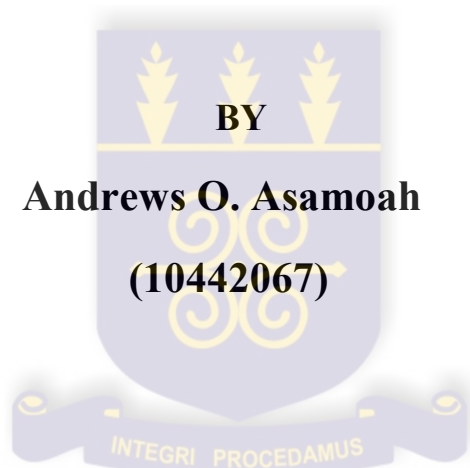


# UNIVERSITY OF GHANA

**Maternal Mortality Audit, a tool to identify the causes of maternal mortality with communities' perspective, a case study of Nsawam-Adoagyiri Municipality**



**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MA DEVELOPMENT STUDIES DEGREE.**

**DECEMBER 2014**

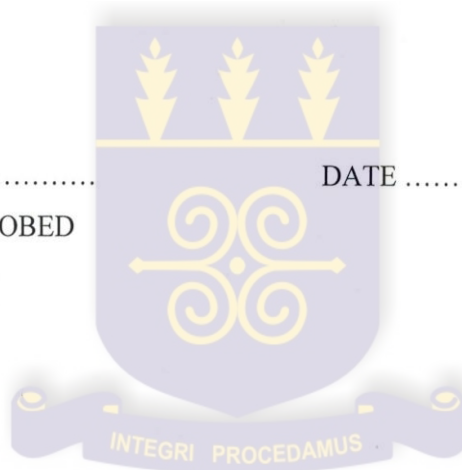
## DECLARATION

I, **Asamoah Andrews Obed**, hereby declare that except for references to other people's work which have been duly acknowledged, this thesis is the result of my own research carried out at the Institute of Statistical, Social and Economic Research (ISSER), University of Ghana under the supervision of Dr. Patricia Aidam (ISSER).

This thesis has neither in whole nor in part been presented for another degree.

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DATE .....

## DEDICATION

This work is dedicated to the Almighty God for making it possible for me to successfully complete this study and then to my family, Mrs. Rita Asamoah, Papa Kwabena Danso Asamoah and Nana Akwaboah Nyansah Asamoah for their support and encouragement throughout this period. I made it because of you.



## ACKNOWLEDGEMENTS

The most difficult tasks of any grateful person is finding the most appropriate way and words to express his/her candid appreciation and feeling about persons who have made him/her what he/she is. This is exactly what I feel about the people who have contributed to the completion of this research. First, I am highly thankful to God for giving me wisdom, good health, favour and guidance to develop and complete this dissertation.

I wish to take this opportunity to express my sincere appreciation to my supervisor, Dr. Patricia Aidam for her encouragement, concrete suggestions, critical guidance, corrections and show of concern. I also appreciate her valuable hours spent on me because of this work. May God bless her and replenish in hundred fold whatever she's lost on me.

I am also grateful to my wife and children for their support at all times. To my mother (Elizabeth Ofori) and siblings (Ophelia Adjei and Ebenezer Asamoah), I say God bless you for your prayers and encouragement. To Catholic Relief Services, I am highly indebted to you, both management and staff for your support to make this a reality. I further acknowledge the advice of other lecturers at Institute of Statistical, Social and Economic Research (ISSER) and the supporting staff for typing various introductory letters needed for data collection.

I would also like to acknowledge the support of Prince Gyamfi who opted to proof read the paper at all times. Special thanks to Nsawam Health Directorate especially Mrs. Bridget Desewu and Mrs Christiana Obeng for facilitating the data collection process. Finally, to all ISSER MA 2013/2014 students, I am very grateful for cooperation and support.

To you all I say thank you and may God bless you all.

## ABSTRACT

As the world gradually enters the last stage of MDGs target, concerns are raised with countries lacking the achievement of MDGs 5 on maternal mortality. In the 2010 Ghana Population and Housing Census, it is indicated that 33,347 women died in the last 12 months preceding the census. Out of the number, 3,026 are recorded as pregnancy-related deaths (i.e. died during pregnancy, delivery or within 42 days of the termination of a pregnancy - GSS, 2012). Since the development of the MDG 5, considerable progress has been made by some countries while others remain stagnated. However, challenge still remains on measurement of maternal mortality, including number of deaths, their causes and circumstances in low-income countries. One of the best strategies and cost effective way of addressing maternal mortality is the use of maternal audit tool to identify the root cause of maternal mortality.

This study therefore aimed at identifying the main causes of maternal mortality in the Nsawam-Adoagyiri District and how maternal death audit together with community assessment brings out these causes. Moreover, the study also reviewed the various approaches adopted by the district in addressing the causes of maternal mortality. The study used both quantitative and qualitative analyses in drawing conclusions on findings from the field. Both primary and secondary data were collected for analysis. The study used both simple random and purposive sampling technique to sample community members, institutions including Health Directorate, Nsawam Hospital, and some health facilities in the district. A total of 125 community women were interviewed at the community. Additionally, two FGDs were conducted for 10 community members (five in each community) and 8 health staff interviewed.

The study observed that maternal mortality data was only available for district hospital. The health directorate had no record of community-level maternal death. However, with a follow up to the community, it was observed that three maternal deaths had occurred at the community level. For the period under review in this research, seven facility-based maternal deaths were recorded with 20020 live births. This comes to confirm the challenges that come with analysing maternal death trends in the country. The recorded seven maternal deaths give an institutional maternal mortality rate of 35 deaths per 100000 live births for the period under the review.

The study established a positive relationship between maternal audit and causes of maternal death. Through the various maternal audits conducted by the district health directorate, it was observed that the leading direct causes of maternal mortality are eclampsia, haemorrhage and obstructed labour. The indirect cause of maternal mortality was identified to be anaemia. It is therefore important to note that any strategy that addresses maternal mortality should consider providing comprehensive education on maternal care including nutrition. To ascertain the causes of maternal mortality a maternal audit team is established to collect data on three different contributing factors: technical, managerial and others (not limited to socio-cultural factors). Strategies adopted to curb any further cause of maternal mortality include emergency community transport system, community awareness campaigns and community outreach health care delivery.

The study therefore recommends that the Nsawam-Adoagyiri Health Directorate through the Public Health Unit should strengthen its structures on the ground to be able to report all maternal death cases in the community. Additionally, the audit process should include community members and deceased's relatives to help establish the socio-cultural causes of maternal death.

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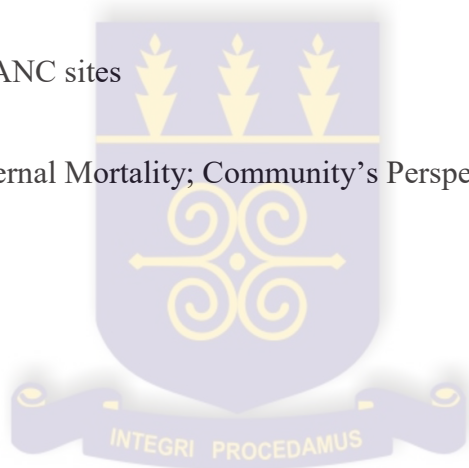
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## LIST OF ABBREVIATIONS

ANC	Antenatal Care
CHPS	Community Health and Planning Services
CHAG	Christian Health Association of Ghana
DDNS	Deputy Director of Nursing Service
GHS	Ghana Health Service
GSS	Ghana Statistical Service
ICD	International Statistical Classification of Disease
LTR	Life Time Risk of Maternal Deaths
MDA	Maternal Death Audit
MDG	Millennium Development Goal
MDSR	Maternal Death Surveillance and Response System
MMR	Maternal Mortality Rate
MNCH	Maternal and Neonatal Health Care
MoH	Ministry of Health
PH	Public Health
RCA	Root Cause Analysis
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organization

## CHAPTER ONE

### GENERAL INTRODUCTION

#### 1.0 Background

Pregnancy is one physiological condition that differentiates a man from a woman and leads to the procreation of young ones. Pregnancy is an experience of growth, change, enrichment and challenge (Eden. 2014). During the 40 weeks of pregnancy, the expectant mother will go through several physical and emotional changes (Eden, 2014). Forthcoming parenthood causes psychological changes in both the expectant mother and father. Physical stress, hormonal changes, coping with a changing body shape, and yet going about in life and performing daily living, attending to the needs of family all together may affect the equilibrium of the would-be-mother (Peter, 2007). Some of these changes when occur with age, gravid parity status, socio-economic factors and genetics may affect the woman and may even lead to death (maternal death/mortality) when not managed well (Mensah, 2008). The death of a mother, especially during pregnancy, is a calamity for the family, community and society at large, something that has been long accepted by all societies (Mensah, 2008).

The World Health Organization (WHO) defines maternal mortality as “the death of a woman while pregnant or within 42 days of termination of pregnancy or from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes, indirect or incidental” (Global Health Watch 3, 2011; pg 124) . The number of maternal deaths is high. An estimated 500,000 women die each year in pregnancy and childbirth (WHO, 2007). In the 2010 Ghana Population and Housing Census, it is indicated that 33,347 women died in the

last 12 months preceding the census. Out of the number, 3,026 are recorded as pregnancy-related deaths (i.e. died during pregnancy, delivery or within 42 days of the termination of a pregnancy - GSS, 2012). An estimated 10 million more women suffer serious maternal morbidities – condition outside of normal pregnancy, labour, and childbirth that negatively affects a woman’s health during those times (Orshan, 2008) – including devastating conditions such as uterine prolapses and obstetric fistulae (Hunt, 2007). Maternal mortality remains a major Public Health challenge despite numerous strategies devised by the international community to curb it. Globally, maternal mortality is the leading cause of death among females aged 15 – 49 years (UN, 2009). More than 1500 women die each day from pregnancy related causes resulting in an estimated 550,000 maternal deaths annually (UN, 2009). To respond to these challenges of maternal mortality, the Millennium Development Goal 5 – improving maternal health with a target of reducing the maternal mortality ratio (MMR) by three-fourth and achieving universal access to reproductive health care by 2015 – was developed.

Since the development of the MDG 5, considerable progress has been made by some countries while others remain stagnated. According to the 2010 WHO/UNICEF/UNFPA/World Bank report on global, regional, and country maternal mortality ratio estimates, while some countries have made substantial progress, others, mainly in sub-Saharan Africa (Chad, Zimbabwe) have made insufficient progress or none at all. Although Ghana has achieved progress in the past 10 years of MDG implementation, challenges of inequalities, geographical disparities and sustaining progress still remain (ISSER, 2013). The maternal mortality rate (MMR) as captured by both survey and institutional data has shown an improvement over the past 20 years. However, the rate of progress has been very slow. Between 1990 and 2005, MMR reduced from 740 to 503 per

100,000 live births and then to 451 deaths per 100,000 live births in 2008 (GHS, 2009). This trend is also supported by institutional data which suggest that maternal deaths per 100,000 live births have declined from 224 per 100,000 in 2007 to 201 per 100,000 live births in 2008, after an increase from 187/100,000 in 2004 to 197 per 100,000 in 2006 (Ministry of Health, 2008).. According to a report by Maternal Mortality Estimates Inter-Agency Group (MMEIG) of United Nations, Ghana's MMR increased from 201 in 2008 to 380 deaths per 100 000 live births (United Nations, 2014). The report further estimates that about 3,100 women died from pregnancy related complications between January and December 2013 (United Nations, 2014). With this trend, it is extremely difficult to achieve the MDG target of 185 per 100,000 by 2015. The issue of institutional data on maternal death has always been limited. However, one major way of reducing MMR is clearly identifying the root cause of maternal mortality. This research therefore assesses the importance of the maternal audit to identify maternal mortality causes.

## **1.1 Problem Statement**

In September 2010, the Secretary-General of the United Nations launched the Global Strategy for Women's and Children's Health, focusing on the 49 lowest-income countries where maternal and child mortality rates are highest (United Nations, 2010). The Commission on Information and Accountability for Women's and Children's Health, established in the wake of that report, stressed the lack of reliable data to monitor progress and also flagged issues concerning the quality of care. The Commission's ten recommendations, announced in September 2011, focused on strengthening country and global accountability (WHO, 2011). The Commission urged countries to improve their health information systems, take significant steps to develop civil

registration and vital statistics systems, and introduce innovative methods to count all maternal deaths and to review and better monitor progress.

Maternal mortality measurement, including numbers of deaths, their causes and circumstances, remains a challenge in low-income countries (AbouZahr, 2011). Only two of the 49 lowest income countries have functional civil registration and vital statistics systems, the preferred source of data for counting deaths (Health Metrics Network and WHO, 2011). In the absence of such systems, alternative methods used to collect retrospective data on maternal mortality include census (recent deaths in the household), household surveys (sibling survival history) and special studies. The uncertainty of statistics derived using these methods tend to be very large. Furthermore, the data refer to the past are generally not available at the sub-national level, making them unsuitable for proactive response, planning or resource allocation.

Ghana's MMR continues to be unacceptably high despite efforts made in an attempt to meet MDG 5. The Ministry of Health has been called on by all stakeholders to treat maternal mortality as a national emergency. Estimation of Maternal Mortality Ratio in Ghana varies widely by source and method of estimation (Zakaria, 2006). Figures from the WHO, UNICEF and UNFPA for Ghana indicate 740 maternal deaths in 1990, 590 in 1995, 540 in 2000 and 560 in 2005 per 100 000 live births (WHO: World Health Statistics, 2009).

At the regional level, the disparities are much wider. The MMR ranges from 355 deaths per 100,000 in Greater Accra Region to 802 deaths per 100,000 in Upper West Region. Closely following the Upper West Region is Volta Region which stands at 701 deaths per 100,000. The third on the list is the Eastern Region which also stands at 531 deaths per 100,000 (Ghana Statistical Service, 2013).

Country strategies have been developed in addressing these increasing rates of maternal death. Missing in these strategies is clear measures to identify the root cause of maternal death. Even in countries with adequate civil registration systems, special studies have revealed that about 50 percent of maternal deaths go unreported due to misclassification (WHO, 2010). In most countries with high maternal mortality, health facility records are usually deficient. The causes of some maternal deaths in obstetric registers are ill-defined, which makes it difficult to compile the causes of maternal deaths. An accurate and complete strategic framework for addressing maternal death depends on the precise identification of the cause of maternal deaths that occur at health facilities. Again, missing in the maternal death assessment is the community based maternal death whose root causes are normally missing. Most often than not, facility-based data is used in analysing the trend of maternal mortality in a district or country. However, there are a number of maternal death cases that occur in the community whose root cause is unknown.

## **1.2 Objectives of the Research**

The research is focused on how maternal death/mortality audit (both at facility based and at the community level) identifies different causes of and contributing factors to maternal deaths.

Some of the specific research objectives include:

- To identify operational issues and potential solutions to conducting maternal death audits at the facility and community levels
- Identify the main causes of and the delays leading to maternal death
- To review the various approaches adopted in addressing the causes of maternal mortality in the municipality

Recommendations towards an improved maternal death audit and strategies in addressing community level maternal death are provided at the end of the discussions.

### **1.3 Research Questions**

The main research questions that are addressed in order to answer the research problems are:

- Are there well-structured tools for maternal death audit?
- How often are maternal death audit conducted and what data is collected?
- What are the main causes of maternal deaths both at the facility and community levels?
- Who constitutes maternal death audit team, if any?
- What are the measures adopted by the facility to address maternal mortality?

### **1.4 Research Hypothesis**

Ahiadeke (2008) explains that research relies mainly on a hypothesis and that hypothesis attempts to show the causal relationships between concepts. This research seeks to establish the relationship between maternal data audit and identification of causes of maternal mortality. The research is therefore based on the assumption that:

- there is a positive relationship between maternal death audit and causes of maternal mortality
- community level assessment identifies the causes of maternal mortality to confirm the observations made at the facility level

### **1.5 Limitation of the Study**

The study suffered data collection challenge from the community level. Some of the respondents were not willing to discuss issues of maternal death as some felt it might bring out some emotional sentiments especially those that have been affected before. Additionally, at the district health directorate there was no record of community maternal death even though, according to them, some might have occurred under the period under review. Notwithstanding the above limitations, the study results have not been affected and thus are credible, reliable and useful for any policy evaluation and decision making.

### **1.6 Organisation of the Study**

The study is organized into five chapters. The first chapter discusses the general background of the research and highlights key sections like statement of problem, objectives and research questions and limitations to the research. Chapter two of the research reviews various literatures around the subject and defines the concepts underpinning the topic. Chapter three presents the methodology adopted in carrying out this research and explains the unit of enquiry for the research. In addition, the chapter briefly discusses the profile of the study area. In Chapter four, results and findings of the research are discussed and analysed thoroughly. Analytical tools are employed in the analysis to highlight the key issues emanated from the study. The analysis is done in reference to the reviewed literature.

The final chapter, Chapter five summarises the key findings of the research. Based on the findings, conclusions and recommendations are made.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Introduction

The fifth Millennium Development Goal (MDG 5) is *improving maternal health with a target of reducing the maternal mortality ratio (MMR) by three-fourths between 1990 and 2015.*

According to the 2010 WHO/UNICEF/UNFPA/World Bank report on global, regional, and country maternal mortality ratio (MMR) estimates, while some countries (such as Bhutan, Bolivia, China, Egypt, Equatorial Guinea, and Eritrea), have made substantial progress others, mainly in sub-Saharan Africa (such as Chad and Zimbabwe) have made insufficient progress or none at all. In Ghana, maternal mortality ratio remains high despite efforts made to meet MDG 5. It is currently noted as a major Public Health challenge despite numerous strategies devised by the international community and the country to curb it. Globally, maternal mortality remains the leading cause of death among women aged 15-49 years old (UN, 2009). More than 1500 women die each day from pregnancy related causes resulting in an estimated 550,000 maternal deaths annually (UN, Human Rights Council, 2009).

Maternal and neonatal deaths in Ghana, particularly in rural communities, are caused by a complex interaction of economic, financial, social, and cultural factors that affect service access and quality. There is reasonable access to antenatal care, with more than 96% of pregnant women 15-49 years receiving antenatal care from a skilled provider. However, institutional delivery (skilled care at childbirth) is lower (68%), despite the free maternal care policy that was introduced in 2003 (Ghana Statistical Service; Ghana Health Service, 2012). An assessment suggested that though the policy led to increases in institutional deliveries, maternal mortality

(451/100000) still remain high (Ghana Statistical Service et al, 2012). The persistent high level of maternal mortality revolves around the "three delays": 1) inability to recognize the problem and make a quick decision to seek care which is more common at the community level; 2) inability to reach the point of care; and, 3) delay in receiving appropriate and high-quality care (USAID, 2013).

This high level of uncertainty and discrepancy makes MMR unsuitable for monitoring maternal mortality and maternal health trends in short term. A number of studies have been conducted on maternal mortality in Ghana, however, there are little records on how the causes of maternal mortality are distributed in different socio-demographic subgroups (GSS, 2009).

Accurately gauging progress on MDG 5 is especially challenging because more countries and territories lack civil registration systems that can be characterized as complete, that is, systems that reliably attribute cause of death. Accurate estimates of national MMR require three things:

- complete records of all deaths
- good attribution of causes of death, and
- knowledge of the pregnancy status of women of reproductive age who die (Mills, 2011)

Even in countries with adequate civil registration systems, special studies have revealed that about 50 percent of maternal deaths go unreported due to misclassifications (Geneva, WHO, 2010). An accurate and complete civil registration system depends on the precise identification of cause of maternal deaths that occur at health facilities, those identified by postmortem pathological examinations, and those reported in verbal autopsies in instances when women die outside health facilities. This chapter therefore reviews the various concepts of maternal

mortality and maternal death audit, maternal mortality in Ghana and the essence of maternal audit in any country.

## **2.1 Theoretical Review of Maternal Mortality and Maternal Audit**

### **2.1.1 Causes of Maternal Mortality**

Ronsmans, et al (2006) indicated that class plays a defining role in maternal mortality and morbidity statistics, with studies in multiple countries showing that MMR among poor women is four times higher than among wealthier groups.

Three fundamental causes of maternal mortality can be identified (Cook, et al. 2001) as described in Global Health Watch Report 2011

- medical causes, consisting of direct medical problems and pre-existent or coexistent medical problems that are aggravated by pregnancy, such as anaemia and malaria;
- health system laws and policies that affect availability, accessibility, acceptability and quality of reproductive health services; and
- underlying socio-legal conditions – which explains the community concept of involvement

The report continues to explain that globally, the five most immediate medical causes of maternal death are: severe bleeding (haemorrhage – 25 per cent); infections (15 percent); unsafe abortions (13 percent); eclampsia (12 percent); and obstructed labour (8 percent) – (WHO, 2005). Indirect causes (responsible for 20 percent of maternal mortalities) include coexisting medical problems such as malaria, anaemia, jaundice and tuberculosis. There is also a contributory role of increased incidence of domestic violence during pregnancy, associated with cultural and stigmatised notions of sexuality and morality (Global Health Watch, 2011).

According to a Global Health Watch Report, 2011 (pg 124 – 126) further mentions that underlying these medical causes is a range of systematic factors. These include discrimination on the grounds of gender, race, ethnicity, religion and caste, and social factors such as lack of education and employment opportunities, increased workload (both outside and domestic), and political and legal issues. Particularly significant are the underlying patriarchal values and norms that define state policy differently across countries. Moreover, different legal provisions relating to abortion, family planning, and medical consent, together with coercive and repressive population policies also account for heightened risks (WHO, 2011).

Risk factors are not limited simply to demographic variables (age, parity, etc) but also relate, for example, to issues of social stigma surrounding sexual behaviour and seasonal peaks in women's workload. In addition, gender biases in the structure and culture of health services provision further augment these risks. For instance, a recent Human Rights Report on maternal deaths in Uttar Pradesh, a state in north India, identified four important reasons for sustained high rates of maternal mortalities – barriers to emergency care, poor referral practices, gaps in continuity of care, and improper demands for payment as a condition for delivery of health services (Human Rights Watch, 2009). Gender analysis also suggest that maternal mortality is linked to a wide range of factors in women's lives, including the value placed by women and their families and communities on women's health, women's economic position, their access to education and information, and their capacity to make autonomous decisions (Oxaal; Baden, 1996). Chatterjee, A. and Paily, V. (2011) in a report on *Achieving Millennium Development Goals 4 and 5 in India*, described two major causes of maternal death as medical causes and non-medical factors.

### ***2.1.1.1 Medical Causes of maternal mortality in India***

The leading medical causes of maternal death are haemorrhage 37%, sepsis 11%, complications of abortion 8%, hypertensive disorders 5% and obstructed labour 5% (Registrar General of India, 2006). But the proportion of these causes varies between states and regions. For example, the leading causes of maternal death in the state of Kerala, where confidential review of maternal deaths is being done, are haemorrhage 19.8%, hypertensive disorders 13.2%, amniotic fluid embolism 9.7%, venous thromboembolism 5.8% and heart disease 9.4% (Kerala, 2009). Under the heading of haemorrhage, postpartum haemorrhage is the leading cause.

### ***2.1.1.2 Non-medical factors contributing to maternal deaths***

As discussed by the Global Health Watch Report, 2011 non-medical factors contribute about 20 percent especially in developing countries. Factors contributing to poor maternal health are as follows:

#### *Political will*

Health is primarily a state issue as enshrined in most of the developing countries constitutions and protocols. However, each political party in power have a different ideology in health care delivery which in its effect affects services provided. The implementation of a health policy by a government in power may not be continued by the opposing government when that government gains power. New governments tend to have different policies and programmes (Global Health Watch, 2011).

### *Infrastructure Problems*

Private and government (public) hospitals coexist in most places, but the poor depend on the health centres run by the government because they provide relatively cheaper service. But these centres have drawbacks including perpetual shortage of funds, equipment and skilled staff. There are not enough government centres, which also leads poor service provision (Global Health Watch, 2011).

### *Organizational Failure*

Organizational failure is one of the main causes of several delays in accessing maternity care in some developing countries (Paily, V. 2011). Lack of availability of transport (car or ambulance) also leads to a delay in reaching the health centres on time. Ready cash to pay for transport is not usually available and this worsens the situation, even when transport is available. Even when patients reach the desired health centre, overcrowding, lack of equipment and other medical support delays emergency management (Global Health Watch, 2011).

Other socio-economic factors that can affect or lead to incidence of maternal mortality are the issues of illiteracy, poverty, poor social status of a woman, reduced awareness of health care needs and age of marriage (on the part of the woman). One other factor is the nutritional and health status of a woman. Poor nutritional status of a woman leads to increased anaemia which easily causes maternal mortality.

### 2.1.1.3 Causes of Maternal Mortality in Ghana

The analyses above are not different from Ghana and any other developing country. The diagram below depicts the main causes of maternal mortality in Ghana as presented by Ghana Health Service (2011).

**Figure 2.1 Causes of maternal deaths in Ghana**

Causes of maternal deaths in Ghana.



**Source: Ghana Health Service, 2011**

It is important to note that Hypertension is one of the leading causes of maternal death – almost a fifth of all deaths are attributable to this condition (Lassey and Wilson, 1998). This data might be linked to the well-documented phenomenon of Ghanaian female obesity (a risk factor for

hypertension) (Amoah, 2003a, 2003b; Biritwum, 2005). Other major causes of maternal death include bleeding, infections, anaemia and unsafe abortion.

Aboagye (2008) indicates that local evidence suggests there are problems for the three core areas identified as the main factors affecting maternal health care delivery in Ghana: family planning, skilled care at delivery and emergency obstetric care.

### *Family Planning*

Ghana's fertility rate has declined over the last ten years, from 6.4 in 1988 to 4.4 in 2003 (GHS, 2004). Population experts attribute this decline to a reduction in the ideal number of children for the average Ghanaian particularly in urban settings. It is important to note that there are regional variations. Fertility rates in the three Northern regions, and some southern regions such as the Central regions, for example, continue to be significantly higher than the national average (Agyei-Mensah, Casterline, and Agyeman, 2005). The Ghana Demographic and Health Survey suggest that while public knowledge of contraceptives is high contraceptive use is low (Ghana Statistical Service (GSS) et al, 2004). There are both rural-urban and regional differences. Over the same period, rates of contraceptive use across regions have not been uniform: the most recent figures gathered in 2006 show that contraceptive use ranges from 8.3% (in the Northern Region) to 18.9% in the Central Region). Despite a general trend of low contraceptive use, the percentage of women using contraceptives increased between 1988 and 2003 (GHS, 2008). Between 2003 and 2006 contraceptive use showed a decline in all regions except the Northern, Upper East and Central Regions (GHS, 2008). Reasons for this disparity need examination. Ghanaian women give a broad range of reasons for not using contraceptives including lack of sexual activity,

unmarried status, sub-fecundity or in-fecundity, breastfeeding, partner opposition, high cost, lack of access to supply centres, and fear of side effects (Yoshida, MMCM, 2008).

### *Skilled Care at Delivery*

There is inequality of access to skilled care at delivery sites. In terms of facility access, 36% of women have access to public facilities, 9% to private facilities; 53% of women give birth at home (Kumah-Aboagye, 2008). In terms of access to skilled birth attendants, current data suggests that 10% of women have access to a doctor, 41% have access to nurses and midwives, 41% to traditional birth attendants and 17% use relations and other informal acquaintances (Islam and Yoshida, 2008). Rural-urban and regional differences exist in terms of access to facilities and to skilled birth attendants. Urban women in the richest and richer categories have best access to highly skilled attendants such as doctors (>61% of women) and nurses/midwives (>41%) (GHS, 2008). In terms of regional access, the three northern regions have worst access to skilled birth attendants (0-30%) and Greater Accra Region has the best access (71% - 80%) (Islam and Yoshida, 2008).

### *Emergency Obstetric Care (EMOC)*

Aboagye (2008) discusses a baseline study on Emergency Obstetric Care conducted in the three northern regions in 2005 by Ghana Health Service (2007) that revealed the following:

- Most district hospitals had no theatres or blood transfusion services (fridges)
- The majority of the health centers did not provide basic EMOC/ENC services.
- A scattered settlement pattern affected geographical access to maternal health services
- Referral services were poor

- There was a lack of facility-based accommodation for essential staff
- There were no 24 hour services
- Many health facilities lacked adequate water and power supply.

Aboagye (2008) notes that other studies show that similar conditions exist in other parts of the country. As maternal mortality issues continue to arise, players within the health sector are worried and always want to find solutions to the problem. However, assessment of ascertaining maternal mortality causes is mostly limited to the health facility.

### **2.1.2 The Concept of Maternal Death Audits (MDA) and Its Essentiality**

In most countries with high maternal mortality, health facility records are usually deficient. The causes of some maternal deaths in obstetric registers are ill defined, which makes it difficult to compile the causes of maternal deaths. Yet information on the underlying causes of maternal deaths, drawn from clinical records and from social and health systems, provides the evidence for local decision-making on the interventions needed to reduce maternal morbidity and mortality.

A maternal death audit is an in-depth systematic review of maternal deaths to delineate their underlying health, social and other contributory factors, and the lessons learned from such an audit are used in making recommendations to prevent similar future deaths. The methods of audit range from simple case descriptions to systematic investigations into the causes of substandard care in a large number of health outcomes. Although the effectiveness of audits in changing the practices of health care professionals remains a matter of debate, medical audits are now accepted in many Western countries (Ronsmans, 2011; WHO, 2002). It is not a process for

*apportioning blame or shame* but exists to identify and learn lessons from the remediable factors that might save the lives of more mothers in future (Mills, 2011).

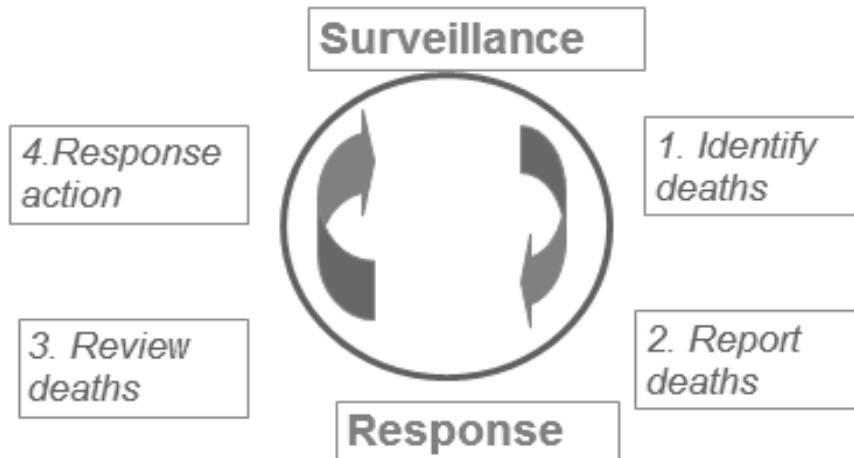
Although this audit process empowers local authorities to understand and take steps to improve maternal health, most of the countries with high maternal mortality have not fully instituted it. It is imperative to establish or strengthen maternal death audits in these settings, both to generate evidence for determining interventions and to provide the data needed to feed into the national civil registration system for the computing of MMR (WHO, 2004). Maternal death surveillance and response (MDSR) as described by ICD-10 (also used for MDA) is defined as "a component of the health information system, which permits the identification, the notification, the quantification, and the determination of causes and avoidability of maternal deaths, for a defined time period and geographic location, with the goal of orienting the measures necessary for its prevention".

In Sub-Saharan Africa, countries that have systematically introduced maternal death audits in the last decade include South Africa, Botswana, Malawi, and Ghana. A recent review of Malawi's maternal death audits found that the District Health Management Teams were providing supportive supervision and that standard protocols for maternal and neonatal care were being used. However, there are shortcomings in Malawi's approach, such as fear of blame, poor recordkeeping, and lack of knowledge and skills for the proper conduct of reviews (Kongnyuy and van den Broek; 2008). Each maternal death has a story to tell and can provide indications on practical ways of addressing its causes and determinants. A large proportion of maternal and perinatal deaths may result from poorly managed deliveries, and many such deaths could be

avoided if suitable care were given. Maternal death reviews provide evidence of where the main problems in overcoming maternal mortality and morbidity may lie, produce an analysis of what can be done in practical terms and highlight the key areas requiring recommendations for health sector and community action as well as policy directions (Ministry of Health, Ethiopia, 2012).

The MDA/MDSR should provide information that can be used in the development of programs and interventions to improve maternal health, reduce maternal morbidity, and improve the quality of care of women during pregnancy, delivery, and the puerperium. Counting cases is important but not enough. The data must lead to information that can, in turn lead to specific recommendations and actions, as well as to an evaluation of the effectiveness of interventions (Ministry of Health, Ethiopia, 2012).

**Figure 1.2: Maternal death surveillance and response system: a continuous action cycle at community, facility, regional & national levels**



Source: Ministry of Health, Ethiopia, 2012

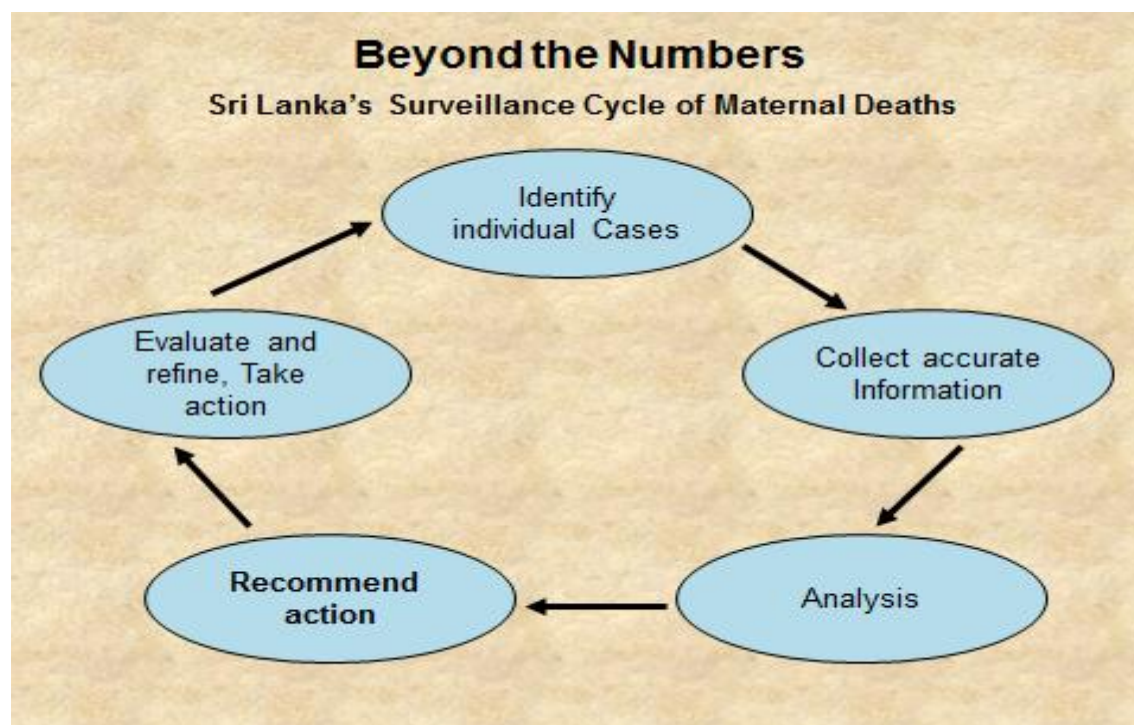
The information contained in the MDA/MDSR can increase awareness of maternal mortality at the community, health care system, and intersectoral (policy-making) levels. Increased awareness can lead to changes in practice among the public and health practitioners, as well as lead to a re-allocation of resources to activities for decreasing maternal mortality. An enabling environment, of collaboration rather than blame, is needed to conduct MDSR and apply the findings towards action.

MDSR has two underlying rationales: First, it provides information about avoidable factors that contributed to a maternal death and guides actions that need to be taken at the community level, within the formal health care system, and at the intersectoral level (i.e. in other governmental and social sectors) to prevent similar deaths in the future.

Second, it establishes the framework for an accurate assessment of the magnitude of women's deaths related to pregnancy. By having an accurate assessment of maternal mortality, policy and decision makers may be more compelled to give the problem the attention it deserves. In addition, evaluators will more accurately assess the effectiveness of interventions to decrease mortality rates. Ultimately an MDSR system will aim to identify every maternal death in order to accurately monitor maternal mortality and the impact of interventions to reduce it (Ministry of Health, Ethiopia, 2012).

In Sri Lanka, the surveillance cycle of maternal death begins with the identification of the individual cases through to action taken. The process of the auditing is basically the same across countries as per WHO proposed procedures (Ministry of Health, Sri Lanka, 2001).

**Figure 2.3** Surveillance Cycle of Maternal Deaths



Source: Ministry of Health, Sri Lanka (2001)

### **2.1.3 Five Approaches for Reviewing Maternal Deaths and Ill health**

*Beyond the Numbers*, a 2004 WHO publication, describes five main approaches for ascertaining the causes and contributing factors for maternal deaths and ill health. A facility-based maternal death review entails auditing maternal deaths that occur in health facilities, while a community-based maternal death review (or verbal autopsy) involves interviewing family members about maternal deaths that occur outside health facilities. A combination of these two approaches would provide a more complete picture of the number and causes of maternal deaths in a given locality. In most cases, the facility based audit is preferred to the community based audit, hence limit in records of most of maternal deaths at the district level.

A third approach is when an enquiry into maternal deaths is made by a national committee and in a confidential manner. A fourth approach entails investigating “near misses” rather than maternal deaths, that is, events in which a woman has nearly died during pregnancy, childbirth, or postpartum. The committee or group that investigates near misses first has to establish what constitutes near misses so that the label is uniformly applied across health facilities. One standard definition of near miss, with uniform identification criteria, has recently been developed by WHO: *A woman who nearly died but survived a complication that occurred during pregnancy, childbirth, or within 42 days of termination of pregnancy*. The fifth approach, a clinical audit, involves systematically reviewing or auditing the obstetric care provided to pregnant women against established protocols or criteria aimed at improving the quality of care. Below is the step by step method of maternal death review

**2.1.3.1 Facility-based maternal death review:**

- In-depth investigation of the causes of and associated factors in maternal deaths that occur in health facilities;
- Entails interviews of health personnel who attended to the deceased. Can also be extended to interviews of family members who accompanied the deceased;
- The review is non-judgmental to encourage the cooperation of the health workers involved;
- Provides information for improving obstetric care.

**2.1.3.2 Community-based maternal death review (verbal autopsy):**

- In-depth non-judgmental investigation of the causes and the associated factors of maternal deaths that occur outside health facilities;
- Entails interviews of family members who cared for the deceased. This requires a community informant to let local authorities know whenever there is a death of a reproductive-age female in the community;
- The interviewer, who is usually not a health worker, should be sensitive when probing the circumstances leading to the death. In some cultures, the interview is done after the mourning period;
- A team of physicians then examines the interview notes to determine the cause of death;
- When this is combined with the facility-based review described above, it gives a more complete picture of maternal deaths in a given local jurisdiction.

### ***2.1.3.3 Confidential enquiries into maternal deaths***

- A national or subnational multidisciplinary committee meets periodically to systematically investigate a representative sample of (or all) maternal deaths to identify the causes and associated factors; the committee then gives written guidelines to health personnel and administrators on how to prevent similar deaths in future;
- The investigation is carried out in a confidential manner (“No blame, no shame”);
- Requires a complete and functioning civil registration or health management information system;
- A subnational or district-level panel might be more appropriate in countries with high mortality, so that the guidelines issued can be tailored to local situations.

### ***2.1.3.4 Survey of severe morbidity (near misses)***

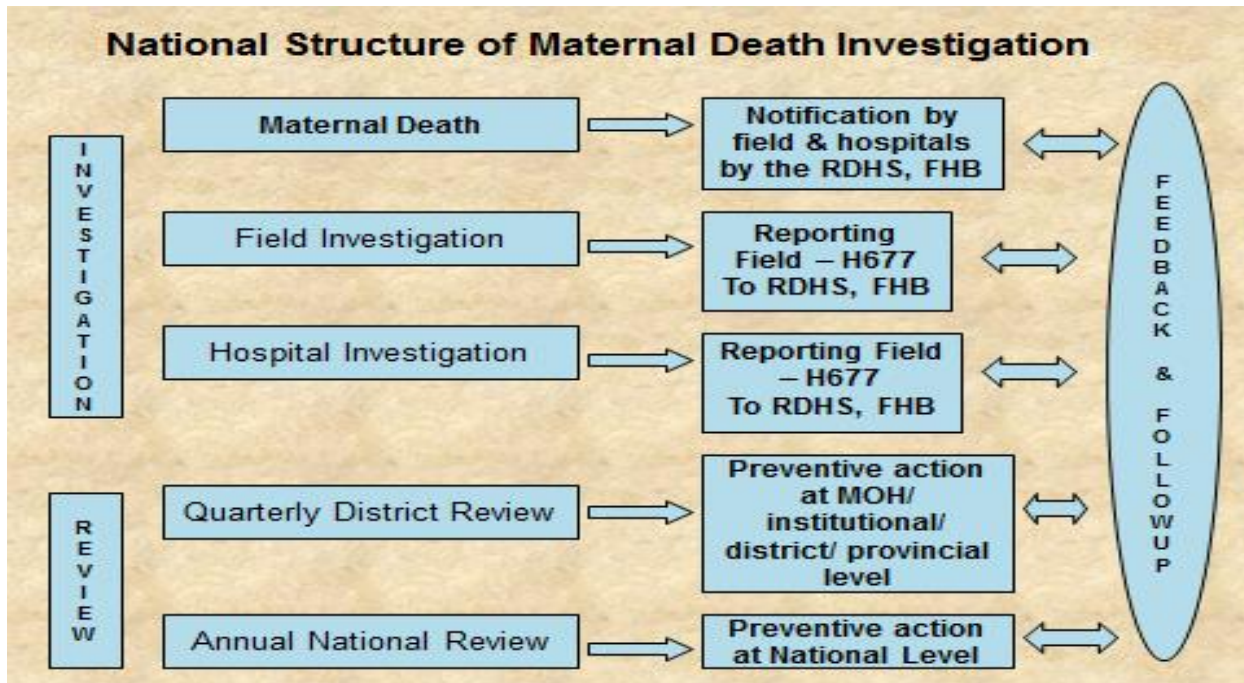
- A near-miss event refers to one in which a woman has nearly died but survived a complication that occurred during pregnancy, childbirth, or within 42 days of termination of pregnancy;
- This survey is an in-depth investigation of the factors that led to the near miss, what worked well in the treatment of the life-threatening complications, and the lessons learned;
- Unlike the other approaches, in this one the pregnant woman herself is also interviewed, creating the opportunity to obtain more insight into the circumstances;
- This survey is less threatening to health personnel than the others, since the women have survived.

#### **2.1.3.5 Clinical audit**

- Entails a systematic review or audit of the obstetric care provided to pregnant women against established protocols or criteria aimed at improving the quality of care;
- Protocols for the management of obstetric complications will have to be established beforehand in order to ascertain whether cases are properly being managed at health facilities;
- If well implemented, it leads to standardized and improved care across health facilities.

The approaches differ from country to country and from district to district. However, in most cases, the facility based approach coupled with community methods are mostly used in maternal data audit. Figure 2.4 shows the national structure of maternal death audit both at the facility and field (community level)

**Figure 2.4 National Structure of Maternal Death Investigation**



Source: WHO, 2002

#### **2.1.4 Guidelines for Establishing a Health Facility-Based Maternal Death Audit**

A health facility-based maternal death audit entails reviewing all maternal deaths that take place at health facilities. Of the five approaches mentioned, this is the most suitable one to start with in most settings. Staff in health facilities should be encouraged to review every maternal death that occurs at their facility and supported with the necessary resources to do this. Information pertaining to the circumstances leading to each death is collected from the health personnel who attended to the deceased (at the health facility where the women died as well as other referring health facilities). This allows local lessons learned to be utilized in adapting safer clinical practice or overcoming other local barriers to care to enable more deaths to be prevented in the future. This type of review should be formalized and incorporated into the routine reporting of services provided at health facilities in due course. Once it is well established it is then possible

to aggregate the lessons learned from several local facilities to provide a more complete picture of the services available in a given local jurisdiction.

In some cases, it is also possible to go back into the community and trace the woman's pathway through her pregnancy until her arrival at the hospital. These community-based audits provide valuable information on other actions at the community level, including education and transport that might save women's lives in the future. Once a health facility-based maternal death audit is well established, it can be extended to include deaths occurring outside the health facilities (through community-based maternal death reviews), so that eventually all maternal deaths in a given geographic area are captured. Additionally, near-miss studies are a useful adjunct, one that appears to be less threatening to health personnel since the women have survived. Establishing maternal death audits requires setting up a committee, taking cognizance of legal implications, developing notification guidelines, and developing audit forms. These are described next.

#### ***2.1.4.1 Setting up a Maternal Death Audit Committee***

Mills (2011) in Health, Nutrition and Population notes (HNP Notes) explain that to ensure sustainability, it is best to enlist the support of local authorities and providers of childbirth services by explaining the purpose of setting up a facility-level maternal death audit team or committee at hospitals or health centers. When communicating about this it is important to emphasize that the process is not designed to apportion blame. Ideally, the Ministry of Health should provide national guidelines on the composition and size of the audit committees, but in the absence of national guidelines the District Health Management Team could provide guidance. Depending on local circumstances, any of the following could be members of the

multidisciplinary committee: obstetricians, physicians, neonatologist/paediatrician, pathologists, laboratory technicians, pharmacists, nurse-midwives, anaesthetists, public/community health professionals, hospital administrators, local statisticians, representative of local women's advocacy group, and representative of the local health authority (Mills, 2011).

It is important the committee is kept as small and workable as possible and that each member is an active participant. All too often senior personnel are nominated by their peers but fail to attend the meetings. The teams should be trained on the guidelines and the use of audit forms, since lack of training has been found to hamper the process (Mills, 2011).. The number of maternal deaths recorded at the health facility could determine the frequency (whether weekly, monthly, or quarterly) of the committee meetings. It is imperative that within 24 hours of any maternal death the committee be notified and an audit form completed by those who attended to the deceased (Mills, 2011).The hospital audit committee could also review maternal deaths that occur at smaller health facilities (with low caseloads) that refer complications to that hospital. Based on the reporting channels from the health facility level to the central level, similar committees can be established at higher levels of the health delivery system, resulting for example in district, regional/provincial, and national committees. These higher committees generally provide oversight to the lower-level committees (Mills, 2011).

The roles and responsibilities of the audit committee are as follows:

- Review all maternal deaths at health facilities;
- Ensure that the recommendations issuing from committee meetings are followed through to improve obstetric services;

- Report the findings (without personal identifying information) to the higher-level committee(s)—district, regional/provincial, or national—and to both the local government administrative office and the civil registration system
- Provide feedback to lower-level committees;
- Share aggregate statistics with the local statistical office;
- The MMR is computed as *(number of maternal deaths/number of live births in the health facility) times 100,000*. This statistic should be labelled as a health facility-based MMR, since it excludes deaths outside the health facilities; and
- Provide input into any future revisions of the audit forms and guidelines (Mills, 2011).

#### ***2.1.4.2 Ethical and Legal Frameworks***

Ideally, maternal death audits should be part of the routine supervision and monitoring of maternal health outcomes. However, given the potential for lawsuits, health personnel who attend to the cases under review might be reluctant to participate. Ministries of health are expected to provide the committees with legal backing to prevent the use of findings for litigation. In this regard, consent forms (or disclosure statement) should be administered prior to interviewing family members. After the committee meeting, all notes with identifying information collected for the purposes of the audit should be destroyed. Further, the notes with identifying information should not be shared by electronic means, such as email (Mills, 2011).

#### ***2.1.4.3 Notification of Maternal Deaths***

In order to capture all maternal deaths nationally, notification of all maternal deaths to local authorities or to the central level within 24 hours should be mandatory. However, making maternal death notifiable requires a legal framework to allow cases that are sensitive in nature,

such as deaths due to unsafe abortion, to be reported to the local health authorities without fear of retribution. In countries where notification is mandatory, there are prescribed forms for reporting (Mills, 2011).

#### ***2.1.4.4 Audit Committee Meeting***

The chair, together with committee members, discusses the case with the health workers who attended to the deceased. Health workers from the referring health facilities who saw the deceased could also be invited to the discussion. The committee examines all the factors that led to the death to determine the immediate and underlying cause of death and to identify contributory/avoidable factors. These last factors could be personal, family, community, socioeconomic, cultural, or access-based (e.g. distance, financial or transport) and could include negligence or the lack of or non-adherence to standardized treatment protocols (Mills, 2011). The initial cause of the death listed on the death certificate could be revised after this meeting. Additionally, the appropriate International Statistical Classification of Diseases and Related Health Problems 10<sup>th</sup> Revision (ICD-10) code for the cause of death is assigned. The audit meetings are to be non-judgmental, fair, and unbiased should not apportion blame, and should be private and confidential (Mills, 2011).

#### ***2.1.4.5 Utilizing the Recommendations***

The essential purpose of establishing an audit system is to improve obstetric service delivery. The recommendations of the meeting must be evidence-based and should be communicated to health personnel and hospital management for appropriate corrective action. Additionally, the health facility audit committee should report the findings to higher-level audit committees, such as district, regional/provincial, and national committees. These higher-level committees should

provide supportive supervision to the lower-level committees and ensure that recommendations of the audit committee meetings are duly implemented to improve the quality of and access to obstetric care. The processes outlined above by WHO have been adopted by many developing countries (Mills, 2011).

## **2.2 Empirical Review of Maternal Audit in some countries – processes, procedures and outcomes of maternal mortality audit.**

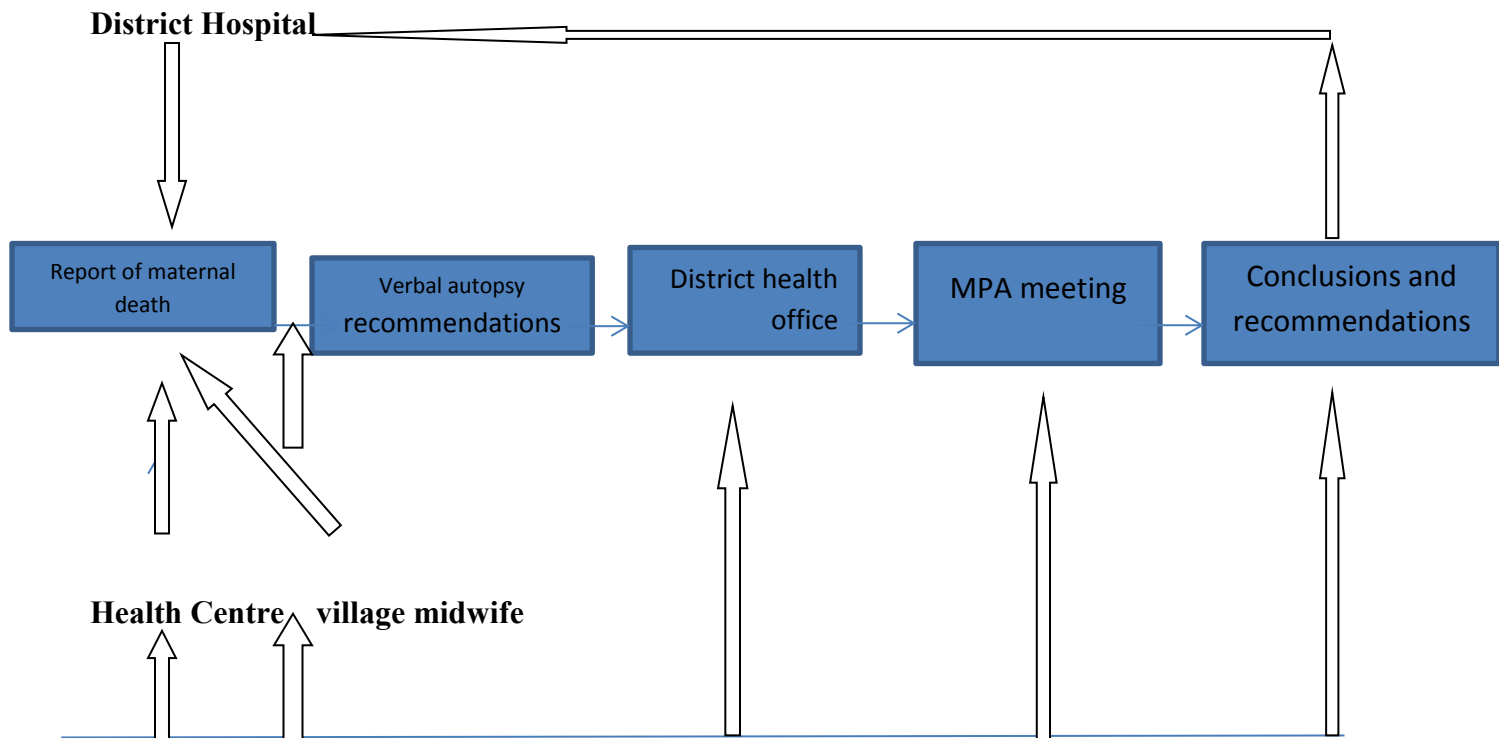
### **2.2.1 A district-based audit of the causes and circumstances of maternal deaths in South Kalimantan, Indonesia**

The maternal and perinatal audit was developed in 1994 as one of many strategies for reducing maternal mortality. The Ministry of Health issued guidelines for piloting the audit in eight provinces, and model projects emerged in Central Java and West Nusa Tenggara. The safe motherhood initiative in South Kalimantan built on experience gained in these provinces. Although the audit focuses on both perinatal and maternal deaths, the present paper is mainly concerned with the latter. The audit aims to bring about a reduction in perinatal and maternal mortality through an improvement in the quality of maternal and child health services at the district level. More specifically, it aims to: identify substandard care factors for maternal and perinatal deaths; strengthen links between district health office, district hospital and health centres; make recommendations for the improvement of service organization and clinical care at the district level; and assess the main causes of maternal and perinatal deaths. In addition to facility-based elements of care, the audit explores obstacles to obtaining care at the community level, e.g. delays in family decision-making and transportation problems (Supratikto, et al; 2002).

**2.2.1.1 Identification and reporting of deaths**

The village midwives are responsible for reporting all maternal and perinatal deaths in their community to the health centre (Fig. 2.5). The midwives may learn about these deaths because they have cared for the women who have died or because they have received reports from village leaders or traditional birth attendants. In addition, maternal deaths occurring in a hospital are reported directly to the district health office, which passes the information to the village midwives.

**Figure 2.5: Schematic representation of the reporting system used in the maternal and perinatal audit (MPA), South Kalimantan, Indonesia**



Source: Bulletin of the World Health Organization, 2002, 80 (3)

*Post-mortem interview*

When a village midwife is notified of a maternal or perinatal death in her community she visits the family of the deceased and conducts a home interview, usually within a week. The verbal autopsy, conducted with the help of a checklist, seeks to uncover clinical signs and symptoms and socioeconomic factors contributing to the death (Ronsmans; Campbell; 1995). The interviewer is guided by a conceptual framework developed by Mother Care/John Snow Inc. (Koblinsky, 1995; 5:1-2). This pathway reconstructs the series of events that may lead to a perinatal or maternal death. Particular attention is paid to documenting the occurrence of and the reasons for delays in the following: family decision-making to refer a woman with a complication; reaching appropriate care; and receiving care from the health provider once the appropriate level of care has been reached (Thaddeus, Maine, 1994).

For women who were in contact with the health services before death, the village midwife obtains further information from traditional birth attendants, midwives, and/or doctors. If a woman was hospitalized, the village midwife also consults the medical records, where available, and copies parts that are relevant to the case. Finally, the village midwife assigns a cause of death and reports directly to a health centre, where a senior midwife or a doctor checks that the information collected is complete and consistent and verifies the accuracy of the cause of death. All interview forms are sent to the district health office (Thaddeus, Maine, 1994).

***2.2.1.2 District maternal and perinatal audit team***

At intervals of 1–2 months, a meeting is attended by staff from the community health centre, midwives involved in the cases being discussed, and the district maternal and perinatal audit

team (health administrators and hospital physicians) to discuss maternal and perinatal deaths that have occurred in the district. If community involvement is considered desirable, representatives of women's organizations or other community groups are invited to attend. The meeting is generally limited to 20 – 30 persons. Expenses for transport and food are reimbursed. In order to facilitate full participatory discussion, the number of cases considered is limited to two or three, usually including one maternal and one perinatal death. The cases are selected on the basis of the nature of the problems identified and the frequency with which the medical causes of death occur (Supratikto et al, 2002).

At the district meetings the village midwife presents the background of the case and the chronology of events leading to death. The participants then consider the case, relying on the expertise of an obstetrician or paediatrician from the district hospital to guide discussion on clinical case management. The purpose of the meeting is not to assign blame but rather to uncover the root causes of death while engaging in constructive peer review. On the basis of the contributing factors identified during the meeting, the audit team at district level designs management initiatives, proposes additional training, and recommends changes in clinical protocol and policy. A formal record of the conclusions reached is kept by a rapporteur and is reviewed by the group at the end of each meeting. The findings and recommendations are discussed at the start of the next audit meeting in order to check on progress made in resolving the problems previously uncovered (Supratikto et al, 2002).

### ***2.2.1.3 Results from the maternal and perinatal audit system in the South Kalimantan District***

Following the above described processes and systems followed by the district, remarkable findings were identified between 1995 and 1999. Between 1995 and 1999 the village midwives

conducted 130 post-mortem interviews. The leading causes of death were haemorrhage (41%), followed by hypertensive diseases (32%). Only 41.5% of the women were seen by a midwife or a doctor before death, and 69.2% of deaths occurred elsewhere than in a health facility (Supratikto et al, 2002).

Aggregate information on contributing factors was available for 30 maternal deaths audited in 1998 and 1999. Delays in decision-making and poor quality of care at the health facility were seen as contributing factors in 77% and 60% of the deaths, respectively (Supratikto et al, 2002). Among the most prevalent aspects of poor quality of care cited were delays in seeing a health provider, inadequate care, and care that did not conform to protocols. Economic constraints were believed to have contributed to 37% of deaths. Problems of distance or transport did not appear to be prominent. Refusal to seek care might have contributed to half the deaths. However, the listing of contributing factors does not reveal the depth of information that can be obtained by verbal autopsy. Many factors may contribute to a death. It is not easy to pinpoint a single factor that might have prevented death. This is illustrated by the case of a woman with a retained placenta who bled to death (Supratikto et al, 2002).

There were several delays in decision-making. The woman suffered three hours with a retained placenta before skilled medical help was sought. This suggested that a delay occurred before the traditional birth attendant recognized the emergency. Once the village midwife had been called there was a delay of half an hour before the family decided to take the woman to hospital. A further delay occurred because transportation arrangements took 45 min, and the time taken to reach the health facility contributed to the maternal death. Family decision-making and attitudes

towards the health sector also had a bearing on the case, since a trained health professional was not asked to be present at the delivery. Finally, issues related to the quality of care were identified. The patient's antenatal care did not include an assessment of haemoglobin levels, which might have indicated a need for treatment other than routine iron supplementation. The equipment in the village midwife's health post for performing a haemoglobin test was in a state of disrepair and the patient did not want to go to the health centre. The obstetrician guiding the audit meeting noted that the village midwife should have given an infusion to the patient in shock, pressing the infusion bag if necessary. He suggested that further training of village midwives in emergency care was needed. It was also noted that village midwives should have kits with more flexible needles and a more rapid flow for infusion (Supratikto et al, 2002).

### **2.2.2 Maternal Audit Processes in Ethiopia**

In Ethiopia, the systems as described in Indonesia are not too different. At each of health delivery, committees are formed to monitor and report any maternal death to the highest body for action. For instance, a hospital based audit or monitoring team comprise of an obstetrician & gynaecologist /IESO officer, a senior midwife, anaesthesiologist /anaesthetist, CEO, medical director, pharmacy case unit head and quality officer of the hospital. The roles and responsibilities of this committee include:

- Develop detailed TOR and plan of action
- Reviews all maternal deaths in the hospital within 48 hours of death notification
- Devise and implement action points based on findings according to their expertise

- Keeps the filled review tool confidential and ensure it will not be used for any other purpose
- Conduct anonymous reviewing of cases to avoid blaming and bias
- Compiles and reports the findings to Regional Health Board (RHB) and the Technical Working Group (TWG) every month.
- Conduct in-depth investigation of selected cases
- Provide technical support to health centres as needed

At the Health centres (HC) the committee comprises a Health Care head/director, a midwife working in the delivery case team, a nurse working in maternal and new-born care health (MNCH) case team, pharmacist/druggist, health workers from the community where the deceased mother resided and health office representative. For deaths that occurred at home/health post (HP) level, two community representatives (e.g. community chairpersons, women group) will be added to the HC committee. The HC head will chair the committee and assign a senior midwife and health officer (HO) to review the death and produce a summary for deaths. The committee's task will be to

- Develops its own TOR that guide and facilitate the task
- Assign the HEW supervisor to collect data (verbal autopsy) for all deaths reported by HEWs irrespective of place of death
- Conducts monthly meeting to review and produce summaries.
- Develops response actions and follow implementation

- Keeps the filled review tool confidential and ensure it will not be used for any other purpose
- Conducts anonymous reviewing of cases to avoid blaming and bias
- Compiles and reports the findings to the community health office focal person on monthly basis

The tools developed by Ministry of Health will be the only tool for the audit. Local data collectors and committee members will be the only persons knowing the names of the deceased and health care workers involved in the management of the case. These data collectors and committee members will have the right to access facility records of cases. The essence of this is to uphold the ethical principles of the audit. Some of the other ethical issues that are considered during the maternal death audit include

- a. Autonomy: family and friends of the deceased will be well informed about the review process. Their voluntary participation will be sought for and the interview can be interrupted at their request.
- b. Privacy: Families and health care workers directly and indirectly involved in the review process have to be reassured of their privacy. The identities of the deceased, family and health care providers involved in the management should be kept confidential and known only to those who are doing the actual review. All persons having access to identifiable information will sign a confidentiality agreement stating that they will not disclose any identifiable information. Data collection forms, case summaries, review meeting minutes and reports or dissemination results will not contain any personal identifiers. All records

of cases reviewed & any discussion will be kept secured; hard copy information will be kept in locked cabinets/offices and electronic data in password protected files.

- c. Beneficence: Data obtained through the MDSR should be tailored in a way that enables production of response actions at different levels.

### **2.2.3 A Facility Based Maternal Death Audit to determine maternal death cause in Jos University Teaching Hospital, Jos - Nigeria**

Ngwan and Swende (2011) did a descriptive analysis of all maternal deaths at the Jos University Teaching Hospital (JUTH), Jos north central Nigeria between 1st June, 2006 and 31st May, 2008. Ngwan and Swande (2011) maintained that maternal mortality ratio is a major reproductive health index and could indeed be rightly considered to be a measure of the socio-economic development of any nation. It is unfortunate that over the past three decades and half, Nigeria has progressively paraded one of the most abysmally poor reproductive health indices in the world, maternal mortality ratio inclusive (Harrison, 1997). Nigeria constitutes 1.76% of the world population but contributes 10% of the maternal deaths and statistics in Nigeria show that rather than improving, death rates are probably increasing in more recent times (Chinwuzie, 1999). Maternal mortality incidence was found to be not equally distributed. The report showed MMR of 735 in Jos (Wright, 1988), 1776 in Port Harcourt (Briggs, 1998), 309 at Ibadan (Olatunji, 1996), and 2138 in Sokoto (Ojo, 1974) per 100000 live births. According to the research, the drawback of these statistics is that almost all of them are hospital based studies and therefore may not be a true reflection of the general population. Sadly, the high maternal mortality in the tropics is further plagued by under reporting and misclassification of maternal deaths, poor case identification and recording as well as poor data collection and storage and

also, methods used to calculate maternal mortality rates are often complex and costly to use (Ojo, 1974). Of a particular interest is the increase in maternal mortality rate in some major hospitals in Nigeria despite the launching of the safe motherhood initiative in Abuja in 1990 (Otolorin, 1999). An earlier review of maternal mortality done at the Jos University Teaching Hospital, Jos revealed increasing rates over a 5-year period (Otolorin, 1999).

Ngwan and Swande observed these unacceptable ratios and occurrence and had a prospective descriptive analysis as indicated above. During the study period, it was indicated that there were 56 maternal deaths at the Jos University Teaching Hospital giving a maternal mortality ratio of 1260/100,000 live births which was higher than one conducted in the same hospital (740/100,000) (Ujah, 2005). The value was also higher than that reported in studies done in Ibadan (309/100,000) and Lagos [14] (852/100,000). Additionally, the maternal mortality ratio of 1260/100,000 live births is higher than the national maternal mortality ratio of 800/100,000 (Otolorin, 1999). Aside from the fact that the values are higher than the national figures, maternal mortality was on the increase in JUTH. It was observed that maternal mortality ratio was highest in those with no formal education compared to those with secondary and tertiary education. This was also similar to the previous study done in JUTH by Ujah et al.

The study also revealed that the leading direct causes of maternal mortality found in this study include eclampsia, haemorrhage, unsafe abortion, embolism and infections. This is similar to what has been reported from other parts of sub-Saharan Africa and other parts of the world (Ujah et al, 1999) although the order of frequency may vary. Obstructed labour, which was rare in this study, was found to be common (4.0%) with a maternal mortality ratio of 605/100,000 live births

in a study done in Gombe (Mela et al, 2008). HIV/AIDS was identified to be the emerging leading indirect cause of maternal mortality in JUTH. Indeed, HIV/AIDS was noted as an influence on maternal mortality in several ways. The report showed that women living with this disease may be more susceptible to direct and indirect obstetric causes of maternal mortality such as postpartum haemorrhage, puerperal sepsis and complications of caesarean section. AIDS-related deaths may be incidental to pregnancy or may be through direct causes of maternal mortality where the infection itself or opportunistic infections such as tuberculosis progress faster in pregnancy. The contribution by HIV/AIDS to indirect causes of maternal mortality in the study was 14.3%. The finding in the study was consistent with an earlier study in Malawi that showed that HIV/AIDS was emerging as the leading cause of maternal mortality (Adams, et al, 2003). The study again noted that the high maternal mortality ratio found in the study and that contributed by HIV/AIDS may be due to the fact that JUTH is also a principal regional referral centre for the management of HIV/AIDS in Nigeria.

The study again showed that unsafe abortion was the leading cause of gynaecological deaths (8.91%) while ectopic pregnancy contributed 1.8%. These results were noted to be similar to those obtained in studies around sub-Saharan Africa. Pulmonary embolism was one of the leading causes of maternal mortality in this study which was similar to that obtained in the Port Harcourt study. It was found that about 57.1% patients died within 24 hours of admission with 8.9% of them dying within an hour of admission.

In concluding the research, Ngwan and Swande indicated that maternal mortality ratio was still high in JUTH. Maternal mortality ratio is a major reproductive health index and could indeed be

rightly considered to be a measure of the socio-economic development of any nation. The study observed that for decades, Nigeria had progressively paraded one of the most abysmally poor reproductive health indices in the world, maternal mortality ratio inclusive. The study therefore made series of recommendation towards addressing the three levels of delays in maternal mortality which eventually results in the causes of maternal mortality.

### **2.3 Conceptual Framework**

This research adopted the theory of root cause analysis to ascertain the fundamental linkages between maternal audit and maternal mortality. Brennan et al (1991) explained that the move to conduct root cause analysis is largely motivated by growing recognition that the complexity of health care and health delivery drives the incidence of adverse events uncomfortably and unacceptably high. Deming Edwards (2002) reiterates that “to find problems is not enough. It is necessary to find the cause behind the problem and build a system that minimises future mistakes”. Root Cause Analysis (RCA) is a popular and often-used technique that helps people answer the question of why the problem occurred in the first place. It identifies the origin of a problem. It uses a specific set of steps, with associated tools, to find the primary cause of the problem, so that you can:

- i. Determine what happened.
- ii. Determine why it happened.
- iii. Figure out what to do to reduce the likelihood that it will happen again.

RCA assumes that systems and events are interrelated. An action in one area triggers an action in another, and another, and so on. By tracing back these actions, it helps to discover where the

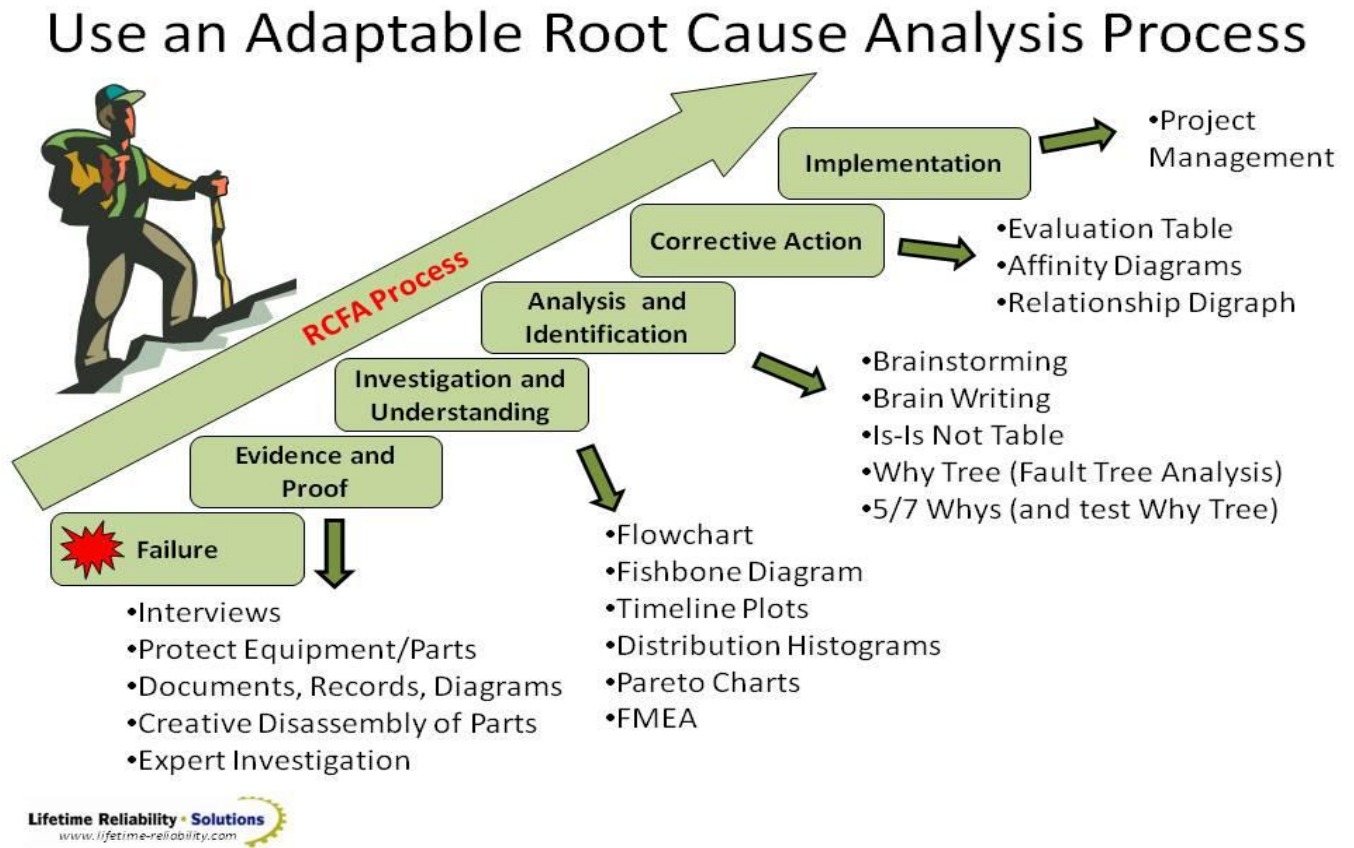
problem started and how it grew into the symptom which is faced. Three basic types of causes are identified in root cause analysis;

- a. **Physical causes** – Tangible, material items failed in some way (for example; equipment in a particular hospital stops functioning).
- b. **Human causes** – People did something wrong, or did not do something that was needed. Human causes typically lead to physical causes (for example, delay in health staff to attend to a client during an emergency).
- c. **Organizational causes** – A system, process, or policy that people use to make decisions or do their work is faulty (for example, lack of defined roles and responsibilities to staff and ability to address managerial challenges).

RCA looks at all three types of causes. It involves investigating the patterns of negative effects, finding hidden flaws in the system, and discovering specific actions that contributed to the problem. This often means that RCA reveals more than one root cause.

Through the theoretical analysis of the above literature, the conceptual framework as adopted from the root cause analysis is used to deduce why maternal mortality continues to occur in hospitals and at the community levels.

Figure 2.6: Conceptual Framework: Root cause analysis



Adopted from: Lifetime Reliability Solutions (2004), Rossmoyne, Western Australia

The RCA identifies the failure or challenges or problem within the system and gathers evidence to confirm the assertion that a particular problem exist. The gathering of evidence and proof is done through interviews, expert investigation, and review of documents, records and available data. Further investigation and clarity is needed to understand the prevailing situation. The identified data and information is analysed to identify the root cause of the problem. The results/outcome of the analysis informs the type of corrective measures/action needed to be implemented to mitigate the problem. These corrective measures are presented as

recommendation to management. The process was adopted in analysing the root cause of maternal mortality of the study areas through which recommendations were provided.

## **2.5 Conclusion**

The importance of establishing health facility-based maternal death audits cannot be overemphasized. However, the analysis has shown that that cannot be done in isolation. Community support is very much important in identifying major causes and to some extent minor causes of maternal death of a mother who was trying to give life. This section has therefore outlined key measures and procedures needed to undertake an effective maternal death audit to yield positive results. With the support of WHO, individual countries with incidence of maternal mortality (either high or low) have developed action plans that focuses on addressing the problem. Many of these are outlined in their respective Millennium Development Accelerated Framework. It is therefore important for countries to establish audit committees to ascertain the causes of maternal deaths and ways to reduce maternal morbidity and mortality. When the maternal death audit system is functional, it can then be extended to cover perinatal deaths as well as maternal deaths that occur outside health facilities.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the research methodology of the study. It describes and justifies the methods and processes that were used to collect data in answering the research questions. The chapter also focuses on the research design adopted, sampling techniques, the key study variables and units of analysis. The rest of issues discussed in this chapter are the sources of data and methods of data collection as well as methods of data analysis. The chapter finally ends with a brief background of the area of study – Nsawam Municipality.

#### **3.2 Research Approach and Methodology**

For the purposes of this study, both qualitative and quantitative approaches to research are used. The two approaches are adopted for the research survey as a result of the complexity and interrelated nature of the issues involved. The survey research approach was adopted to investigate into maternal death issues and how audit and community assessment bring out the causes of maternal mortality. According to Bryman and Bell (2003 p. 49) survey research is where data are collected predominantly by questionnaire or interviews on more than one case and at a single point in time. Bryman and Bell (2003) further claimed that survey research is invariably concerned with generalising findings to larger population by using simple random to enhance the representativeness of the sample. Based on this, the study was conducted in Nsawam Adoagyiri Municipality using interview guides, structured questionnaire and observations to elicit the required responses. Interview guide was used to solicit information about the processes involved in the audit and the outcome of the audit. Eight health workers were involved. In-depth

interviews were conducted to collect data from these health workers. Community level interviews were also conducted through Focus Group Discussions and one-on-one interviews with 125 community members. These communities are communities who were affected with maternal death in the last four years according to the health directorate data.

### **3.3 Sampling Frame and Sample Size**

The sampling frame is the list of all sample units in the population. In this study the sampling frame consisted of municipal hospital where maternal deaths in the districts are recorded/occur and two CHPS compounds which had direct referral records on two of the maternal deaths at the district hospitals. These facilities additionally provide maternal services. Five affected communities were visited as a follow up to the recorded maternal deaths to identify the causes of maternal death at the community level. This selection and follow up visit was done in collaboration with the municipal health directorate. Within the five communities, community members especially women were sampled for survey.

The study centered on the procedures of maternal death audit, the challenges of the process, the guidelines, communities' view of causes of maternal mortality and the contributions of both community members and the facilities in addressing the causes. For facility-based assessment, eight (8) health workers were interviewed for the study. These health workers were selected based on their involvement in maternal death audit at the facility level. In the first step, the researcher identified a list of all health facilities in the district and used the list to determine which of these provides maternal services – whether a hospital, a clinic, health post or CHPS compound. For the step two, personnel within the selected facilities who are responsible for

maternal issues especially maternal audit were selected for interviewing. The number of institutional respondents differed in relation to the level and type of institutions. Three persons who are responsible for maternal issues and decision making were interviewed in Nsawam Hospital and they include Medical Superintendent, Deputy Director of Nursing Service (Clinical) and Hospital Administrator. For the other two health facilities, the nurses in charge of the facilities were interviewed. The nurses were randomly selected based on the numbers available at the facility and also working on maternal care delivery. These nurses were both midwives. At the health directorate, three nurses directly involved in maternal death audit and maternal campaigns were interviewed. These include District Director of Health Services, Deputy Director of Nursing Service (Public Health) and one Principal Nursing Officer. In all, eight health staff were interviewed.

At the community level, five communities affected by maternal mortality within the last four years (2010 – 2013), according to the district data were selected for assessment. In each community, 25 women who are within the active reproductive age were selected for interview. In all, 125 women were interviewed. Simple random sampling method was used to select these women. In each community, any woman who falls within child bearing age was accessed and interviewed. This was continued until the required number was obtained. Beyond this, two community level FGDs were conducted. In each FGD, five (5) respondents were selected to participate in the discussion. The respondents were mainly community leaders (2), women group leader, one community volunteer and one person who have been affected by maternal mortality.

### **3.4 Data Type and Scope**

Data for this research focused on literature on the concept, procedures and processes, constitution of audit committees and approaches to addressing the identified issue. Data collected was therefore limited to information provided by various procedures and processes outlined in the literature review and classical procedures as shared from different countries.

### **3.5 Sources of Data and Methods of Data Collection**

The research relied on both primary and secondary source of data. The secondary data source provided key understanding of the concept and helps provide descriptive analysis of the study. Secondary information (both published and unpublished) relevant to the study were obtained from articles, journals, newsletters and institutional records, thesis, books, annual reports as well as the internet. Data from facility-based maternal mortality audit from Nsawam Hospital was collected as well as data from key health practitioners involved in maternal care.

Primary data was also collected during field research within the municipality. The researcher administered questionnaire to sampled participants for interviews. Focus group discussions were also used to gather information from community members to support qualitative analysis of the research. Appointments were made to meet the interviewees in their respective offices and communities and arrange for their time of convenience. During each interview, the researcher took down notes, which were transcribed after the field research for deeper analysis.

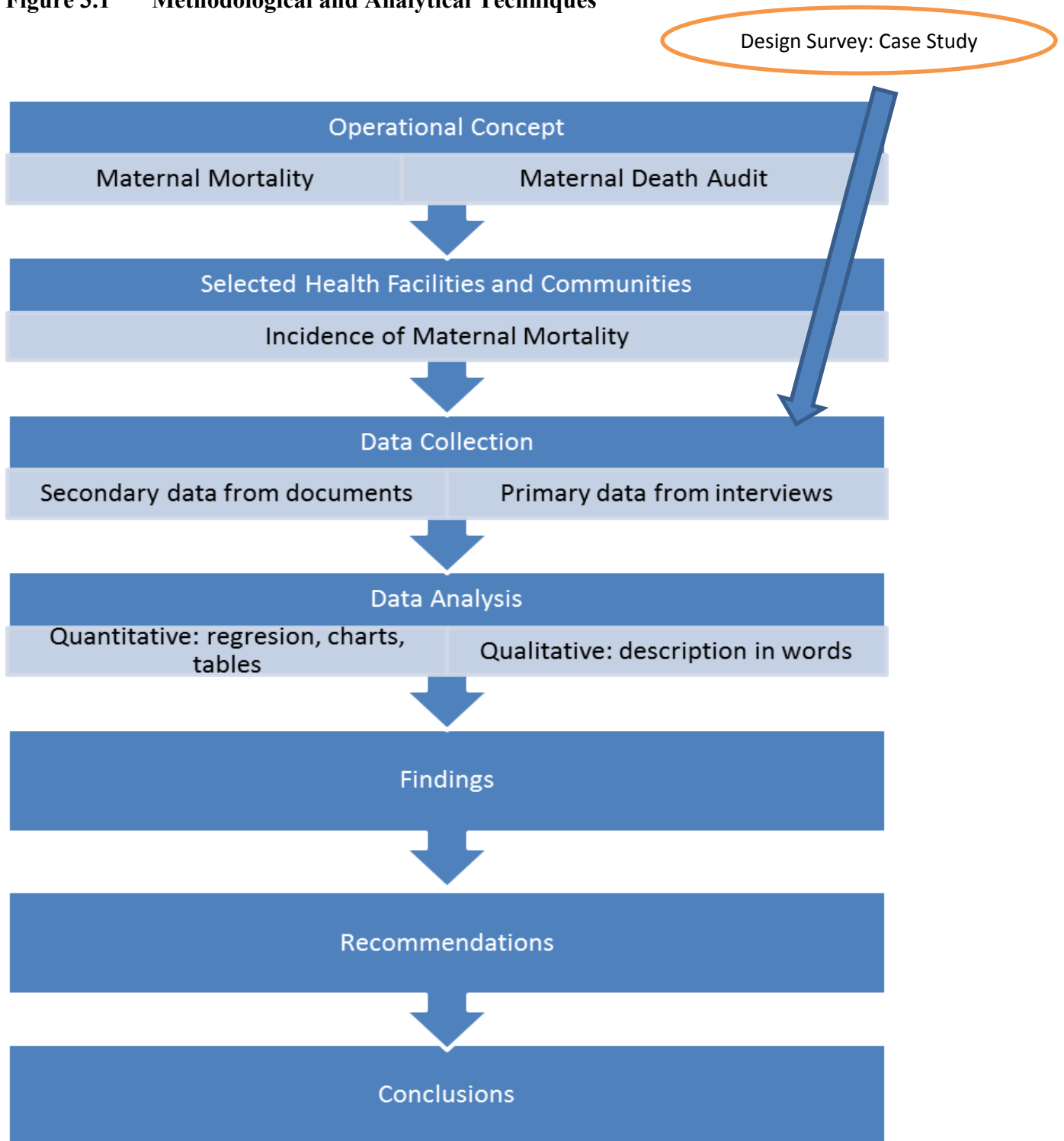
### **3.6 Data Collection Tools and Instruments**

The data collection tools that were employed in the research included the use of semi-structured questionnaire, interview guide, and a pocket notebook. The questionnaires were used to collect data from the five communities that have been affected with maternal mortality and the health personnel from the selected health facilities while interview guide was used to conduct the FGDs.

### **3.7 Methods of Data Analysis and Reporting Framework**

Data collected from both primary and secondary sources were collated, synthesized and analysed using both qualitative and quantitative analytical techniques. Tables, percentages, cross tabulation and graphs were used to present the quantitative aspect of the study. Quantitative tools like ratio were used to determine the maternal mortality ratio of the district. Descriptive analysis was used to explain the qualitative part of the research. To further describe the qualitative nature of the study, references are made to some respondents and quoted to buttress the point described in the analysis. The findings and recommendations of the analysis were deduced from the discussions. As adapted from Waugh (1995) analytical framework structure as presented below was used in the data analysis and conclusion. Figure 3.1 therefore is summary of the methodology and the analytical techniques that was adopted for the study.

**Figure 3.1 Methodological and Analytical Techniques**



Source: Adapted from Waugh (1995 p. 403)

### **3.8 Profile of the study area - Nsawam Adoagyiri Municipality**

The study was carried out in Nsawam Adoagyiri Municipality with focus on health. The municipality is endowed with different types of health facilities that engage in health service delivery and provide different kinds of services. The health service providers in the Municipality consist of public, private and Christian Health Association of Ghana (CHAG). The level of health facilities in the municipality are:

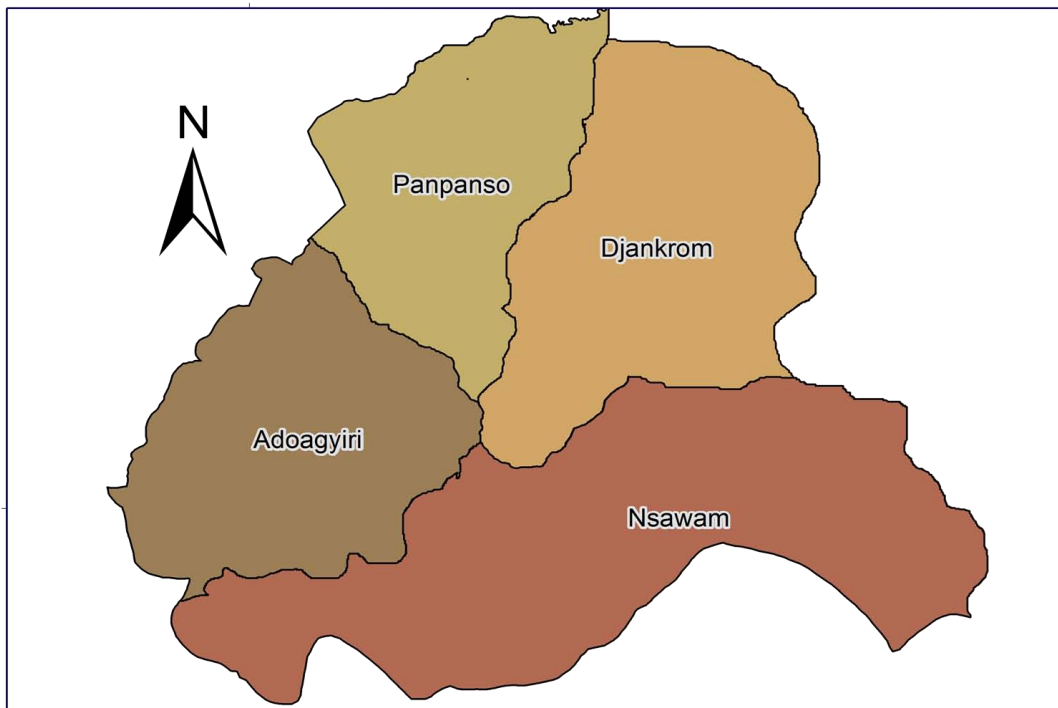
- Hospitals
- Health centres
- Clinics
- Community clinics or Community based Health Planning and Services (CHPS).

The Municipality has (1) District Hospital, (2) Private Hospitals, (2) Health Centres, (2) Private Clinics, (1) Christian Health Association of Ghana (CHAG) Clinic and (20) Community Health Planning and Services (CHPS) Zones. People from Akwapim South, Ga West, Ayensuano, and Upper West Akim districts come to the Nsawam Government hospital for health care services. It is one of the twenty six administrative Districts in the Eastern region of Ghana. It lies at the South Eastern part of the Eastern Region and covers a land area of about 205 sq/km. The Municipality before its separation by the Legislative Instrument (LI 1839) into two (2) in September, 2012 was called Akwapim South Municipality.

The former district was upgraded from District to a Municipality in January, 2008. In terms of spatial interaction, it is bordered to the south by the Ga West District in the Greater Accra Region and to the North by Ayensuano District, to the West by Upper West Akim District and the East by Akwapim South District. The Municipal capital Nsawam, is a gap town along the

main highway linking the coastal lands to the Northern part of the country that is the Accra-Kumasi Road. This provides opportunities for commercial activities in the town, particularly the marketing of bread, fried yam and pastries.

**Figure 3.2 The Map of Nsawam-Adoagyiri Municipality**



Source: Nsawam-Adoagyiri Medium Term Development Plan, 2014

The Municipality consists of Four (4) sub Municipals namely; Adoagyiri, Djankrom, Nsawam and Panpanso with about 120 communities. The current projected population estimated is Ninety One Thousand Two Hundred and Sixteen (91,216).

**Table 3.1: Projected Population distribution in the Municipality 2014**

SUB-MUNICIPAL	Proj. pop 2013	WIFA	Exp Preg	Chn 0-11 Months	Chn 12-23 Months	Chn 24-59 Months	Chn 0-59 Months	Adolescents
		24.4 %	4 %	4%	2.5 %	8.2 %	13.6 %	22.9 %
Adoagyiri	21,635	5,279	865	865	541	1,774	2,942	4,954
Djankrom	24,061	5,871	962	962	602	1,973	3,272	5,510
Nsawam	32,938	8,037	1,318	1,318	823	2,701	4,480	7,543
Panpanso	12,582	3,070	503	503	315	1,032	1,711	2,881
<b>TOTAL</b>	<b>91,216</b>	<b>22,257</b>	<b>3,649</b>	<b>3,649</b>	<b>2,280</b>	<b>7,480</b>	<b>12,405</b>	<b>20,888</b>

**Source:** Municipal Health Directorate Health Survey, 2013

The Akans form a significant number of the population. There are other tribes such as Ga Adangbe, Ewes as well as northern tribes. The religious groups in the municipality are Christians, Islamic and other diverse groups.

The major economic activity in the district is agriculture. Majority of the people engage in commercial farming especially in the area of pineapple, pawpaw, mango and other fruits that are exported. Some are also sent to the open market for sale. Bakery is also one area of commercial activity that people engage in. Nsawam is one the busy towns along the Accra-Kumasi road with a lot hawking activities along the road. The most common commodity being sold by these hawkers is bread, fried turkey tail (popularly called “tsofes”) and fried yam. The Municipality is endowed with fruit processing factories and these employ a significant number of people,

especially the youth. The Municipality has two (2) market days in a week i.e. Mondays and Thursdays at its capital Nsawam. Farmers, sellers and buyers from the Municipality and outside come to the market to sell or buy. During the market days the Nsawam Township becomes busy and that leads to traffic jam.

Weather conditions in the Municipality are generally cool. Lying in the wet semi-equatorial climate and with a double maximal rainfall recording an average annual rainfall of between 125cm and 299cm, the first rainy season is from May to June with the heaviest rainfall experienced in June and a second rainy season from September to October, accounting for the all year round farming practices of two farming seasons based on the rain-fed agriculture. The highest temperature averaging 30°C are recorded between March and April. With the lowest average temperature of 26°C recorded in August. Roads connecting to villages within Panpanso, Adoagyiri and Nsawam Sub-Municipals are mainly untarred.

Sources of water available to the people of Nsawam Adoagyiri Municipality are pipe born water, the Densu River, streams, ponds, borehole and sachet water. It has been established that the environmental conditions of the Densu River Basins leaves much to be desired. Economic development, farming near water bodies, encroachment and other human activities exacerbate the existing pollution problem, which subsequently affects the lives of inhabitants. These reflect on the number of water-borne diseases that are recorded at the hospital as captured in the hospital data. The major health burden of the Municipality are Buruli ulcer, malnutrition among children under five (5) years, high teenage pregnancy rate and food hygiene. Malaria, Upper Respiratory Infections, Skin Diseases, Rheumatism & Joints Pains and Diarrhoea diseases are the major conditions affecting the people in the Municipality.

## CHAPTER FOUR

### MATERNAL MORTALITY AND MATERNAL MORTALITY AUDIT, THE CAUSAL RELATIONSHIP WITH COMMUNITY'S PERSPECTIVE

#### 4.0 Introduction

In doing a descriptive analysis of maternal mortality and its related issues, it is important to review all units of enquiry to ascertain the veracity of the topic under investigation. AbouZahr (2011) maintains that addressing maternal mortality issues requires a vigorous analysis of the root cause of the problem and assessing the approach and tools required for addressing the problem. The research therefore analyse existing issues in relation to literature from other countries and presents the outcome of the research. The chapter discusses the prevailing issues within Nsawam Adoagyiri Municipality on maternal mortality and maternal death audit and how the audit and community assessment identifies the causes of maternal mortality, and audit trails and processes.

#### 4.1 Operational Definitions of concepts

In reviewing literature it was observed that maternal mortality, according to WHO is “the death of a woman while pregnant or within 42 days of termination of pregnancy or from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes, indirect or incidental” (Global Health Watch 3, 2011; pg 124). This is not different from the Nsawam Municipal Health Directorate in classifying what constitutes maternal mortality.

The World Bank (2011) defines maternal death audit as an in-depth systematic review of maternal deaths to delineate their underlying health, social and other contributing factors (WB, 2011). The Ghana Health Service in their maternal audit guideline defines maternal audit as a systematic quantified comparison against explicit standards of current medical practices in order to improve quality of care to clients. This definition is more of a medical audit and limits itself of the community involvement. The study revealed the community level of audit is termed as community investigation which helps to identify the socio-cultural factors that determines maternal death.

*The medical audit is clinical review of the dead to ascertain the main cause of death. This definition helps to differentiate facility-based maternal death from community-based maternal death. Facility-based maternal deaths are deaths that occur within a facility (hospital, clinic, etc) irrespective of the time of arrival of the woman while community-based maternal death occur in the house or at the community level (Senior Nursing Officer, Nsawam Government Hospital).*

#### **4.2 Maternal Mortality occurrence in Nsawam Municipality**

The research obtained data on maternal death within the municipality over a period of four years (from 2010 to 2013). Data were not available for the previous two years and therefore data for analysis was limited for the four years. The data collected were to define the mortality rate and do a comparative analysis with the national rate. The table 4.1 shows the facility-based maternal mortality occurrence in the municipality within the stated period. Again, the records available at the Nsawam Health directorate showed that all maternal death cases occur in the district hospital.

There was no record of maternal death in any of the other health facilities. This was explained in two ways;

- Some other health facilities including community health planning (CHP) compounds and private clinics provide maternal services like antenatal care and deliveries. However, maternal complications are referred to the district facility for higher level of care;
- The municipal hospital serves as the higher-level facility providing higher services to clients as compared to other facilities. In view of this, indigenes and other people outside the district prefer to have health care delivery in this facility than any other facility.

Data on community-based maternal death was not available at the health directorate. According to the Municipal Health Directorate it is always difficult to ascertain data on community-based maternal death because of cultural challenges. This explains one of the main deficiencies of obtaining data on maternal death in the country.

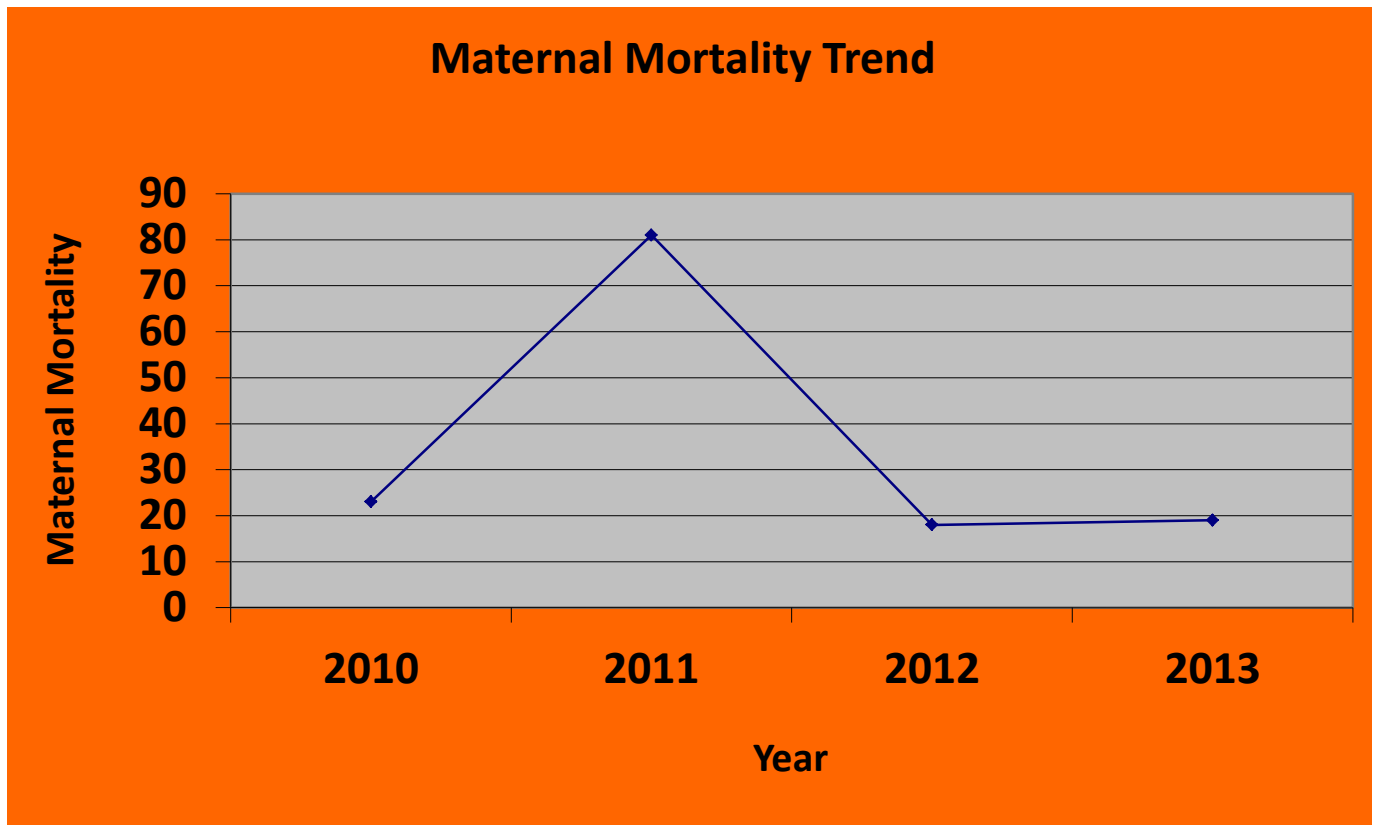
**Table 4.1 Facility-based maternal mortality in Nsawam-Adoagyiri Municipality (2010 – 2013)**

Year	Quarter I	Quarter II	Quarter III	Quarter IV	Total
2010	1	0	0	0	1
2011	2	0	1	1	4
2012	0	0	0	1	1
2013	0	1	0	0	1

Source: Nsawam Municipal Health Directorate, 2014

Except in 2011, maternal death occurrence in the districts has been relatively stable for the four year period. With this data, one might conclude that there is an improvement in the maternal health delivery in the district. However, as indicated above, the absence of community-level maternal mortality data at the district level makes it difficult to conclude on the performance of the district. Within the period (2010 – 2013), 20020 live births were recorded within the district ranging from 4329 in 2010, 4923 in 2011, 5618 in 2012 and 5150 in 2013. Between 2010 and 2012, Ghana has recorded national consistent maternal mortality figure of 350 deaths per 100000 live births and 380 deaths per 100000 live births. Nsawam-Adoagyiri Municipality recorded a relatively good maternal mortality as compared to the national data. The available data showed an institutional maternal mortality rate of 23 deaths per 100000 live births in 2010, 81 deaths per 100000 live births in 2011, 18 deaths per 100000 live births and 19 deaths per 100000 live births in 2013.

**Figure 4.1** Trend Analysis of Institutional/Facility-Based Maternal Mortality Rate of Nsawam-Adoagyiri Municipality (2010 – 2013)



Source: Researcher's Field Data, 2014

In Figure 4.1, the rate of maternal mortality for Nsawam-Adoagyiri municipality increased sharp from 22 maternal deaths per 100 000 live births in 2010 to 81 maternal deaths per 100 000 live births. However, the rate reduced immensely to 18 maternal deaths per 100 000 live births in 2012 and was relatively sustained in 2013. If the same strategies are sustained, the district will continue to witness low maternal mortality rate.

Based on the above data obtained from the district directorate, the researcher further followed up with these five communities which have recorded maternal mortality within the period under review. It was then observed that more than seven deaths (maternal) had occurred within the period. The community review as presented in table 4.2 showed that 10 maternal deaths have occurred within the period under review. However, not all the 10 deaths occurred in the Municipal Hospital. In comparing this with the district data, one might conclude that the additional three deaths occurred in the community. This was not the case. Two out of the three occurred at the regional hospital. The other one occurred at the community level. Some community members prefer services provided by regional facility as higher than district level.

In the table 4.2, 10 out of 125 women interviewed indicated that they have been affected by maternal death. To be able to ascertain the actual maternal occurrence, the researcher ensured that only one woman from a particular household or family was interviewed.

**Table 4.2: Maternal Death as reported by Community Members**

**Maternal death at community**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	10	7.8	8.0	8.0
Valid No	115	89.8	92.0	100.0
Total	125	97.7	100.0	
Missing System	3	2.3		
Total	128	100.0		

Source: Researcher's Field Data, 2014

### **4.3 Causes of Maternal Mortality**

Both the facility-based data and community level analysis have shown that maternal mortality occurred during the period under review. Though there are disparities in the number of deaths that occurred at the facility level and at the community, they all indicate that maternal death occurred within the four year period. This section therefore discusses the causes of maternal mortality as identified at the two levels.

#### **4.3.1 Facility-based Assessment of Maternal Death Causes**

Within the period under review, it was observed that maternal death audit was carried out for the seven deaths recorded in the districts. This, in essence, was to identify the causes of maternal mortality. Mensah (2008) maintains that every death of a woman during pregnancy or after 42 days of pregnancy is a special case. According to Ghana Health Service's Reproductive and Child Health Unit (2002), "*complications of pregnant, childbirth and unsafe abortion are the major causes of death for women in reproductive age in Ghana*". The document further mentions that there are two main causes of maternal death; direct cause or indirect cause. The leading causes of facility-based maternal mortality as was observed during the review within the municipality are sepsis, haemorrhage, hypertensive disorders of pregnancy, obstructed labour and abortion complications. These causes were determined based on the maternal audit conducted by the district health directorate. (Details of maternal death audit is discussed later).

### 4.3.2 Community-level Assessment of Maternal Death Causes

Following the data received from the District Health Directorate on reported maternal death cases, a community-based assessment was carried in all the five communities. The survey was to ascertain the main causes of the maternal death in the community's perspective. As discussed in Chapter 3, 125 community women were interviewed to ascertain the causes of maternal mortality. Also two FGDs were conducted with ten people participating to better understand the reasons behind the causes of maternal mortality. Seventy-two percent of the respondents are rural dwellers while urban respondents represent twenty-nine percent. In terms of age bracket, 15-24 age bracket was noted to be active in maternal issues as compared to the other age bracket especially in the rural areas than in urban areas as presented in the table 4.3. This explains the high rate of teenage pregnancy in the district as reported in the district health annual report, 2013.

**Table 4.3 Age Bracket as against Location of Women**

Description	Location of mother		Total	
	Rural	Urban		
Year bracket				
	15-24	45	14	59
	25-34	36	12	48
	35+	8	10	18
Total		89	36	125

Source: Researcher's Field Data, 2014

On the issue of marriage, it was observed that 64.8 percent of the respondents were married while 21.6 percent and 13.6 percent are single and divorced respectively. Fifty-nine percent of the respondents are unemployed and this raises a lot of concern especially in seeking maternal care services. The unemployment rate among respondents is relatively higher in urban areas (69.4 percent) than in rural areas (30.6 percent).

Another observation during the survey was the high rate of mothers who do not seek antenatal care during pregnancy. In analysing the table 4.4, it can be noted that 24.4 percent of women respondent on the rural areas did not seek antenatal care. These women, according to the survey, resort to traditional methods. More worrying is the number of women who are in the urban areas and are not seeking antenatal care during pregnancy. Six women out of the 32 women who have delivered before in urban areas did not seek antenatal care. It must be noted that all these factors have a role to play in causing maternal mortality.

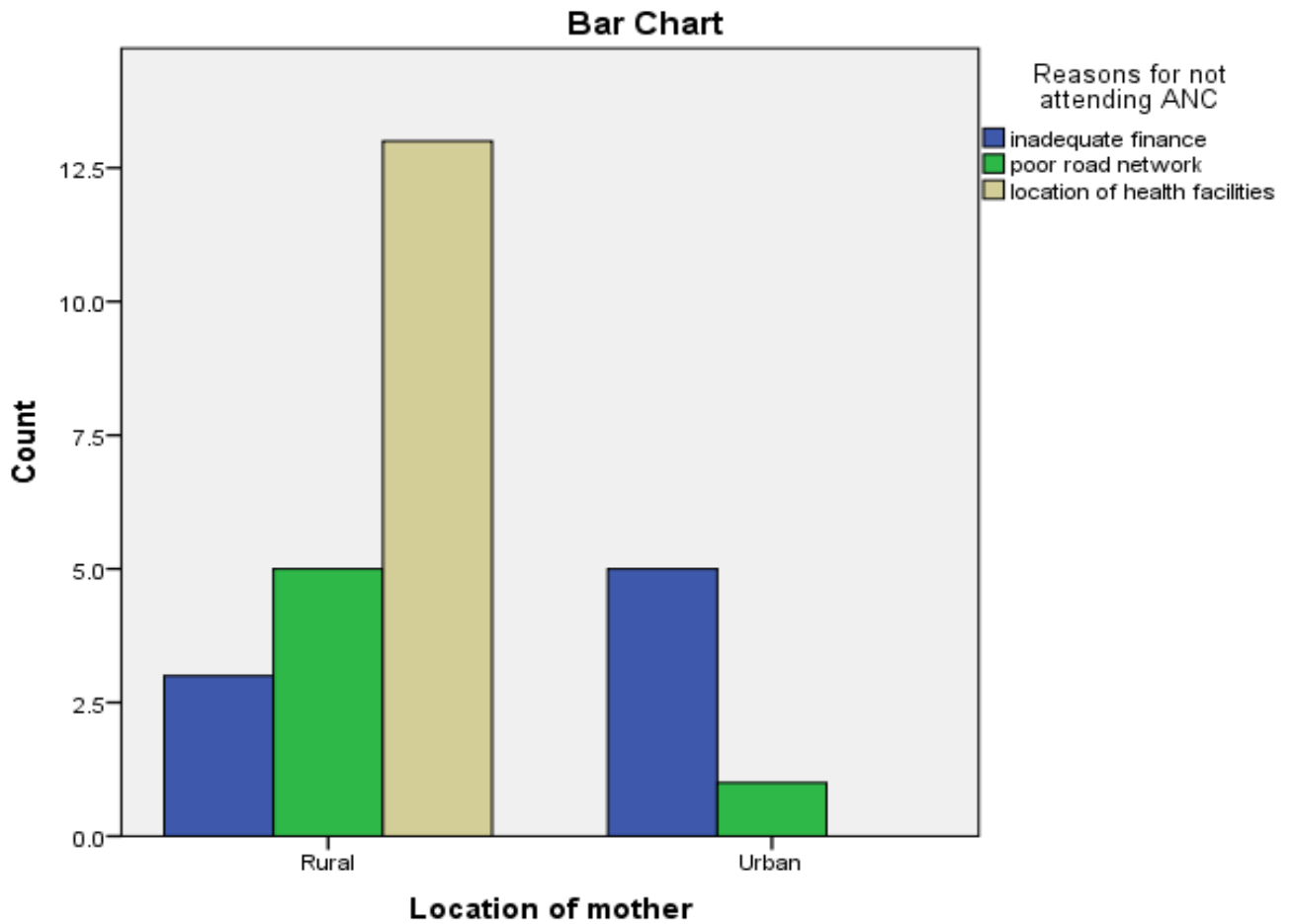
**Table 4.4 Women participation in antenatal clinics**

		Seeking antenatal care			Total
		yes	No	N/A	
Location of mother	Rural	65	21	3	89
	Urban	26	6	4	36
Total		91	27	7	125

Source: Researcher's Field Data, 2014

The survey observed that the reasons for not attending antenatal care differ with location of the respondents. This is explained in Figure 4.2.

**Figure 4.2**                      **Reasons for not attending ANC**



Source: Researcher’s Field Data, 2014

In the bar chart above, it is noted that among the rural folks, the location of the health facility is the main reason for not attending antenatal clinic. Most of health facilities are located far from the communities. The location of the health facility alone wouldn’t have being a major concern. However, the visit to the clinic has been affected by poor road networks and more especially the

financial strength of the women to travel from the village to the district capital for ANC. For the urban folks, it is mostly the issue of finance. From the reasons given by the urban respondents, two clear issues comes into play:

- Either the respondents are not aware of the government’s policy on free maternal health care; or
- The free maternal health care policy is not working and pregnant women are always to pay for their visits.

Respondents seeking antenatal care also have their challenges in reference to the service they required. The table below presents the various challenges enumerated by the respondents as they access maternal health care services at their respective ANC sites.

**Table 4.5 Challenges Pregnant Women faced at Antenatal Clinics**

	Description	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absence of health workers	16	12.5	17.6	17.6
	lack of medication	7	5.5	7.7	25.3
	poor attitude of health workers towards pregnant women	12	9.4	13.2	38.5
	delays in service delivery	49	38.3	53.8	92.3
	Other	7	5.5	7.7	100.0
Missing	Total	91	71.1	100.0	
	System	37	28.9		
	Total	128	100.0		

Source: Researcher’s Field Data, 2014

From the above table, it is observed that more than half of the respondents who attend ANC complain of delays in service delivery at the various health facilities by health staff. In general, the attitude of health workers towards pregnant women and work within the study area is something that needs further research and assessment. This research shows that about 84 percent of the respondents have challenges with the services provided at the facilities. This again reflects the general thought on one of the three main causes of maternal mortality (as explained latter in this section).

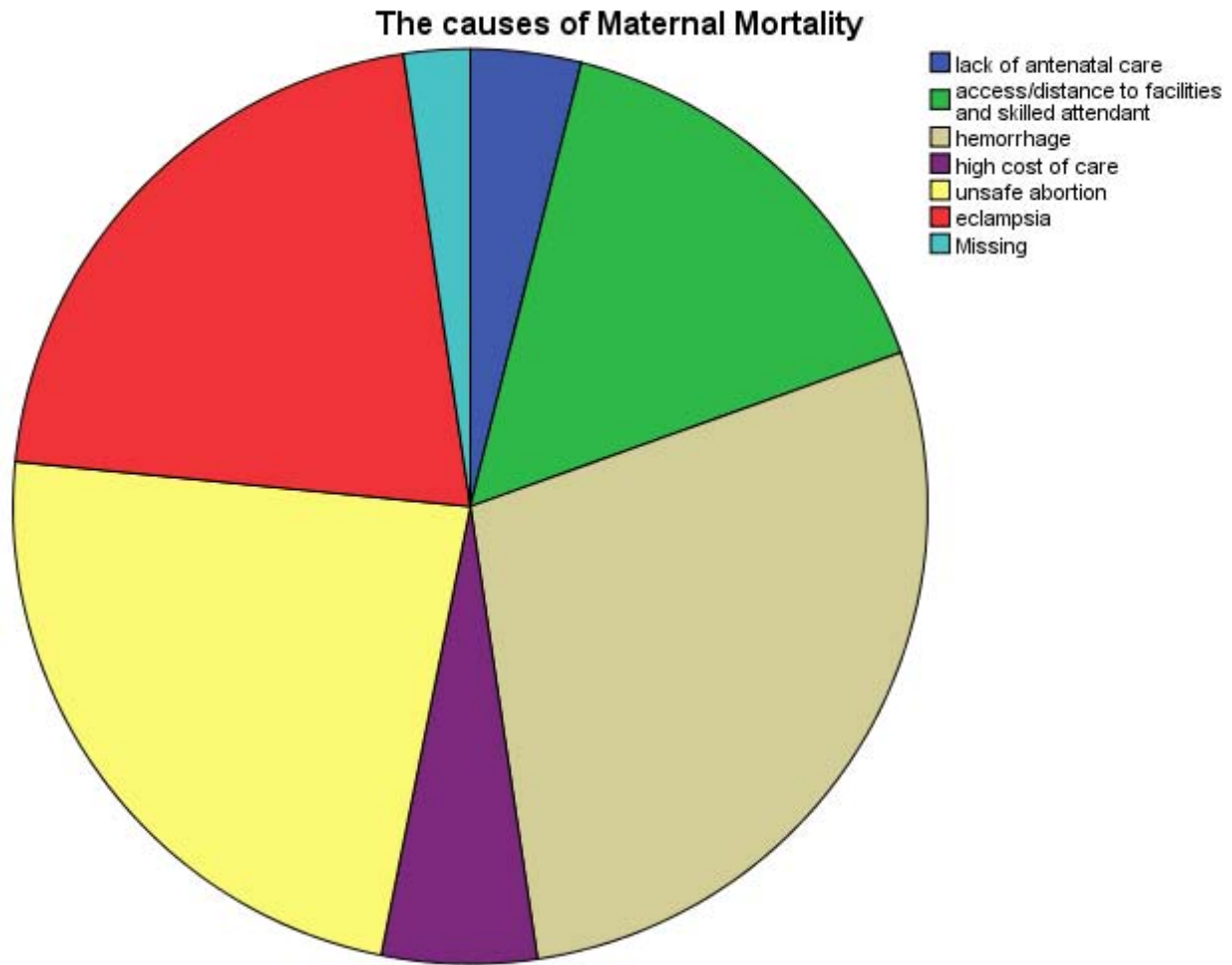
In furtherance to the above discussions, the research enquired about respondent's understanding of the causes of maternal mortality in their communities. The table and the pie chart below presents the views of the respondents.

**Table 4.6 Causes of maternal mortality; respondent's view**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid lack of antenatal care	5	3.9	4.0	4.0
Valid access/distance to facilities and skilled attendant	20	15.6	16.0	20.0
Valid Hemorrhage	36	28.1	28.8	48.8
Valid high cost of care	7	5.5	5.6	54.4
Valid unsafe abortion	30	23.4	24.0	78.4
Valid Eclampsia	27	21.1	21.6	100.0
Valid Total	125	97.7	100.0	
Missing System	3	2.3		
Total	128	100.0		

Source: Researcher's Field Data, 2014

**Figure 4.3 Causes of maternal mortality; respondents' view**



**Source: Researcher's Field Data, 2014**

According to the respondents, the three leading causes of maternal mortality in the various communities are hemorrhage, unsafe abortion and eclampsia. Access and distance to health care facility for ANC is another leading cause of maternal mortality in the district. This is not surprising to observe knowing from the discussions earlier that one major challenge especially for the rural women in accessing health care facility is the distance to the facility.

### 4.3.3 Comparative analysis of the causes of maternal mortality with other findings

The two perspectives – facility based assessment and community follow up have shown that the leading causes of maternal mortality in the district are haemorrhage, eclampsia, unsafe abortion and largely, distance to the facility of health care. This is similar to the Jos Teaching University report (discussed earlier) which showed eclampsia, haemorrhage, unsafe abortion and infections as the main direct causes of maternal mortality. Additionally, in a study conducted by Ujah (1999), causes of maternal mortality in Sub-Saharan Africa were identified as similar as what this study reveals although the order of frequency may vary.

The discussions above have revealed the main causes of maternal mortality in Nsawam Adoagyiri Municipality. WHO (1999) explained that the major causes of maternal mortality especially in developing countries are summarised into three major causes and this is termed as the “*three-delay model*”. The three-delay model is explained as follows:

- **Delay in decision to seek care** which comprises of low status of women, poor understanding of complications and risk factors in pregnancy and of when medical interventions are needed, previous poor experience of health care, acceptance of maternal death and financial implications
- **Delay in reaching care** which is more related to access and distance to health centres and hospitals, availability of and cost of transportation and geography of the area
- **Delay in receiving adequate health care** and is determined by poor facilities and lack of medical supplies, inadequately trained and poorly motivated medical staff and inadequate referral systems

These delays reflect the main causes of maternal mortality in Nsawam Adoagyiri for both facility and community levels. According to Deputy Director of Nursing Services “*community’s understanding of risk and complications of pregnancy and when medical interventions are needed is very limited and diverse opinions are expressed on the essence of clinical care during pregnancy*”.

The causes of maternal mortality as discussed above explains the research conducted by Cook et al (2001) as discussed in Global Health Watch Report, 2011. The report identifies three main causes of maternal mortality as medical causes consisting of direct medical problems, health system laws and policies that affect availability and quality of service and socio-legal conditions. The study therefore confirmed that all maternal death audits conducted by Nsawam Hospital and for that matter Nsawam-Adoagyiri Municipal Health directorate establishes cause of maternal death of all recorded cases. The next session therefore discusses the processes involved in conducting maternal death audit with a comparative analysis as per systems in other countries and standards by WHO.

#### **4.4 Maternal Death Audit Process and Procedures**

Maternal audit as discussed above is a valuable tool for monitoring the standards of client care being delivered by doctors, midwives and other members of the health team at different levels of health delivery system. It was noted that “*the audit is needed for setting standards for provision of care*” (Mrs Esther Duah Oyinka, Municipal Health Director, Nsawam-Adoagyiri Health Directorate). Different sources of information are needed for enhancing audit. The Municipal Health Director also maintained that “*the audit is aimed at achieving three main results:*

- *Evaluate services and provide feedback*
- *Plan and formulate policies for the improvement of maternal health services*
- *Improve recommended strategies and policies”*

#### **4.4.1 The Procedures for reporting maternal death in the Municipality**

The research revealed two main channels for reporting maternal death cases

- a. Facility-based procedures/channel
- b. Community-based procedures/channel

The Medical Superintendent of Nsawam Hospital explained the procedure for reporting the facility based maternal death and this was confirmed by the municipal health directorate as follows;

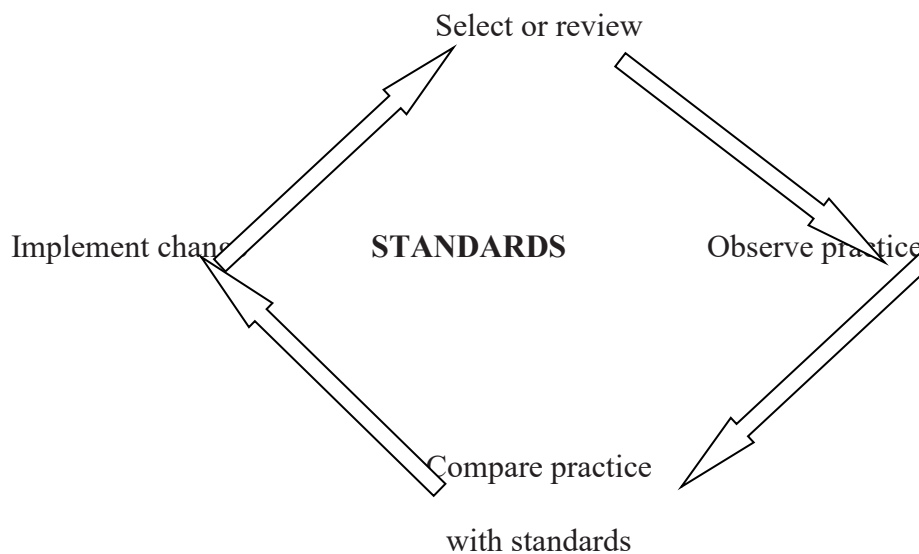
- An oral or verbal report is made to the district by the facility within 24 hours of incidence and this is communicated immediately to the region through the district
- Maternal death case notification form (Appendix IV) is completed by the facility and submitted to the district within the same 24 hours period. The maternal death case notification form highlights key factors as name of patient, district of case, age and date of birth of the deceased, traceable address and antenatal records. The district, upon receiving the form submits to the region.
- The region therefore authorizes the district to commission an enquiry or audit into the death to ascertain the cause of death.

#### 4.4.2 The Audit Cycle

In earlier discussions on the audit cycle it was observed that the cycle differs with country. However, the concept for the audit remains almost the same. For instance, in Ethiopia, maternal death audit is considered a surveillance-response system. In that system or cycle, four stages are discussed: identification of death, reporting of death, review of death and response action (MoH, Ethiopia, 2012). Sri Lanka’s surveillance cycle of maternal death has five stages; identify individual cases, collect accurate information, analyse information collected, implement recommended action and evaluate, refine and take action (MoH, Sri Lanka, 2001).

In Nsawam-Adoagyiri Municipality, the health directorate as a decentralized structure of Ghana Health Service adopts and works within the Ghana Health Service’s audit system. The cycle discusses four steps/stages. It is important to note that these steps are based on standards the health system operates on. The four stages are described in the cycle below.

**Figure 4.4 Ghana Health Service Standard Audit Cycle**



Source: Ghana Health Service, 2002

As in the case of Ethiopian surveillance-response system, the above cycle establishes the framework for accurate assessment of the magnitude of women's death related to pregnancy and how medical practice influence the cause of death. The essence of the assessment also helps policy makers and decision makers to be more proactive in giving attention maternal health deserves.

In view of the above, the Ministry of Health strongly recommends the formation of audit committees and audit guidelines at all health institutions especially first and second referral levels (District and Regional Health facilities).

#### **4.4.3. Maternal Death Audit Committee in Nsawam Hospital**

Dilen van (2007) postulates the idea of maintaining a small and workable committee as possible and that each member is active participant. It must be noted here that the essence of the audit (to establish the cause of death) highly depends on this committee and therefore it is equally important to select people who qualified to present a credible report for decision making. In Nsawam-Adoagyiri Municipality, maternal death audit is carried out by the following team members as mentioned by Municipal Health Director

- a) The Medical Superintendent of Nsawam Hospital;
- b) The Municipal Health Director of Health Services;
- c) Hospital Administrator;
- d) Hospital Matron (DDNS/General Nursing);
- e) Municipal Public Health Nurse (DDNS/PH);
- f) In-charges of clinics/health centres;
- g) Clinical Coordinator/gynaecologist;

- h) Medical Doctor present at maternity ward during maternal death; and
- i) Head of Pharmacy

The GHS guidelines mention the Head of Maternity Unit as the chairperson of the committee. However, in Nsawam Adoagyiri Municipality, the Medical Superintendent chairs the committee. Because of its permanent nature, the committee is only briefed about the incidence and begins their work. In discussing the procedures for reporting maternal death occurrence, the region was mentioned as the next level of authority who receives the notification form from the municipality. In view of this, the research found out that the region also conducts audit into the maternal death in the district. However, not all deaths have received regional review. Upon receiving the audit report from the districts, the region conducts audit into deaths that are noted to be more complicated and has a lot of issues surrounding the death. Cases of this nature draw specialist and personnel from different districts into the district of concern. The regional team (which conducts the audit review at both regional and district facilities), according to the research, was found to comprise of the following;

- a) Department Head (obstetrician, gynaecologist if possible)
- b) Medical officers
- c) Midwives in the obstetrics and gynaecology department
- d) Public health nurses
- e) Pathologist if possible
- f) Hospital matron
- g) Hospital administrator
- h) Head of pharmacy

#### 4.4.4 Mandate of the Committee and Data collected and audit processes

Brennan et al (1991) explained that the move to conduct root cause analysis is largely motivated by growing recognition that the complexity of health care and health delivery drives the incidence of adverse events unacceptable high. The essence of conducting root cause analysis is to:

- Determine what happened;
- Determine why it happened; and
- Figure out what to do to reduce the likelihood that it will happen again

Learning from this concept presented by Brennan et all, the audit committee by Nsawam-Adoagyiri Health directorate *“is mandated to review all maternal deaths at the facility. In this case, each death is reviewed separately as and when it occurs. The audit begins within 24hrs of occurrence and must be completed within 72hrs of start. The committee*

- a) Determines what happened through sample interviews and questioning*
- b) Analyse why the death occurred through clinical methods and questioning*
- c) Document all findings and discusses strategies for averting such occurrence*
- d) Provide input into any future revisions of the audit forms and guidelines (Municipal Health Director, Nsawam-Adoagyiri Municipality).*

To be able to achieve this result, the committee collects data pertaining to the circumstances leading to the death from health personnel who attended to the deceased (at the facility where the woman died as well as other referring health facilities), to relatives who accompanied the deceased to the facility. This allows local lessons learnt to be utilized in adapting safer clinical practice. Data is therefore collected on the following:

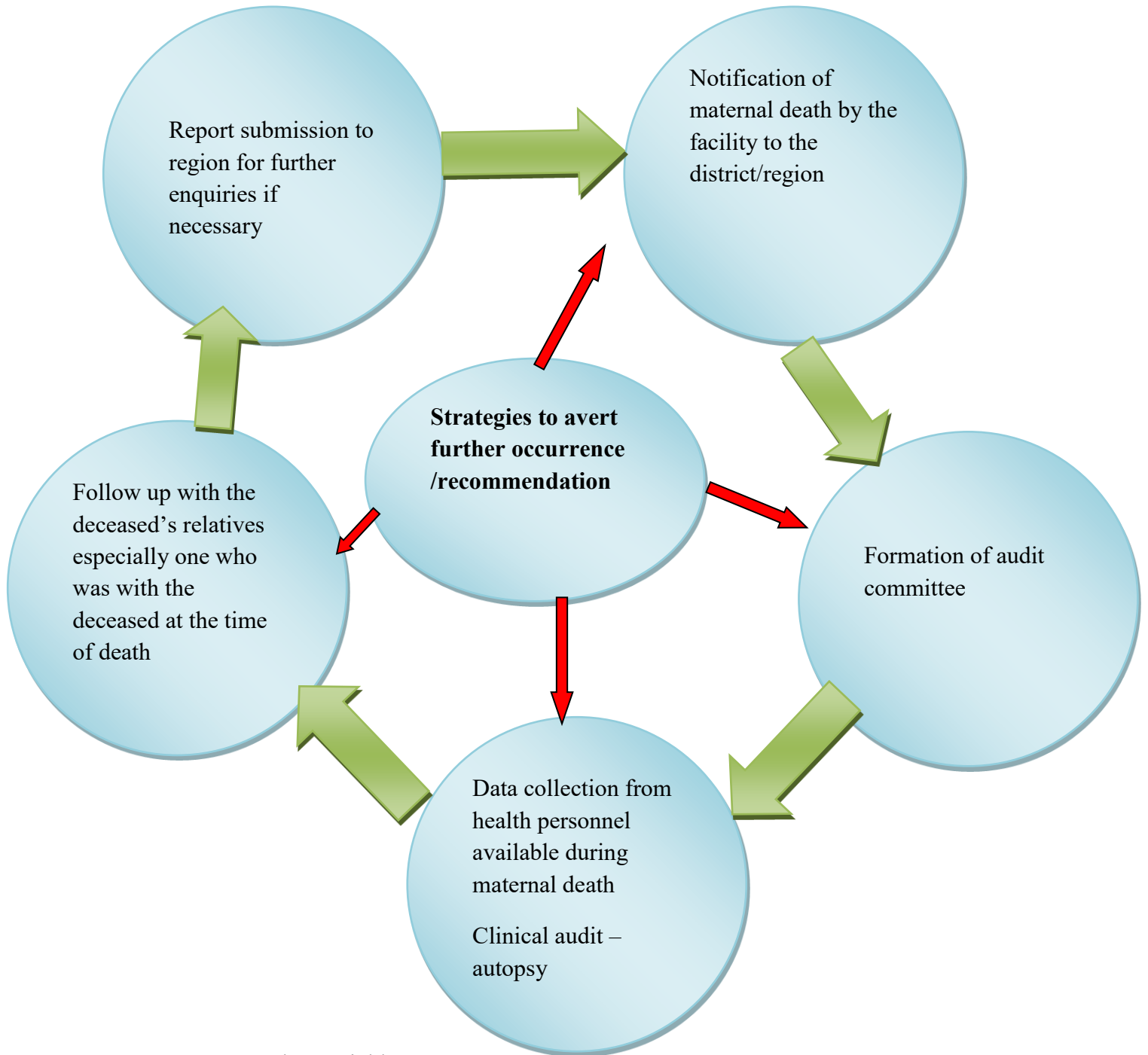
- Name of client; Age; Parity; Gravidity; Maturity of pregnancy (gestation age) and date and time seen at health facility.
- The rest are date and time of death; Antenatal clinic attendance; Location of delivery – if death occurred during delivery or after delivery; cause of death and antenatal risk factors.
- History of pregnancy; Educational background; occupation of the deceased and husband; and the measures/interventions put in place before the death occurred – medication and nursing procedures

On the cause of death, data is collected on three different contributing factors; technical, managerial and others (not limited to socio-cultural factors). Recommendation is provided at the end of collecting all these data for future action. For instance, in one of the audit held on 29<sup>th</sup> August, 2011, it was observed that the client had undergone two previous caesarian sections (CS) in labour. The client however, did not inform the health team. The client was also not informed of another CS. Meanwhile, the blood pressure (BP) on admission had risen to 220/130. The medical doctor on duty also indicated that the client had not been seen in any ANC days. The team concluded that the possible cause of the client's death was severe pre-eclampsia with acute renal failure. The audit committee therefore recommended that health workers should be given enough training on pregnancy related risk and its related complications (GHS, Nsawam-Adoagyiri Health Directorate, 2011).

Feedback is given to the team for assessment and conclusion. The essence of the community-based audit is to provide valuable information on other actions at the community level, including education and transport that might save women's life in future. The study also revealed that

during the audit, the data collection process is non-judgmental, not fault finding but helps to provide information for improving obstetric care.

**Figure 4.5 Maternal Death Audit Process and Feedback, Nsawam Health Directorate**



Source: Researcher’s Field Data; 2014

#### **4.4.5 Ethical Considerations**

The Ministry of Health has provided the committees undertaking maternal death audit a legal backing through the establishment of Maternal Health/Death Audit Guidelines, 2002. In this regard, the Nsawam-Adoagyiri Health Directorate ensures that all maternal audits follow the guidelines provided by the Ministry and Ghana Health Service. Members of the audit committee are mandated to keep all findings confidential by signing in to a consent form. The report is submitted to the region and information in the report is kept confidential. Relatives of the deceased are assured of confidentiality of the process.

#### **4.5 Measures to improve on maternal health care delivery in Nsawam-Adoagyiri**

##### **Municipality – Strategic Response**

The discussions so far have revealed that maternal death audit coupled with community assessment is essential in identifying the main causes of maternal mortality. It helps any health facility and for that matter the health directorate to draw mitigation plan in resolving the problem. The district and the community members have institute measures to address the three levels of delay in causing maternal mortality in the district.

##### **4.5.1 Delay in decision to seek care**

This delay occurs as a result of inadequate or absence of information on pregnancy related complications and risk. The Nsawam Health Directorate through its Public Health Unit has instituted community level campaigns through durbars, church and mosque education and radio programmes. This is to sensitize community members on the need to attend ANC during pregnancy. The sensitization is focuses on nutritional status of the pregnant women. Community

volunteers have also been trained to provide community-level education in the absence of health professionals.

#### **4.5.2 Delays in reaching care – accessibility**

The absence of transport services and health facilities at the community level and the poor nature of road network restrict some women to access health care during pregnancy. For the avoidance of walking long distances to seek maternal health care, pregnant women resort to traditional methods thereby increasing the risk of delivery. The district has therefore instituted two main measures/approaches to curb the situation

- a) Introduction of community emergency transport system (community ambulance service).

In each of the rural communities where access to health facility is limited, the communities through the chiefs and elders have identified two responsible taxi drivers who reside in the community. The drivers are tasked with the responsibility of transporting pregnant women to the nearest health facility in case of an emergency. To aid this, the telephone numbers of these drivers are provided to any woman who is confirmed pregnant by community health volunteers to call any of the drivers when needed. These drivers have accepted the task and have agreed with community members the approved rate for undertaking such an activity to avoid any negotiation and further delays. *“This has really helped to improve maternal health care delivery in the district”* (Senior Nursing Officer, Nsawam-Adoagyiri Health Directorate).

- b) Mobile community health care delivery. This is an initiative of the Ghana Health Service to provide health care services at the door step of each Ghanaian. Here, community health

nurses on monthly basis visits rural communities to provide maternal and child health care services to women and children.

#### **4.5.3 Delay in receiving adequate health care**

This is caused by poor facilities and lack of medical supplies, inadequately trained and poorly motivated medical staff and inadequate referral systems. As indicated in one of the audit reports, the committee recommended that health personnel in the district be given refresher training on pregnancy and its related complications and risk. The research found out that these trainings have been organized periodically by the district health directorate. According to Municipal Health Director, health personnel are trained to save lives and not vice versa. Therefore, any means possible by which health personnel can save a life is instituted by the district to ensure that the district does not record any facility-based maternal death irrespective of the time the client visits the facility. Notwithstanding, the district is challenged with funding to conduct periodic trainings especially for new staff.

#### **4.6 Conclusion**

Discussions so far have revealed all the processes and procedures involved in undertaking a maternal death audit and how the audit relates with the causes of maternal death. Additionally, the research followed up with community assessment to establish/affirm the causes of maternal mortality as identified during the audit. Assessment has also been done on the various levels of audit making a comparative analysis with other countries where similar audits have been conducted. The session has also discussed the strategies adopted by the districts in mitigating any further occurrence in the district.

Additionally, the discussion has shown that maternal mortality records within the district are mainly facility-based. Community-based maternal deaths are unavailable making it difficult to assess the true picture for the district.

## CHAPTER FIVE

### MAJOR FINDINGS, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

The preceding chapter has presented situational analysis of the study area (Nsawam-Adoagyiri Municipality) in relation to maternal mortality causes as per communities' view and maternal mortality audit. The section discussed various components of the study and assessed the relationship that exists between maternal mortality audit and the causes of maternal mortality. This section therefore outlines the key findings of the research and discusses the implications of the findings. Policy recommendations to improve on maternal audit processes to better address issues of maternal death are presented in this chapter.

#### 5.2 Major Findings and Implications

The major findings of the analysis of the study are sub divided into three. The findings are grouped under maternal mortality occurrence, causes of maternal mortality and maternal audit and its processes.

##### 5.2.1 Maternal Mortality Occurrence in Nsawam Municipality

The research observed the following findings in relation to maternal mortality in the district.

- Maternal mortality data was only available for the district hospital. The district health directorate have no records of maternal death occurring at the community

level. Again, records at the Nsawam Health Directorate showed that all maternal death cases occur in the district hospital.

- The municipal hospital serves as the higher-level facility providing higher services to clients as compared to other facilities. In view of this, indigenes and other people outside the district prefer to have health care delivery in this facility than any other facility.
- For the period under review in this research, seven facility-based maternal deaths were recorded with 20020 live births. This gives a maternal mortality rate of 35 deaths per 100000 live births for the period under the review. In 2010, 23 maternal deaths were recorded per 100000 live births. The rate increased to 81 deaths per 100000 live births in 2011 but declined to 19 deaths per 100000 live births in 2013. The district however recorded a low maternal mortality rate (facility-based) lower than the MDGs target of 185 deaths per 100000 live births by 2015. If the trend is maintained and the strategies adopted are implemented consistently, the rate is likely to reduce further.
- In community follow-up assessment, it was observed that 10 maternal deaths had occurred in the district, three more than the reported cases at the district hospital. Two of such cases occurred at the regional hospital while the other one occurred in a community. This variation in data explains the difficulty in analysing a true picture of maternal mortality rate in a Nsawam-Adoagyiri district for a given time.

### **5.2.2 Causes of maternal mortality**

The research conducted two levels of review to ascertain the causes of maternal death – facility based assessment through audit review and community follow up. During these two reviews, the following issues were observed:

- Maternal deaths occur either through a direct cause or indirect cause. The leading direct causes of maternal mortality found in the study include eclampsia, haemorrhage, obstructed labour through unsafe abortion and distance to health facility. The indirect cause of maternal mortality was identified to be anaemia. This has a relation with the nutritional status of some women during pregnancy. It is therefore important that any strategy that addresses maternal mortality should consider providing comprehensive education on maternal care including nutrition.
- Three main levels of delay were identified as the processes leading to maternal death; delay in decision to seek care which comprises of poor understanding of complications and risk factors in pregnancy, delay in reaching care with access to and distance to health centres and hospitals as the main factors and delay in receiving adequate health care and is determined by poor facilities and inadequately trained and poorly motivated medical staff and inadequate referral systems.

### **5.2.3 Maternal Mortality Audit**

The study observed the following findings under maternal mortality audit in the district

- In the occurrence of maternal death, an oral or verbal report is made to the district by the facility within 24 hours of incidence and this is communicated immediately to the region

through the district. Maternal death case notification form is completed by the facility and submitted to the district within the same 24 hour period. The region therefore authorizes the district to commission an enquiry or audit into the death to ascertain the cause of death.

- The Nsawam-Adoagyiri Health directorate forms a nine-member audit committee in the occurrence of maternal death in the district. Maternal audit begins within 24hrs of maternal death and must be completed within 72hrs of start. The committee determines what happened through sample interviews and questioning, analyse why the death occurred through clinical methods and questioning, document all findings and discusses strategies for averting such occurrence.
- To ascertain the causes of maternal mortality, the audit collects data on three different contributing factors; technical, managerial and others (not limited to socio-cultural factors). The maternal history of the dead woman is collected together with parity and age of pregnancy.
- The Nsawam Health Directorate has initiated strategies to address the three delays in maternal health service: community campaigns through durbars, church and mosque education and radio programmes on maternal health; introduction of community emergency transport system (community ambulance service) to address the problem of accessibility; and periodic training and provision of equipment and materials is outlined as key measures to address the third delay of receiving adequate health care

### 5.3 Conclusion

Childbirth is mostly a great experience and the joy and excitement for most communities is exceptional. However, the various complications of pregnancy and childbirth make it undesirable. Women die out of preventable deaths while the causes of these preventable causes are not determined. The effective way of addressing the root cause of all maternal deaths is to carry out an effective maternal death audit. This research has therefore showed how maternal death audit identifies the causes of maternal mortality and how this is collaborated with community involvement. However, community level maternal deaths which explain socio-cultural happenings are limited in data. This research has therefore outlined key findings and made recommendations to achieve a zero maternal mortality rate in the district. It is hoped these recommendations, if implemented by the district health directorate, will ensure a continuous decline of maternal mortality and promote effective health care delivery. Further research could be done to unravel the socio-cultural hindrances to maternal health care delivery and further comparative analysis could be done with other districts to present different perspective of the causes in different districts.

Additionally, the research outlined the three levels of delays affecting maternal mortality. These delays when addressed, would improve maternal delivery in the district. As indicated in the research, further research requires to be done on the attitude of nurses towards clients (pregnant women and lactating mothers). The research should focus on quality improvement services and how health staff contributes to the achievement of quality satisfaction among women.

## **5.4 Recommendation**

As the study has shown, there are prevailing issues that should be addressed in order to ensure further reduction of maternal mortality in the district. The research therefore makes the following recommendations based on the analysis of data from the field:

### **5.4.1 Maternal Mortality Occurrence**

- Absence of data on maternal mortality at the community is a worry for national fight against maternal mortality. The Nsawam-Adoagyiri Health Directorate through the Public Health Unit should strengthen its structures on the ground to be able to report all maternal death cases in the community. The unit is mandated to undertake all maternal related issues at the community.
- Community participation should be encouraged through the use of community health volunteers to support community health nurses in providing community education. Through these volunteers, a reporting channel should be instituted to ensure that all public health related issues are reported to the district through community health nurses.
- The fight against maternal mortality should be a collaborative effort with all stakeholders. The Nsawam-Adoagyiri Health directorate should collaborate with Health Non-Governmental Organisations (NGOs) in the district through Ghana Coalition of NGOs in Health for effective community mobilization and identification of health related issues in the district.

#### 5.4.2 Causes of Maternal Mortality

- Periodic community education and sensitization should be carried out by the Public Health Unit especially in small communities where access to health care is limited to increase community's knowledge on maternal health and its related issues. Monthly community-based outreaches and child welfare clinics instituted by GHS to serve small communities should be continued and strengthened to serve both women and children. In addition to that, the district should provide information vans to support community education on maternal issues and other public health issues.
- The promotion of family planning methods (FPM) is another measure of reducing maternal mortality. This is one of the key strategies promoted by WHO to ensure the achievement of MDG 5. Women visiting antenatal services should be encouraged to accept FPMs. FP promotion should also be carried through community outreaches. The challenge with the FP uptake is the issue of low
- Community emergency transport services initiated by the district should be carried out in all communities. Midwives within the various CHPS compounds should liaise effectively with community women groups and health volunteers to ensure effective and quick transportation of emergencies to the district hospital to avoid any delay.
- Adequate training on obstetric life-saving skills for Ghana Health Staff could be important factor for reducing maternal mortality in Nsawam-Adoagyiri and therefore should be promoted consistently.
- To improve the quality of service at MCH clinics, midwives and public health nurses should be periodically trained in MCH protocols and guidelines. The guidelines and protocols provide clear direction as what is expected of MCH health workers.

- Graham (2008) argues that to reduce the global maternal mortality burden at least six future interventions are required: 1. Renewed focus on family planning, skilled care at delivery & emergency obstetric care 2. Recruitment and training of more health professionals 3. Greater financial investment in maternal health services 4. Robust tracking of progress & accountability. 5. Securing and sustaining political commitment 6. Facilitating productive alliances between key international and local stakeholders. These should include: Funders; Research institutions; advocates, civil society, NGOs, parliamentarians; Think Tanks; Media; and Government bodies.
- To be able to achieve free maternal mortality in the district, managers of health care delivery in the district should commit themselves to further research in identifying the root cause of maternal mortality in the district especially at the community level to help develop strategies that best fit the issue.

#### **5.4.3 Maternal Death Audit Processes**

- It was observed that in most cases maternal audits do not follow up with community investigations. This does not present a conclusive analysis of the finding even though the clinical aspects are mostly eminent. Maternal audits within the district should follow community investigations by engaging key personalities involved in the community. Family members should be involved in the audit process from start to end to ensure community confidence in the results. The community involvement helps to identify the socio-cultural practices that cause maternal deaths.
- Though the audit process is not a fault finding, for fear of punishment and victimization, health professionals are not willing to provide real information on the cause of maternal

death. This makes it difficult to identify maternal deaths caused by health staff. Health staff who are present at the time of death of a women either pregnant or within 42 days of delivery should be encouraged to participate in the audit fully by providing all necessary information to the team. The health directorate should provide some assurance to these health staff through a letter signed by the Health Director. The assurance letter should provide some level of protection to the staff involved.

- If it is observed that the cause of maternal deaths was due to the negligence of health staff, appropriate sanctions including suspension or termination of license should be meted out to the culprit to serve as deterrent to other staff.

## REFERENCES

- AbouZahr, C. A. (2011).** *New Estimates of Maternal Mortality and how to interpret them, choice or confusion?* Reproduction Health Matters
- Ahiadeke, C. (2008).** *Research Methodology, Theory and Practice in the Social Sciences*
- Asamoah, B., Moussa, K., Stafstrom, M., & Musinguzi, G. (2011).** *Distribution of causes of maternal mortality among different socio-demographic groups in Ghana; a descriptive study,* Malmo University Hospital
- Brennan et al (1991).** *Incidence of adverse events and negligence in hospitalized patients; Results of the Harvard Medical Practice Study I*
- Chatterjee, A., & Paily, V. P. (2011).** *Achieving Millennium Development Goals 4 and 5 in India, Kerala-India*
- Chinwuzie, J., & Okolocha, C. A. (1999).** *Pragmatic Approach to Reduction of Maternal Mortality in Africa;* Trop J. Obstet Gynaecol, 16:18-20
- Danel, I., Graham, W., & Boerma, T. (2011).** *Maternal Death Surveillance and response,* WHO Bulletin
- Dillen van J. et al (2007).** *the use of audit to identify maternal mortality in different settings: is it just a difference between the rich and the poor?* Maternal Mortality Committee, Netherlands
- Filippi, V., & Ronsmans, C.; (2005).** *Maternity Wards or Emergency Obstetric Rooms? Incidence of Near-Miss Events in African Hospitals,* Scandinavica pp 11-16

**Ghana Health Service (2002).** *Maternal Health/Death Audit Guidelines*; Reproductive and Child Health Unit, Public Health Division, GHS

**Ghana Health Service (2010).** *Health Sector Review Report*, 2009; Ministry of Health; 2008

**Ghana Statistical Service (GSS), Ghana Health Service (GHS), & Macro International (2007).** *Ghana Maternal Health Survey 2007*, Calverton, Maryland USA

**Ghana Statistical Service (2009).** *Ghana Living Standards Survey Report of the Fifth Round (GSLL5)*, GSS, Accra

**Ghana Statistical Service (2012).** *2010 Ghana Population and Housing Census Report*, GSS, Accra

**Global Health Watch 3 (2011).** *An Alternative World Report*, 2011, pg 124, Zed Books Ltd, London, UK

**Graham, W (2008).** *Maternal Mortality evidence gaps and measurement traps, Approaches to Maternal Mortality in Africa journal*; University of Aberdeen, UK

**Gunawan, S., et al (2003).** *District-based audit of the causes and circumstances of maternal death in South Kalimantan, Indonesia*; WHO 2002 Maternal and Audit System

**Harrison, K. A. (1997).** *Maternal mortality in Nigeria, the real issues*; African Journal Reproductive Health; 1:7-13

**Hogan, M. C. et al (2010).** *Maternal Mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5*, The Lancet, 375

**Kerala, S. (2009).** *Why Mothers Die 2004-2005*, Kerala Federation of Obstetrics and Gynaecology

**Ki-Moon, B. (2010).** *Global Strategy for Women and Children's Health*, United Nations General Assembly, Geneva

**Kongnyuy, E. J., & Broek, van den N. (2008).** *The Difficulties of Conducting Maternal Death Reviews in Malawi*, BMC Pregnancy and Childbirth 8(42)

**Kongnyuy, E. J., Mlava, G., & Broek, van den N. (2009).** *Facility-based maternal death review in three districts in the central region of Malawi, an analysis of causes and characteristics of maternal deaths*; Women's Health Issues, 19 : 14-20

**Mills, S., Williams, J. E., Wak, G., & Hodgson, A., (2008).** *Maternal Mortality Decline in the Kassena-Nankana District of Ghana*, Maternal Child Health Journal 12(5), pp 577-85

**Ngwan, D., Stephen, S., & Terrumun, Z. (2011).** *Maternal mortality in Jos Nigeria, a facility-based prospective review*; International Journal of Biological and Medical Research

**Nsawam-Adoagyiri Municipal Assembly (2013).** *Medium Term Development Plan, 2012 – 2016*

**Register General of India (2006).** *Maternal Mortality in India 1997-2003, Trends, Causes and Risk Factors*, Delhi, India

**Ronsmans, C., & Campbell, O. (2012).** *Verbal autopsies for maternal deaths*, Report of World Health Organization workshop held at London school of Hygiene, Division of Family Health, London, UK.

**Supratokto, G. Wirth, M. E., Achadi, E., Cohen, S., Ronmans, C., (2002).** *A district-based audit of the causes and circumstances of maternal deaths in South Kalimantan*, Bulletin of WHO, Indonesia

**Thonneau P. F., et al (2004).** *Distribution of causes of maternal mortality during delivery and post-partum: results of an African multicentre hospital-based study*, European Journal of Obstetrics Gynaecology and Reproductive Biology, 114(2)

**United Nations (2009).** *Preventable Maternal Mortality and Morbidity and Human Rights*, Human Rights Council, Geneva

**United Nations (2011).** *The Millennium Development Goals report*, UN, New York

**World Health Organization (2011).** *Keeping promises, measuring results*, Commission on information and accountability for women's and children's health, Geneva

**WHO, UNICEF, UNFPA, & The World Bank (2010).** *Trends in Maternal Mortality 1990-2008*, Geneva

**World Health Organization (2004).** *Beyond the Numbers: Reviewing Maternal Deaths and Complications to Make Pregnancy Safer*, Geneva

**World Health Organization (2006).** *In Health Status: Mortality*, World Health Statistics, Geneva

**World Health Organization (2007).** *Maternal Mortality in 2005, country level specifics and achievement*; Health Journals, Geneva

**World Health Organization (2011).** *A review of current situation and trend*, Country Health Information Systems, Geneva

**Wright, E. A, & Disu, F. R. (1988).** *Maternal mortality in Jos University Teaching Hospital;* Nigeria Medical Practice

**Zakariah, A. Y., Alexander, S., Roosmalen, J. V., & Kwawukume, E. Y. (2006).** *Maternal Mortality in Greater Accra region in Ghana: assessing completeness of registration and data quality*, PubMed Abstract

**APPENDIX I: DISTRICT HEALTH DIRECTORATE AND HEALTH  
FACILITIES QUESTIONNAIRE**

**INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH**

**UNIVERSITY OF GHANA - LEGON**

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Name of respondent .....

Position/Title .....

Sex M ( ) F ( )

Date .....

1. What is the operational definition of maternal mortality in your municipality?
2. How different is maternal morbidity from maternal mortality?
3. What are the various types of maternal mortality?
4. How are these types different from each other?
5. How do you define “facility-based” maternal mortality?
6. How do you define “community based” maternal mortality?
7. What has been the trend of maternal mortality in the municipality from 2010? Please use the table below: (If possible, please indicate maternal mortality per facility)

FACILITY ONE

Year	Quarter I	Quarter II	Quarter III	Quarter IV	Total
2010					
2011					
2012					
2013					

8. What has been the trend of reported maternal mortality at community level? Use the table below: If possible, data should be separated as per community or zonal area

Year	Quarter I	Quarter II	Quarter III	Quarter IV	Total
2010					
2011					
2012					
2013					

9. What is the operational definition of maternal death audit?
10. Does the municipality undertake maternal death audit?

11. If yes, how often is it undertaking?

- a) Quarterly                      b) Half year    c) Annually    d) As and when maternal death occur    e) Other (specify)

12. If the response in Question 11 is (d), please indicate how long it takes for the audit to begin when maternal death occur

13. What are the importance of maternal death audits to the Health directorate?

14. What are the procedures for reporting maternal death when it occurs at the facility?

15. When maternal death occurs in the community, who reports the incidence?

16. What are the procedures for reporting?

17. If community level maternal death is not reported to Ghana Health Service by the community, is there any mechanism by the Municipal Health Directorate to identify such an occurrence?    Yes    /    No

18. If yes, please explain how the mechanism works

19. Please describe the processes for doing maternal death audit?

20. What is the composition of the audit team?

21. What is the rational for selecting these members for the exercise?

22. What is the mandate of the team after its composition?

23. Briefly describe the type of data that is expected to be collected by the team?

24. Is there any guideline for the audit team as per their mandate?    Yes    /    No

25. If yes, who developed the guidelines?

26. Are community members or family members of the deceased included in the team?

Yes / No

27. If yes, why?

28. Is there any legal and ethical framework that guides the team? Yes / No
29. If yes, what are the terms in the framework?
30. If no, why?
31. How long does it take the team to complete the audit?
32. How different is the community-level maternal death audit from the facility-level maternal audit?
33. Is the team for community-level maternal audit different from facility level? Yes / No
34. If yes, please indicate the team for the community level audit?
35. Explain the guidelines for the team, if any?
36. What is the level of community participation in any community level maternal death audit?
37. What is the essence of community level maternal audit?
38. What are the causes of maternal death audit in the municipality?
39. How are these causes determined?
40. How useful is maternal death audit in identifying the causes of maternal death in the municipality?
41. Briefly explain the measures instituted by the Municipal Health Directorate to address the identified causes of maternal death at:
  - a) Facility level
  - b) Community level
42. What is your recommendation for improving on maternal death audit in the municipality?

**APPENDIX II – COMMUNITY FOLLOW UP QUESTIONNAIRE**  
**INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH**  
**UNIVERSITY OF GHANA – LEGON**

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Name of respondent .....

Sex M ( ) F ( )                      Name of Community.....

Date .....

1. Which part of the district do you currently reside?  
a) Urban    b) Rural
2. How old are you                      a) 15 – 24    b) 25 – 34    c) 35+
3. What is your employment status?                      a) employed    b) unemployed
4. How much do you earn averagely per month?
5. What is your marital status?                      a) Single                      b) Married                      c) divorced
6. How many children do you have?                      a) one    b) two    c) three    d) four or more
7. If married (to Q5), what is your husband’s employment status? a) employed  
b)unemployed
8. When was your last delivery?                      a) less than 3 months    b) 3 – 12 months  
c) 1 – 3 years    d) above 3 yrs
9. When you were pregnant, did you seek antenatal care?    Yes                      No
10. If yes, how many times before delivery    a) one    b) two    c) three    d) four    e) five+

11. If less than four, why? .....
12. What were some of the challenges you faced during your antenatal clinics?
  - a.
  - b.
13. If no to Q9, what were some of the reasons why you did not attend antenatal care?
  - a.
14. Do you know any woman in this community who never attends antenatal clinics?  
Yes No
15. If yes, what are some of the reasons why they are not attending antenatal clinics?
  - a.
  - b.
16. Do you know any woman who died during pregnancy or one month after delivery in this community or in the communities around? Yes No
17. If Yes, what are the reasons for the death of the woman?  
.....
18. Where did she die? a) home b) clinic c) hospital (specify location of the hospital)
19. In your own view, please mention the three main causes of maternal mortality in this area/district that you know
  - a. ....
  - b. ....
20. What is the role of community/family members when a woman is in labour?

21. Is there any system in place that supports transportation of emergency cases to the district hospital?
22. What happens when a woman dies during pregnancy or during labour?
23. What is the role of community leaders in maternal health care to community members
24. When a woman dies during pregnancy or one month after delivery, do you get any health workers coming to the community?      Yes              No
25. If Yes, what do they come to do? .....  
.....
26. Are there any women groups in this community?
27. If Yes, what is their role on maternal issues?
28. How are the men involved in maternal mortality issue
29. Can you please mention some of the strategies adopted by the community to address maternal death issue in this community?

**APPENDIX III: COMMUNITY-BASED INTERVIEW GUIDE FOR FOCUS GROUP**

**DISCUSSIONS**

**INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH**

**UNIVERSITY OF GHANA - LEGON**

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Name of respondent .....

Position/Title .....

Sex M ( ) F ( )                      Name of Community.....

Date .....

1.     What happens when a woman dies during pregnancy or during labour?
2.     Role of community leaders in maternal health care to community members
3.     The involvement of community members in maternal death audit in any health facility
4.     Availability of women groups and their role in maternal issues
5.     The level of support of men to women in addressing maternal mortality
6.     Community's response to emergency issues on maternal care

