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Chapter

An Analysis of Institutional Maternal Death Audit Reports in the Western Region of Ghana

Marion Okoh-Owusu, George Kojo Owusu, Celia Brown and Frank Baiden

Abstract

Institutional maternal deaths in the Western Region of Ghana increased from 133 in 2011 to 150 deaths per 100,000 live births in 2014. We reviewed available audit reports on deaths that occurred in 2014 in order to identify priorities for improvement. We undertook a manual search for audit reports and used a structured questionnaire to extract information on the sociodemographic characteristics of patients and the circumstances of care and death. We entered and analyzed the data using EPI-INFO (v.7). Analysis was largely descriptive. Audit reports were available for 75% of the 93 deaths recorded in the region in 2014. The mean (SD) age of death was 28 (± 8) yrs. The majority (80%) involved women who made at least three Antenatal Clinic (ANC) visits. Hypertensive diseases (35.8%), hemorrhage (31.3%) and sepsis (7.5%) were the leading causes of death. Most (82%) deaths occurred in hospitals, with almost 75% after 24 hours of arrival. Data completeness and consistency were the major limitations in the analysis. There is a need to improve institutional maternal health care in the region, with interventions designed to address the causes of maternal deaths and to improve the survival of mothers and babies ultimately.

Keywords: maternal deaths, audit, mortality, descriptive, evidence-informed

1. Introduction

Globally 830 women die daily from preventable causes related to pregnancy and childbirth. Nearly all of these deaths occur in developing countries. Despite considerable efforts, maternal mortality in sub-Saharan Africa remains unacceptably high and falls short of the target set in Millennium Development Goals (MDGs) [1–3].

According to the Ghana Demographic and Health Surveys, maternal mortality in the country declined from 634 per 1000 live births in 1990 to 319 in 2015 [4, 5]. This represented an average annual rate of decline of 2.7%. Ghana has achieved this level of reduction in maternal mortality through the deployment of interventions that have improved access to maternal health services, including emergency obstetric care and skilled attendants at delivery. The most notable of the interventions was introduction of the fee-free delivery policy (FEP) in the country in 2005. This is reported to have

contributed to increased access to skilled attendants at delivery and reduced maternal deaths. Overall, however, Ghana failed to achieve the MDG target of attaining a maternal mortality ratio of 185 deaths per 100,000 live births by 2015 [6, 7].

A problem that has persisted throughout the implementation of the fee-free delivery policy has been high number of avoidable maternal deaths within health facilities, that is, institutional deaths. Progress in reducing institutional maternal deaths has been slow, with reports of sustained high numbers of avoidable deaths in health facilities in the country [8–11]. A case in point is the increase in institutional maternal deaths in the Western Region of Ghana from 133 to 150 deaths per 100,000 live births between 2011 and 2014. Reducing institutional maternal deaths will be important if Ghana is to achieve the target set in the Sustainable Development Goals (SDGs) of 70 maternal deaths per 100,000 live births or less by 2030.

2. Maternal death audits

An important intervention introduced in Ghana in the early 2000s is the conduct of audits on all maternal deaths in health facilities in the country [12]. Such audits must be conducted within four weeks of the death, and hard copies of reports must be shared with District and Regional Health Management Teams [10]. The audits aim to establish the circumstances of death and identify service delivery factors that must be improved to prevent future deaths. All deaths are simultaneous to be entered into the District Health Information Management System-2 (DHIMS-2), the backbone electronic data capture system of the Ghana Health Service (GHS).

While the information on all maternal health audits is expected to be shared at the regional and national levels, district and regional health management teams are also encouraged to periodically analyze the data that are made available to them to identify areas of generating generalizable knowledge and information to guide revisions to policies and guidelines. This paper is a descriptive analysis of data available in maternal death audit reports submitted to the Western Regional Health Directorate in Ghana in 2014.

3. Methods

3.1 Study site

The Western Region is one of the ten administrative regions of Ghana. The region covers a land area of 23,921 square kilometers and is the fourth-largest region in the country. It has a population of about two and half million people, 24% of whom are women of childbearing age. The entire western boundary of the region shares a border with La Cote D'Ivoire. The region experiences the highest level of rainfall in Ghana, and most parts of the region are forest that is traversed by very poor roads. The capital of the Western Region is Sekondi-Takoradi. The Effia Nkwanta Hospital in the Sekondi-Takoradi metropolis (STM) is the main referral health facility in the region. In addition, each of the 22 districts/municipalities in the region has a hospital or health center that offers comprehensive maternal health services. Consistent with the guidelines of the GHS, all maternal deaths in the region must be subjected to audit by facility management teams. Audits are required to cover the history of pregnancy,

circumstances of death, and findings on the causes of death. The findings are to be reported on specially-designed maternal deaths audit forms. This information is expected to be entered into the District Health Information System Two (DHIMS-2) and transmitted to the regional and national levels. The DHIMS-2 is the electronic data capture system that serves as the backbone of institutional health service information management in Ghana. A copy of the report must also be sent to the regional level.

3.2 Data management, analysis, and limitations

The findings of the audit are recorded on specially-designed audit forms. The information is copied and transmitted to the district and regional health administration for collation and analysis. In addition, periodically teams from the regional health administration travel to the various districts and sub-district health facilities to verify submitted audit reports and follow-up on actions taken on the basis of the findings.

For the purpose of the work presented here, data were extracted from all audit forms submitted to the Regional Health Administration in 2014. Where feasible, information was corroborated with data in the DHIMS-2. The data from the forms were entered into computer using a platform created in EPI-INFO version 7. Analysis was largely descriptive and included computation of mean age of death, maternal mortality ratio, and extent of data adequacy.

An important limitation to the extent of analysis is the extent of data completeness for different variables. The effect of this is the use of different denominators for some variables (reported in the “Results” section). The absence of comparator data from overall (all pregnant women) maternal services against which the findings could be compared and inferences drawn was yet another limitation.

4. Results

A total of 93 maternal deaths occurred in 2014, and all the deaths were entered into the DHMIS-2 by December 2016. At least one maternal death was recorded in 15 out of the 22 districts in the region. However, at the Regional Health Directorate, audit reports were available for 67 (72%) of deaths, and all 67 were from 9 out of the 22 districts/municipalities (**Table 1**). The number of deaths recorded in the DHIMS and the number of deaths reported to have been audited as per the DHIMS were consistent with the number of actual reports available at the Regional Health Directorate in only 9 out of the 22 (41%) districts/municipalities. Among these nine district, seven had recorded no deaths (**Figure 1**).

The total number of audited maternal deaths for STM (60%) represents the highest number of deaths recorded in a district. It was followed by Ellebelle district, which also recorded 13 deaths in the DHIMS (DHIMS-2, 2017b) but reported 10 (15%) cases of audited maternal deaths. The highest maternal mortality ratios were recorded in the regional hospital in Sekondi-Takoradi (355/100,000 live births) and the districts hospitals Ellebelle (231) and Jomoro (146) (**Table 1**). Per population of women of childbearing age, however, the Ellebelle district recorded the highest of 45 deaths per 100,000 women, with the STM recording 25 deaths per 100,000 women.

The median and mean ages of women were 27 (range of 13–51 yrs) and 28 yrs., respectively. The age distribution was as follows: 10/67, 5% (less than 19 yrs); 45/67, 67% (20–35 yrs); and 12/67, 18% (above 36 years). In all the districts, deaths occurred among women who were regular Antenatal Clinic (ANC) attendants. Seven (18%)

District	WoCBA*	No. of live births	No. of deaths	Maternal mortality ratio/100,000 live births	Age/Mean Age	No of cases attending ANC	No. of live births	Deaths within 24 hrs	Autopsy done	Time of death		Place of death		Parity			Period of death		
										pm	am	Facility	Home	Null	1-5	>5	Ante partum	Intra partum	Post partum
Bibiani Ahwiaso Bekwai	30,844	4201	2	48	18	2	2	2	0	1	1	1				0	2	0	
Ellembelle	22,148	4329	10	231	28	10	7	2	0	5	5	9	1	6	1	0	2	8	
Jomoro	38,145	2049	3	146	23	3	0	1	0	1	1			3		0	1	0	
Nzema East	15,155	1362	1	73		1	0	1	0			1	0			0	1	0	
Prestea Huni Valley	39,035	3701	5	135	27	5	3	1	1	4	1	3	2	1	1	0	1	2	
Sekondi-Takoradi	158,170	11,279	40	355	29	33	22	7	2	19	15	29	6	2	28	1	4	7	24
Tarkwa Nsuaem	22,852	5466	3	55	35	3	1	1	0		2	2	1	2		0	1	0	
Wiawso	34,406	4856	3	62	28	3	1	2	2		2	3	0	3		0	2	0	
Total	360,755	35,764	67	187	28	60	36	17	5	29	27	48	11	3	43	2	4	17	34
Data completeness	N/A	N/A	72%		N/A	N/A	N/A	N/A	N/A	84%		88%			64%			82%	

*Based on the information provided in audit reports available at the Regional Health Directorate.

*WoCBA – Women of childbearing age, that is, 15–49 yrs.

Table 1.
Maternal deaths and related factors in the Western region of Ghana in 2014*.

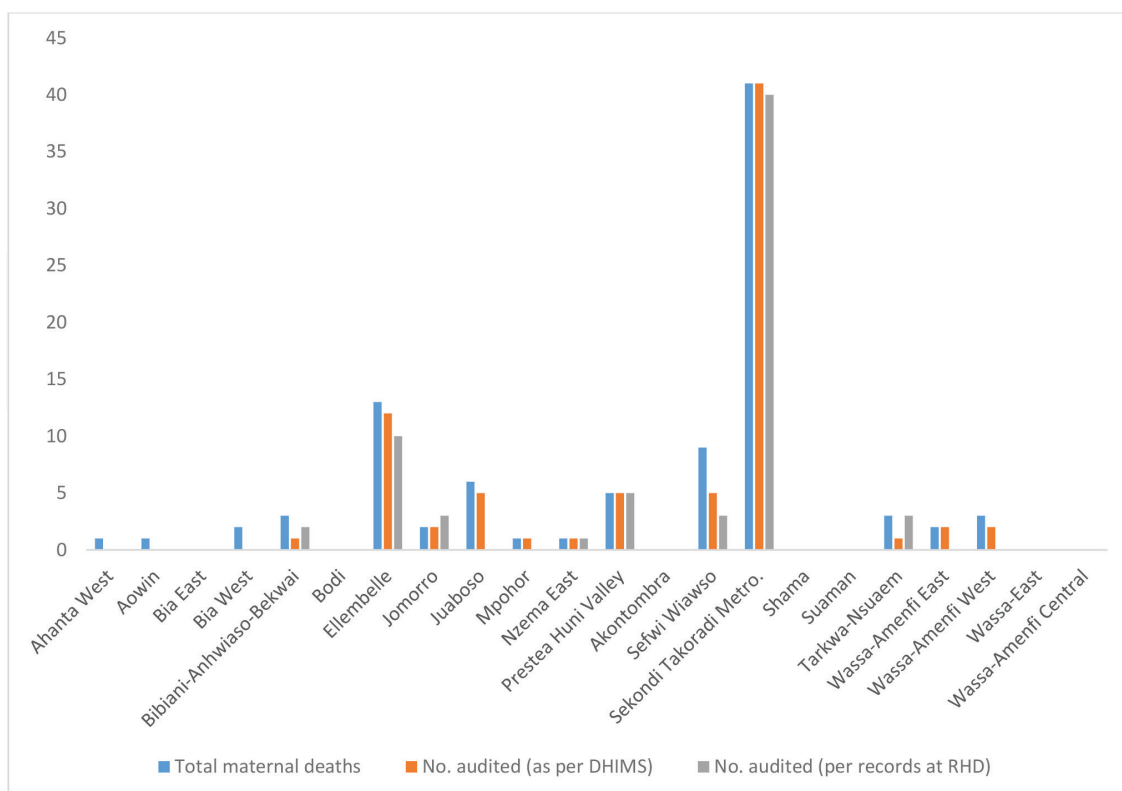


Figure 1. Maternal deaths and number audited in 2014 as per different sources of record in the Western region of Ghana.

women in the cases in the Sekondi-Takoradi metropolis were non-ANC attendants. Overall, 80% of cases involved women who made at least three ANC visits.

The leading causes of death were hypertensive diseases (24 out of 67 cases, 36%), hemorrhage (31%), and sepsis (8%) (**Figure 2**). Nearly all (96%) of the cases of

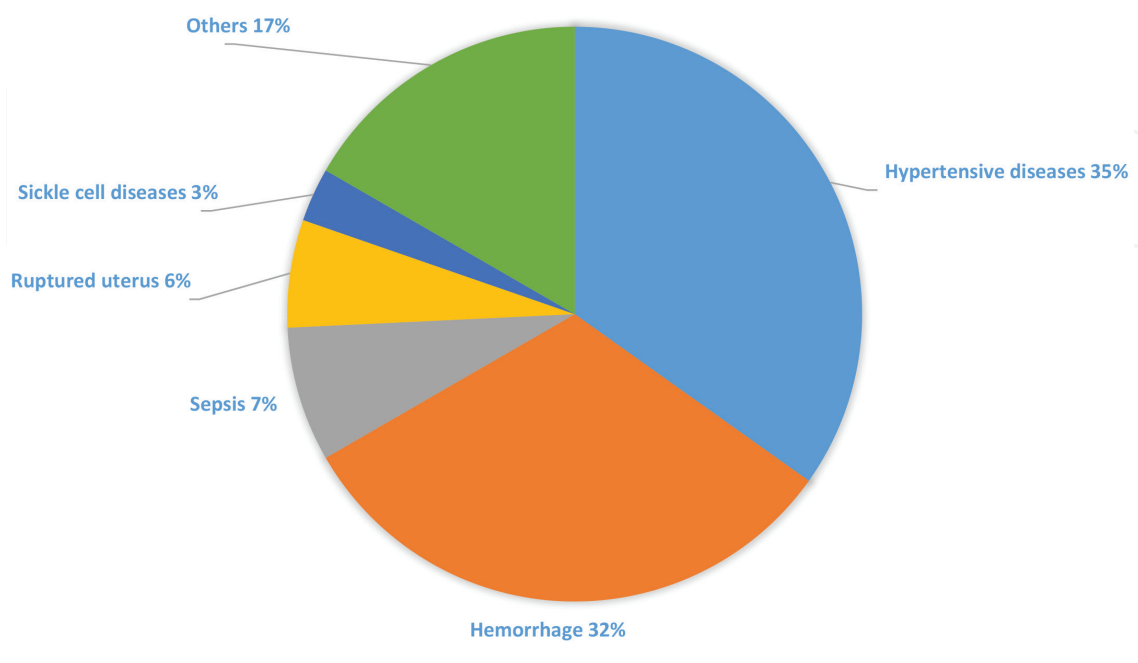


Figure 2. Causes of maternal deaths in the Western region of Ghana in 2014.

District	No of cases with audit reports	Causes of maternal deaths								Audit report availability
		Hypertensive diseases	Hemorrhage	Sepsis	Ruptured uterus	Sickle cell diseases	Unsafe abortions	Ectopic gestation	Others	
Bibiani Ahwiaso Bekwai	2	0	2	0	0	0	0	0	0	100%
Ellembelle	10	4	5	0	0	1	0	0	0	100%
Jomoro	3	0	1	0	0	0	0	0	1	67%
Nzema East	1	0	1	0	0	0	0	0	0	100%
Prestea Huni Valley	5	1	1	0	0	1	0	0	2	100%
Sekondi- Takoradi	40	18	9	4	2	0	1	0	6	100%
Tarkwa Nsuaem	3	0	1	1	1	0	0	0	0	100%
Wiawso	3	0	1	0	1	0	0	1	0	100%
Total	67	23	21	5	4	2	1	1	9	99%

Table 2.
Causes of maternal deaths per district in 2014 in the Western region of Ghana.

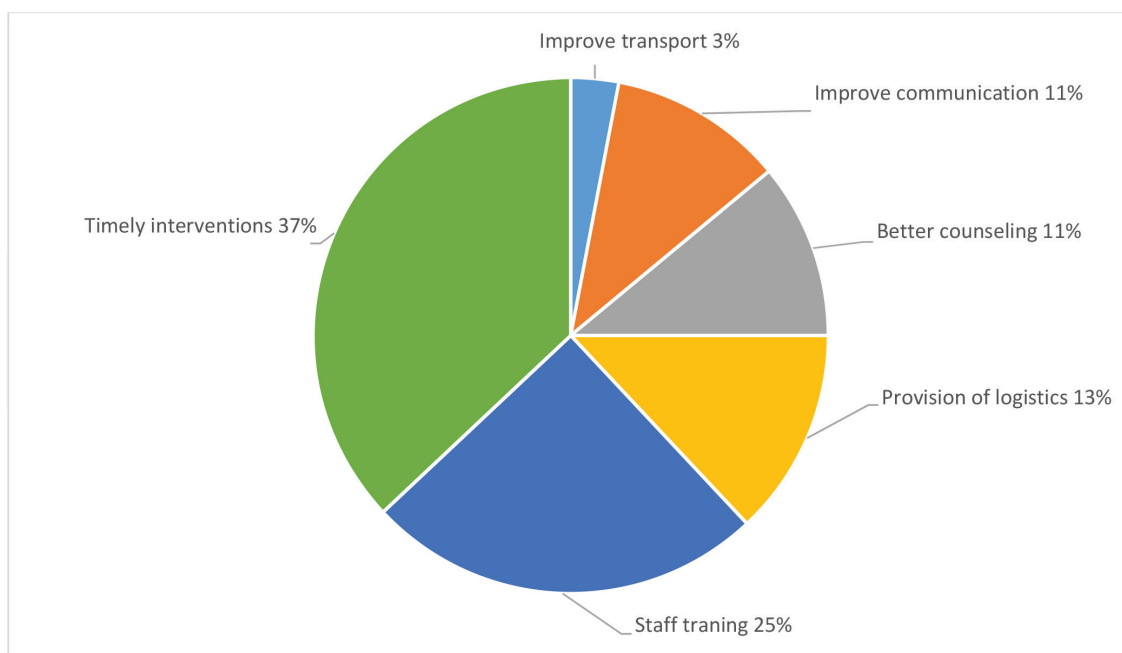


Figure 3. Recommended actions following audit of maternal deaths in the Western region of Ghana – 2014.

hypertension-related deaths occurred in the Sekondi-Takoradi (18 cases, i.e., 78% of cases) and Ellembelle (4 cases, i.e., 17% of cases). In contrast, at least one hemorrhage-related death occurred in each district and municipality, with STM having the highest proportion of 43%, followed by 24% in Ellembelle (**Table 2**). All the cases of sepsis-related deaths occurred in the Sekondi-Takoradi municipality and Wiawso district. In 61% (34 out of 55) of cases, death occurred during the postpartum period. In 36 (54%) cases, deliveries resulted in live births.

The majority 82%, that is, 48 out of 59 cases of deaths, occurred in hospitals, with about a quarter (25%) occurring within 24 hours of arrival. Nearly an equal number of deaths during the day (29 out of 56 cases) occurred at night (27). The autopsy was conducted in only five (8%) cases in three districts or municipalities. The major interventions recommended by the audits were more timely intervention (38% of recommendations), improved staff competency through in-service training (25%), and improved logistics (11%) (**Figure 3**).

5. Discussion

The paper is a descriptive analysis of the causes and factors of maternal deaths in the Western Region of Ghana in 2014. A major limitation of this effort has been the quality of data available at the regional level. Although maternal death audits are mandatory and audits reports are required to be submitted to the region, it was in only 67 out of the 93 (73.1%) cases that such audit reports were submitted more than a year after the deaths occurred. Nationwide, out of 941 maternal deaths in 2014, only 81% had been audited by the end of the year (DHIMS-2, 2016).

It is apparent that the disparity between data on maternal deaths captured in the DHIMS-2 and physical records of audits at the Regional Health Directorate was quite considerable and is likely to be a national problem. This could be attributed to the fact that most health information officers have access to the online DHIMS-2 platform

(DHIMS-2, 2017c) and tend to make that data entry more prompt at the district level. The fact is the lack of completeness in the details required for the audit review process at the regional level. The lack of records on maternal health audits and hence lack of completeness in maternal health records was similarly reported in a recent review of maternal deaths at the regional hospital in the Eastern Region in 2012. In that review, it was found that audit reports were not available for 24% of cases [13].

Another level of data inadequacy that undermined the validity of the analysis is the lack of completeness in the data presented in various audit reports. Many fields on the audit forms were not filled, and the number of events did not add up. It was evident that audit teams or officers who completed the audit forms placed emphasis on filling out the section on the cause of death (99% completeness) and were less concerned when completing portions of the form that describe the circumstances of death. Data incompleteness ranged from 64 to 88% for parameters such as parity, time, place, and period of death. Given the basic nature of such information, the lack of completeness in these instances is unlikely due to a lack of familiarity or staff's lack of knowledge on how to complete these forms. It is more likely due to negligence buoyed by a lack of oversight and review of forms prior to submission to the regional level. In a study done in the era when mandatory audits had not been institutionalized, maternal health data at a district hospital in rural northern Ghana were similarly found to be grossly incomplete, inaccurate, and inconsistent. The era of audit and the introduction of an electronic data platform does not appear to have had much effect in these regards.

The current procedure where maternal health audits are conducted by the health teams at the facility where the death occurred needs to be reviewed. The approach appears overly self-serving and unlikely to engender the desired level of scrutiny and accountability. Consideration should be given to establishing a system of audits that routinely involves external and independent experts [8, 10]. It is critical that every maternal death is properly accounted for as a matter of public health records and as part of quality assurance in health institutions in the country. The lack of completeness of data on maternal death events is a serious issue that the authorities in the Ghana Health Service need to address urgently. A regime of responsibility and sanctions needs to be instituted.

This study found that the three main causes of death accounted for about 75% of all deaths. This pattern is consistent with findings in other studies and suggests that a precipitous drop in maternal deaths could be achieved if interventions could be targeted at these causes. Hypertensive diseases in pregnancy are overtaking hemorrhage as the leading cause of maternal mortality in Ghana [14–16]. Substantial reduction in these maternal deaths could be made in Ghana through widespread hypertension and proteinuria screening and early delivery of women with severe diseases [17]. Hemorrhage and sepsis are amenable to improved blood transfusion services and early and appropriate use of antibiotics. The positive impact of these has been demonstrated in a quality improvement program piloted at the Greater Accra Regional Hospital [18].

For many years, programs to reduce Ghana's maternal mortality ratio have predominantly focused on interventions at the community level. It has often been implied that when women attend ANC, the risk factors for maternal deaths will be identified, and the instituted interventions will lead to safe delivery. In this study, however, we find that 80% of deaths occurred among women who attended ANC at least thrice during pregnancy. We also found that most deaths occurred among women who had been at the facility beyond 24 hours. These findings support those

made in a 2009 review of maternal deaths in the Upper West Region of Ghana [10] and in other countries with a high burden of maternal deaths [19, 20]. They put to question the long-held preposition (often advanced by health workers) that most maternal deaths result from women reporting late at the health facility [10, 13]. The quality of institutional maternal care should not be taken to be assured, and unless the issue of quality of institutional maternal care is rigorously addressed by the health service, substantial gains made in increasing antenatal attendance and skilled attendance will be undermined.

6. Conclusion

Hypertensive diseases in pregnancy, hemorrhage, and sepsis account for about 75% of institutional maternal deaths in the Western Region of Ghana. With most of the deaths occurring in women who were regular antenatal attendants and in women who were in health facilities for more than 24 hours, it is evident that most could have been prevented with appropriate and timely interventions at the various health facilities. Therefore, institutional maternal care strengthening should be a major priority in reducing maternal mortality in the Western Region of Ghana.

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Conflict of interest

The authors have no conflicts of interest.

Contribution of authors

Marion Okoh-Owusu MBChB MPH: Contribution: principal investigator, team leader, data collection, data entry and analyses, writing of manuscript.

George Kojo Owusu, MBChB: Contribution: co-investigator, data collection, writing of manuscript, review of manuscript.

Celia Taylor BSoc Sc, PHD: Contribution: writing and critical review of manuscript.

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