heavily on foreign aid and remittances from her citizens living abroad. The economy grew at 3.3% in 2014. (6,7). By the end of 2014, the public sector wage bill as a percentage of total revenue of the country stood at 49% which is above the ECOWAS benchmark of 35%. (8).

1.3 Organization of Health Services in Ghana.

Ghana operates a comprehensive health service delivery system and the services are organized in several tiers ranging from the community level to the national level. This is depicted diagrammatically below:

Figure 2. Organization of Health Services in Ghana (10).



Source: DHIMS, GHS, 2014

As shown in the above figure 2 (10), the first three tiers; community, sub-district and district are operated by Community based volunteers, public facilities like CHPS compounds, health posts, clinics and health centers. Faith based facilities including CHAG and the private sector providers. The opening up for wider range of providers (private, faith-

based and public) is done to ensure access to health care by all. The teaching and regional hospitals are the referral points for the polyclinics and other hospitals. Polyclinics and hospitals are the referral point for CHPS centers, clinics, health post and health centers for medical and obstetric complications at the lowest level of the pyramid. CHPS centers, clinics and health post refer to the nearest health centers and if the obstetric complication case cannot be managed at that level it is sent to the district level or further for management (10).

At the national level, the apex of the hierarchy is the Ministry of Health who is headed by the Minister of Health and his deputy where policy guidelines and directives are emanating. The Ghana Health service which is headed by the Director General is the implementing body of national health policies and directives from the Ministry of Health. There is collaboration between the public health sector and the private for profit and not for profit providers to ensure that their activities are regulated. Majority of the health service providers are covered by the National Health insurance even though it has recently been going through challenges of indebtedness to the facilities. Maternal health services including delivery services are equally covered by the NHIS, however, not all services are covered. Example of services not covered are ambulatory services, other opportunity cost pertaining to delivery are equally not covered by the NHIS (10).

Over the years, the GoG/MoH/GHS recognizing the importance of maternal health care has enshrined it into most national development frameworks and policies even to include the GPRS1 & 11 documents. Some of the initiatives put in place specifically to reduce maternal deaths include safe motherhood initiative, prevention of maternal mortality program (PMMP), making pregnancy safer initiative, free delivery care services for NHIS card holders and the roll back malaria programme (23).

1.3.1. Reproductive Health Services and profile in Ghana.

The Reproductive and Child Health (RCH) Department is one of the departments under the Family Health Division of the Ghana Health Service.

The following services are offered at different levels of the health care delivery system as per the GHS (11).

- ✓ Safe motherhood including antenatal, safe delivery and postnatal care especially breastfeeding, prevention of mother to child transmission of HIV (PMTCT), infant health and women's health.
- ✓ Family planning
- ✓ Prevention and management of unsafe abortion and post abortion care

- ✓ Prevention and management of reproductive tract infection (RTI), including sexually transmitted infections (STI), HIV/AIDS.
- ✓ Management of cancers of the reproductive system, including cervical, breast, testicular and prostatic cancers
- ✓ Responding to concerns about menopause
- ✓ Prevention and management of harmful traditional practices that affect the reproductive health of men and women such as female genital mutilation.
- ✓ Information and counseling on human sexuality, responsible sexual behavior, responsible parenthood, pre-conceptual care and sexual health
- ✓ Gender-based violence and reproductive health (11).

The total fertility rate (TFR) of the country was 4.2 in 2014 representing an increase from 4.0 in 2008 according to the 2014 GDHS (12). The routine facility data from the HMIS in the country reports that the ANC and SBA figures for 2013 remains fairly stable (13). The maternal mortality ratio stands at 380/100,000LBs (14) with institutional maternal mortality rate of 154/100,000LBs (13). Post-natal care saw an increase to 64.1% from 62.7% in 2013 and 2012 respectively (13).

1.4. Northern Region.

The northern region occupies one third (1/3rd) of the total land area of Ghana. It borders Togo and La Cote D'Ivoire to the East and West respectively, to the north by Upper East and West Regions and to the south by the Black Volta, the Brong ahafo and Volta regions. With a projected population of 2,701,488 at a growth rate of 2.9 per annum as of 2013 (15), the region has been sub-divided into 26 administrative districts with Tamale as the regional capital. With over 5,000 settlements in the Region, about 54.4% have population less than 200 people (15, 16). The region is said to be one of the deprived regions where poverty is high and widespread with Agriculture being the highest employer of the productive age group (about 90%) (17). About 30.2% of the people in the region are urban dwellers with 69.8% constituting rural dwellers (18). Islam/Muslim is the predominant religion (60%) in the region with the rest representing other religions or no religion (18). Mole-Dagbani is the largest (52.7%) ethnic group in the region with Ga-Dangbe being the least representing 0.3% (18).

1.4.1. Health Services in Northern Region

Health services are organized in the region as per the national hierarchy; thus from the community levels to the regional level. Varied services ranging from primary to tertiary prevention services are offered from the 404 private not for profit, private for profit and government health facilities spread in the region. Settlements and health facilities in the region are far apart making health delivery, for example immunization, ANC and other public health services a challenge. (10, 15, 19).

The region has one teaching hospital located at the regional capital, 28 other hospitals, 4 polyclinics, 94 health centers with the rest being clinics and CHPS centers. Three (11.5%) out of the 26 districts have no hospitals (15, 19). Emergency obstetric and newborn care (EmONC) assessment in 2011 showed that most of the facilities lack qualified staff (doctors, midwives, nurses and other paramedical), equipment and supplies and other logistics for better service delivery. This assessment showed that only five facilities offered comprehensive EmONC services, one (1) facility offered basic EmONC services and 25 facilities offered partially functional EmONC services in the region (20,73).

Maternal health indicators thus ANC, skilled delivery, PNC, maternal mortality ratio and others have equally recorded unsatisfactory coverages as compared to national and international targets (12, 15).

CHAPTER II. PROBLEM STATEMENT, JUSTIFICATION, OBJECTIVES AND METHODOLOGY

2.1. Problem Statement

Globally, about 289,000 women died in 2013 due to preventable pregnancy and childbirth complications with about 99% of these deaths occurring in developing countries. About 60% (179,000) of the deaths occur in Sub-Saharan Africa including Ghana (14, 21). Those who survive these complications, a considerable number of them develop pregnancy related morbidities like incontinence, infertility and obstetric fistula (22).

Maternal mortality has reduced over the years in Ghana reaching 3,100 in 2013, with an MMR of 380/100,000 LBs, though there are variations in some regions (1, 14). However this is by far not enough to meet the MDG5 target in 2015 of 190/100,000LBs (1).

The Northern Regional health directorate recorded 105 maternal deaths occurring in health facilities in 2013 representing an MMR of 194/100,00LBs which is unacceptably higher than the 54/100,000LBs institutional MMR target in Ghana (15, 23). Most economic indicators in Ghana show that the Northern Region is the second poorest region with decreases in indicators like educational levels of women, low health infrastructure and poor road network (17), the MMR target in the region is therefore a challenge to meet (15).

Gumanga et al (24) in a study found that about 71% of maternal deaths in the region are caused by five direct obstetric complications: hemorrhage, sepsis, unsafe abortions, hypertensive disorders and obstructed labor. Studies (25,26) seem to identify that the remoteness and vastness of some parts of the country, distance, poor access to vehicles, coupled with unequitable distribution of health care services and health workforce have significant associations to maternal health outcomes.

2.2. Justification.

According to WHO, 88-98% of maternal mortalities could be averted with prompt access to existing emergency obstetric (EmOC) interventions/treatment. This is due to the fact that most maternal deaths occur either during labor, delivery or the immediate post-partum period (27). Some argue that for eclampsia and pre-eclampsia, identifying the risk factors early during Antenatal care for proper management could prevent their associated deaths even though that is not a surety (13).

It is globally known that the single most significant intervention to reducing maternal deaths is to ensure that all births are attended by skilled personnel and transport available in case of emergency (48). However, the Antenatal and skilled birth attendance statistics from the GHS Northern Region report for 2013 show interesting trends. While first ANC visits exceeded the expected number of pregnancies in the region, (113.6%²) (15), only 57% of women benefitted from skilled attendance during delivery and postpartum (15). It stands to reason that more women in the region do not get skilled assistance by midwife, doctor or a trained nurse and during complications.

Figure3. Percentage Distribution of Causes of institutional maternal deaths in Northern Region, 2013 ⁽¹⁵⁾.

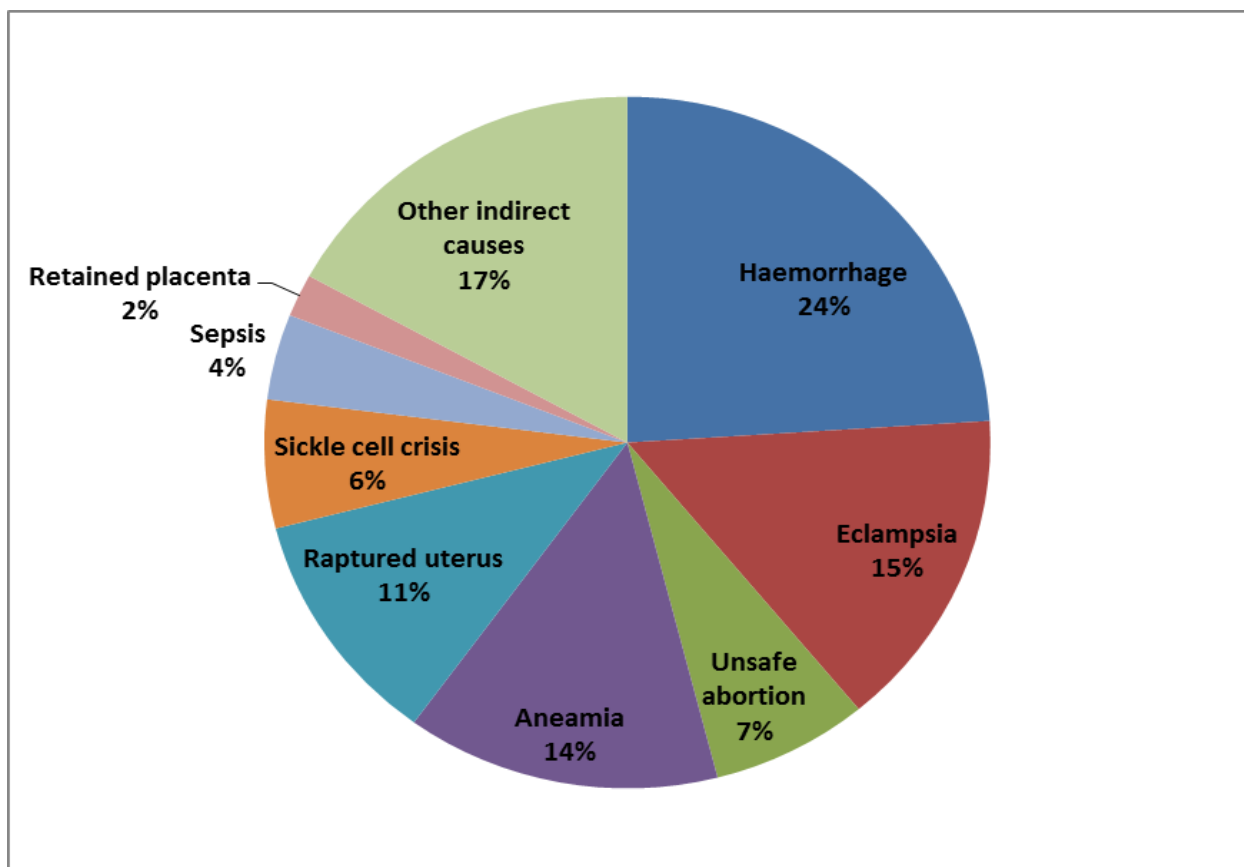


Figure 3 above demonstrates the causes of maternal mortalities in Northern Region showing some of the direct causes of maternal deaths to include hemorrhage, eclampsia, ruptured uterus and unsafe abortions. Further analysis of the deaths have shown that about 83% of the deaths were as a result of direct causes and the audits done by the various

² 113.6% does not mean double counting. There are instances that pregnant mothers come into Northern region from the neighboring countries for ANC services especially the border towns. This inflates the numerator for calculating the ANC coverage.

facilities in the region were suggestive of delays in getting emergency obstetric care (EmOC) (15).

The GDHS 2014 estimates that the unmet need for family planning among the sexually active unmarried female rural and urban dwellers in Ghana is 41.4% and 42.9% respectively (13). There is the possibility of high number of unwanted pregnancies especially amongst adolescents which could eventually lead to high number of unsafe abortions; which is one of the leading direct obstetric cause of maternal deaths in the region (15, 24). Socio cultural and religious idiosyncrasies in the region relate abortion with issues of fear and stigma hence there is the possibility of under reporting (28). About 9% of maternal deaths in Ghana are caused by abortion complications (13). In Northern Region, 7% (figure 3 above) of maternal deaths in 2013 were due to unsafe abortions as against reported abortion cases of 4,054 with 523 confirmed induced abortions. Eight hundred and thirty seven (837) representing 21% of the reported abortion cases were teenagers (15). In the Maternal and health survey 2007, abortion is highest among the youngest cohort of women less than 20 years (16%) and reduces steadily with increase in age. Other findings in this survey showed that in Ghana, the commonest way of delaying childbearing is abortion (29).

Evidence has shown that maternal mortality is caused by medical causes however, there are underlying social determinants thus - socio cultural, economic, accessibility and quality of care factors that cause delays for expectant mothers in seeking effective and immediate care during obstetric complication (21, 31). To reduce maternal mortality in the Northern region, knowing the factors that influence the occurrence are therefore important to inform policy and program managers on programming (15).

Small scale studies have been conducted in the Northern Region to identify the factors influencing maternal death, however, Thaddeus and Maine (31), proposed the three delay model in 1994 categorizing these social factors into three phases of delay from beginning of obstetric complications to receiving appropriate intervention. In the case of abortions, the three delays may not clearly fit to lead to maternal deaths however, the delays will come into play when there is a complication from unsafe abortion at home, and then the woman goes through delays in seeking and receiving post abortion care/treatment.

Family planning, ANC and skilled birth attendance are important interventions that prevent and or reduce maternal deaths however; the focus of this thesis centers on events happening around labor, delivery and post-partum period that can lead to maternal death.

Studies bringing all the three delay factors in a single document or thesis are lacking for Northern Region. This study will therefore look at the

influencing factors using the three delay model to inform policy makers on programming in reducing maternal deaths thereby tracking the progress of the MDG5 and significantly the sustainable development goals (SDGs) in Northern Region of Ghana.

2.3. Main Objective.

To analyze the factors influencing maternal mortality in Northern Region of Ghana in order to make recommendations for policy makers and stakeholders for better programming.

2.3.1 Specific Objectives.

1. To explore the socio-economic, socio-cultural and geographical accessibility factors that cause delays in seeking timely treatment during obstetric complications in Northern Region of Ghana.
2. To analyze the health system factors that lead to delay in timely treatment during obstetric complications in Northern Region of Ghana
3. To review evidence of best interventions/strategies in Ghana and other countries including recommendations from expert organizations on reducing maternal mortality in Northern Region of Ghana.
4. To make recommendations using the findings to policy makers and stakeholders for informed programming and decision making on the prevention of maternal mortalities in Northern Region of Ghana.

2.4 Methodology

The methodology is mainly a literature review. The search for the literature was in three phases according to the specific objectives of this thesis. First the part of the search focused on the socio cultural, socio economic and access factors causing delays which subsequently result in maternal mortality in northern region/Ghana. The second phase focused on the health system factors leading to delay in timely treatment of obstetric complications and finally the search was focused on best practices or intervention that helped in reducing maternal mortality.

The literature search included peer reviewed journals, grey literature and regional, national and international reports that were relevant in identifying the magnitude of the problem in Ghana and the northern region. Literature used was those with year of publication ranging from 2000 to 2015. Equally used were unpublished reports, presentations and articles.

2.4.1 Search Strategy:

Literature was accessed from various sources with several keywords used to search by objectives. The sources and keywords used are presented in Table 1 below.

Table 1. Search strategy, sources and keywords.

<i>Type of document</i>	<i>Source</i>	<i>Objective 1</i>	<i>Objective 2</i>	<i>Objective 3</i>
		Keywords Used	Keywords Used	Keywords Used
Published Peer reviewed	PubMed	socio-economic,	Quality of care	strategies
	VU library	socio-cultural	Health system factors	interventions
	Google scholar	Accessibility factors	Maternal death	reducing maternal mortality
	Google	maternal death	Maternal mortality	reducing maternal deaths
	Refseek	maternal mortality Delay factors Utilisation Barriers	3 delay factors	
Grey literature Reports	Google scholar Institutional sites WHO UNICEF KIT Government websites	Delay factors Utilisation Maternal death maternal mortality	Quality of care Health system factors Maternal death	strategies interventions reducing maternal mortality reducing maternal deaths

2.5 Conceptual Framework.

The conceptual framework used to analyze the influencing factors for MM in NR is adopted from Thaddeus & Maine called the three (3) delay model to help analyze the factors influencing the continued high maternal mortality in Northern Region of Ghana. Several broad factors contribute to the occurrence of maternal deaths, for example nutritional status of the mother; however Thaddeus and Maine (31) focused on factors that influenced the occurrence of maternal deaths between start of obstetric complication and its outcome, an interval that undoubtedly is important for the reduction of maternal mortalities (30). In doing this, they identified that women and girls face several barriers and delays in accessing the effective and timely medical care needed to prevent deaths during complications due to pregnancy and childbirth (31).

This framework will be suitable since about 83% (15) of the maternal deaths in NR are as a result of direct obstetric causes; this thesis will focus on assessing the factors that lead to these deaths between onset of obstetric complication and its outcome thus death.

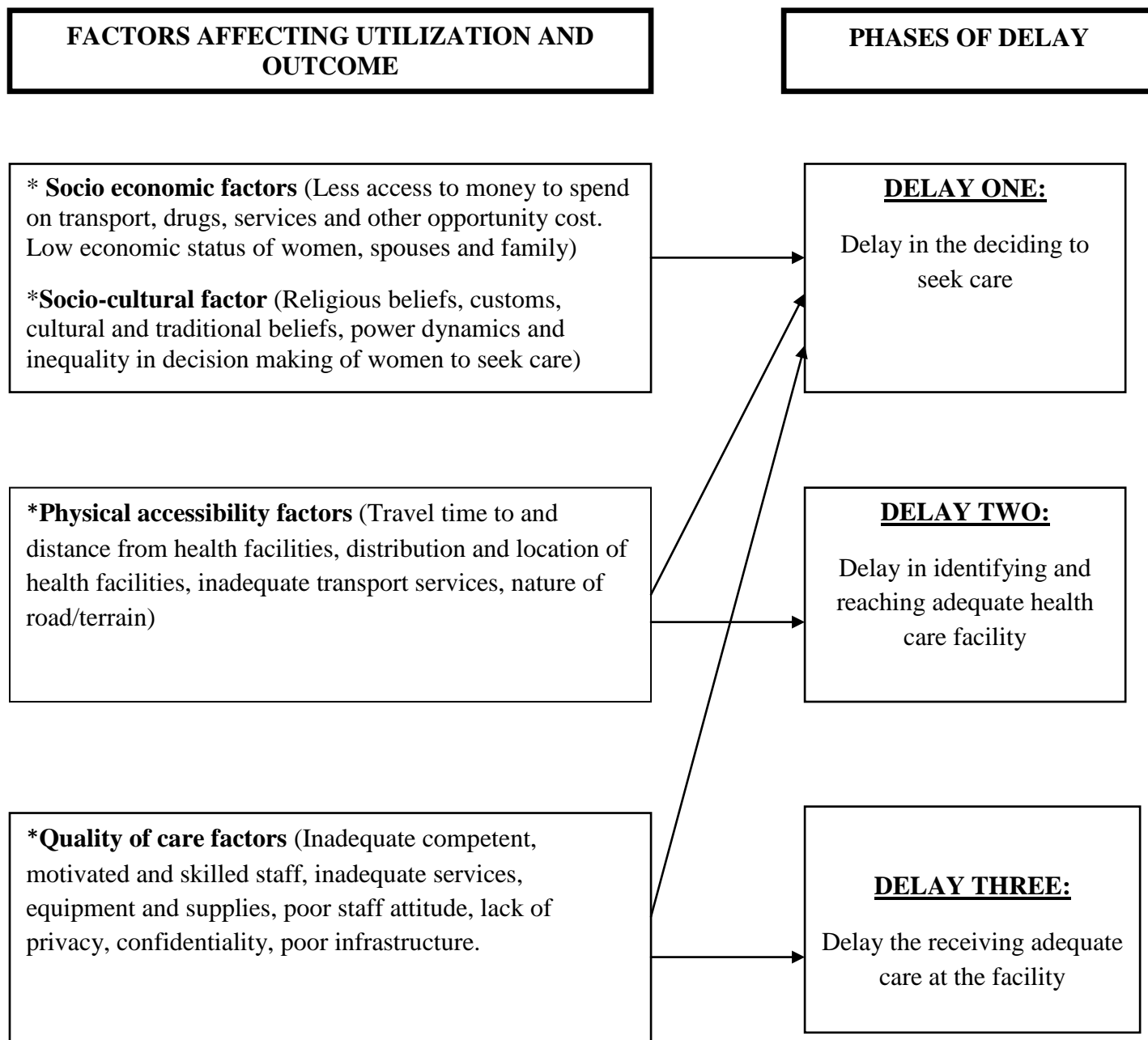
The foundational premise of this model is that, three phases of delay will intercept a woman from getting immediate and appropriate maternal health care and these will become relevant factor contributing to maternal mortalities at the end of the day (32). These are called the 3 delay factors thus:

Delay One: Delay in decision to seek care on the part of the individual, family or both. These are factors that influence a woman, the spouse or the household from making timely decision. They are enabled by either perceived or actual barriers thus economic status, cost, religious, cultural and traditional beliefs.

Delay two: Delay in arrival at a facility. After the woman has decided to seek medical care in the facility, several factors will equally influence her from getting to the health facility. Those to be discussed here would be travel time/distance to health facility, poor road network, availability of and cost of transportation, geography, for example mountainous terrain, rivers, seasonal flooding.

Delay three: Delay in the provision of adequate care at the facility
When the woman finally gets to the health care service, Thaddeus and Maine identified factors at the health facility level that can influence a maternal death. These factors to be discussed in this thesis are poor facility and lack of medical supplies and equipment, inadequately trained and poorly motivated medical staff, lack of staff and inadequate referral systems.

Figure 4. Adopted Three Delay Model of Maternal Mortality (Thaddeus S & Maine, 1994) ⁽³¹⁾.



CHAPTER III: FINDINGS/RESULTS.

In line with the above background information, this section will explore additional scientific literature and some personal observation from the field that will provide evidence to address the objectives of this thesis. This review will be guided by the three delays model of maternal mortality by Thaddeus and Maine (1994) described above.

3.1. Delay One: The factors that influence the decision to seek care by the woman from the onset of illness (specifically obstetric complication) and its outcome, are often those discussed as constraints or barriers to utilization of maternal health services in most literature on health care seeking behavior. Factors that were found include.

3.1.1. Economic status.

Economic status can influence a woman's decision to seek care timely during complications. A number of factors: household wealth, income levels and occupation interplay to measure the economic status of the woman, the husband or the family. Poverty is widespread in northern Ghana especially among rural dwellers (17), and this can influence early care seeking. A study conducted by Moyer et al (33) in rural northern Ghana identifies that, the lowest rate of facility delivery was found among women with low economic status. The GDHS, 2014 equally found among women who had livebirths 5 years preceding the survey that the rate of facility delivery increases with increases in wealth quartile thus 46% and 96.2% respectively for lowest and highest quartiles (12). In a rural district in Ghana, a study among women who had delivered one year prior to the study finds that occupation and household income of the woman showed significant associations to the use of skilled delivery during labour and complications (34).

3.1.2. Cost

Cost in the literature received valuable attention. Even though by policy in Ghana, most of the safe motherhood services are free (35), anecdotal evidence claims that there is still under table payment of some services by women. Other cost associated variables that cause delay for women in seeking maternal health care include cost of transport, and other opportunity cost. Much is not found on cost of medication, however Heyen-Perschen (47) claims that about 70% of the poor in Ghana cited cost as one key factor for non-use of health care. This cost, he includes are cost of treatment, cost of medicine and cost of transport to and from the facility. Also, Mills and Bertrand (36) exploring the response of women to use of health professional for obstetric care in northern Ghana claim that a pertinent reason for women opting for TBAs is cost, but this study did not specify the type of cost the respondents meant. However, a study in the same context confirmed that transportation and other indirect cost at the facility accounted for the largest proportion of total cost of

treatment for obstetric complications (38). Moyer et al (33) equally confirmed this in their study in northern Ghana. They found associations between cost of transport and cost of care seeking as barriers to facility delivery during obstetric complication. A study (46) also asserted that even though the maternal health policy is supposed to benefit all women especially the poor, in reality it is not because the poor women do not have access to the health facilities because of transport cost and some opportunity cost barriers during referrals or complications.

3.1.3. Socio-cultural factors.

Socio-cultural variables play a major role in this context in the health seeking behavior of women during obstetric complications. Socio cultural variables were found around religion, customs and traditions and power dynamics or gender inequalities in the family.

Religious beliefs and affiliations influence the way of thinking and behavior of people even to include their health seeking behavior in times of emergencies. In the northern region about 60% (18) of the population are Muslims. In Muslim religion covering of the body is considered as preservation of bodily sanctity and therefore the private part of the woman is the sole preserve of the husband. This makes physical examination during labour and delivery a practice that violates their religious belief. It is however important to know that the educational level of the woman and/or man can influence their religious beliefs to tow toward skilled delivery. In his study, Ganle (38) argues that religious obligation of women to keep bodily sanctity limits Muslim women from accessing delivery services. Ganle further claims that lack of privacy at health facility judging based on the Muslim standards, also serves as a barrier to facility delivery. Sarkodie and Abubakari (39) equally confirm in their study among women who had delivered in Salaga hospital that, the choice of place of delivery of the woman was prescribed by a Pastor/Priest or Mallam.

Customs, norms, culture and traditions limit some women to make concrete decisions to seek care when complications set in. In most situations, the decisions are either with the husbands, in-laws or a prominent relative. Most of these cultural and traditional beliefs will make women and husbands associate an obstetric cause to something else and by the time they will realize, it will be too late to handle. Sarkodie and Abubakari (39) in Northern Region found amongst other things that use of local medicine in pregnancy and childbirth, superstition/customarily practices during labor were some of the pertinent socio cultural causes of maternal deaths in their study.

Among most of the Muslims communities in the region the general belief is that a woman is supposed to deliver at her husband's house. Abubakari and Yahaya (40) in their study assert that by the traditional beliefs and

customs, unfaithful women will find it exceptionally difficult to deliver. Any woman who commits such a crime is supposed to mention all the names of the men she had sex with before she will be able to safely give birth. A case of obstructed labor or prolonged labor could be attributed to this act. Ninety percent (90%) of the respondents in their study believe that women who resort to facility delivery are suspected to committing adultery. To avoid such suspicion, women will avoid going to the health facility for delivery even in cases of complications (40).

Abortion cases in most part of West Africa are seen as medico legal cases and therefore seeking care becomes an afterthought. In situations where medical attention is required, the said attention is not given because of religious, traditional and legal connotations even among health providers (28).

Power dynamics in the family, community and society relates to gender inequalities which influences the decision making power of the woman. A women in a culturally dominated regions have no decision making power even in emergency situations (60). Majority of women during labor need permission from other people to seek care. Abubakari and Yahaya (40) identified that the husband or the family determines whether the woman should deliver at the hospital or at home and most times by the time a decision is arrived at it will be too late. Sarkodie and Abubakai (39) in Northern Region confirm that in case of complications, only 34% of women make personal decision as to where to go and what to do.

3.2. Delay Two: This phase occurs when a decision has been arrived at for the woman to seek care. The time spent in identifying and getting to the health facility is a period that can cause delay in emergency situations. Those factors identified in the literature include:

3.2.1. Distance/travel time. Distance can serve as a disincentive and a barrier (31). The northern region is the biggest region in Ghana in terms of land size. Facilities are far apart and inadequate making travel distances far in cases where either the woman is coming from home or on referral to a more resourced health facility (15). In a study conducted in Tamale Teaching hospital in Northern region analyzing maternal deaths, Gumanga et al (24) argues that a chunk of the women who died had traveled 150 kilometers to the regional hospital as emergency cases taking too long time to get to the hospital. Sarkodie and Abubakai (39) in their study in that same region, identified as a factor long distances in addition to travel time to health facilities were cited as a factors militating against facility delivery. A study in Myanmar by Win et al (41) analyzing the maternal mortalities found that travel distances to reach hospitals showed significant association among women who died in the hospital.

3.2.2. Transport availability. Transport availability influences utilization of health facility after a woman has decided to seek care. Coupled with the inadequacies of transport is the cost in hiring the transport especially in the night. A study by Abugri (42) in northern Ghana, quoted a respondent during a FGDs thus

"I planned to deliver in the health facility, but when labour started and I look for a taxi, I delivered before it came or you will not get at all".

Some of these women who live in far places will resort to walking or using a bicycle, motorbike or donkey cart and by the time they get to a facility, they will be at an advanced stage of complication. A study (43) in Ghana of similar context did confirm that of the 83 respondents who did not use skilled delivery services, 36 (43.3%) responses showed that lack of transport was their major challenge. This situation is worsened in some part of the region where cars cannot ply those roads making bicycles, motorbike or donkey carts the next available means of transportation in situation where complications begin (15). A study (39) in Salaga hospital in the northern region equally affirms that lack of transport is a barrier to facility delivery.

Another form of delay occurs where a client has to be referred from a lower facility to a higher facility during emergencies (31). *Ganle et al* (50) found that Ambulatory services are not covered by the national health insurance scheme in Ghana, and facilities that have them are very limited, often ineffective and restricted to urban areas. A pregnant respondent in this study (50) bemoaned that

"Right now, the government says it is free if you go to hospital to deliver, but it is not easy to get to the hospital...hiring a car is always a problem because the cost is very high. If you can't reach the hospital, how can you benefit from this free thing? So if the government is serious, then it should also provide transportation or even if it can pay for that, it will encourage more women to go to hospital when they are pregnant".

Even more, this study found that in two communities in northern Ghana, transport was inappropriate, difficult and expensive to arrange in cases of emergencies (50).

3.2.3. Nature of road/terrain. Few roads in the region are tarred. The main Tamale to Bolga road, Tamale to Yendi road and the recent Tamale to Damongo through to Bole Roads are the only tarred roads in the region. Some districts are entirely cut off during the raining season making it impossible for those districts to be accessed by road (15). During complications, the nature of the road/terrain can influence the traveling time to get to nearest health facility, which is further influenced

by the availability of transport. In Gushegu District in the Northern Region, Poku-Boasi et al (44) argue that the inadequate transport system is worsened by poor nature of roads making referral of complications a challenge. They claim that mothers have even died on the way in their attempt to get to the health facility (44). This finding is supported by Daniels et al (25) who argue that the nature of road is associated with the use of maternal health services in rural Ghana. A study (51) in rural Malawi analyzing maternal deaths in a hospital, found that some of the deaths lived in rural areas with access to only animal carts with bad roads. This study further indicated that two women died on their way to the hospital, while others died upon arrival at the hospital.

3.2.4 Distribution of facilities. Physical accessibility of health facilities to women in labor especially in rural areas is a challenge in developing countries with most health facilities being situated in urban areas to the detriment of the rural dwellers (45). With about 70% (18) of the northern region population being rural dwellers, it is maybe certain that majority of the hospitals and health centers with better health services would be far from women serving as barriers to facility delivery during labor or complications. Inequalities in distribution of maternal health services including health facilities was what Ganle et al (46) found in their study in the Northern and Ashanti regions of Ghana, Poku-Boasi et al (44) however argues that besides this, physical location of the health facility is undesirable to women in labour and during complications in northern region. This becomes worsened where health workforce and equipment are equally inadequate. In Northern region a study (55) estimates that only 25% and 50% can access a CEmOC facility within two and four hours respectively.

3.3. Delay Three: These occur at the health facility and are related to quality of care. Myriad of factors can serve as barriers in receiving appropriate and timely treatment that can lead to obstetric deaths. Herewith the literature found:

3.3.1 Inadequately competent and skilled staff: WHO states that most maternal deaths are avoidable with skilled birth attendance (21, 48), but with the global human resource crisis, this target is becoming challenging to achieve especially in developing countries (48). The Population/doctor, population/nurse ratio of the northern region shows woeful indicators as against the WHO recommended doctor to patient and nurse to patient ratio of 1/6000 and 1/500 respectively (20, 73).

Table 2. Selected Human Resource for Health Indicators, Northern Region, 2011 – 2013 ⁽¹⁵⁾.

INDICATOR	2011	2012	2013
Population/Doctor ratio	1/87978	1/77216	1/81863
Population/Nurse (all categories) ratio	1/1914.	1/1312	1/1249
Women of Fertility age/Midwife Ratio	1/2581	1/2742.	1/3611
Population/Physician Assistant ratio	1/28993	1/33658	1/32945

Source: GHS, NRHD 2013 annual report.

From the Table 2, as of the year 2013, the region has doctor patient and nurse patient ratios of 1/81863 and 1/1249 respectively which shows inadequate staff strength in the region. Another challenge in the region is that the few staff are mostly working in urban centers (15) making them stressed that could even influence their behavior and conduct towards clients. Inadequate staffing has in most instances led to long waiting times as most times the only doctor or midwife in the facility is attending to so many people that when a complication is brought, by the time attention is sort, it will be too late. A study (46) shows that there were instances where clients complained the people were crowded and they had to wait for long hours or even a whole day to be attended to. This is confirmed by Benchani and Tenkorang (49) in their study in Tamale among health providers in two hospitals in which a respondent bemoaned that they are overwhelmed with workload because of shortage of midwives in the hospital. This same study they said equally found that because of inadequate in-service training for midwives and doctors it affected their knowledge on new insight into maternal health policies that affected the quality of care in the hospital.

3.3.2 Inadequate services, equipment and supplies: When women get to the health care facility timely with a complication, many health facilities in developing countries do not provide adequate emergency obstetric care (EmOC) (52). One critical intervention to reducing maternal mortalities is that apart from having sufficiently skilled health workforce with midwifery skills there should be provided with essential supplies, drugs and equipment especially in rural areas (53). United Nations/WHO recommendation stipulates that for every 500,000 population there should be 5 EmOC facilities comprising one providing comprehensive (CEmOC) and four facilities providing basic emergency obstetric care (BEmOC) (54). In Ghana this population is further reduced to 200,000 (*due to low population density in some areas*) for the same amount of BEmOC and CEmOC facilities (20). Gething et al (55) in their study demonstrate the inadequacy of BEmOC and CEmOC services in northern region in that, they found that clients had to cover long distances to get to these services. A survey (20) in Ghana equally found that in northern region there were stock outs of essential drugs like oxytocin, ergometrine, ketamine, magnesium sulphate and atropine in the six months prior to

the survey in health facilities. Oiyemhonlan et al (56) in Kintampo hospital among midwives to explore knowledge and response to management of obstetric emergencies found that inadequate equipment as well as insufficient staffing are barriers to accessing emergency obstetric care. Apart from the above, women who struggle to get to lower level facilities also have to be referred to higher facilities and this causes delays that sometimes lead to death. A community health nurse in Kpatinga CHPS compound in Northern Region asserted that she had to refer most of the suspected complication cases to the hospital due to lack of BEmOC services but the women refused to go because they assumed it was punishment to them (*personal experience*) A study by Mills et al (57) in Ghana, India and Kenya found that in a rural northern Ghana, women had to be referred from the lower facilities to a district hospital outside that district with reasons as factors relating to lack of doctors, surgical equipment, or drugs. Ganyaglo (58) equally confirms that Of the 191 maternal deaths in a hospital, 98 representing 48% occurred in patients who were referred to the regional hospital from other health facilities within the region because of lack of BEmOC and CEmOC services. A maternal death study (51) in Malawi confirmed this in that in their study, they found major reasons that led to the death of the women being lack of blood and lack of hydralazine.

3.3.3 Poor staff attitude: Women with complications who manage to get to the facility sometimes are faced with distrustful and poor staff attitude making them reluctant in following the regimen for a safe delivery. Evidence found records instances where some women were beaten in the process of giving birth. In this study by Crissman et al (59), a respondent recounted by saying

"Some of them [facility midwives] are too harsh and their characters are not good. You won't do anything but how they receive you is not good and some too they will be feeling sleepy and you will call them and they won't come. What I have heard is that some of the midwives, they will beat you, they will shout on you".

This is a clear attitudinal problem that affects quality of care. Another study by Ganle et al (50) found that poor conduct of providers encountered by clients at the facility have led to unsatisfactory outcomes of clients that influenced their usage of health facility during delivery. Esena and Sappor (43) equally found an association in poor attitude of health workers serving as barrier for skilled attendance. Mills and Bertrand (36) also found that some of the reasons for not using obstetric care facilities are shouting from midwives, sneering at them, embarrassing them by telling them they are dirty, slapping them when they delayed in pushing during the second stage of labor and sometimes left them unattended to.

3.3.4 Lack of privacy, confidentiality and inadequate infrastructure

As found earlier, in the northern region, health facilities are inadequate and not evenly distributed (15,20) with competing programs and units, there are limited spaces allocated as maternity wards in the health centers and hospitals with some health facilities having only 2 rooms for every kind of service (*personal observation*). In an event of labour or complication, by the time providers are able to find a place for the client it might be too late and lead to dissatisfactory outcomes even if a skilled attendant is present. While A study (49) in Tamale in two hospitals among health providers found inadequate infrastructure including labor wards as barrier for access to obstetric care, that in Kintampo hospital argues that health care providers bemoaned that the physical space and beds in the maternity ward should be increased to accommodate the demand. A respondent in this study quoted

“There is lack of a good infrastructure here, the maternity ward is chaotic, and the design of the department is not conducive” (56).

In most of these facilities in northern region, the delivery rooms are not secured bridging privacy and confidentiality of the patient. Ganle et al (46) identified that mothers who had given birth in the hospital before cited limited birth choices and no privacy as barriers to nonuse of health facility for delivery.

All these factors found in the literature contribute to delay in seeking care, delay in identifying and getting to the health facility and delay in seeking prompt treatment after a client has arrived at the health facility during labor, delivery and the post-partum period which could lead to maternal death.

CHAPTER IV: BEST PRACTICES THAT CAN IMPROVE THE THREE DELAYS IN NORTHERN REGION.

A lot has been done in reducing maternal mortality in Ghana and Northern Region but the problems still exist (22). Evidence based successful interventions that have been tried in Ghana and other developing countries that could be deployed in the region are herein outlined:

4.1. Best Practices to improve first delay.

Education of the girl child is free only for primary schools in Ghana (60). Children however tend to drop out of school after this stage because of cultural, traditional or economic reasons (60). Equally so, evidence show that high girl literacy has a positive correlation to maternal health outcomes like uptake of Family planning, skilled attendance and other maternal health services (12, 29, 61). In Sri Lanka, the government provided free education to the university level for over 60 years and it helped to empower women. This contributed to reduced teenage pregnancy by delaying the age of marriage. It also empowered women and gave them access to electronic and print media enabling them to have an increased awareness regarding health (62). Education will increase their knowledge and also remove socio cultural, traditional and economic barriers for women.

Savannah Signatures with support from STAR Ghana implemented the Technology for Maternal Health (T4MH) project in 4 districts in northern region with the aim of complementing GHS effort of reducing maternal and child mortalities. Amongst other interventions in this project, training of staff on Life Saving Skills and interpersonal relation skills, knowledge sharing sessions were organized at health facilities for expectant mothers during ANC, key health information about pregnancy and when to recognize danger signs were sent to pregnant women from a distance via mobile phones and expectant mothers were reminded via phones to attend ANC sessions and to report timely whenever they suspected labor was due. Pregnant women also had the opportunity to send information to care givers during complication for early response. Evaluation showed an increase in ANC attendance, skilled delivery and also pregnant women in labor did not wait so long in their houses to experience delay to the facility. It eventually decreased maternal mortality in the districts implemented over the period (63). The Mobile Technology for Community Health (MoTeCH) project that was implemented in the Kassena-Nankana district in the upper East Region of Ghana equally registered similar results when it was evaluated (64). So also did the M-health technology project in Malawi record similar results (65).

The organization Maternal Worldwide by the use of the three delay model implemented the integrated maternal health program in West Wollega in the Oromia region of Ethiopia to decrease maternal mortalities. It aimed

among others strategies to carry out community health promotional sessions about maternal health issues and addressing women's rights and status. Also, it formed women's income generating groups to enable women to set up their own businesses to give them increased financial independency to improve their influence in the communities. Besides, a Safe Birth Fund was established to provide the poorest women in the zone with the funds to enable them to deliver at health facilities without financial barrier. It also provided essential supplies, drugs and equipment in the health facilities of the project area. An evaluation of the project showed amongst other results that facility delivery increased by 51%. Also the number of deaths from complications of pregnancy had reduced in a hospital from 6.2% to 0.6%. Also, within two years of the project, 90% of the women had made profits and were able to make loan repayments (66).

Through collaboration of government and community leaders, the community loan fund for obstetric emergencies was implemented in Zaria in northern Nigeria. Under this arrangement, contributions from community members were compulsory and loans without interest were only given for obstetric complications. A transport system with the local transport owners was also established to avoid delay in seeking care. Results showed that an equivalent of US \$20 500 was collected, and from this, 18 loans were approved for obstetric complications. Also, 23 drivers agreed to be permanent participants. Fifty eight drivers also agreed to be participants in 6 month rotation. Eighteen women were transported to health facility due to obstetric complication at the time of evaluation. An important impact was that the project increases referrals of complications to the health centers and hospitals in the project area, the outcome which hitherto would have been maternal deaths (67).

4.2. Best practices to improve second delay.

The Upper East region in Ghana is one of the best performing regions in Ghana in maternal health indicators including reductions in maternal mortalities (13). Paramount among the interventions deployed has been the establishment of emergency transport for obstetric conditions championed by the communities thus deploying motor king ambulances at health center, clinic and community levels and providing free ambulance services for referrals from the communities or health center levels to the hospitals. Another component has been to establish an emergency communication system to facilitate effective communication between community members and health workers (68). The gains have shown significant improvement in maternal health indicators including reduction of obstetric deaths in that region (13).

The Community-Based Reproductive Health Project (CBRHP) was implemented by CARE-Tanzania in two rural districts to address the high

maternal mortalities in those areas. Emergency transport system and a scheme for retaining village health workers (VHW) were the main components of the intervention. Review of surveillance data demonstrated positive impact in pre-natal indicators in the two districts. Trained village health workers continued to provide education and refer women in their communities for obstetric attention resulting in lowered admissions at the hospital of obstetric complications and deaths (69).

The intervention in Bo district hospital in Sierra Leone by the Prevention of maternal mortality network (PMM) was to improve transport and referral of women with obstetric complications to the hospital. A four wheel drive vehicle was given to the Bo hospital with one each of a motor bike put at 8 primary health units in the project area. Later, radio systems were installed linking the primary health units to the hospital. These strategies were complemented by community educational activities and also improvement in quality of care at the facilities. This resulted in increases in the number of major obstetric complications at Bo hospital with corresponding reductions in fatalities as compared to the pre-intervention period (70).

4.3. Best practices to improve third delay.

In the Northern Region, Liverpool School of Tropical Medicine (LSTM) in collaboration with GHS deployed the Making it Happen project in 2013 in selected districts. Under this projects, doctors, nurses and midwives are trained in life saving skills, M&E and data management skills and new born care. The project also equipped health centers and hospitals in project area with EmOC equipment and Neonatal Intensive Care Units (NICU) centers. This has resulted in an improvement in some of the maternal health indicators in the region (15).

The Ministry of Health in Ghana adopted the Community-based Health Planning and Services (CHPS) programme to place community health officers in deprived and rural areas. This program however stalled because of inadequate funding. The Upper East Region where it was first piloted continued with the programme and that has contributed immensely to the continued improvement of the maternal health indicators in that region (13, 69, 71).

The Optimizing Access to Emergency Care with Mobile Urgent Maternity Service project in Kenya aims at bringing emergency obstetric services closer to women. In doing this the project sorted to station fully equipped and staffed mobile clinics with ambulance to ensure that as many women as possible had access to emergency care where needed. Preliminary reports showed that about 99% of women in the project areas had access

to timely emergency care that reduced further adverse maternal outcomes (72).

Analyzing the above findings reveals that gaps are eminent within the three delays in accessing obstetric care in the northern region of Ghana and herewith follows the discussion and conclusion of the findings.

CHAPTER V: DISCUSSION OF STUDY FINDINGS/RESULTS.

From the earlier findings, an attempt is now made to synthesize the issues identified in the three delays in NR in conformity to the objectives of this thesis. As per the framework by Thaddeus S & Maine, these delays are not independent of each other and therefore this discussion would relate them in some sense for better understanding.

5.1 Socio-economic factors that lead to delay in seeking timely EmOC services in Northern Region.

Evidence from the findings shows that economic status of the woman, the husband or the family and cost were significant socio economic factors for deciding to seek obstetric care during labor and/or emergencies. However, I would like to discuss cost as the central hub around which other factors can revolve. Cost can be defined as any fee that one has to pay or incur for services. In Ghana, as already indicated in the literature, the safe motherhood services are free (35) however, women still incur other major cost in their quest to seeking these services and this came out as barriers in seeking maternal health services during labor and/or complication and could cause delay (33,36,38,46,47). Cost of maternal health care is influenced by various factors. Cost for deciding to seek care is influenced by the socio-economic status of the women and family. Higher socio-economic status which can be determined by the employment, money and resources in the family leads to the ability to pay and afford for the medical, travel and other expenses of the woman (12). Higher socio-economic position could also mean better social networks and support systems for decision making, support and travel assistance. This is opposite to the situation faced by the women and families in Northern region who have poor socio economic status and would think of all the other costs that they have to pay in deciding to seek medical service during labor and/or complication.

Mal-distribution of maternal health services in northern region of Ghana shows inadequate maternal health services for rural areas and more in the cities (45). Rural populations suffer from the unavailability of adequate EmOC especially CEmOC services for severe complications. Use of adequate maternal service would mean travel to the cities which could mean incurring some treatment costs, transport costs, time, lodging costs, loss of wages, and other opportunity costs which may affect the decision to seek care during emergencies.

Cost implications in deciding to seek care during labor and complications could lead to delay in getting to the health facility leading eventually to death or may push a family to seek for TBA services even though they may be aware of risks involved in the emergency (36).

Dealing with the socio economic factors that lead to delay in seeking care during complications may involve measures to alleviate household poverty and empowering women financially.

5.2 Socio-cultural factors that lead to delay in seeking timely EmOC services in Northern Region.

As majority of the population in northern region are Muslims (18), religious values and norms play an important role in deciding to seek care as evidenced in the literature. The conservative norms of Islam for women and the limitations of openness to another person beside ones husband can also lead the women and family to a decision of not seeking medical care. Most of the time the health facilities may not offer adequate privacy and confidentiality for patients, which in turn can trigger a decision for delivery at home or resort to using TBA services.

The traditions and rituals associated with pregnancy and delivery also play a major role in delaying the decision to seek medical care. The socio cultural norm and pressure on women who resort to facility delivery leaves them with no option than to opt for home delivery even in emergency situations. This social stigma in the use of health facility during delivery could be an influencing factor that would superimpose itself on other accessibility and affordability factors in seeking maternal health services. Value of delivery at the husband's house and assistance by TBA or a family member may lead the women to suffer the complications and by the time they get to the health facility, it might be too late.

Dependency on religious leaders, spouses or other family members for major decisions in health seeking is a common practice during labor or complication. Women in northern region of Ghana do not enjoy much decision making power as they are subdued to decisions of husbands, in laws and other senior women in the family or society (39, 40). Women if they are not the earning member of the family, have no say in decisions which involve financial costs. Women who have to go to the health facility during labor in the absence of the husband may have to wait till the man returns or resort to using TBAs even during emergencies and the resultant outcome could be unfavorable.

Measures that involve health education and promotion (BCC) campaigns using the community structures and preferably a prominent member of the community (the chief or opinion leaders) for husbands, in-laws and other family relatives to see pregnancy as a condition needing medical attention and not related to gods, culture or traditions might help mitigate socio-cultural factors leading to decision in seeking care during obstetric complications. However, the effectiveness of this area has not been researched.

5.3 Geographical accessibility factors that lead to delay in seeking EmOC services in Northern Region.

The findings showed that distance/travel time, transport availability, nature of road and distribution of facilities were seen to be associated with the second delay in Northern Region.

The distantly located maternal health facilities and services make it difficult for women and family to opt for it considering the vastness of the region. The distance and the time involved in traveling may have its repercussions on women in getting to the health facility timely after a woman has decided to seek care. During emergencies, getting to a health facility after 3 to 5 or more hours can seem like an eternity. Long distances and time during labor can build travel stress and lead to delays leading to maternal complications as confirmed by a similar study in Myanmar (41). This in turn can negatively influence the decision to not seek help from a health facility and can strengthen even the first delay.

Travelling long distance to seek care during emergencies could further be aggravated by the poor and inadequate transport facilities including ambulatory services in the region and also the geographical distribution of maternal health services. Limited number of public transport facilities coupled with poor road network in most rural areas in the region could lead to devastating outcomes even if the woman comes out early to get to the health facility. Financial barriers and support to get a private car or taxi to reach the health facility however may push women to opt for other means of travel like walking, cycling, bikes or donkey carts which would take so much of time and energy to get to the health facility causing delays. Challenge also emanates if the person needs to be referred to higher health facility like a hospital. The rural health posts and health centers struggle with availability of ambulatory services and also the financial challenges for the women to pay for the ambulatory services. This inability to reach the desired health facility timely has resulted in women dying in vehicles or immediately after they got to the health facility (51).

Geographical accessibility factors in the literature are factors that women and their families can do relatively little to influence. Any measure to mitigate it therefore might be geared at moving the maternal health services closer to pregnant women or moving the pregnant women towards these services.

5.4 Health system factors that lead to delay in accessing EmOC services in Northern Region.

The findings showed that inadequate competent and skilled health staff, inadequate services, equipment and supplies, poor staff attitude and

finally lack of privacy, confidentiality and inadequate infrastructure are factors that affect quality of care and could lead to the third delay in early treatment of obstetric complications. Deciding to seek help in emergency situations and reaching the health facility alone cannot guarantee a safe delivery. Woman may have to wait for several hours to be attended to or transferred to higher level facilities. The waiting time at the health services during emergencies may occurs due to inadequate number of skilled staff, services, equipment and supplies. There are inadequate numbers of midwives in the Northern region and the few that are there are posted to the urban areas. The same is for the doctors and nurses required in the health facilities (73). As already identified in the findings, the inadequacies of health staff in health facilities are further aggravated in health facilities where there are no female doctors/health providers. Per the conservative norms of Islam, where a woman's private part is the sole preserve of the husband, women may avoid coming there for delivery or even in emergencies. Chances are that mothers will decide to travel far distances to health facilities that have women as health care providers or resort to using the TBAs and the end result might be unfavorably fatalistic.

Also, the health worker's desire to working in urban areas because of better social amenities like electricity, good water and education for their children make the rural health facilities suffer from lack of skilled health professionals where the majority of the population in the region dwells. In situations of emergencies the unskilled health staff in these areas will have to use trial and error skills and by the time they decide to send the patient to the next level, it is too late and could lead to death.

Urban areas though may seem to be luring the health workers, impose another challenge for the health workers. Limited number of even skilled staff in a busy health facility with inadequate infrastructure having patients coming in from all parts of the region may lead to over burdening of health equipment, for example delivery beds. Inadequate staff managing more patients could lead to overburdened staff that could lead to burnout and stress. This often could be shown in the unfriendly attitude and violating of privacy and confidentiality shown towards patients. A patient experiencing this at a facility could be influenced in their decision not to prefer facility delivery next time even in cases of emergencies leading to fatalistic outcomes.

Findings also brought out inadequate services, equipment and supplies required in emergency situations in the Northern Region (20, 55, 57, 58). As already outlined in the finding, the required recommendation by WHO to ensure readiness of health facilities in developing countries to manage safe delivery including complication is one CEmOC facility (hospital) and four BEmOC facilities (health centers) for every 500,000 population (53). This benchmark was found not being reached by far in northern region.

This could mean that women who come to facilities without these services would have to be managed with whatever is available that could lead to infections or other complications or may have to be referred to higher facilities and because of financial, transport and other constraints would lead to delay in getting to the higher facilities. Higher facilities may also lack some supplies like blood or may have to wait for the one doctor who is out of town to come and perform a C/S ending up in unfavorable outcomes. It should however be mentioned here that having all infrastructures - physical, medical, supplies is not a necessary condition for utilization of health services. As discussed earlier inadequate number of staff, poor staff skills and attitude, motivation to work and many other factors may lead to nonuse of health facilities, and therefore must be improved to ensure usage. Achieving a perfect balance might be necessary in the context of northern region to address the delay in accessing quality services in case of maternal emergencies.

Mitigating Health system factors that would lead to delay in timely treatment of obstetric complications might be measures to improve Quality of care including in-service training in customer care skills and provision of BEmOC services in health centers/post and CEmOC services in hospitals.

5.5 Best practices that are applicable in Northern Region to reduce Maternal Mortality.

This section discusses the best interventions that could be adapted for the context on northern region of Ghana per the findings. These interventions to discuss will be the ones that when implemented would be able to tackle more than one delay factor identified in the findings.

The Organization Savannah Signatures with funding from STAR-Ghana implemented the Technology for maternal health project (T4MH) in four districts in the northern region that had recorded higher maternal mortalities. This intervention had strategies that would improve all the three delays of maternal mortalities as also evidenced by the similar projects in the Upper East region of Ghana and Malawi (64, 65). The package of knowledge sharing during ANC sessions and also the periodic health information messages in local languages given to pregnant women about danger signs, when to attend ANC sessions using the mobile phone technology, demystified some of the cultural, religious and traditional beliefs of the women, husbands and in-laws who had a major say in deciding the health seeking behavior of the pregnant woman in the family. Pregnant women (or their husbands- in cases that the mobile phone belonged to the husband) in this project had the opportunity to send text message or call a toll free line during emergency situations for early evacuation to the hospital with the hospital ambulance or an alternative arrangement for transport made available for them. The

burden of cost, transport availability, distances was a non-issue for most of the women. The health care providers (nurses/midwives/doctors) were also trained in life saving (LSS) and interpersonal relationship skills and hospitals were equipped with some supplies and equipment. Expectant mothers therefore felt at home any time they visited the health facility as per the evaluation report revealed. This project has been implemented in four districts of the region and results showed improvements in maternal health indicators especially reduction in maternal deaths in these districts. Mobile phones technology and use has increased in the region. One could argue that there is at least one mobile phone in every household or a close household in every village in northern region. With directive of the GHS to increase quality of care, GHS/MOH with support from stakeholders including the private sector could harness funds from donor organizations or the DA common fund to scale up these strategies gradually till all the 26 districts in the region are covered. It is however imperative that community involvement should be key in these processes to ensure community ownership and sustainability.

In West Wollega in the Oromia region in Ethiopia, the Organization Maternal Worldwide, with the award of big lottery fund grant, implemented the integrated maternal health program purposely to decrease maternal mortality using the three delay model as a framework for their project structuring. With their community health educational and promotional programs; and also inculcating into the women the aspect of rights to their sexuality and health had the tendency of creating awareness for communities especially women to accept facility deliveries and report early to health facility in cases of emergencies and made women to appreciate birth preparedness as part of safe delivery practice. Women also practiced safe sex and decided with the support of their husbands when to have sex and give birth. Poverty may have a lot of influence on most maternal health outcomes in developing countries. Empowering households especially women economically might reduce a lot of these burdens including maternal deaths. The safe birth fund and also forming income generation groups to help women set up their own businesses was one aspect of the project that would curtail the burden of every kind of cost incurred by women during emergencies and this could prevent delay in deciding to seek care, accessing health facility and early treatment when they get to the health facility. The northern region of Ghana is believed to be the second poorest region in the country with majority being rural dwellers (17, 18). Villages already have mother to mother and father to father support groups where some sort of pool funding already exists in most communities. The GHS, NR in collaboration with community leaders (chiefs) could build on the already existing structures to serve as small loan facilities for women who would want to be involved in some form of income generating activity to support them financially. It is however important to ensure that commitment and transparency of the community members especially the leaders in

mobilizing funds is assured to ensure sustainability in the NR context. Community health nurses in the region already go for monthly CWC sessions in villages where immunization, health educational and promotional messages are given to women, nursing mothers and expectant mothers. The Regional health promotion unit could develop a comprehensive health promotional package to include prevention of maternal morbidities and mortality and women sexual reproductive health rights. With commitment and support from stakeholders (Government, Health sector, NGO/CBO, private sector and community leaders) including ensuring effective supervision and monitoring, this system might suit the northern region context.

The CHPS strategy with support from the Navrongo Research Center, has been continued by the Regional Health Directorate, Upper East region after it came to a standstill in most regions in the country after its adoption in 2000. This is a system that mobilizes community support and leadership, decision making and logistics in a defined area known as "Zone – (with population not exceeding 5000 people)" and a reoriented Community Health Officer (CHO) (with basic midwifery skills) is deployed to offer basic curative and preventive care. An infrastructure (building) known as a CHPS compound is constructed most time with the help of the local District assembly (DA). This has led to early identification of danger signs, prompt referrals of complications, increase in ANC services and other maternal health outcomes including maternal deaths in Upper East Region (13). Settlements and health facilities are far apart. Demarcating districts into zones and building a CHPS compound within every 5000 population might go a long way to reduce travel time, travel cost barriers, improve referrals and may build a sense of trust in the health system by the rural populace since most of the process in the CHPS concept is community driven. Above all it may improve equity in accessing basic health services by the rural dweller during complications. With increases in enrolment of students into the health training institutions, deploying health staff might not be a problem now since majority of them sign bonds with the MOH to serve in which ever location they are posted to after training. It may even go a long way to encourage redistribution of staff in the whole region since majority of the staff are stationed in the urban areas. To make this work in the northern region might require more government and political will, commitment and dedication from GHS/NR and finally community support and leadership to ensure sustainability. Community mobilization and participation is prominent in the CHPS concept however this may have to be active since religious, cultural and traditional idiosyncrasies appear to be huge in the region. The involvement of NGOs/CBOs and the private sector are equally important to harness for successful implementation and sustainability.

*The adopted three delay model conceptual framework by **Thaddeus S & Maine, 1994** for the literature review, though focuses on onset of emergencies to outcome, has been effective in analyzing the socio economic, socio cultural, accessibility and health system related factors that influence the occurrence of maternal deaths in NR.*

CHAPTER VI: CONCLUSION/RECOMMENDATION.

6.1. Conclusion

Mothers in Northern region continue to die from preventable pregnancy and childbirth related complications. The IMMR for the region, which is still distant from the MDG5 target stands at 194/100,000LB and this is a challenge. Maternal deaths are not only due to medical cause but equally due to other underlying social determinants causing delays in getting proper treatment for an emergency that eventually lead to death. This study therefore sorts to basically examine the influencing factors for the occurrence of maternal mortality in the region, using the three delays as a framework.

From the forgoing review it is realized that low economic status of women, spouse or household, the cost and socio-cultural including religious influences stand out as the first delay factors influencing the occurrence of MM in the northern region of Ghana. The cost of health services and other associated cost pose as an influencing factor in deciding to seek care during labor and/or complication. However, if the socio- economic status of the woman, the spouse or household is high, cost may not be considered as a barrier. Clearly shown also is that the pressure of culture, religion and tradition leave women with no choice than to opt for either home delivery or TBAs and sometimes the outcome turns out to be unfavorable.

For the second delay, distance/travel time, transport availability, nature of road/terrain and distribution of health facilities stand out as factors that influence the occurrence of MM in NR of Ghana. Settlements in the region are scattered making travel time between them tiresome and unthinkable. This is further worsened by the bad nature of the road coupled with unavailability of transport during labor or complication in the communities and the health facilities. Health facilities equally seem to be mal-distributed because of the dilemma between urban population and rural population. All these factors put together negatively influence women from reaching a health facility or deciding to seek maternal health services during labor or complication and the resultant outcome is always fatalistic.

The delay three factors related to quality of care issues which this study identifies in NR are inadequately competent and skilled staff, inadequate services, equipment and supplies, poor staff attitude and lack of privacy, confidentiality and limited infrastructure. The shortages of skilled and competent staff especially in the rural areas where majority of the populace in the region dwell aggravated by lack of equipment, services and supplies especially EmOC services may results in delays in referral to higher facilities which may sometimes result in deaths. Due to the

inadequacies in health workforce, staff is overwhelmed by increasing numbers of clients. This might result in unfriendly attitude of some staff towards clients due to stress which could have a tow on the client's future decision to opt for home or TBA delivery or even in the case of emergencies which could result in fatalities.

On the best practices for intervention, the study found several, however for the case of northern region an intervention that should have an influence on two or more of the delays would have an impact considering the large nature of the region. In the light of this, the review found that behavior change communication campaigns at CWC sessions for women, husbands, in-laws etc., knowledge sharing during ANC sessions coupled with the use of the mobile phone technology, with free access to emergency transport might help reduce a lot of the delays during labor and emergencies. An intervention that may empower women economically should not be downplayed either. Also, moving the maternal health services including BEmOC and CEmOC services closer to women in the form of building CHPS compound in communities and training the staff on LSS and customer relation skills might go a long way to remove acceptability and accessibility barriers which may reduce delays during labor and complications. All these interventions however at a point in time would require government and political will, commitment from GHS, NGO/CBO, private sector and finally community support and leadership to ensure sustainability.

The findings of this thesis serve as evidence in the NR of Ghana as factors influencing the occurrence of MM. Policy makers, senior health managers and program officers can consider the findings of this thesis when making major decisions on MM in the region, however, it should be stated that an innovative action research is needed to confirm some of the findings.

6.2. Recommendations

Based on the findings of this thesis, the following recommendations would be appropriate:

Ministry of Health:

- Scale up the CHPS strategy to bridge the long distances between facilities and communities. Staff deployed to these compounds should be trained in midwifery and lifesaving skills and provided with at least BEmOC services.
- Inclusion of ambulatory services in the benefit package of the NHIS for all maternal health outcomes.

Ghana Health Service:

- Enforce equitable distribution of qualified health workers especially midwives and doctors to all regions.
- Procure and equitably distribute essential services, equipment and logistics to all regions especially those related BEmOC and CEmOC services and equipment.
- Incorporate customer care skills training in the in-service training curriculum for health staff.
- Institute incentive packages to attract and retain qualified midwives in the rural areas. It could include further studies for midwives after they have served in rural areas for some specified number of years.

Northern Regional Health Directorate:

- Regular monitoring and supervision of districts and facilities to ensure compliance to maternal health policies, interventions and targets.

District Health Directorates of Northern Region:

- Adopt the technology for maternal health project intervention. The strategies enable the districts to reach out to pregnant women, their husbands and other relatives with effective messages surrounding pregnancies and its related complications. These messages equally demystify the cultural, religious and traditional beliefs regarding pregnancy. DHMTs could lobby DAs for common fund to support in the implementation especially related to payment for the massaging, training of the health staff in LSS, and furnishing of the health facilities with BEmOC and CEmOC services. DHMTs could also apply to national and international funding agencies for support. DHMTs should recognize community involvement from the inception of the project and throughout the project life cycle to ensure ownership and sustainability.

Community:

- Form income generating groups out of that some should be allocated for maternal health issues especially during obstetric emergencies.

Further Research.

- A qualitative research to find out the role of traditional/community leaders in educating women about pregnancy and its related complications in the northern region.

6.3. Limitations of this Study:

This this is a product of reviewing and analyzing published and unpublished literature. In order to understand the problem and analyze the associated factors primary data collection would have been more effective compared to the literature review. The literature review for the thesis relies on data that may not be representative of the current situation. There is possibility of outdated information as the health care is dynamic and adapts new policies and plans in the process. In addition, there were some studies relating to some factors that was not done in the Northern Region, so other regions or outside Ghana were used which may not be comparable to the NR context. Finally it was not possible to do primary data collection due to time constraints.

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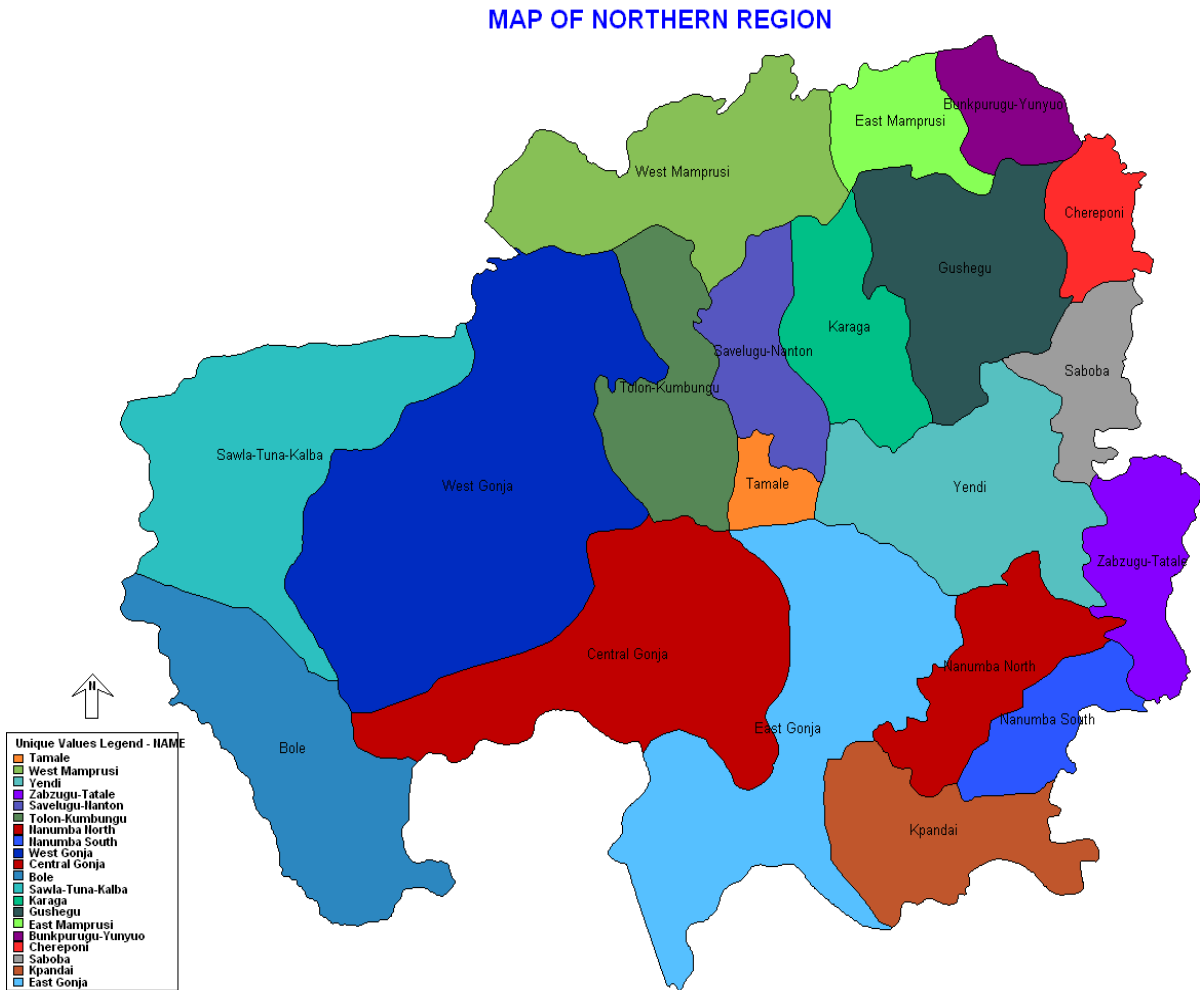
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Appendix 1. Map of Northern Region of Ghana showing administrative boundaries.



Appendix 2. The Original six Emergency Obstetric Care Indicators, with Modifications.

Indicator	Acceptable level
1. Availability of emergency obstetric care: basic and comprehensive care facilities	There are at least five emergency obstetric care facilities (including at least one comprehensive facility) for every 500 000 population
2. Geographical distribution of emergency obstetric care facilities	All subnational areas have at least five emergency obstetric care facilities (including at least one comprehensive facility) for every 500 000 population
3. Proportion of all births in emergency obstetric care facilities ^a	(Minimum acceptable level to be set locally)
4. Meeting the need for emergency obstetric care: proportion of women with major direct obstetric complications who are treated in such facilities ^a	100% of women estimated to have major direct obstetric complications ^b are treated in emergency obstetric care facilities
5. Caesarean sections as a proportion of all births ^a	The estimated proportion of births by caesarean section in the population is not less than 5% or more than 15% ^c
6. Direct obstetric case fatality rate ^a	The case fatality rate among women with direct obstetric complications in emergency obstetric care facilities is less than 1%

The New Added indicators for Emergency Obstetric Care

Indicator	Acceptable level
7. Intrapartum and very early neonatal death rate	Standards to be determined
8. Proportion of maternal deaths due to indirect causes in emergency obstetric care facilities	No standard can be set

Appendix 3. Signal functions use to identify Basic and Comprehensive EmOC services

Basic services	Comprehensive services
(1) Administer parenteral ¹ antibiotics	Perform signal functions 1–7, plus:
(2) Administer uterotonic drugs (i.e., parenteral oxytocin ²)	(8) Perform surgery (e.g., caesarean section)
(3) Administer parenteral anticonvulsants for pre-eclampsia and eclampsia (i.e., magnesium sulfate).	(9) Perform blood transfusion
(4) Manually remove the placenta	
(5) Remove retained products (e.g. manual vacuum extraction, dilation and curettage)	
(6) Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)	
(7) Perform basic neonatal resuscitation (e.g., with bag and mask)	
<p>A basic emergency obstetric care facility is one in which all functions 1–7 are performed. A comprehensive emergency obstetric care facility is one in which all functions 1–9 are performed.</p>	

Appendix 4. Operational Definitions of Major Obstetric complications.

<p>Haemorrhage</p> <p>Antepartum</p> <ul style="list-style-type: none">• severe bleeding before and during labour: placenta praevia, placental abruption <p>Postpartum (any of the following)</p> <ul style="list-style-type: none">• bleeding that requires treatment (e.g. provision of intravenous fluids, uterotonic drugs or blood)• retained placenta• severe bleeding from lacerations (vaginal or cervical)• vaginal bleeding in excess of 500 ml after childbirth• more than one pad soaked in blood in 5 minutes
<p>Prolonged or obstructed labour (dystocia, abnormal labour) (any of the following)</p> <ul style="list-style-type: none">• prolonged established first stage of labour (> 12 h)• prolonged second stage of labour (> 1 h)• cephalo-pelvic disproportion, including scarred uterus• malpresentation: transverse, brow or face presentation
<p>Postpartum sepsis</p> <ul style="list-style-type: none">• A temperature of 38 °C or higher more than 24 h after delivery (with at least two readings, as labour alone can cause some fever) and any one of the following signs and symptoms: lower abdominal pain, purulent, offensive vaginal discharge (lochia), tender uterus, uterus not well contracted, history of heavy vaginal bleeding (Rule out malaria.)
<p>Complications of abortion (spontaneous or induced)</p> <ul style="list-style-type: none">• haemorrhage due to abortion which requires resuscitation with intravenous fluids, blood transfusion or uterotonics• sepsis due to abortion (including perforation and pelvic abscess)
<p>Severe pre-eclampsia and eclampsia</p> <ul style="list-style-type: none">• Severe pre-eclampsia: Diastolic blood pressure \geq 110 mm Hg or proteinuria \geq 3 after 20 weeks' gestation. Various signs and symptoms: headache, hyperflexia, blurred vision, oliguria, epigastric pain, pulmonary oedema• Eclampsia• Convulsions; diastolic blood pressure \geq 90 mm Hg after 20 weeks' gestation or proteinuria \geq 2. Signs and symptoms of severe pre-eclampsia may be present
<p>Ectopic pregnancy</p> <ul style="list-style-type: none">• Internal bleeding from a pregnancy outside the uterus; lower abdominal pain and shock possible from internal bleeding; delayed menses or positive pregnancy test
<p>Ruptured uterus</p> <ul style="list-style-type: none">• Uterine rupture with a history of prolonged or obstructed labour when uterine contractions suddenly stopped. Painful abdomen (pain may decrease after rupture of uterus). Patient may be in shock from internal or vaginal bleeding

Appendix 5. Signal functions and Related Complications.

Major obstetric complication	Signal function
Haemorrhage	<p><i>Antepartum:</i></p> <ul style="list-style-type: none"> Perform blood transfusion Perform surgery (e.g., caesarean section for placenta praevia) <p><i>Postpartum:</i></p> <ul style="list-style-type: none"> Administer uterotonic drugs Perform blood transfusion Perform manual removal of placenta Perform removal of retained products Perform surgery (hysterectomy) for uterine rupture
Prolonged or obstructed labour	<ul style="list-style-type: none"> Perform assisted vaginal delivery Perform surgery (caesarean section) Administer uterotonic drugs Perform neonatal resuscitation
Postpartum sepsis	<ul style="list-style-type: none"> Administer parenteral antibiotics Remove retained products Perform surgery for pelvic abscess
Complications of abortion	<p><i>For haemorrhage:</i></p> <ul style="list-style-type: none"> Perform blood transfusion Remove retained products <p><i>For sepsis:</i></p> <ul style="list-style-type: none"> Administer parenteral antibiotics Remove retained products <p><i>For intra-abdominal injury:</i></p> <ul style="list-style-type: none"> Administer parenteral antibiotics Perform blood transfusion Perform surgery
Pre-eclampsia or eclampsia	<ul style="list-style-type: none"> Administer parenteral anticonvulsants Perform neonatal resuscitation Perform surgery (caesarean section)
Ectopic pregnancy	<ul style="list-style-type: none"> Perform surgery Perform blood transfusion
Ruptured uterus	<ul style="list-style-type: none"> Perform surgery Perform blood transfusion Administer parenteral antibiotics
Newborn distress (intrapartum)	<ul style="list-style-type: none"> Perform newborn resuscitation Perform surgery (caesarean section)