

**SCHOOL OF PUBLIC HEALTH  
COLLEGE OF HEALTH SCIENCES  
UNIVERSITY OF GHANA**

**REVIEW OF MATERNAL DEATHS AUDIT IN EFFIA NKWANTA  
REGIONAL HOSPITAL IN THE WESTERN REGION**

**BY**

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON  
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE  
MASTER OF PUBLIC HEALTH (MPH) DEGREE.**

**OCTOBER, 2015**

## DECLARATION

I hereby declare that this work is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All reference used in the work have been fully acknowledged.

Any shortfalls therein are my sole responsibility.

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## DEDICATION

This dissertation is dedicated to Alhaji B. A. Fuseini and the late Alhaji Aliu Mahama for their guidance and vision with love towards my success. May the creator have unlimited mercy on them and grant them paradise.



## ACKNOWLEDGEMENT

I give thanks to the almighty God for his unchanging grace and absolute sustenance in my life.

I am extremely thankful to my supervisor Dr. Samuel Sackey for his assistance, guidance and constructive criticism. I also acknowledge with deep appreciation to all the lecturers and course mates (2014-2015 cohort) for their valuable comments and contributions whenever I called upon them.

My profound thanks also goes to my family for their love and unlimited support throughout my studies in School of Public Health.



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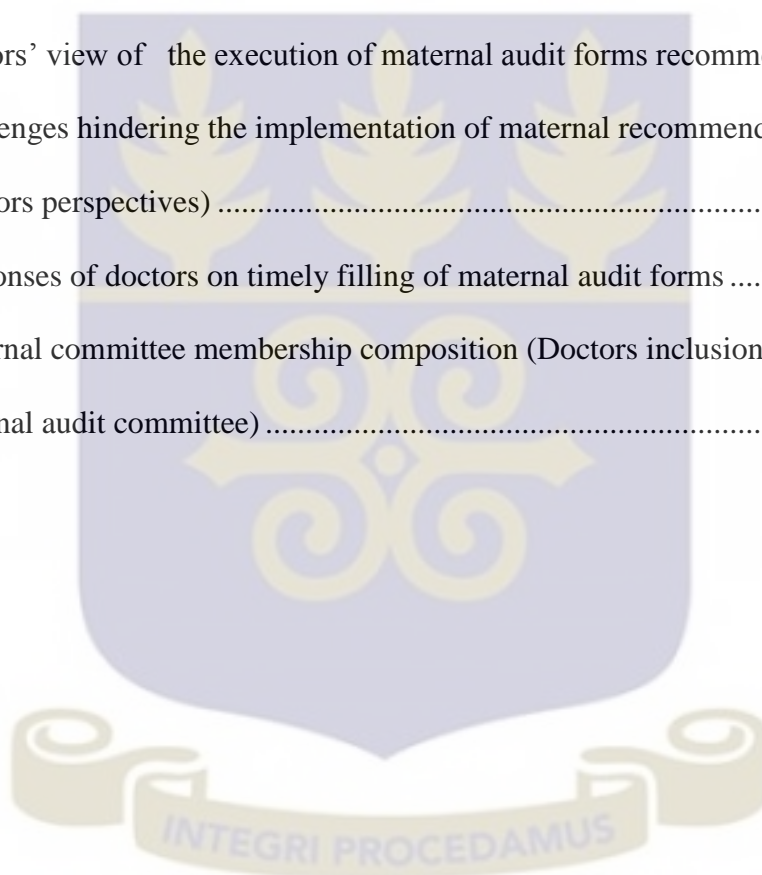
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## LIST OF ACRONYMS

ANC-	Antenatal Care
EmOC-	Emergency Obstetric Care
MDG-	Millennium Development Goal
PHC-	Population and Housing Census
PPH-	Postpartum Hemorrhage
SBA-	Skilled Birth Attendant
SPSS-	Statistical Package for Social Sciences
WHO-	World Health Organization



## ABSTRACT

Review of maternal mortality is one of the most effective methods to improve the performance of health workers and it could bring about changes to reduce maternal mortality. Ghana recorded 3,100 maternal deaths in 2013. The Western Region recorded 85 maternal deaths per 100,000 live births and Effia Nkwanta Regional Hospital recorded 24 maternal deaths out of 2,788 deliveries in 2013 giving a maternal mortality ratio of 717/ 100,000 live births. The hospital also recorded 32 maternal deaths at the end of 2014 showing an increasing trend in maternal mortality.

The study was aimed at determining the factors that contributed to the 24 avoidable maternal deaths in the Effia Nkwanta Regional Hospital and to identify challenges associated with the use of maternal death audit guideline forms by health care providers.

Data was collected from existing hospital record system using a data extraction sheet. Interviews were also conducted with health care workers who manage cases of maternal deaths from January to December 2013 using a questionnaire. Data was analyzed using SPSS Version 20. The descriptive variables of interest were computed and chi square test was used to ascertain whether there was a significant level of dependency between the variables of interest. A logistic regression was performed to ascertain the effect of place of residence, age of mother, parity, avoidable factors, antenatal care and education in the likelihood that the cause of death will be either direct or indirect. The logistic regression model was statistically significant for  $p$  value  $< 0.05$ .

The findings of this review showed that most of the maternal deaths resulted from direct causes occurring in rural setups. From the direct causes of maternal deaths, eclampsia was the leading cause of death 9 (37.5%), followed by haemorrhage 4 (16.7%), uterine rupture 3 (12.5%), unsafe abortion 2 (8.3%), and ectopic pregnancies 2 (8.3%) and 4 (16.7%) constituted indirect causes of death. Place of residence, parity, level of education and age were associated with cause of

maternal deaths. The study also indicated that the main challenge in the use of maternal audit forms by health providers was due to busy work schedules. There is therefore a need to intensified Health promotion and education activities in the region and maternal audit guidelines forms should be reviewed and made simpler for health care providers.



## CHAPTER ONE

### 1.1 Background

According to WHO and UNICEF (2014), global maternal mortality had reduced by 45% between 1990 and 2013. An estimated 289,000 women died due to obstetric conditions showing a reduction from 523,000 in 1990. Sub-Saharan Africa remained the highest in terms of maternal mortality ratio in the world (510) maternal deaths per 100,000 live births accounting for 62% of the global maternal deaths. Ghana recorded 3100 maternal deaths in 2013 (WHO and UNICEF 2014). Western Region had its share of 85 maternal deaths / 100,000 live births in the same year with Effia Nkwanta Regional Hospital which serves as a referral point for most peripheral facilities in the region recording 24 maternal deaths which was the highest among the health facilities in the region. The Region has a population of 2,537,357 (Population census 2010) and land size of 23,760sq km which comprise of 23 districts with 13 district hospitals and 17 health centers.

Maternal death audit is a systematic and critical analysis of the quality of care provided mostly in cases of adverse outcomes during emergency obstetric care. It is a qualitative in-depth investigation of the causes and circumstances surrounding maternal deaths. Analysis of the maternal deaths is more likely to yield the answers to why maternal deaths continue to occur. Numerous studies on maternal mortality has been carried out with a great deal of time, energy and resources being invested on measuring levels of maternal mortality than focusing on those factors contributing to maternal deaths.

Many strategies and interventions, which had been implemented, some of the interventions include maternal mortality audit guideline forms and monitoring, national protocols and strengthen family planning initiatives. The strategies to attain decrease in maternal mortality includes strengthen leadership and commitment to postpartum hemorrhage (PPH) prevention initiatives at all levels, improve coordination mechanism and channels, improve quality of

data on PPH initiatives such as medical records and administrative records with maternal death audit reports (Postpartum Hemorrhage Prevention and Management Strategies for Ghana Health Services. November 2013). But whether these interventions had been effective in reducing the increasing number of maternal deaths to meet the Millennium Development Goals five (5) needs an in-depth investigation which is of concern to the government and its development partners in the region.

## **1.2 Problem Statement**

Maternal deaths increased from 75 per 100,000 live births in 2012 to 85 per 100,000 live births in 2013 despite the reported improvement in all indicators of reproductive health in the Region, the Regional Skilled delivery dropped significantly from 76.2% in 2012 to 73.5% in 2013. Abortion with complications also increased from 7.6% in 2012 to 15.4% in 2013. Family planning acceptor rate dropped from 22.8% in 2012 to 21.2% in 2013 (Western Regional Health Services 2013 Annual Review Report). The contributing factors include inadequate healthcare providers due to retirement, transfers, lack of transport in certain deprive areas due to the deplorable road network etc. all this factors affect maternal healthcare with decrease family planning acceptor rate which implies increase in unwanted pregnancies with the devastating unsaved abortions

The study was therefore aimed at determining the factors that contributed to the 24 avoidable maternal deaths in the Effia Nkwanta Regional Hospital and to identify challenges associated with the use of maternal death audit guideline forms by health care providers.

### **1.3 Rationale**

Although several studies on maternal mortality had carried out most have focused on levels of maternal mortality with very little on contributing factors of maternal deaths. Findings from this study may serve as basis for policy change and strategic plan development to address the current upward trend of maternal mortality. It will also add to the pool of knowledge and form the basis for further research.

### **1.4 Research Objectives**

#### **1.4.1 Main Objective**

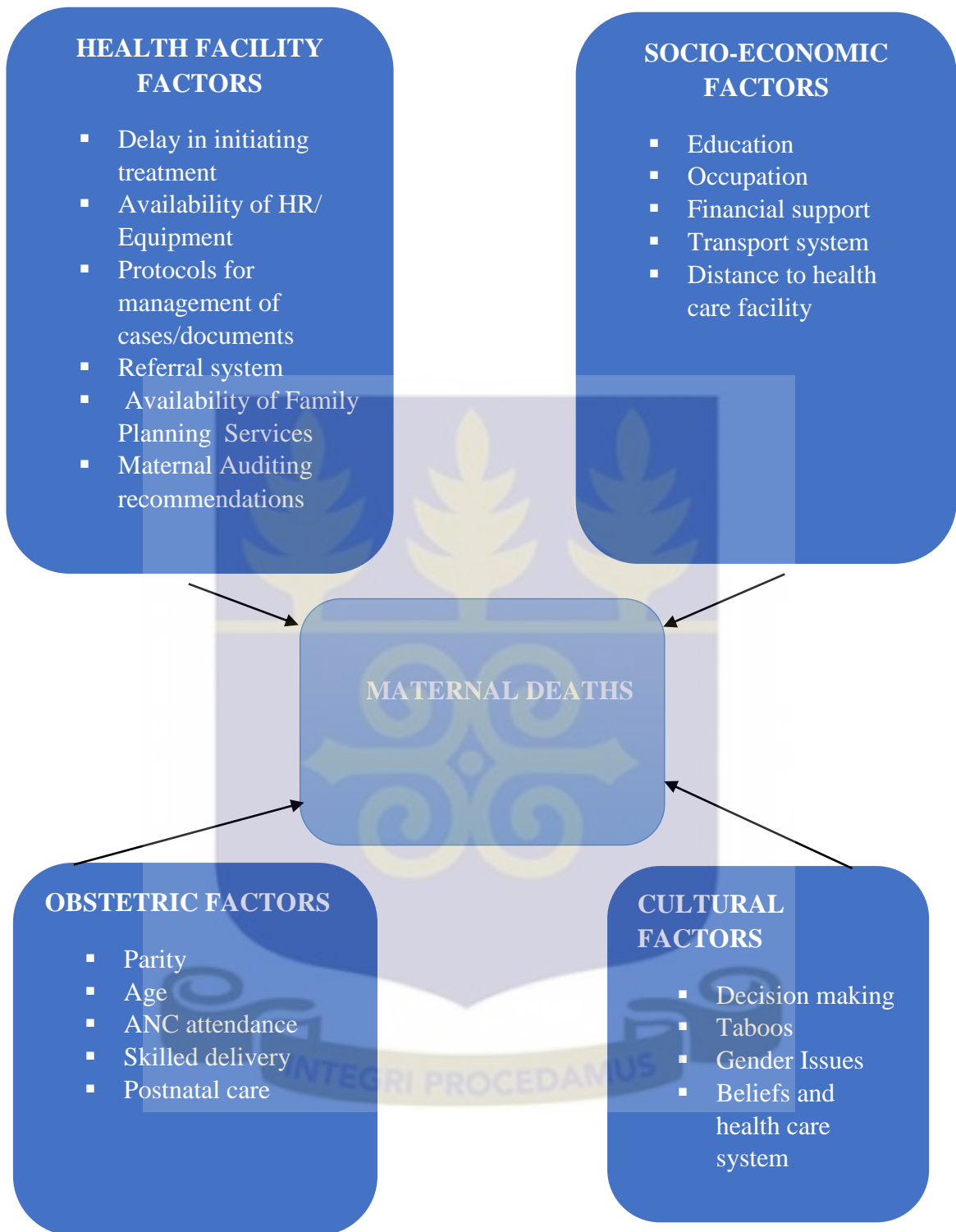
To review all twenty (24) maternal deaths that occurred between January 1<sup>st</sup> and December 31<sup>st</sup> 2013 at Effia Nkwanta Regional Hospital.

#### **1.4.2 Specific Objectives**

- To determine the facility factors that contributed to the high proportion of maternal deaths in the regional hospital.
- To identify challenges associated with the use of maternal death audit guidelines forms.







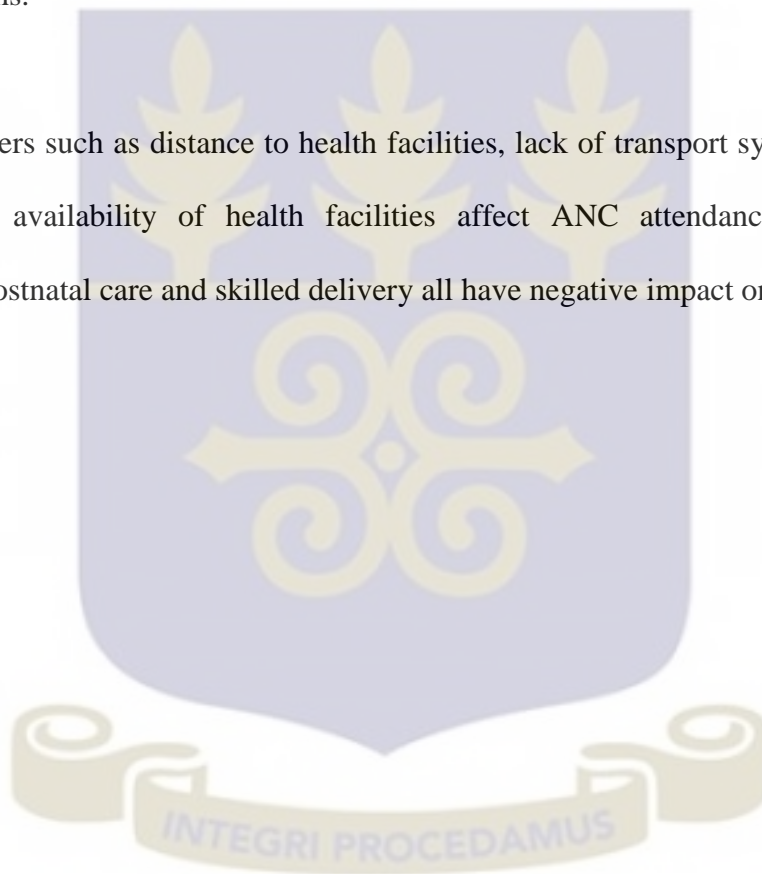
**Figure 1.1: Conceptual framework for maternal mortality**

Low educational status results in early marriages, and teenage pregnancies and unsafe abortions. Poor health systems, low family planning acceptance rate due to religious and



traditional beliefs cause an increase in unwanted pregnancies and increase parity which contribute significantly to maternal death in the region. Lack of Governmental support and political will for maternal health issues also affect health facility factors for example human resources and. requisite equipment. Negative Cultural beliefs and taboos have adverse impact on obstetric factors such as parity, ANC attendance and skilled delivery. Health care facility factors such as negative attitude of health care providers towards clients, non –implementation of audit review recommendations has adverse effects on health service delivery which leads to maternal deaths.

Physical barriers such as distance to health facilities, lack of transport systems and poor road network and availability of health facilities affect ANC attendance, Family planning acceptance, postnatal care and skilled delivery all have negative impact on maternal health.



## CHAPTER TWO

### LITERATURE REVIEW

According to Ronsmans et al (2000), audit review is a systematic and critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources and resulting outcome and quality of life for the patient. Review audit of maternal deaths criticizes the current practice and also involves the diverse issues such as timeliness of interventions referred to as the three (3) Delays, the appropriateness of referral and the attitudes staff of to the patients. The delay by the patient in the decision to seek care, the delay in reaching the appropriate care once the decision has been made to seek care and the delay in receiving adequate care after arriving at the health facility, all contribute to maternal mortality. (Colbourn et al 2013).

The purpose of this study is to review the existing secondary data in the Effia Nkwanta Regional Hospital to highlight the deficiencies by comparing the care that was given to the care that ought to be given and to explore the circumstances surrounding the high proportion of maternal deaths. .Audit reviews stimulates a change in clinical practice through quality assurance and Hospital peer reviews strategies. But the question whether audit reviews can improve care in obstetrics to reduce maternal mortality is still unanswered. Because maternal deaths and complications are typically underreported, confidential inquiries are also vital in contributing to the accurate collection of data. Was there a delay in reaching the facility? Did the family or birth attendant not recognize there was a problem? Was there difficulty in finding transportation to a health Centre? Did the health Centre have adequate supplies and trained staff available to properly treat the women (Dumont et al 2006).

#### **2.1 Facility Based Maternal Deaths Review**

Reviewing maternal deaths and complications makes future pregnancies safer leading to reduction in maternal deaths. It is essential that maternal death report be made as soon as

possible to ensure primary source of such information (relations and health workers), including the events surrounding the deaths. This also reduces recall bias.

In Ghana many health systems have put in place a multidisciplinary team consisting of obstetricians, nurses, midwives, pathologists and anesthetists to review cases of maternal mortality to consider whether lessons may be learned from management of the case and how local procedures might be improved for the benefit of future patients. But in the rural settings where most of the maternal deaths occur, it is impossible to have a complete team and in most cases only one medical doctor and nurses constitute the team to poor documentation and in certain cases, maternal deaths left unreported.

## **2.2 Confidential Enquiries**

Confidential enquiries into maternal deaths are to learn lessons in order to save lives and reduce the burden of severe maternal and neonatal morbidity. They provide evidence to show where the problems in overcoming maternal mortality may be and an analysis of what can be done in practical terms. They also highlight the key areas that require recommendations for health sector and community action as well as guidelines for improving clinical outcomes.

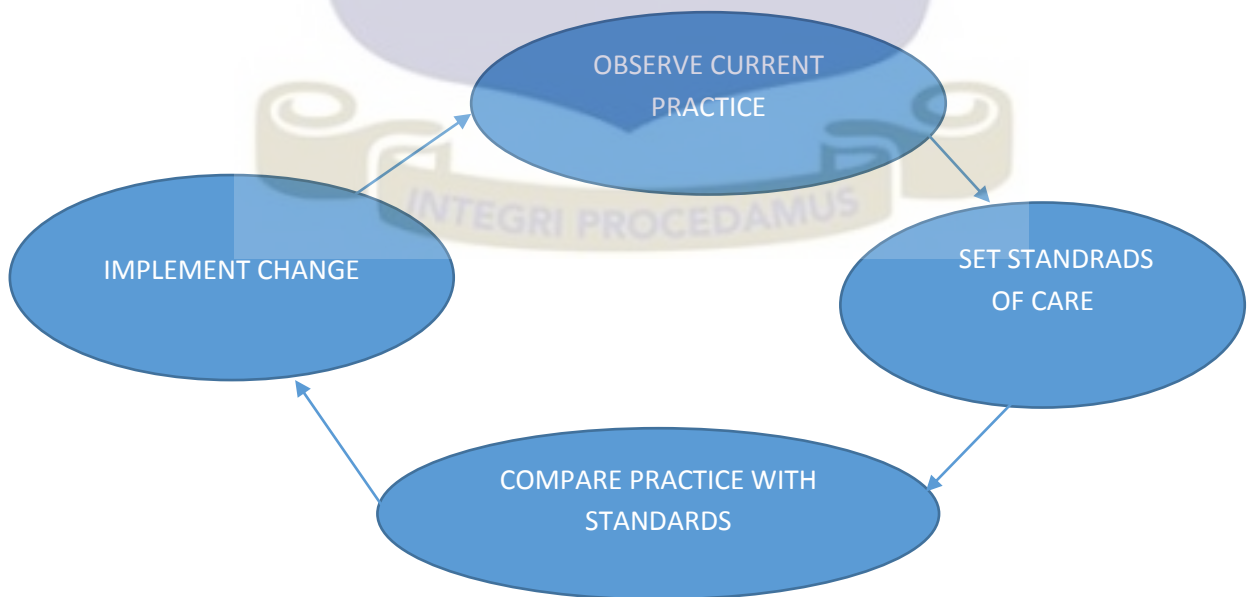
The main strategy to reach MDG 5 has been to have a 'skilled birth attendant' (SBA) at 90% of all births. However, a review of ecological and observational studies in developing countries concludes that there is 'little evidence that giving birth with a health professional reduces the risk of dying, and in some settings it appears to be associated with an increased risk of dying (Sorensen et al 2010).

An explanation for these findings could be that many SBAs are unable to provide emergency obstetric care (EmOC) when complications occur because they work with insufficient

supplies, colleagues, training, supervision and quality assurance. The findings can be used to develop national or regional maternal health programs. All deaths are reviewed individually by experts who classify the deaths as avoidable or not avoidable (Recently sub-standard or not) according to whether there was a departure from generally accepted standards of care. The disadvantages of the enquiry guidelines is that; its lengthy and cumbersome making health care workers reluctant in its use , it also focuses on service providers ignoring the socio- economic factors like poverty, geographical locations that may contribute to maternal deaths and there is no explicit for change provided in it.

### 2.3 Setting Standards in Obstetric Care

One of the main advantages of audit review in obstetric care is the evidence base practice guidelines developed based on scientific literature (Ronsmans et al 2000). The audit review cycle compare current practice to the standards, suggest solutions for the deficiencies identified and implement changes to improve the delivery of care. All the three dimensions of health care structure, process, and outcome can be audited and improvement in care are recommended with realistic targets set.



**Figure 2.1: The audit review process represented in a form of closed cycle.**

Source: Ronsmans et al (2000)

## 2.4 Maternal Death Tragedy

According to Khan et al. (2006), maternal death is defined in the International Classification of Diseases, 10th edition (ICD-10) as the death of a woman while pregnant or within 42 days (or 1 year for late maternal deaths) of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Over eight million women suffer from complications of pregnancy or childbirth and over half a million women die giving birth annually worldwide.

In sub-Saharan Africa the risk of a woman dying as a result of pregnancy labor and child birth during her life time is about one in six, indicating maternal mortality ratio of five hundred and ten per hundred thousand (510/100,000) accounting for 62 % (179,000) of global maternal deaths compared with 30,000 in Northern Europe (Ronsmans et al 2006). Such discrepancy poses a huge challenge to meeting the 5<sup>th</sup> millennium development goal to reduce maternal mortality by 75% between 1990 and 2015.

The unfortunate issue is that the courses of deaths are well known and documented, and what needs to be done to save the lives of these women are also known (PROMISE conference 2010 Takoradi). Maternal deaths are clustered around labor, delivery and the immediate postpartum hemorrhage (PPH) period with obstetric hemorrhage being the main medical course of maternal death. Hemorrhage, hypertensive disorders and unsafe abortions are the leading causes of maternal deaths in Ghana. PPH accounted for 25% of maternal deaths in the Western Region. In Effia Nkwanta Regional hospital, PPH accounted for 13% of maternal deaths in 2007 and 20.6% in 2008 (PROMISE conference 2010).

According to Asamoah et al. (2011), direct causes of maternal mortality conducted in Ghana include hemorrhage (postpartum and antepartum), abortion, miscarriages, sepsis, obstructed labor, ectopic pregnancy and hypertensive disorders (pre-eclampsia and eclampsia).

From Table 2.1, the indirect causes of maternal deaths were malaria 53.6%, viral hepatitis 13.1%, unspecified infections 7.1% and tuberculosis 2. According to Gumanga et al (2011) the burden of maternal deaths in Sub-Saharan Africa is a serious challenge. The teaching and regional hospitals have higher figures than the national average because most of the very ill and complicated cases are usually referred to these tertiary centers like Effia-Nkwanta Regional hospital for management.

The main strategy to reach MDG 5 has been to have a 'skilled birth attendant' (SBA) at 90% of all births. However, a review of ecological and observational studies in developing countries concludes that there is 'little evidence that giving birth with a health professional reduces the risk of dying, and in some settings it appears to be associated with an increased risk. An explanation for these findings could be that many SBAs are unable to provide emergency obstetric care (EmOC) when complications occur because they work with insufficient supplies, colleagues, training, supervision and quality assurance (Sorensen et al 2010).



**Table 2. 1: Causes of maternal mortality among 605 women who died from pregnancy-related causes in Ghana between 2000 and 2005**

Variable	Number	Valid Percent (%)
<b>Direct causes</b>		
Haemorrhage(ante partum and postpartum)	138	22.8
Abortion(Medical, Attempted, failed, other, unspecified)	83	13.7
Hypertensive disorders of pregnancy(including Eclampsia)	54	8.9
Sepsis	42	6.9
Obstructed Labour	27	4.5
Miscarriage	20	3.3
<b>Indirect causes</b>		
Other Infectious diseases*	84	13.9
Other non-infectious diseases**	75	12.4
Miscellaneous***	82	13.6
<b>Total</b>	<b>605</b>	<b>100</b>

**Source:** Asamoah et al (2011)

## 2.5 Interventions to Reduce Maternal Mortality

Most interventions had been directed towards treating five (5) prioritized obstetric cases that causes maternal deaths; hemorrhage, hypertensive disorders in pregnancy, puerperal sepsis, unsafe abortions and obstructed labor. WHO recommends that for every 500,000 people, at least four (4) Emergence obstetric care facilities should be constructed which include caesarean section and blood transfusion facilities. Education on family planning acceptance will reduce unwanted or unplanned pregnancies which will prevent unsafe abortions leading to reduction in maternal deaths.

Antenatal care (ANC) should be encouraged as it reduces adverse outcome of pregnancy which leads to reduction of maternal mortality. Increase knowledge of sexually transmitted diseases will help reduce risk taking behavior leading to reduction in maternal deaths.

Nepal experienced a steep decline in maternal mortality between 1996 and 2006 which again dropped by 2010. This was due to major demographic and socio-economic changes notable fewer women delivering at high risk ages (below 20yrs and above 35yrs) decrease fertility, higher education levels and migration to urban areas. There was also significant improvement in maternity care leading to a decline in maternal mortality. Maternal mortality is declining globally at an annually rate of 3.1%. Unless lessons learned from those countries achieving the most substantial reductions can be shared and implemented, developing countries will fall far off the millennium development goal five (5) in 2015. (Shrestha et al 2014).

One of the main conclusions is that all determinants of maternal mortality (and, hence, all efforts to reduce maternal mortality) must operate through a sequence of only three intermediate outcomes. These efforts must either (1) reduce the likelihood that a woman will become pregnant; (2) reduce the likelihood that a pregnant woman will experience a serious complication of pregnancy or childbirth; or (3) improve the outcomes for women with complications.

Several types of interventions are most likely to have substantial and immediate effects on maternal mortality, including family planning programs to prevent pregnancies, safe abortion services to reduce the incidence of complications, and improvements in labor and delivery services to increase the survival of women who do experience complications. The purpose of this study is to determine factors that repeatedly contribute to high proportion of avoidable maternal deaths and to help assess progress in the hospital towards attainment of the



millennium development goal five on maternal health, recommendations will then be made for improvement of maternal health service delivery (McCarthy et al. 1992).

## **2.6 Caesarean Sections**

Effia Nkwanta recorded 861 cases of caesarean sections with 2788 deliveries in the year 2013. Caesarean sections are associated with an intrinsic risk for short term maternal outcomes. The main challenge related to C/S is making the best use of this procedure which certainly is an important source for reduction of maternal mortality, but overuse maybe associated with an increased risk of severe maternal outcomes. (Souza et al 2010).

In many parts of Ghana where district Hospitals are managed by one doctor, many C/S are done without proper diagnosis with the fear of preventing maternal mortality in the facility. In certain cases in the teaching Hospitals patients are left to the mercy of newly graduated medical doctors who have no experience in handling obstetric cases.

Cesarean Sections performed appropriately and following appropriate medical indications are potential lifesaving procedures.



## CHAPTER THREE

### METHODS

#### 3.0 Introduction

This chapter deals with the approach that was employed for the maternal death audit review study. It includes the study design, data collection techniques and tools as well as the statistical methods that were employed in the data analysis.

#### 3.1 Type Of Study

A descriptive cross-sectional study design with retrospective records review was employed to carry out this study using Hospital records of maternal deaths and questionnaires to interview providers and summary of how data was collected in the analysis done.

#### 3.2 Study Location/ Area

Effia Nkwanta regional hospital is located in the Western Region which has a population of 2,537,357 (2010 Population and Housing Census). The Hospital was established in 1938 as a military hospital in the Second World War by the then British West African Royal Frontier force based in Takoradi.

It is the third largest hospital in the country after Korle Bu and Komfo Anokye Teaching hospitals with a bed capacity of 350. The Hospital serves the Shama/ Ahanta East metropolis with a population of 350,000 and also caters for referrals both from Western and central regions. The maternity ward provides comprehensive emergency obstetric care with a bed capacity of 86. In 2013 the hospital recorded a total of 2788 deliveries, 861 Caesarean sections and has 54 midwives, 4 obstetric specialists and 20 other workers. Services provided include Out Patient Department and Reproductive and Child Health Services.

### **3.3 Variables**

**Dependent variable:** Causes of Maternal Deaths

#### **Independent Variables**

Independent variables for the study included Obstetric factors (e.g. parity, age, ANC attendance), Health facility factors (e.g. Family planning services availability, availability of human resources/ equipment, maternal auditing recommendations), Socioeconomic factors (e.g. Education, occupation, financial support, transport system and marital status) and Cultural and religious factors.

### **3.4 Study Population**

Study population comprised the medical staff including doctors, nurses, midwives and other hospital staff and the records of maternal deaths from January to December 2013.

### **3.5 Sample Size**

All 24 records of maternal deaths that occurred at the hospital between 1<sup>st</sup> January 2013 and 31<sup>st</sup> December 2013 were reviewed, 50 staffs members who were at post at the time of the study were all interviewed.

### **3.6 Data Collection Techniques/ Methods And Tools**

A total of 24 maternal deaths of women reaching the facilities for health care services were used for the study using confidential maternal audit forms, antenatal care booklets (ANC) and hospital admission case files. Face to face, interviews were conducted to identify the various circumstances leading to the deaths. Health care staffs who participated in the provision of health care to the deceased were interviewed confidentially using checklist to extract data from case file records and questionnaires. The interview included specific issues of the

patient, time taking to seek help, and socio-cultural factors influencing care seeking processes and means of transport to the facilities.

### **3.7 Quality Control**

To ensure the quality of the tool and data, a pilot study was conducted by the investigator using convenience sampling of 20 maternity ward staff of Prestea Government Hospital. This was done by the principal investigator. Before data entry, the questionnaires were edited by the principal investigator to ensure all questions were being responded to and coding was done. Data entry was done by the principal investigator.

### **3.8 Data Processing And Analysis**

The collected data was processed using IBM SPSS version 20. The descriptive variables of interest were computed. The chi-square cross tabulation was used as the main descriptive tool buttressed with some graphical representations of the variables measured. These graphs, specifically histograms, were used for the descriptive variables. The cross tabulations were followed by a chi-test of independence. The test is applied when you have two *categorical variables* from a single population. It is used to determine whether there is a significant association between the two variables. The chi-square test was used to ascertain whether there was a significant level of dependence between the variables of interest.

Chi-square test was selected because, the study variables were categorical (nominal and ordinal) in nature and sample data were displayed in a *contingency table*.

A logistic regression was also adopted to find which variables (independent variables) had significant effect on the response variable of interest (Cause of death). The choice of logistic regression was made because of the binary and categorical nature of the response variable.

### **3.9 Ethical Considerations/ Issues**

Permission was sort from the hospital authorities for the records review.

The questionnaire used in the survey was designed to help ensure confidentiality, and individual questionnaires were identified only by a unique identifying code. Written approval for the study was obtained from the Ghana Health Service Ethical Review Committee.

Participation was voluntary. The interviewer ensured that all participants provided their informed consent by signing on the participant information and informed consent form before starting the interview. Their right not to participate, as well as to withdraw from the study at any point, was emphasized. Only health care staff who were part of the Maternal Death Review were interviewed, data collected was kept confidential in a locked file cabinet and destroyed after every aspect of the research had been completed.

### **3.10 Pretest/Pilot Study**

A pilot study with a sample size of about twenty (20) health care Staff from Prestea Government Hospital was conducted before data collection was carried out in the study area, an audit form from the same facility was used to develop the checklist for data extraction. This was to enable testing of the questionnaire to ensure practicability and reliability of the questionnaires. All challenges encountered in the conduct of the pilot study were rectified before the questionnaire was used in the field.

### **3.11 Limitations of the Study**

1. Maternal mortality involves confidentiality hence making data availability difficult since health care providers who were directly involved in patient management feared being held accountable for their deficiencies in treatment which might have led to death, they were reluctant to make data available.
2. Most of the auditing forms were filled several weeks after the death leading to information lost and poor data recording.

## CHAPTER FOUR

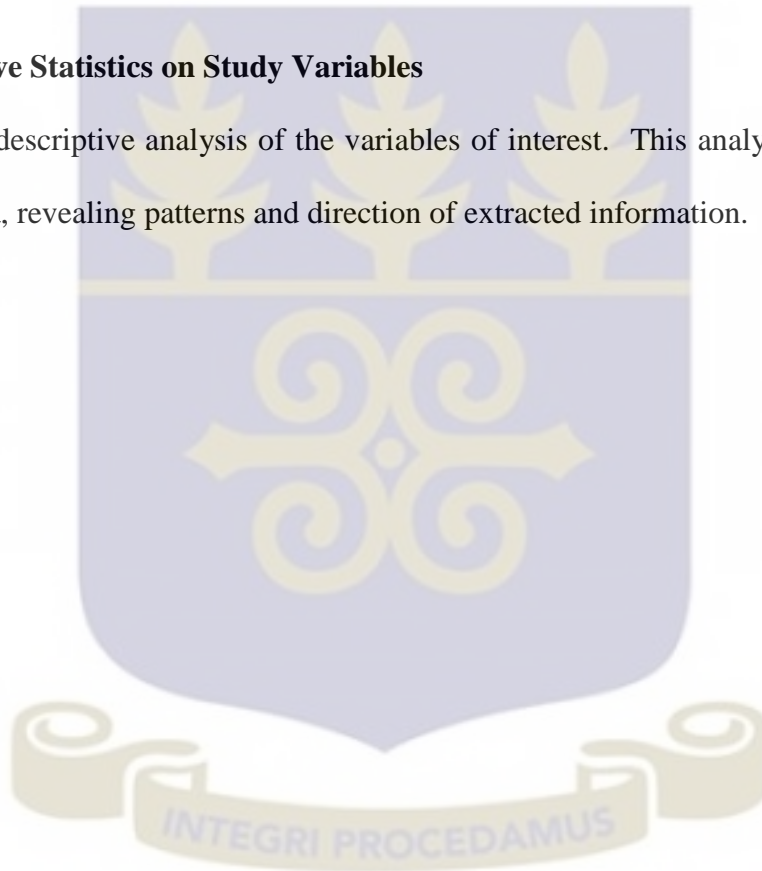
### RESULTS

#### 4.0 Introduction

This chapter presents the findings of the study from secondary data extracted from hospital records to review the 24 maternal mortality cases from 1<sup>st</sup> January 2013 to 31<sup>st</sup> December 2013. It presents the responses of a sample of health care providers and audit committee members who were successfully interviewed using questionnaires.

#### 4.1 Descriptive Statistics on Study Variables

Below is the descriptive analysis of the variables of interest. This analysis help summarizes the entire data, revealing patterns and direction of extracted information.





**Table 4.1: Association between demographic characteristics of the deceased mothers and cause of death**

Socio-demographic factors	Cause of Death		$\chi^2$ (P-value)	
	Direct n (%)	Indirect n (%)		
Place of Resident	Rural	17 (70.8)	1(4.2)	6.4(0.011)
	Urban	3(12.5)	3(12.5)	
Age	15-19	1(4.2)	2(8.3)	14.4(0.006)
	20-24	1(4.2)	2(8.3)	
	25-29	4(16.7)	0 (0)	
	30-34	10(41.7)	0 (0)	
	35	4(16.7)	0 (0)	
Occupation of Mother	Self-employed	13(54.2)	3(12.5)	0.278(0.87)
	Unemployed	6(25)	1(4.2)	
	Employee	1(4.2)	0 (0)	
Parity	Primiparous	1(4.2)	2(8.3)	6.480(0.039)
	Multiparous	5(20.8)	1(4.2)	
	Grand multiparous	14(58.3)	1(4.2)	
Educational level	None	12(50)	1(4.2)	10.954(0.004)
	Primary	8(33.3)	1(4.2)	
	Tertiary	0(0)	2(8.3)	
Religion	Christianity	19(79.2)	3(12.5)	5.345(0.069)
	Islam	0(0)	1(4.2)	
	Traditional	1(4.2)	0(0)	
Marital status	Widowed	1(4.2)	3(12.5)	12.429(0.006)
	Married	10(41.7)	0(0)	
	divorce/separate	3(12.5)	0(0)	
	Single	6(25)	1(4.2)	
Avoidable factors	Patient delay	0(0)	4(16.7)	24(0.00)
	Facility delay	4(16.7)	0(0)	
	Inadequate treatment	10(41.7)	0(0)	
	Lack of requisite Equipment	3(12.5)	0(0)	
	Lack of communication between facilities	3(12.5)	0(0)	
Antenatal care	Yes	5(20.8)	4(16.7)	8.0(0.005)
	No	15(62.5)	0(0)	

#### **4.2 Causes of Maternal Death**

The maternal death audit review showed that majority of the maternal deaths, 20 representing (83.33%) of the total deaths were due to direct causes. Out of these 83.3%, (37.5%) resulted from eclampsia, (16.67%) hemorrhage, (12.5%) uterine rupture, (8.33%) unsafe abortion and (8.33%) from ectopic pregnancy. However, 16.67% of the deaths were due to indirect causes as shown in figure 4.1 appendix D.

#### **4.3 Place of Residence and Cause of Death**

The place of residence was categorized into urban and rural. The valid responses were 24 and this represented 100% of the sample under study.

From Table 4.1 above, 20 (83.3%) constituted the majority of deaths were due to direct obstetric death category whereas the remaining 4 (16.7%) fell in the indirect death category (4.1). For mothers in the rural areas, 70.8% died from direct causes and 4.2% died from indirect causes. The count of mothers in the rural area is 18 constituting 75% of the entire sample under study. For mother in urban areas, 3 (12.5%) died from direct causes and the remaining 3 (12.5%) died from indirect causes.

The chi-square test statistic gave a value of 6.40 with a corresponding p-value of 0.011. This is less than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the cause of death (direct or indirect) among pregnant mothers is dependent on their place of residence.

#### **4.4 Age of Mother and Cause of Death**

From Table 4.1, majority 10 (41.7%) of the mothers were aged 30-34 years. Most of these mothers died from a direct cause. 16.7% of mothers aged 25-29 years and 35 years and above



died from direct cause. The remaining age groups (15-19 and 20-24) constituted 12.5% each of the study sample. The chi-square test statistic gave a value of 14.4 with a corresponding p-value of 0.006. This is less than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the cause of death (direct or indirect) among pregnant mothers is dependent on the age of mother.

#### **4.5 Parity and Cause of Death**

Table 4.1 it can be seen that, 15 (62.5%) out of the entire sample under study had parity of 4 and more (grandmultiparous). Out of the 62.5%, 58.3% of these mothers died from direct causes. Twenty-five per cent (25%) of the study sample were multiparous and 12.5% primiparous. The chi-square test statistic gave a value of 6.48 with a corresponding p-value of 0.039. This is less than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, there is significant association of maternal mortality and parity.

#### **4.6 Occupation of Mothers and Cause of Death**

From Table 4.1 that majority of the study sample 16 (66.7%) were self-employed, 29.2% unemployed and 4.2% employed. From Table 4.1, 54.2% of the self-employed mother died from direct causes. The chi-square test statistic gave a value of 0.279 with a corresponding p-value of 0.870. This is greater than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the association of death (direct or indirect) among pregnant mothers is independent on the occupation of mother.

#### **4.7 Educational Level of Mothers and Cause of Death**

Majority (54.2%) of the study sample had no education, 9 (37.5%) had primary education, 0% no secondary education and 8.3% had tertiary education. It also evident from Table 4.1 that, majority of mothers who died from direct causes thus 50% were uneducated. Figure 4.6 in

appendix D shows a pictorial representation of the educational level of mothers under study and their respective causes of death. The chi-square test statistic gave a value of 10.954 with a corresponding p-value of 0.004. This is less than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the cause of death (direct or indirect) among pregnant mothers is dependent on the educational level of mothers.

#### **4.8 Religion and Cause of Death**

Majority of the study sample 22(91.7%) were Christians, 1 (4.2%) Muslims and 4.2 % Traditionalists. Majority (79.2%) of the Christians died from direct cause. The chi-square test statistic gave a value of 5.345 with a corresponding p-value of 0.069. This is greater than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the cause of death (direct or indirect) among pregnant mothers is independent on the religion of mothers.

#### **4.9 Marital Status and Cause of Death**

From Table 4.1, majority 10 (41.7%) of the study sample were married. All of the married women died from direct causes. Out of 29.2% of the study of single mothers 25% of them died from direct causes. Divorce/separated mothers and those who were widowed constituted 16.7 % of the study sample and all died from direct causes. The remaining 16.7 % died from and indirect causes. The chi-square test statistic gave a value of 12.429 with a corresponding p-value of 0.006. This is lesser than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the cause of death (direct or indirect) among pregnant mothers is dependent on the marital status of mothers.

#### **4.9.1 Avoidable Factors and Cause of death**

Table 4.1 shows that, inadequate treatment was the major cause of death in the sample under study. This represents 10 (41.7%) of the entire sample under study. Facility delay, Patient delay also represented 16.7% each of the entire sample under study. Lack of requisite equipment and lack of communication between facilities also contributed to cause of death by 12.5%. Figure 9.0 below shows the distribution of the various avoidable factors and their respective contribution to the death of the mothers. The chi-square test statistic gave a value of 24.0 with a corresponding p-value of 0.00. This is lesser than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the cause of death (direct or indirect) among pregnant mothers is associated with the avoidable factors.

#### **4.9.2 Antenatal Care and Cause of Death**

Table 4.1 shows that 62.5% of the study sample did not get antenatal care. All mothers in this category also died from a direct cause. 37.5% obtain antenatal care. Out of the 37.5%, 20.8% died from a direct cause. The chi-square test statistic gave a value of 8.0 with a corresponding p-value of 0.005. This is lesser than 0.05 (level of significance). It can therefore be concluded at 5% level of significance that, the cause of death (direct or indirect) among pregnant mothers is associated with antenatal care.

#### **4.9.3 Binary Logistic Regression of the association between variables of interest and cause of maternal deaths**

Results from the logistic regression shows that place, parity, level of education and age were significantly associated with causes of maternal death. Women from urban areas have the odds 0.06 times likely to die from direct causes compared to indirect causes [ $p=0.031$ ] while grand-multiparous women are 5.16 times likely to die from direct causes compared to indirect causes. From 4.2 below it evident that, women with tertiary education have the odds of 0.178

of dying from direct causes compared to indirect causes and mothers between the ages of 30-34 years have the odds of 7.97 of dying from direct causes than indirect causes.

**Table 4.2. Logistic Regression of causes of death**

Variables	Odds Ratio	P -Value	95% CI
Place of residence	0.05	0.031	0.00-0.77
Parity	5.162957	0.05	1.034263-25.77307
Level of education	0.2	0.05	0.033-0.97
Age	7.974392	0.03	1.23565-51.46353

#### 4.9.4 Results of Audit Committee Members Responses to challenges limiting the use of audit guideline forms

All selected sample of seven Doctors and all admitted having knowledge about maternal death forms and admitted having some challenges in the filling of maternal Audit forms. From Table 4.2 above it is evident that, 57.1% of the challenge faced in filling the maternal death audit forms were due to workload or the busy schedules of those responsible for filling the forms. 14.3% justified their inability to fill maternal death audit forms with the unavailable audit forms. 28.6% said the forms filling was time consuming.

One interest area of the study was to access the challenges stakeholders face in filling maternal audit forms. The result presented in table 4.3 shows the various difficulties faced and their respective subscriptions.

**Table 4.3: Filling of audit forms**

Doctors challenges in filling maternal audit forms		What is the most important challenge you face in filling audit forms				
		Workload/ busy	Unavailability of audit forms	Time consuming	Total	
who normally fills audit forms	Doctors	Count	4	1	2	7
		% of Total	57.10%	14.30%	28.60%	100.00%
Total		Count	4	1	2	7
		% of Total	57.10%	14.30%	28.60%	100.00%

From Table 4.4, 57.1% of respondents subscribed to the fact that, on the average, recommendations were executed after maternal death audit. The remaining 42.9% said recommendations are not executed after the maternal death audit

**Table 4.4. Doctors’ view of the execution of maternal audit forms recommendations.**

		Are the recommendation often carried out		Total	
		Yes	No		
who normally fills audit forms	Doctors	Count	4	3	7
		% of Total	57.1%	42.9%	100.0%
Total		Count	4	3	7
		% of Total	57.1%	42.9%	100.0%

From Table 4.5, 42.9% of the Doctors responsible for filling the maternal audit forms admitted that, their challenge hindering the implementation of the audit recommendations was due to fund. 28.5% of the respondents also revealed that communication gaps are their main challenge and 14.3% of respondents had logistics and Management challenges each.

**Table 4.5: Challenges hindering the implementation of maternal recommendations (Doctors perspectives)**

		What is the most important challenge that hinders recommendation being implemented				Total	
		Funds	Logistics	Management challenges	Communication gaps		
who normally fills audit forms	Doctors	Count	3	1	1	2	7
		% of Total	42.9%	14.3%	14.3%	28.6%	100.0%
Total		Count	3	1	1	2	7
		% of Total	42.9%	14.3%	14.3%	28.6%	100.0%

From Table 4.6, 57.1% admitted that the maternal death audit forms were filled a week after death occurs. 42.9% revealed that the maternal audit forms were filled immediately after death occurs. All the respondents are of the view that, maternal death audit recommendations

have impacted on service deliver. All respondents said the maternal death audit forms were filled in good and appropriate times.

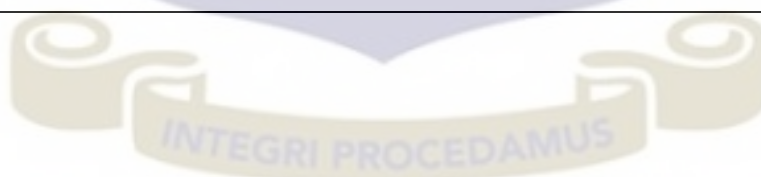
**Table 4. 6: Responses of doctors on timely filling of maternal audit forms**

		How soon is the audit forms filled after the death			Total
			Immediately after death occurs	A week after death occurs	
Who fills the maternal audit forms in the facility	Doctors	Count	3	4	7
		% of Total	42.9%	57.1%	100.0%
Total		Count	3	4	7
		% of Total	42.9%	57.1%	100.0%

It is evident from Table 4.7 that, 71.4% of the Doctors who fill maternal audit forms were not members of the maternal audit committee.

**Table 4. 7: Maternal committee membership composition (Doctors inclusion in the maternal audit committee)**

		Part of a maternal death audit committee where these forms were used		Total	
			Yes	No	
Who fills the maternal audit forms in the facility	Doctors	Count	2	5	7
		% of Total	28.6%	71.4%	100.0%





## CHAPTER FIVE

### DISCUSSIONS

#### 5.0 Introduction

This chapter presents a discussion of the findings from the study. It explains the factors leading to the causes of maternal deaths and the challenges limiting the use of maternal audit guidelines forms by health care providers at the Effia Nkwanta Regional Hospital. It also relates the findings to those of similar studies.

#### 5.1 Place of Residence and Maternal Deaths

Place of residence was significant ( $P$ -value= 0.0011) related to the cause of death. And the commonest cause of death (70.8%) among rural mothers were due to direct causes. This is not unexpected since the rural areas have inadequate access to preventive care (ANC/healthcare) coupled with socioeconomic and cultural barriers. This has led to the three delays: first, delay in decision making, second, delay in reaching the health facility and third, delay in facility taking request action. Similar studies was done by Colbourn et al (2013). Poor infrastructure especially in the hard to reach areas increases the delay in reaching the appropriate health facility to seek for care. This has largely contributed in the increase in mortality in the rural set ups.

#### 5.2 Age of Mother and Maternal Deaths

The age of respondents was also significant ( $P$ -value=0.006) in relation to the cause of death. Majority of death occurred within the age group 30-34 years, which was mostly due to direct causes. Only 4 indirect causes of death was noted in the study group which were among 15-24 age group representing adolescents and early adults. It is likely their pregnancies could have been aggravated by their medical conditions. The delays towards seeking early care could be responsible for deaths among the 15-24 age group.

Other studies that support the findings shows a slight increase risk of mortality in adolescents compared with women age 20-24 years and the highest risk in women older than 30 years. (Nove et al. 2013).

### **5.3 Parity**

Parity was found to be significant ( $P$ -value=0.039) related to cause of death. Majority of the direct cause of death occurred among grand-multiparous mothers (58.3%) this could explain the suggestion that grand-multiparous mothers may delay seeking care. This is because of the feeling of having gone through previous pregnancies coupled with the commonest cause of obstetric death being hemorrhage in women aged 30 years and above which may be due to an increase in incidence of uterine atony with increasing age ( Olopade et al. 2008). Women at the extreme reproduction ages limit of fertility are more likely to develop complications such as hemorrhage, toxemia or prolonged labour during pregnancy and parturition. It is partly suggested that multiparity is associated with higher level of risk of dying than primiparity. Maternal mortality rate is therefore increased by parturient of the socio-economic high-risk group who are in the upper reproduction age group category greater than 35 years.

### **5.4 Occupation**

Occupation of mother and cause of death was not significant ( $P$ -value=0.870) in relation to causing maternal death. A good number of the respondents (66.7%) were self-employed mostly from the rural settings which comprised of petty trading and subsistence farming. This may not contribute much to the socio-economic status to enable them get the much needed health care. Besides cultural changes where many women depend on their spouses for support and permission to visit health institution.



This study is in line with previous work done by Olopade et al. (2008) which stated that women who had lower occupational status were more likely to die than those with higher occupational status.

### **5.5 Education**

Education, a key factor that influenced maternal mortality rate was found to be significant in causing maternal deaths. Majority of the deaths due to direct causes was noted in the mothers who had no education at all. This study is supported by findings of Chauhan et al. (2011), who found that education enhances the knowledge and skills of mother concerning, ANC attendance nutrition and seeking care early.

### **5.6 Antenatal Care**

The study showed that 62.5% of the mothers never had antenatal care possibly due to lack of education among the deceased women. Women between the ages of 35 and above forms the majority of women who never attended ANC.

Findings from the study is supported by studies done by Begum et al. (2003), who found that women over 35 years are less likely to attend ANC, have skilled delivery at birth, and post-partum care compared to women in their twenties and early thirties.

### **5.7 Religion**

In this study religion was not significant (P-value=0.069) this is because majority of them (79.2%) belong to the Christianity religion. The rest of the religious faith could not influence our results of maternal mortality even though in general religious, cultural beliefs and lack of knowledge contributed largely to maternal mortality. However, George Kwarteng (2014) found that, religion and spirituality determine the health seeking behavior of some Ghanaian

women who are less likely to patronize modern health care services primarily because of their religious beliefs, thus members are less likely to also utilize maternal health services or visit ANC during pregnancy.

### **5.8 Challenges Limiting the Use of Maternal Death Audit Guideline Forms**

All the doctors who filled the audit forms admitted having challenges, 57.10% said it was due to workload, 28.6% said it was time consuming and only 14.3% said it was due to non-availability of forms when required.

This is due to human resources challenges as the doctors patients' ratio is 1:13,000 in Ghana. United Nations acceptable ratio is 1:600. (2012 annual report in the shared growth and development). This study is similar to the study by Sorensen et al. 2010, which refers to enquiry guidelines as lengthy and cumbersome making health care workers reluctant in its use.

Table 4.4 shows the results of audit forms and execution of recommendations, 57.1% show recommendations were executed after maternal death audit and 42.9% said recommendations were not executed. The increasing maternal mortality from 24 in 2013 to 43 in 2014 shows very little was done in terms of recommendations being implemented after maternal death auditing.

In Table 4.5 ,42.9 % of doctors admitted implementation of recommendations was hindered by lack of funds, 28.6% of respondents said it was due to communication gaps while 28.6 % said it was due to logistics and management problems. This can be attributed to financial problems facing the hospital. The hospital have about 90% of their internal generated funds coming from NHIS which delays in reimbursement of the hospital sometimes for more than 3

months. A large percentage of their internal generated funds is spent on casual employees' salaries as government had placed ban on employment leading to acute shortage of human resources , hence the hospital has little resources to implement audit committee recommendations to have positive impact on service delivery.

From Table 4.6, 57.1% of the respondent's admitted audit forms were filled a week after death and 42.9% filled audit forms immediately after death occurs. To ensure primary source of information and avoid recall bias the researcher recommends that audit forms are filled as soon as death occurs. This could also lead to good and accurate documentation of events which could improve audit committee recommendations.

From table 4.7, 71.4% of doctors who filled the audit forms were not part of the audit committee members during the confidential enquiries. This implies that this category of doctors who played an important role in the management of the patients but were not part of the audit committee could not add their inputs to the audit recommendations.



## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

In summary, the findings of this review clearly shows that most of the deaths resulted from direct causes from rural setups. From the direct causes of deaths, eclampsia was the leading cause of death (37.5%), followed by haemorrhage 16.7%, uterine rapture 12.5%, unsafe abortion 8.3%, and ectopic pregnancies 8.3% and 16.7% constituted indirect causes of death. All the causes were avoidable. Also place of residence, parity, level of education and age were significant factors in the cause of maternal deaths.

The study also indicated that the main challenge in the use of maternal audit forms by health providers was due to busy work schedule. In addition, audit committee recommendations implementation were largely hindered by financial constraints, lack of logistics and management challenges.

#### 6.1 Recommendations

Based on the findings of the review, it is recommended that;

1. Effia Nkwanta hospital management should develop protocols for treatment of emergency obstetric cases such as hypertensive disorders and haemorrhage as well as improvement in acquisition of logistics for service delivery.
2. Health promotion and education activities in the region should be intensified by Ghana Health Services and District Assemblies which should be extended to include males and opinion leaders in the districts to help reduce some of these avoidable factors, which led to the death of these mothers.
3. The hospital management should also develop non-punitive and actionable recommendations where names should be attached to accountability. This will help reduce the negative attitudes of health care providers and improve quality of care

4. The regional health directorate should establish a maternal mortality review committee for the region.
5. Maternal audit guideline forms should be reviewed and made simpler for filling.

## **6.2 Future Research**

Since the research did not cover the whole region, it is hoped that future research will cover all the regional health facilities which will lead to the reduction and prevention of avoidable maternal deaths.



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## APPENDICES

### Appendix A: Consent Form For Participants

**PROJECT TITLE:** Review of Maternal Deaths Audit in Effia Nkwanta Regional Hospital in the Western Region.

**NAME OF INSTITUTION:** School of Public Health, University of Ghana, Legon.

**BACKGROUND OF INTERVIEWER:**

My name is ..... from .....

(I am a student who is here) to collect data purely for academic research for a DEGREE IN MASTERS IN PUBLIC HEALTH. The research will span a period of seven months starting from November 2014 to June 2015.

**PROCEDURE:** Information required from you for this study includes experience in conducting maternal mortality review, the audit process, dissemination of recommendations, opinions about the audit process and other suggestion. . The interview will take about 30 minutes.

**RISKS AND BENEFITS:** There are minimum or no risks if you take part in this study. There are also no incentives but the information you provide will reduce maternal Deaths and improve the health of Women and the society as a whole. This survey will also assist policy makers and the Effia Nkwanta Regional Hospital to put in place measures to prevent and reduce future maternal Deaths.

**RIGHT TO REFUSE:** Your consent to participate in this study is voluntary and you can withdraw from this study at any time.

**ANONYMITY AND CONFIDENTIALITY:** You are assured of strict anonymity and confidentiality on any information you give. All the information we obtain will remain strictly Confidential and your answers will never be shared with anyone other than our Project Team.

If you have any further information or questions about the study, you may contact the principal investigator, **Mahamadu Mbiniwaya** on phone number: **0244228539** or email: [mmibinwaya@yahoo.com](mailto:mmibinwaya@yahoo.com)

**YOUR RIGHTS AS A PARTICIPANT:** This research has been reviewed and approved by the Ethical Review Committee of the Ghana Health Service. If you have any questions about your rights as a research participant you can contact the ERB Office between the hours of 9am – 4pm on Monday to Friday through **0507041223 (Miss Hannah Frimpong)**.

I have read the information above, or it has been read to me. I have had the opportunity to ask questions about it and any question I have asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

Signature of Participant : .....

Date : .....

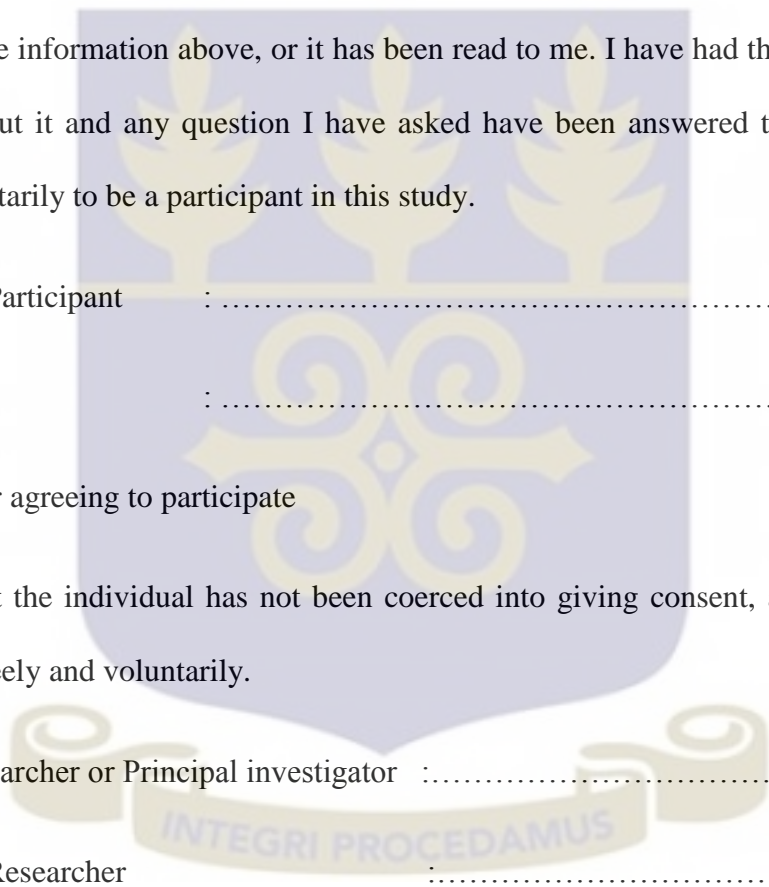
Thank you for agreeing to participate

I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher or Principal investigator : .....

Signature of Researcher : .....

Date : .....



**Appendix B: Consent Form For Deceased Relatives**

**(Even though it will be difficult tracing the relatives of the deceased all efforts will be made in getting their consent)**

**PROJECT TITLE: Review of Maternal Deaths Audit in Effia Nkwanta Regional Hospital in the Western Region.****NAME OF INSTITUTION:** School of Public Health,

University of Ghana, Legon.

**BACKGROUND OF INTERVIEWER:**

My name is..... from.....

(I am a student who is here) to collect data purely for academic work for a DEGREE IN MASTERS IN PUBLIC HEALTH. . The research will span a period of seven months starting from November 2014 to June 2015.

**PROCEDURE:** You are required to give consent for the extraction of data from your deceased relative hospital records at the Effia Nkwanta Regional Hospital. This requires you to provide your signature or thumbprint on the consent form. This will take about 15 minutes.

**RISKS AND BENEFITS:** There are minimum or no risks if you take part in this study. There are also no incentives but the information you provide will reduce maternal Deaths and improve the health of Women and the society as a whole. This survey will also assist policy makers and the Effia Nkwanta Regional Hospital to put in place measures to prevent and reduce future maternal Deaths.

**RIGHT TO REFUSE:** Your consent to participate in this study is voluntary and you can withdraw from this study at any time.

**ANONYMITY AND CONFIDENTIALITY:** You are assured of strict anonymity and confidentiality on any information that will be extracted from your deceased relative hospital records. To ensure anonymity the data extraction sheets will be coded. For purposes of

confidentiality data extracted will never be shared with anyone other than our Project Team. Also informed consent forms and data extraction sheets will be kept under locked cabinet and destroyed after all necessary procedures have been completed.

If you have any further information or questions about the study, you may contact the principal investigator, **Mahamadu Mbiniwaya** on phone number: **0244228539** or email: [mmibinwaya@yahoo.com](mailto:mmibinwaya@yahoo.com)

**YOUR RIGHTS AS A PARTICIPANT:** This research has been reviewed and approved by the Ethical Review Committee of the Ghana Health Service. If you have any questions about your rights as the deceased relative you can contact the ERB Office between the hours of 9am – 4pm on Monday to Friday through **0507041223 (Miss Hannah Frimpong)**.

I have read the information above, or it has been read to me. I have had the opportunity to ask questions about it and any question I have asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

Signature of Deceased Relative : .....

Date : .....

Thank you for your consent

Date : .....

I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher or Principal investigator : .....

Signature of Researcher : .....

Date: .....

**DATA EXTRACTION SHEET FOR MOTHERS' DEMOGRAPHIC INFORMATION**

**CODE OF MOTHER**.....

**PLACE OF RESIDENCE**.....

Rural.....0

Urban.....1

**AGE OF MOTHER**.....

>15 years.....0

15-19 years.....1

20-24 years.....2

25-29 years.....3

30-34 years.....4

35+years.....5

**OCCUPATION OF MOTHER**.....

Self-employed.....0

Unemployed.....1

Employee.....2

**PARITY**.....

Primiparous.....0

Multiparous.....1

Grandmulti.....2

**EDUCATIONAL LEVEL**.....

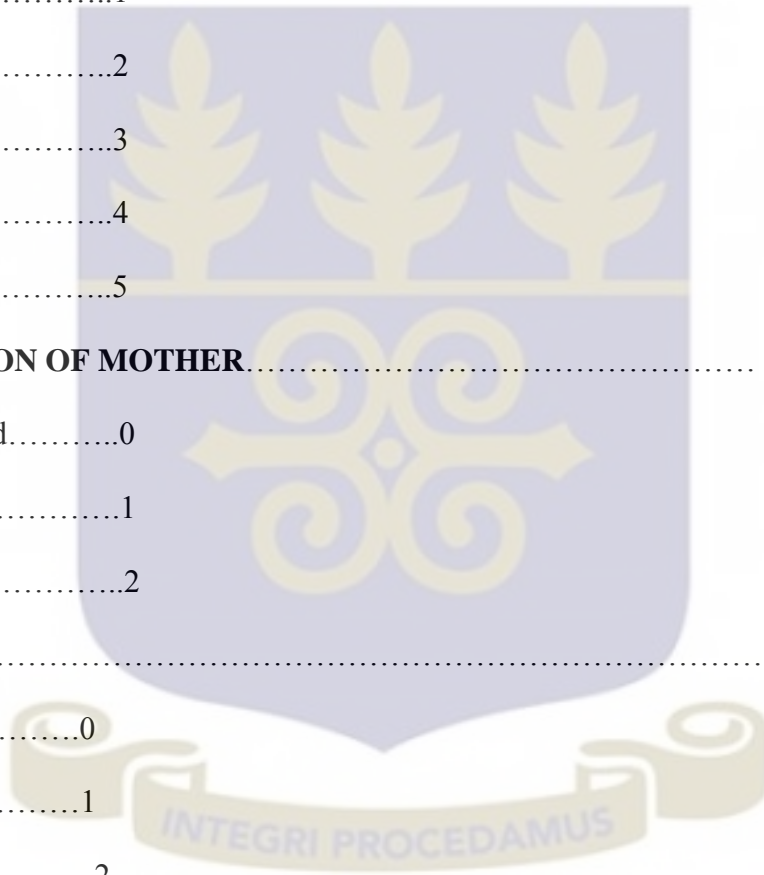
None.....0

Primary.....1

Secondary.....2

Tertiary.....3

DK.....4



**RELIGION**.....

Christianity.....0

Islam.....1

Traditional .....2

Others..... (Specify)

**MARITAL STATUS**.....

Married.....0

Widowed.....1

Divorced/separated.....2

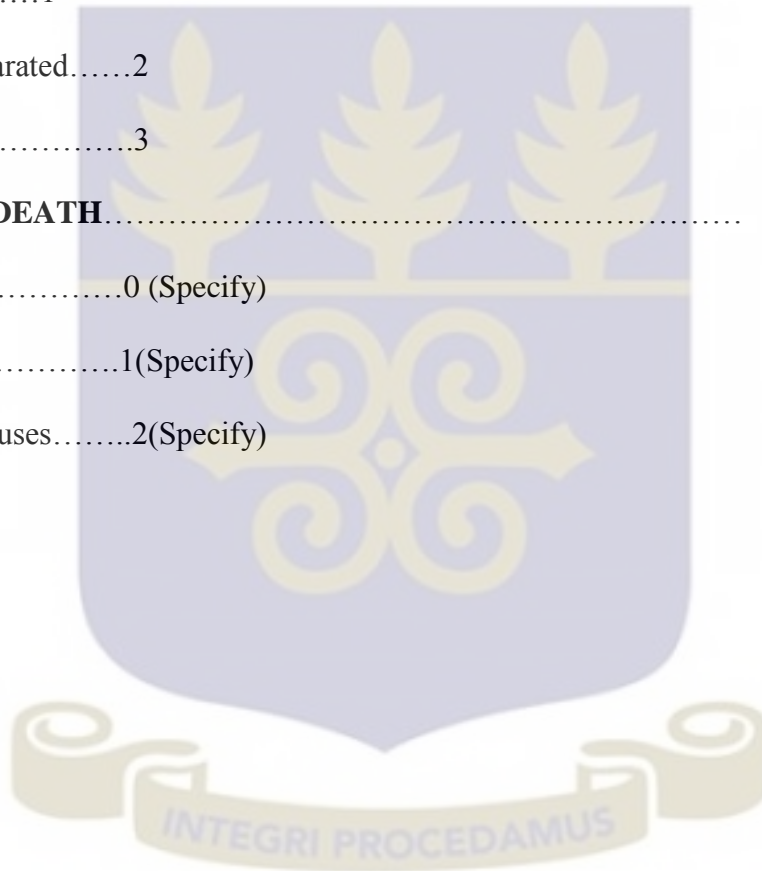
Single.....3

**CAUSE OF DEATH**.....

Direct.....0 (Specify)

Indirect.....1(Specify)

Associated causes.....2(Specify)



**Appendix C: Maternal Death Audit Committee Members**

1. How often do you review audit forms?
  - a. Monthly
  - b. Quarterly
  - c. Others (Specify).....
  
2. Who normally fills audit forms?
  - a. Doctors
  - b. Midwives
  - c. Others (Specify).....
  
3. Are audit forms filled in good times and appropriate?
  - a. Yes
  - b. No
  
4. To whom are the recommendations of the audit disseminated?
  - a. Stake holder
  - b. Referring hospitals
  - c. Health care provider
  
5. Are the recommendations often carried out?
  - a. Yes
  - b. No
  
6. If yes give example  
.....  
.....  
.....  
.....  
.....  
.....  
.....
  
7. If no why?  
.....
  
8. What is the most important challenge that hinders recommendations being implemented?
  - a. Funds
  - b. Logistics
  - c. Management challenges
  - d. Communication gaps
  - e. Others (Specify).....



9. Have you seen any effect on service delivery due to maternal death audit recommendations

- a. Yes
- b. No

10. If yes what effect?

.....  
.....  
.....

11. If no why?

.....  
.....

12. What is most important challenge you face in filling audit forms?

- a. Workload/ busy
- b. Technical content
- c. Unavailability of audit forms
- d. Time consuming

13. Sometimes the old audit forms are used instead of the new ones, what do you think account for this?

- a. Easy to fill old forms
- b. Unavailability of new forms
- c. Others (Specify).....

14. Can you give any suggestions to improve audit mechanisms in other to bring change in obstetric care in the hospital?

.....  
.....  
.....

15. Is there communication between departments in the facility in terms of patient care?

- a. Yes
- b. No

16. If yes how is the communication like in terms of patient care?

- a. Excellent
- b. Good
- c. Poor

17. Is there any communication or feedback between the facility and the referral centers?

- a. Yes
- b. No

**HEALTH CARE WORKERS/MIDWIVES QUESTIONNAIRE**

1. Do you know about the maternal death audit form?

- a. Yes
- b. No

2. Do you know the importance of maternal death audit forms

- a. Yes
- b. No

3. If yes what is the importance of its use?

.....

.....

.....

4. Who fills the maternal audit forms in the facility?

- a. Doctors.....
- b. Nurses.....
- c. Others specify.....

5. Have you used the maternal death audit form before?

- a. Yes
- b. No

(If no, thank you for participation)

6. How soon is the audit forms filled after the death?

- a. immediately after death occurs
- b. A week after death occurs
- c. Others (Specify).....

7. Have you been part of a maternal death audit committee where these forms were used?

- a. Yes
- b. No

8. Have you had any feedback on the audit forms you filled?

- a. Yes
- b. No

9. Do you have any challenge in filling of the forms?

- a. Yes
- b. No

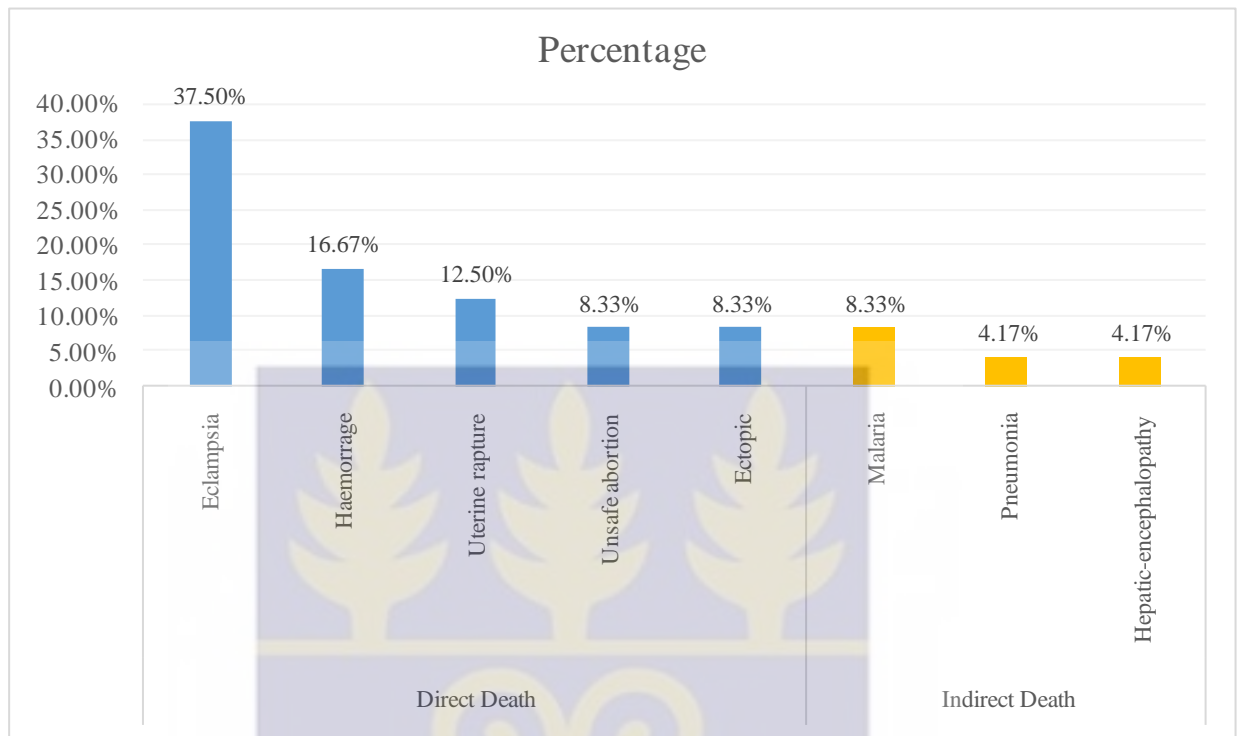
10. If yes what is the most important challenge?

- a. Workload/ busy
- b. Technical content
- c. Unavailability of audit forms
- d. Time consuming

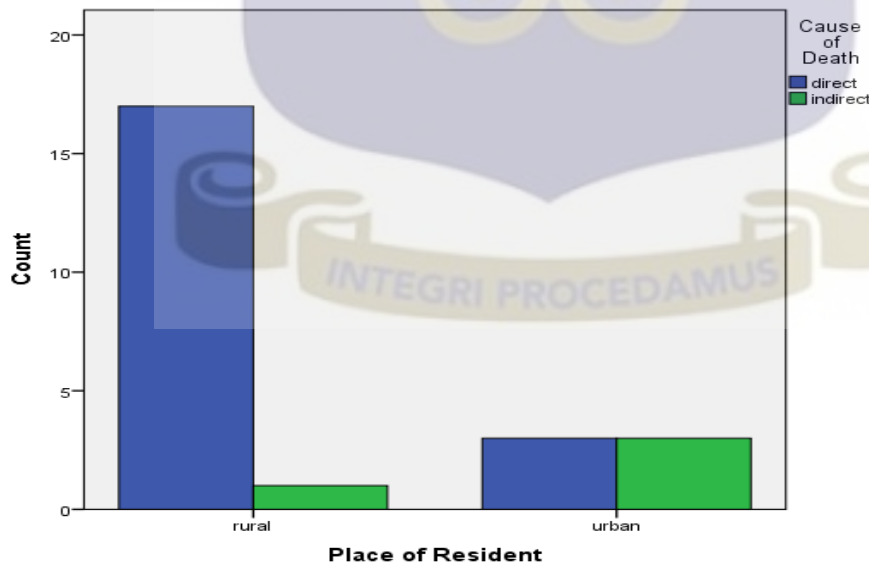


## Appendix D: Histograms

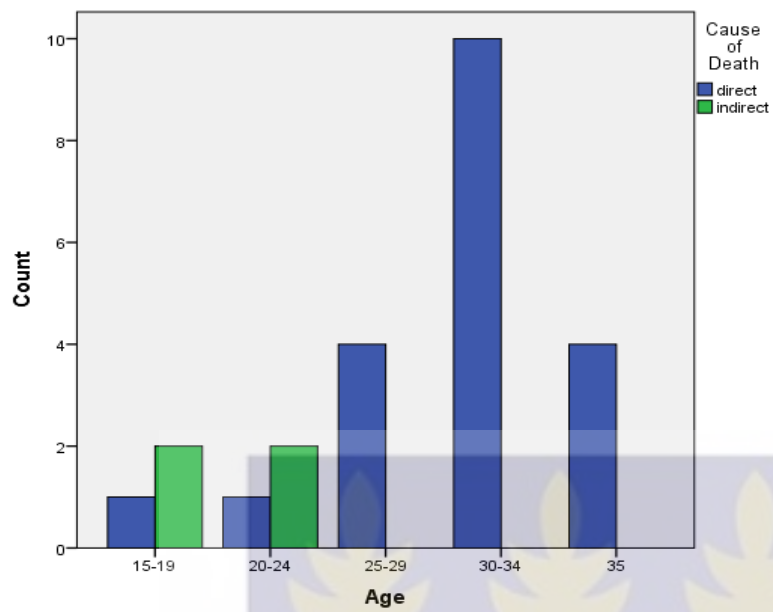
### 1: Causes of maternal death



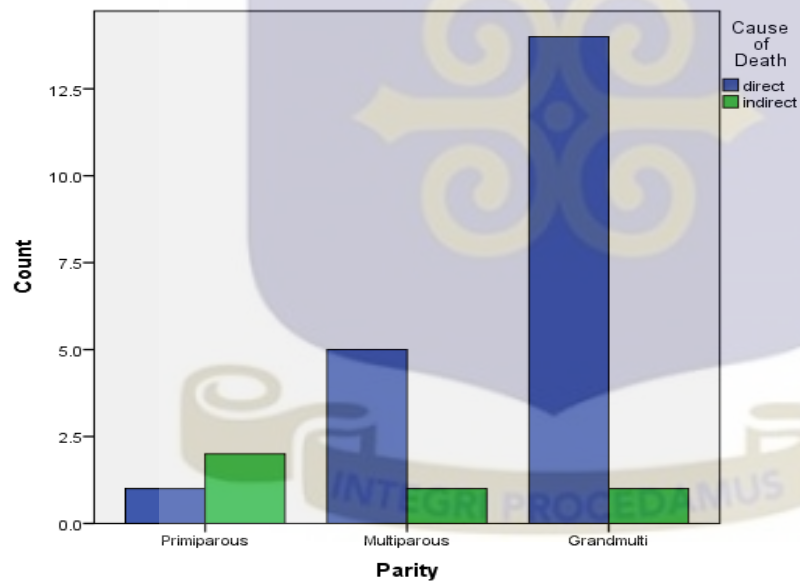
### 2 Pictorial representation of the place of residence and cause of death



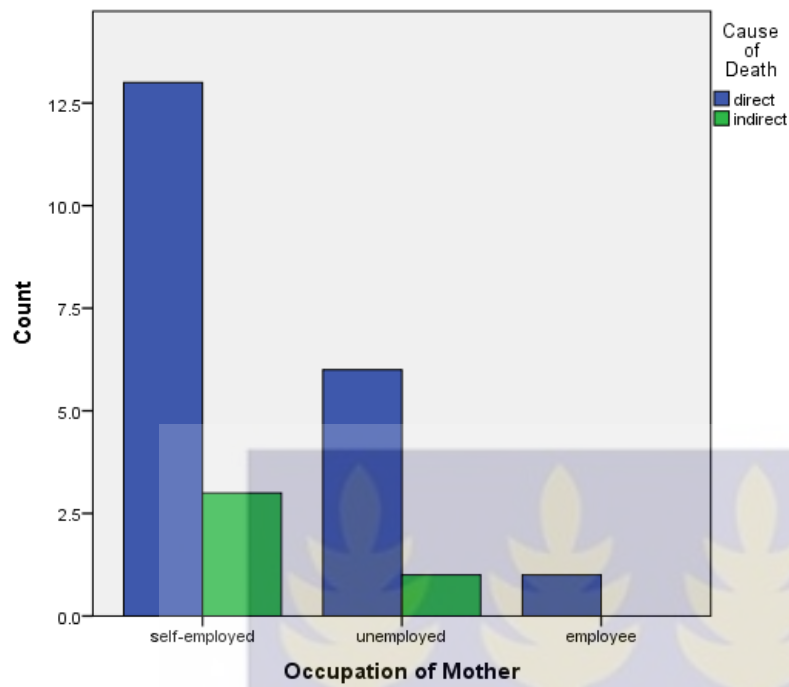
### 3 Pictorial representation of the age of mother and cause of death



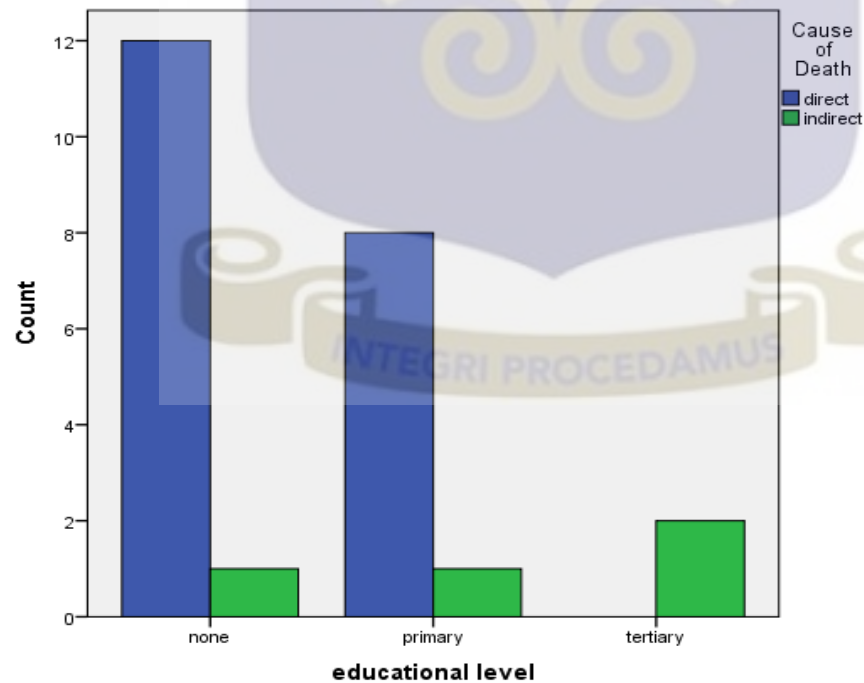
### 4 Pictorial representation of parity and cause of death.



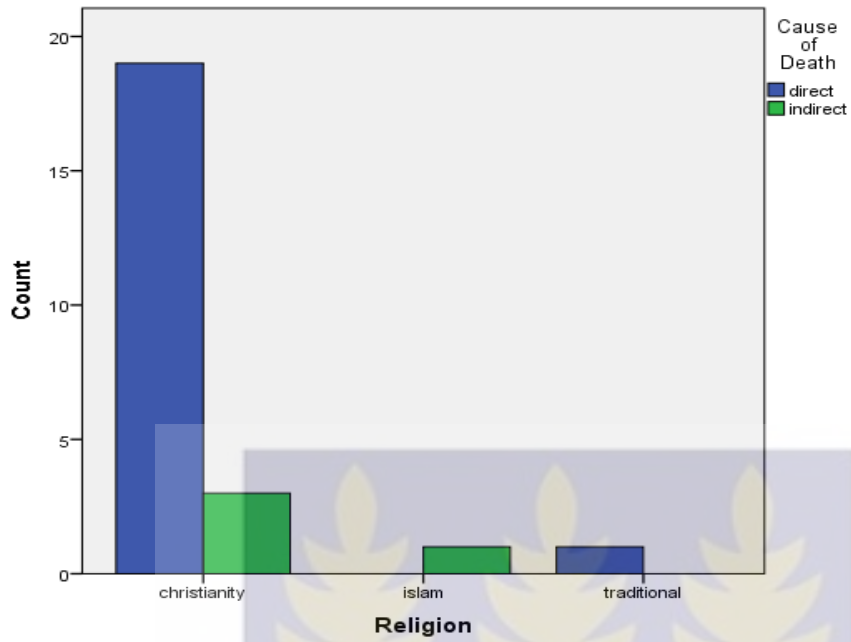
### 5 Pictorial representation of occupation of mother and cause of death



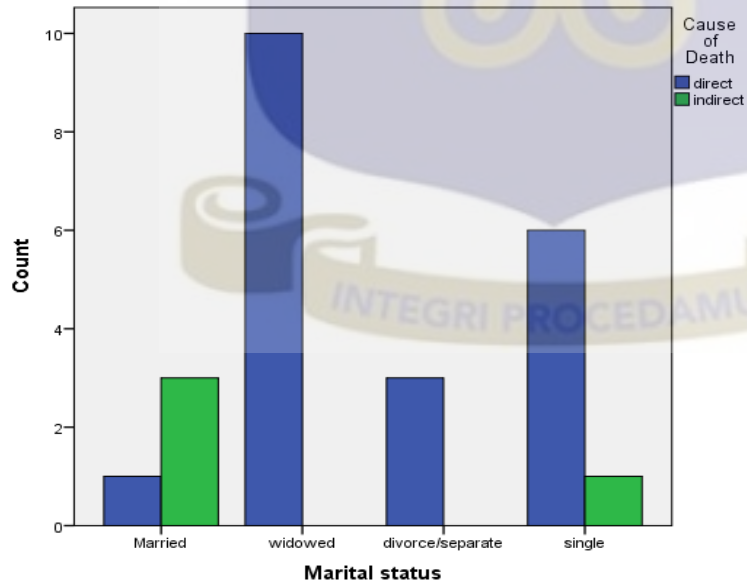
### 6 Pictorial representation of Education level of mothers and cause of death.



**7 Pictorial representation of Religion of mothers and cause of death.**

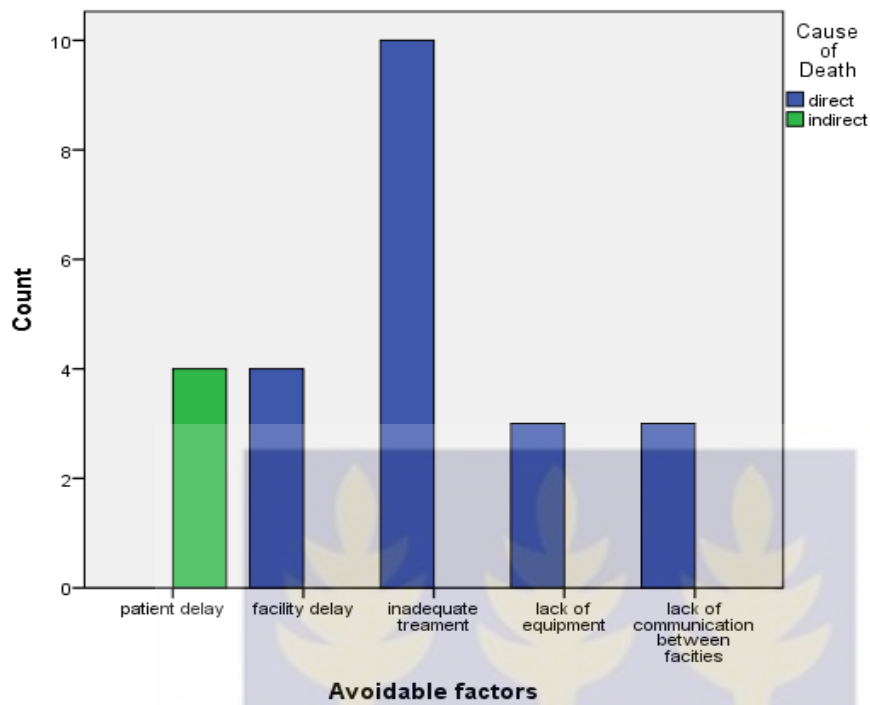


**8 Pictorial representation of Marital Status and cause of death.**

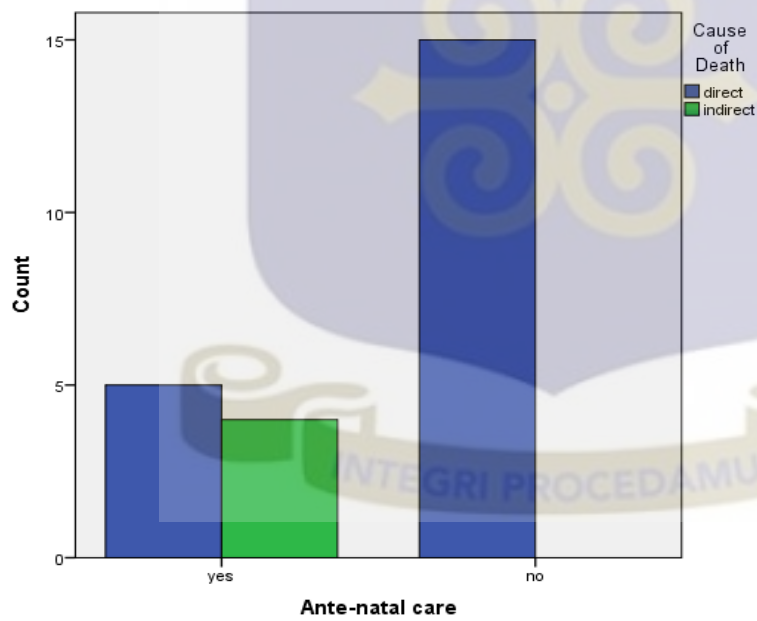




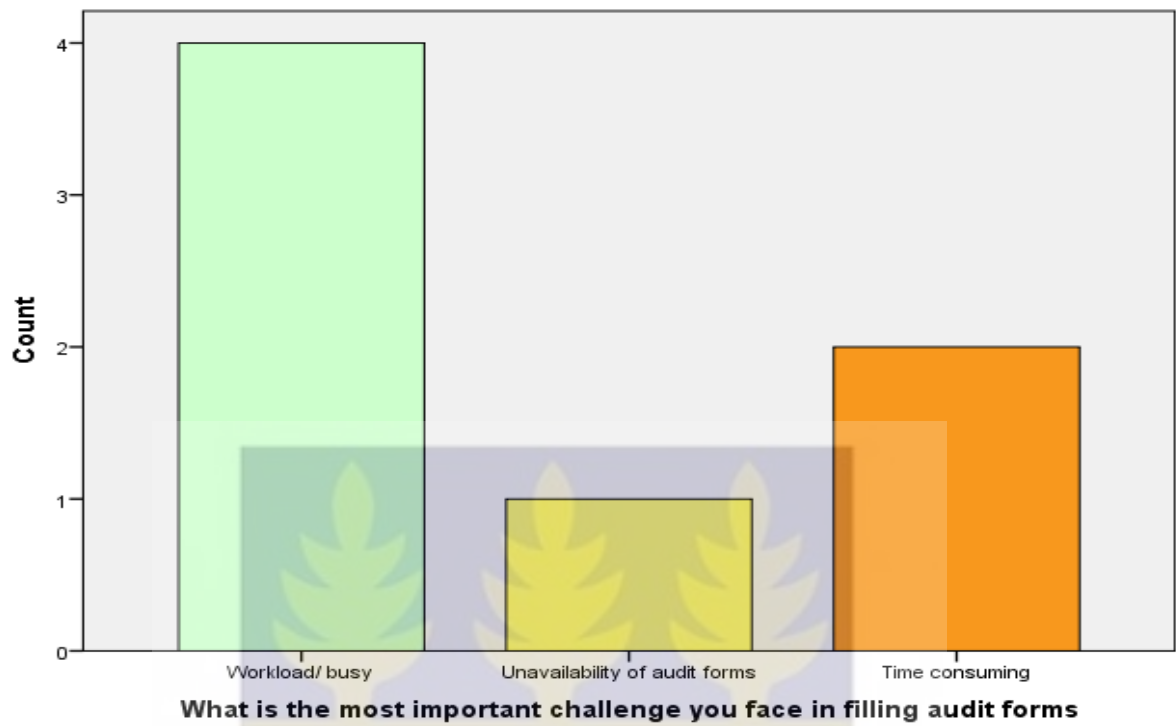
**9 Pictorial representation of avoidable factors and cause of death.**



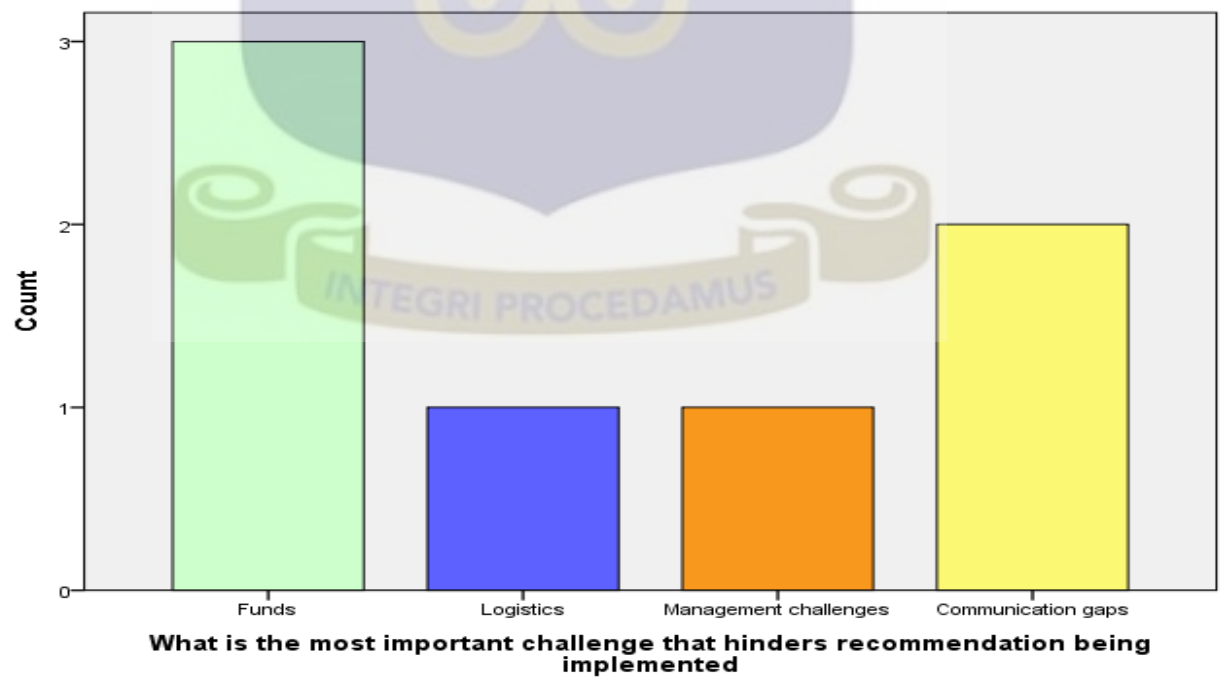
**10 Pictorial representation of Antenatal care and cause of death.**



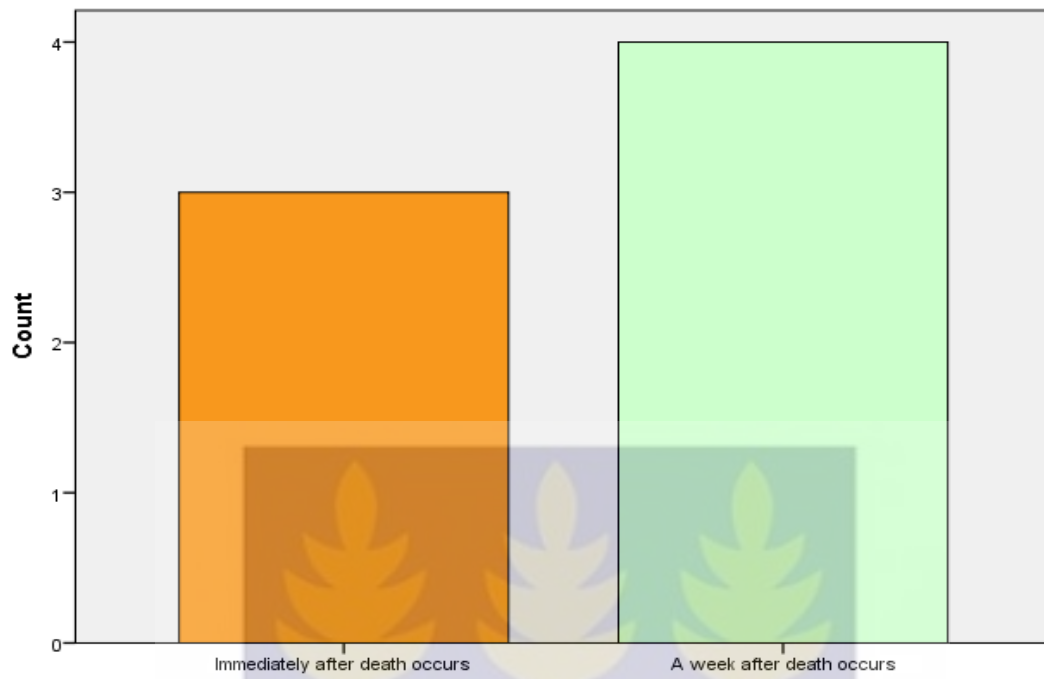
**11 Pictorial view of the challenges hindering the filling of maternal death audit forms**



**12 Pictorial view of important challenges that hinders recommendation being implemented.**



### 13 Pictorial view of time of filling maternal audit forms



How soon is the audit forms filled after the death

