Trends and Causes of Maternal Mortality at the Tamale Teaching Hospital in Ghana, between 2010 and 2016

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Abstract

Background: Maternal mortality has become a thorny issue in the health discourse of many developing countries including Ghana. The research made a comprehensive audit of the maternal mortality cases at the Tamale Teaching Hospital during the MDG period and beyond. Despite the huge public cry on the subject, just a few studies have been conducted across the country.

Objective: The aim and objective of this study was to identify the trends and causes of maternal deaths at the Tamale Teaching Hospital between 2010 and 2016, and find ways of reducing the rates.

Method: A retrogressive investigation was conducted on maternal mortality records between January 2010 and December 2016. It consisted of all deaths related to pregnancy and childbirth at the hospital within the period under review. Nurses, midwives, and a gynaecologist were interviewed for the primary data while the secondary data was gathered from reports and records of patients.

Results: The results revealed that a total of 272 women died out of 61,368 who came on admission to the facility. This represents a maternal mortality rate of 437.9 per 100,000 live births. The annual mortality trend did not indicate a uniform scenario but kept rising and falling. Direct or medical causes included eclampsia, sepsis, severe anaemia, pneumonia accounting for 68.27 percent of the deaths, while indirect causes such as malaria, HIV/AIDS, CSM and heart failure contributed 31.73%. Deaths Attributable to eclampsia alone was 25.30%, followed by severe anaemia with 15.60%, sepsis (10.84%), unsafe abortion (7.23%) with the least being pneumonia recording 2.41%.

Conclusion: The maternal mortality rate recorded at the Tamale Teaching Hospital may appear to be smaller than other studies in the country and outside but it failed to meet MDG 5. This requires immediate action to help save the lives of mothers from these preventable causes. Major recommendations include: building new obstetric units in all facilities and improving existing ones with qualified personnel, logistics and equipment to fully take care of women in labour.

Keywords: Maternal Mortality, Maternal Mortality Rate, Tamale Teaching Hospital, Trends, Causes, Ghana.

INTRODUCTION

September 2000 marked the declaration of the eight-pronged Millennium Development Goals (MDGs) by 189 leaders of the world to improve the lives of women, men and children in their respective nations. The goal number 5a sought to reduce maternal mortality by 75 percentage points between 1990 and 2015, while goal 5b, supplement of goal 5a was meant to achieve universal contraception. These two MDGs have engineered a significant reduction in maternal mortality in many jurisdictions. Despite this valuable experience, many constraints abound in the low-income nations, especially Sub-Saharan Africa (SSA) and post conflict environments which have not had sufficient experience by way of MDG 5a. Beyond the MDGs era in 2015, a new regime known as Sustainable Development Goals (SDGs) has emerged with a greater number of non-health aspect and more attention on inequity reduction [1,2]. The world officially launched the implementation of the 2030 Agenda for the SDGs in January 1, 2016, with 17 SDGs meant to transform and resolve urgent global challenges over a period of 15 years. This agenda would build on the successes and failures of the MDGs to ensure a sound socioeconomic and environmental progress worldwide within the period under review. The SDG 5a and 5b involves the elimination of all forms of discrimination and violence against women and the female child, as well as harmful practices and diseases affecting this gender. The goal seeks to advance the wellbeing of every female species in the areas of sexual, reproductive health and productive resources [3,4]. The aim of this research is to determine the trends and identify the causes of maternal deaths at the Tamale Teaching Hospital between 2010 and 2016.

Globally, maternal deaths have seen a downward trend, decreasing from 532,000 in 1990 to 303,000 in 2015, representing a reduction by 43%. The maternal mortality ratio (MMR) also experienced a decrease from 385,000 per 100,000 live births to 216,000 per 100,000 live births within the period under consideration, being a difference of 44% [5,6]. Within the same framework every Region around the world had the opportunity to experience a decline in maternal mortality. East Asia had a lion share of 72 percent reduction, with the least coming from West Asia with 43 percent. Africa recorded 59% with Sub-Saharan Africa bagging 45%. These great success stories were a direct result of increased quality access to healthcare, effective management and increased education to mention a few.
Sylvester et al. investigated the trends and reasons for maternal deaths between 2005 and 2010 at the Wa Regional Hospital in the Upper West Region of Ghana in 2016 and the results indicated that 73 deaths were recorded within the period. The causes for these deaths were either direct or indirect, and the direct causes, consisting of Sepsis, Eclampsia, obstructed labour and hemorrhage were responsible for 60% of the deaths. On the other hand, the forty percent indirect causes made up of malaria, sickle cell anaemia, HIV/AIDS and TB. The study further identified socio-cultural factors such as competition for more children, taboos in foods, blood transfusion and attendance of antenatal and poverty as contributory factors to the maternal curse [7,8]. A similar publication in 2017 sought to verify the factors influencing maternal deaths in South Africa, within the Limpopo province and determined that there were 232 deaths out of 14,685 live births from 2011 to 2015, representing an institutional Maternal Mortality Ratio (iMMR) of 1579/100,000 live births. Further, the average age of mothers was 29 years, with 43% of deaths occurring within 24 hours of admission while obstetric haemorrhage and eclampsia accounted for most of the deaths recorded. The data further showed that 89% of the patients were referred from community, district and regional hospitals, and 35% of them died at the ICU out of the main causes and non-pregnancy-oriented factors [9]. At the end of the UN prepared Millennium Development Goals (MDGs) in 2015, WHO identified a number of interventions and strategies to help improve the monitoring of maternal mortality in member states, knowing that most of them failed to meet the prescribed MDGs. In order to effectively monitor maternal mortality for eventual reduced rates, WHO suggests proper death registration, collection of every data on deaths via registration and autopsy in local communities, regular health surveys at the household level as well as complete review and reporting on all health facilities accompanied by regular quality control performance [10,11].

In another development, research and development in the area of maternal mortality has the capacity to improve the state of the subject. Recommendations made from such studies if fully implemented would lead to the development of very important and critical policies and programmes that would help address most of the problems experienced in the maternal death landscape [12,13]. For instance, The HIV epidemic in relation to maternal mortality requires an integrated and effective health system which can be achieved through research and development that will generate the needed evidence of practice. Nepal has experienced significant reduction in maternal mortality rates in the past few years and to proof this, Shrestha et al. [14] conducted an investigation with the aim of confirming a steep decline in the numbers. The research was based on secondary data on care services and socio-demographic constructs extracted from the Nepal health surveys for 1996, 2001, 2006 and 2011. The results revealed that indeed there was drastic reduction in the mortality rates which emanated from improved delivery and adoption of maternal care provision. Education according to the authors was a critical factor in improving the rates due to increased awareness and adherence.

METHODS AND MATERIALS

Study Site

The Tamale Teaching Hospital, formerly referred to as the Tamale Regional Hospital resides in the heart of the Tamale Metropolitan Assembly. It was established in 1974 to provide various healthcare services to the Northern, Upper East and Upper West Regions. Its current status of a teaching hospital came into being in 2005 to help train health professionals from the University for Development Studies and became the main referral facility for the three regions within its catchment area.

The hospital has over 34 wards and departments; among which are the male, female, surgical, emergency wards. Major departments include, the Out-Patient Department (ODP), pathology, pharmacy, biostatistics, mortuary, security, ICT and the human resource.

Design for the Study

A retrogressive method was employed to audit the deaths of the 272 women between January 2010 and December 2016. It dealt with pregnancy related deaths at the hospital within the period of time in contention. This involved a critical review of all pre and post pregnancy deaths identified in the records and folders of the hospital for the seven-year period.

Additionally, more than 12 midwives, two gynecologists at the maternal service department, including the labor unit, antenatal unit and the recovery wards were interviewed to elicit information on the substantive matter and related cases. Respondents were open enough to provide clarification of data on the folders and at the same time gave their own perspectives concerning maternal mortality issues.

The primary data was derived from the midwives, gynecologists and other workers while, a tool called the fact sheet was used to extract secondary information from the digital records of the ICT department with prior written request to access such information. This fact sheet captured data such as maternal deaths, age of victims, antenatal attendance and facility of referrals among others.

Demographic constructs of the dead women, causes of death, behavior towards seeking healthcare services and socio-cultural factors responsible for the cases within the period were also explored.

RESULTS

The Demographics of Maternal Mortality Cases

The cases for this study have been demographically characterized by age distribution, educational background, marital status and place of referral. The results have been tabulated and presented as follows:

Table 1 depicts the age distribution of maternal mortality at the Tamale Teaching Hospital (TATH) from 2010 to 2016. The results show that age group 30-34 recorded 90 deaths, the
highest, representing 33.09% of the total number recorded within the period under discussion.

Table 1: Deaths According to Age Distribution and Year

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No. of Deaths</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19</td>
<td>3 2 4 5 2</td>
<td>18</td>
<td>6.62</td>
</tr>
<tr>
<td>20-24</td>
<td>6 12 8 9 7</td>
<td>48</td>
<td>17.65</td>
</tr>
<tr>
<td>25-29</td>
<td>9 14 24 11 6</td>
<td>75</td>
<td>27.57</td>
</tr>
<tr>
<td>30-34</td>
<td>9 17 36 5 11</td>
<td>90</td>
<td>33.09</td>
</tr>
<tr>
<td>35-39</td>
<td>6 3 12 4 7</td>
<td>33</td>
<td>12.13</td>
</tr>
<tr>
<td>40 and above</td>
<td>0 1 3 2 0 2</td>
<td>8</td>
<td>2.94</td>
</tr>
<tr>
<td>TOTAL</td>
<td>272</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Data, June 2018

The least was recorded by ages 40 and above, represented by 8 or 2.94%. The other age groups had 6.62%, 12.13%, 17.65%, and 27.57% for 15-19, 35-39, 20-24, and 25-29 respectively. The most active reproductive ages of between 20 and 39 accounted for the highest incidence of mortality of almost 90.50% of the cases. It is convenient to argue that women with ages below 20 and above 40 are most likely to die during child birth, the research proves the contrary. It is established that those living within the age bracket of 20 and 39 are most vulnerable and risk death when they go through child birth because they have the propensity to become pregnant multiple times. An observation also shows the least record of death of zero was recorded in 2010 and 2015 for the forty years and above category while the highest value was for 30-34 in 2013.

Educational Background

Level of education was one of the constructs sought for in this study but not enough information was gathered to make any informed pronouncements. However, based on the referral nature, antenatal attendance and the diagnosis, it is only faire to intimate that a very high percentage of these women have very little or no education at all.

Marital Status

The marital status was a demography that was highly considered in this study after the age distribution. The available data distributes the maternal deaths into 85% for married and 15% for the unmarried. Additional investigations revealed that this assertion may not be correct since some pregnant single ladies are allowed to use the parent’s names as though they were married in order to avoid the stigmatization of giving birth without a husband.

Place of Referral

By virtue of the fact that TATH receives a huge number of referrals outside the Metropolis, the paper embarked on a journey to find out where these cases are coming from and determine if it has any bearing on the victims.

Table 2: Referral of Cases to the Tamale Teaching Hospital

<table>
<thead>
<tr>
<th>Main Referrals</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamale Metropolis</td>
<td>82</td>
<td>44.57</td>
</tr>
<tr>
<td>Other Districts of the Region</td>
<td>90</td>
<td>48.91</td>
</tr>
<tr>
<td>Upper East Region</td>
<td>4</td>
<td>2.17</td>
</tr>
<tr>
<td>Upper West Region</td>
<td>1</td>
<td>0.54</td>
</tr>
<tr>
<td>Other Nearby Regions</td>
<td>7</td>
<td>3.80</td>
</tr>
<tr>
<td>Total</td>
<td>184</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Field Data, June 2018

It is clear from Table 2 that 44.57% of the maternal cases come from the Tamale Metropolitan area, while the remaining 55.43% come from places outside the Metropolis. About 90 referrals, representing 48.91% came from other districts but within the Northern Region. While 2.17% of them were attributable to the Upper East Region, only 1 woman or 0.54% came from the Upper West Region and the remaining 3.80% was associated with other adjoining regions. Referrals within the region included Walewale, Savelugu, Salaga and Daboya, while those from outside are Bolga and Bawku. The high numbers from the Metropolis and the region is justified by the fact that it is a Teaching Hospital and by design supposed to handle a huge amount of patient traffic.

Maternal Mortality Trends

A careful analysis of data indicates that a total of 272 maternal deaths were recorded between 2010 and 2016, a period of 7 years for a total of 61,863 admissions or live births. This means the institutional Maternal Mortality Ratio (iMMR) was 439.7 deaths births per 100,000 live births.

The average maternal death rate over the period under discussion is 0.48% which is also the rate for 2013 as shown on Table 3. The least rate of 0.24% was realized in 2014 and it was expected that 2015 which marked the end of the Millennium Development Goals (MDGs) would see a reduction in the rate, rather recorded a growth. The results established an erratic behavior of the rates, in 2010, 33 deaths were seen, this increased to 53 in 2011, reduced by one in 2012 and further reduced went down to 47 by the end 2013. In 2014, the record was 27, the lowest, even at the highest number of admissions of 11,138, it increased to 38 in 2015 and ends at 39 in 2016. This means that whatever was done between 2013 and 2014 was the best and administrators would need to revisit it.
### Table 3: Annual Maternal Mortality Trends

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Admissions</th>
<th>No. of Deaths</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>9,419</td>
<td>36</td>
<td>0.35</td>
</tr>
<tr>
<td>2011</td>
<td>10,695</td>
<td>53</td>
<td>0.50</td>
</tr>
<tr>
<td>2012</td>
<td>10,693</td>
<td>59</td>
<td>0.49</td>
</tr>
<tr>
<td>2013</td>
<td>9,892</td>
<td>49</td>
<td>0.48</td>
</tr>
<tr>
<td>2014</td>
<td>11,138</td>
<td>35</td>
<td>0.24</td>
</tr>
<tr>
<td>2015</td>
<td>10,026</td>
<td>40</td>
<td>0.38</td>
</tr>
<tr>
<td>2016</td>
<td>-</td>
<td>39</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>61,863</strong></td>
<td><strong>272</strong></td>
<td><strong>0.48</strong></td>
</tr>
</tbody>
</table>

*Source: Field Data, June 2018*

### Causes of Maternal Deaths at the Tamale Teaching Hospital

This research extended the investigations to cover the causes of deaths of the 272 women over the period under review. This was to satisfy the curiosity that the great medical institution should have the capacity to determine these causes and find strategies to reduce the incidence. It was also to erode the notion that no one ever finnes out why and how maternal mortality happens and should continue to shroud in secrecy because of spiritual linkages.

### Table 4: Diagnosed Causes of Maternal Deaths at the Hospital

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Year 2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis</td>
<td>8</td>
<td>-</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>27</td>
<td>10.84</td>
</tr>
<tr>
<td>Eclampsia</td>
<td>8</td>
<td>-</td>
<td>13</td>
<td>21</td>
<td>6</td>
<td>6</td>
<td>9</td>
<td>63</td>
<td>25.30</td>
</tr>
<tr>
<td>Unsafe Abortion</td>
<td>2</td>
<td>-</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>-</td>
<td>18</td>
<td>7.23</td>
</tr>
<tr>
<td>Severe Anaemia</td>
<td>9</td>
<td>-</td>
<td>6</td>
<td>14</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>39</td>
<td>15.66</td>
</tr>
<tr>
<td>Perforated Uterus</td>
<td>1</td>
<td>-</td>
<td>5</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>17</td>
<td>6.83</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>2</td>
<td>-</td>
<td>0</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>2.41</td>
</tr>
<tr>
<td>Medical Conditions (malaria et al.)</td>
<td>10</td>
<td>-</td>
<td>15</td>
<td>19</td>
<td>19</td>
<td>9</td>
<td>7</td>
<td>79</td>
<td>31.73</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>249</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Field Data, June 2018*

An audit of the records over the period under the study revealed that the causes could be categorized into direct and indirect, where 68.27% indicate direct causes and 31.73% being indirect. Out of the direct causes, 37.06% or 25.30% of the entire causes is attributable to deaths by Eclampsia. This is closely followed by Severe Anaemia with 15.66%, Sepsis (10.84%), 7.23% for unsafe abortion and the least recorded by Pneumonia (2.41%). Causes treated under indirect include malaria, HIV/AIDS, CSM, heart failure and others, accounting for the 31.73%.

### Socio-Cultural Causes

Apart from the medical causes, the authors sought to find out if there were any socio-cultural factors responsible for the deaths. To establish this, midwives, senior nurses, nurses and some key workers of the facility were engaged and at the end there was confirmation to the fact that deaths via socio-cultural factors did exist.

Key contacts say, women within the polygamous environment seek to proof to one another how fertile they are by indulging in multiple pregnancies that result in the weakening of the uterus. Some cultures also believe that real women must give birth at home only to visit a facility at a critical stage, others do not subscribe to caesarean section and would prefer to invoke the spirits or pray when things get complicated. Taboos for some kinds of food, blood transfusion, bad road network as well as poverty are key factors to the loss of these precious lives.

### DISCUSSION

Available global data indicate that about 830 women die on a daily basis from preventable pregnancy and childbirth related causes. Almost 99% of these deaths can be traced to the developing economies of the world which is home to the highest proportion of these women within the poorest communities of rural areas. It is observed that pregnant young adolescents have higher propensity of complications than the elderly women [15]. Maternal mortality experienced a worldwide decline by 44% between 1990 and 2015, with a target of reducing the global ratio to a figure below 70 per
100,000 live births. The mortality ratio for under developed countries is 239/100,000 as against 12 per 100,000 live births in the advanced countries since 2015 [16]. Annual pregnancy-related causes of death across the world is pegged at 287,000, and 20 to 30 of such deaths are directly related to short- or long-term illnesses such as severe anaemia, postpartum disability or capture of the reproductive organs [17]. In another study, about 27% of maternal deaths is linked to severe bleeding, 11% for Sepsis and unsafe abortion responsible for 8% of the total deaths, while 14% was attributable to HIV/AIDS and other causes [18]. Lale et al [19] identified maternal mortality related publications involving 2,443,000 deaths from 115 countries, between 2003 and 2012. Out of the total, 73.0% were as result of obstetric causes while 20.7% were due to indirect causes. 27.1 percent of the deaths were attributable to haemorrhage, 14.0% for hypertensive disorders and Sepsis caused 10.7% deaths. The rest are 7.9% for abortion, embolism (3.2%), and the other direct causes accounted for 9.6% [20].

The maternal mortality ratio for this study was 439.7 per 100,000 live births or 272 deaths. Despite the fact that this value seems lower than records from other researches, it is still far from the MDG target of 185/100,000 at the end of 2015. A similar study conducted at the Wa Regional Hospital reveal that 73 women died out 14,027, translating to a maternal ratio of 520.4 per 100,000 live births [7], which is far higher than the rate recorded in this research. The causes of deaths for this research included 68.27% of direct and 31.73% indirect categories which are quite different from other related studies available. Eclampsia recorded the highest, accounting for 37.06% of the causes, followed by severe anaemia with 15.55 percent. Sepsis had 10.84% and the least figure was recorded by Pneumonia at 2.41%. These causes happen to be among the top five maternal mortality killers across the world. The indirect causes were related to HIV/AIDS, malaria heart failure. Other causes in this group include taboos for food, blood transfusion and birth at the hospital, lack of medical facilities, bad roads, untimely or late referrals, lack of medical professionals and poverty. Such reasons for death cut across most developing nations and if proper strategies are not designed to resolve these issues, meeting the SDG on this sector would be very difficult.

The reduction in Maternal Mortality Rate (MMR) is seen as an achievement MDG in the international community and the results attained by [21] in a research in South Sudan indicate that MMR can be reduced by 1.4% through increasing skilled assistant birth attendants by 1.22%. Also, reduction in general fertility rate by 1.22% leads to a 1.8% decrease in MMR. The Africa Public Health Alliance undertook a campaign to help increase the annual budget allocations for health as a whole and maternal health as a specific area. In consonance with this, Ghana decided to increase the national budget on health by 15% in 2015. Aside this, Ghana promised to strengthen the policy on the free maternal health care that will ensure that 95% of pregnant women would enjoy a comprehensive health care [21]. Maternal mortality mostly affects women in nations with little or no skilled professions such as midwives, nurses and doctors. Globally, HIV/AIDS remains the singular cause of death among pregnant women.

CONCLUSION

Despite the fact that maternal mortality trends at the Tamale Teaching Hospital over the period under discussion are not the worse within the subregion, it is very certain that it did not meet the MDG 5 even a year after the time elapsed. Even though policies, plans and programmes have been put in place both at the national and regional levels, it seems the solutions to curb the high trend have not yet been found. A number of medical and non-medical, direct and indirect causes of death have been identified by the authors as responsible for the deaths in the Northern Region. Most of these cases can be prevented or in the least be properly managed to avoid death if they are detected early enough. Because the medical and socio-cultural causes are deeply intertwined, strategies and policies must be designed with that in mind. Another area worth a critical attention is the integration of the medical and non-medical cases. Further studies are therefore required to investigate the relationship between the two and how they together affect the mortality numbers in the region and Ghana as a whole.

RECOMMENDATIONS

These suggestions are made in the form of recommendations to assist in the bid to fight against the horrifying face of maternal mortality in the hospital. The government, legislators, health related organizations and other stakeholders should:

- Provide emergency obstetric units in hospitals and improve existing ones by putting in place qualified personnel, logistics and better facilities to support women in labour.
- Intensify education and encourage women to attend antenatal throughout their gestation period
- Demystify the taboos through proper channels to assure women that the hospital is a friend
- Build more medical facilities in the rural communities to help close the health gap for women
- Repair and construct new roads to link health facilities and provide sustainable ambulance service network to facilitate the quick evacuation of referred cases
- Empower women to become self-sustained financially so that the incidence of poverty can be reduced so that they can take care of their pregnancies.

REFERENCES


