Facility Based Maternal and Perinatal Mortality: 
Evidence from Maternal and Perinatal Death 
Surveillance and Response, Gombe State, Nigeria

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ABSTRACT

Background: Globally, women and their unborn babies continue to die from preventable causes. This study aims to highlight the causes of maternal and perinatal deaths and bring to the fore areas that need to be improved in order to improve maternal and perinatal health indices in Gombe State.

Methodology: Information for this report was obtained from Maternal and Perinatal Deaths Surveillance and Response (MPDSR) desk officers and chairmen across MPDSR supported health facilities in the state. Secondary data abstraction from registers was conducted using an electronic questionnaire and was analysed using SPSS version 23.

Findings: The Maternal Mortality Ratio (MMR) was 1,092/100,000 livebirths in 2019 and 993/100,000 live births in 2020. Majority of the women (84.3% and 86.7% in 2019 and 2020 respectively) were severely ill at presentation, while most maternal deaths were as a result of eclampsia/pre-eclampsia and Post Partum Haemorrhage (PPH). Only 15.9% and 14.4% of maternal deaths in 2019 and 2020 respectively were reviewed. Perinatal asphyxia accounted for 36.4% and 31.8% of perinatal deaths in 2019 and 2020 respectively, while prematurity resulted in 24.7% and 35.6% of deaths in 2019 and 2020 respectively. The Perinatal Mortality Rates (PMR) were 78.3/1000 births in 2019 and 76.1/1000 births in 2020.

Conclusion: Although MMR and PMR have been on a decline in Gombe state from 2018 till date, these figures are still far from achieving the SDG 2030 target. There is therefore the need to revive MPDSR activities in the state and improve emergency obstetric health care services.

Keywords: Maternal mortality ratio, perinatal mortality rate, surveillance.

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I. INTRODUCTION

Women constitute about half of the world’s population, yet they encounter major health challenges resulting from inequity in accessing quality health care services. While childbirth is expectedly a pleasant experience, it is associated with fear and uncertainty of the possibility of survival for some women and their unborn babies. Conversely, surviving a pregnancy and childbirth is only fulfilling the fundamental reproductive right of a woman and the unborn babies right to live, thrive and reach their full potential [1].

Whilst most maternal and perinatal deaths are preventable, women and babies continue to die from these preventable causes and in many cases these deaths are unaccounted for. Every day, 830 women die from preventable causes worldwide, for each of these deaths, approximately 20 other women suffer severe complications [2], [3]. In addition, as of 2015, 18.4 of every 1000 births is a stillbirth, with one stillbirth occurring in every 16 seconds mostly because of poor monitoring during labour, and delivery [4]. The situation is even worse in developing countries like Nigeria where disparities exist across regions, geographical location, and socioeconomic class [1].

Maternal and perinatal indices provide an understanding on the functionality of the health systems, development of a nation and impacts significantly on the growth of every nation and economy. Unfortunately, despite numerous interventions, maternal and child health indices are still unacceptably poor especially in low and middle income countries [4]. Until Every Newborn Action Plan (ENAP) was initiated in 2012 and subsequently the Sustainable Development Goals (SDG) targeting the newborns in 2015, little attention was given specifically to the newborns who account for a significant proportion of infant deaths. Sadly, stillbirths are still neglected with rudimentary strategies of prevention and no targets set towards halting these deaths even by the SDGs [4].

Although the Millennium Development Goals (MDGs) achieved a 45% reduction in Maternal Mortality, many middle and low income countries including Nigeria made insignificant contribution to that success [5], [6]. In 2017, there were 295,000 maternal deaths with a Maternal Mortality Ratio (MMR) of 211 per 100,000 live births globally [1], [7]. MMR in the least developed countries was 415 per 100,000 live births compared to Europe and New Zealand which recorded MMR of 10 and 7 deaths respectively in the same year [7]. Most of these deaths occurred in Sub-Saharan Africa and Asia which accounted for 86% of these deaths, of this proportion, 66% occurred in Africa alone [1], [7]. Nigeria is one of two countries accounting for one third of the global maternal deaths [1]. A woman in Nigeria has a 1 in 22 lifetime risk of dying from pregnancy, childbirth or postpartum [8]. In 2018, the country recorded an MMR of 814 deaths per 100,000 live births [9] and a Perinatal Mortality Ratio (PMR) of 39/1000 live births [10], while data from Gombe state MPDSR supported sites reported an MMRatio of 1,876 deaths/100,000 live births and a PMR of 184 deaths per 1000 live births in 2018 [11]. This is a far cry from achieving the SDGs which aims to reduce maternal mortality to less than 70 per 100,000 live births and Neonatal Mortality Rate to less than 12 deaths per 1000 live births by 2030 [12].

Simple clinical interventions have proven to play a significant role in reducing the morbidity and mortality associated with women and children. However, this is strongly dependent on a functional health care system embedded with reliable monitoring and evaluation of health activities at the communities and facilities. Maternal and Perinatal Death Surveillance and Response (MPDSR) is an accountability framework based on accurate and consistent monitoring of comprehensive health report involving stakeholder review of data [13]. It is a cost-effective and superior approach that permits the routine identification, notification, quantification, mapping, and determination of causes and prevention of all maternal and perinatal deaths [1]. Gombe state institutionalized MPDSR in 2016 with support from Partners, presently it has 23 MPDSR supported facilities which were selected based on the type of facility, all secondary facilities and cottage hospitals in the state and the only tertiary facility were included into the MPDSR programme. The aim was to provide an insight to success of interventions and progress of maternal health indices in the state and assist the state to study the contributory factors and the trend of mortality while serving as a tool to develop policies for reducing maternal mortality ratios and perinatal death rates and achieving Universal Health Coverage (UHC) [14].

II. MATERIALS AND METHOD

A. Study Area

Gombe State is in the North-east geo-political zone of Nigeria. The states’ 2021 projected population is 3,665,040 of which 783,934 are women of reproductive age and 183,252 are infants, with an annual growth rate of 3.2% for all the Local Government Areas (LGAs) within the state [7]. It is a multi-ethnic state with eleven (11) LGAs. Some of the ethnic groups are Fulani, Tangale, Waja, Tera, Jukun, Bolewa, Tula, Cham, Lunguda, Awak, Kamo and Dadiya. Hausa is the inter-ethnic medium of communication, but English is the official language in the state. Presently, the state has 592 PHCs of which 114 PHC have been revitalized in line with one PHC per ward. There are 11 secondary health facilities and 12 cottage hospitals in the state which are regarded by the state as secondary health facilities. One of these secondary health facilities is a snake bite centre, while all the others along with 1 tertiary health facilities, 4 faith and 75 private health facilities provide Maternal Newborn and Child Health (MNCH) services in the state. Maternal and Perinatal Death Surveillance and response is institutionalized in these 23 facilities which is comprised of 22 secondary facilities cottage and the tertiary facility in the state.

B. Study Design

Descriptive cross-sectional design was used. Secondary data abstraction was done using facility registers.

C. Study Population

1. MPDSR committee members.
2. Secondary data abstraction from facility registers - obtaining information from all women who delivered in the health care facility.
D. Inclusion Criteria

Individuals who were MPDSR committee members at the facility level at the time of the study.

Data was abstracted from all delivery and inpatient registers in the selected facilities.

E. Sampling Technique

All MPDSR supported health facilities were included and studied.

F. Data Collection Procedure

Information for this report was obtained from MPDSR committee members, focal persons, desk officers in all facilities and MPDSR chairmen in selected facilities. Secondary data abstraction was done using an electronic questionnaire which was pretested. With the aid of trained research assistants, data on Maternal and Perinatal deaths were obtained from registers in labour room, Obstetrics and Gynaecology wards, Gynaecology emergency, Special Baby Care Unit (SCBU), monthly summary sheets and death certificate from each of the 23 facilities.

In the course of data collection, a maternal death was referred to as the death of a woman while pregnancy or 42 days after termination of pregnancy irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by pregnancy or its management but not from accidental or incidental cause. Perinatal death was referred to as any death that occurred at the time of birth which comprised of still births and deaths occurring in neonates within the first 7 days of life.

G. Data Analysis

The data collected was cleaned and analyzed using Statistical Package for Social Sciences (SPSS) version 23. Most results were presented in frequency tables and charts and key indicators were calculated.

H. Ethical Consideration

Ethical approval was obtained from the Gombe State ministry of health; Informed consent was also obtained from the study participants. Confidentiality and anonymity was maintained.

I. Limitations

Poor record keeping and poor documentation during patient care resulting in abstraction of incomplete and inconsistent data.

III. RESULTS

In 2019 and 2020 48.2% and 45.9% of maternal deaths occurred in the tertiary health care facilities. The Cottage Hospitals accounted for fewer proportion of maternal deaths (Table I). Fig.1 showed the trend of MMRatio in Gombe State from 2018 to 2020. The total number of live births were 16,695 and 14,568 in 2019 and 2020 respectively (not shown in the figure). The MMRatio in 2019 was 1,092/100,000 live births while in 2020 the MMRatio was 993/100,000 live births. In 2018 the MMRatio was 1,876 deaths per 100,000 live births in MPDSR supported facilities.

There is a downward trend of maternal mortality from 2018 to 2020. The least was 993/100,000 live births recorded in 2020.

In Table II, the mean ages of women who died was 28.64 ± 8.0 and 26.26 ± 7.32 in 2019 and 2020 respectively. Most of the pregnancies reached the third trimester resulting in death either during pregnancy, delivery, or puerperium. Majority, 84.3% and 86.7%, of the women were unstable at presentation in the facility with a few dead-on arrivals.

<table>
<thead>
<tr>
<th>S/NO</th>
<th>Facility Type</th>
<th>Number of facilities</th>
<th>Number of Maternal deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Frequency (%)</td>
<td>Frequency (%)</td>
</tr>
<tr>
<td>1</td>
<td>Tertiary Facility &amp; Specialist Hospital General</td>
<td>2 (8.7)</td>
<td>82 (48.2)</td>
</tr>
<tr>
<td>2</td>
<td>Hospitals Cottage Hospitals</td>
<td>12 (52.2)</td>
<td>*70 (41.2)</td>
</tr>
<tr>
<td>3</td>
<td>TOTAL</td>
<td>9 (39.1)</td>
<td>18 (10.6)</td>
</tr>
</tbody>
</table>

Key: *Incomplete records from registers

Fig. 1. Trend of Maternal Mortality Ratio in Gombe State from 2018 to 2020.

<table>
<thead>
<tr>
<th>Variable</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age of women</td>
<td>28.64 ± 8.0</td>
<td>26.26 ± 7.32</td>
</tr>
<tr>
<td>Median Parity</td>
<td>2.50 (12)</td>
<td>3.0 (10)</td>
</tr>
<tr>
<td>Median Gravidity</td>
<td>2.50 (12)</td>
<td>4.0 (11)</td>
</tr>
</tbody>
</table>

In Table III above, Pre-eclampsia and Postpartum haemorrhage accounted for more maternal deaths in 2019 and 2020. Pre-eclampsia/eclampsia accounted for 218.5 and 1490 deaths of every 100,000 live births in 2019 and 2020 respectively.

Majority of the maternal deaths in 2019 and 2020 were not reviewed (84.1% and 85.9% respectively). Some reasons given were lack of time and unavailability of the MPDSR forms. Some Health Care Workers (HCWs) also mentioned lack of manpower and frequent transfers to other facilities which affected sustainability.

The perinatal mortality rates were 78.3/1000 births in 2019 and 76.1/1000 births in 2020.
Disparities exist across regions in Nigeria with the North East still unacceptably high and worse than the National figures. births in 2017 [16], the figures obtained in Gombe State are 100,000 live births trend showing a 38% reduction in MMR from 342 deaths per 2018 [10], [15]. Although we observed a downward trend in deaths per 100,000 live births in 2008, 576 deaths per 1 deaths worldwide with worsening indices from 2008 till date. The number of deaths recorded in these facilities. As corrected data from the selected facilities could have influenced challenges we faced with obtaining complete, consistent and correct data from the selected facilities could have influenced the number of deaths recorded in these facilities.

TABLE III: PROPORTION OF DEATHS SECONDARY TO SPECIFIC CAUSES IN MPDSR SUPPORTED FACILITIES

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Frequency (n=170)</th>
<th>PMR (%)</th>
<th>CSFR/100,000 live births</th>
<th>Frequency (n=135)</th>
<th>PMR (%)</th>
<th>CSFR/100,000 live births</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2019</td>
<td></td>
<td></td>
<td>2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eclampsia/preeclampsia</td>
<td>34</td>
<td>20.0</td>
<td>218.5</td>
<td>35</td>
<td>26.1</td>
<td>257.4</td>
</tr>
<tr>
<td>Antepartum haemorrhage</td>
<td>27</td>
<td>15.2</td>
<td>173.5</td>
<td>7</td>
<td>5.1</td>
<td>51.4</td>
</tr>
<tr>
<td>Postpartum haemorrhage</td>
<td>32</td>
<td>19.3</td>
<td>205.6</td>
<td>25</td>
<td>19.6</td>
<td>183.8</td>
</tr>
<tr>
<td>Obstructed labour</td>
<td>13</td>
<td>6.9</td>
<td>83.5</td>
<td>18</td>
<td>13.0</td>
<td>132.4</td>
</tr>
<tr>
<td>Sepsis</td>
<td>25</td>
<td>13.1</td>
<td>160.6</td>
<td>15</td>
<td>10.9</td>
<td>110.3</td>
</tr>
<tr>
<td>Complications of abortion</td>
<td>4</td>
<td>2.8</td>
<td>25.6</td>
<td>1</td>
<td>0.7</td>
<td>7.4</td>
</tr>
<tr>
<td>Anaemia in pregnancy</td>
<td>17</td>
<td>10.3</td>
<td>109.2</td>
<td>11</td>
<td>7.9</td>
<td>80.9</td>
</tr>
<tr>
<td>Others*</td>
<td>18</td>
<td>12.4</td>
<td>115.6</td>
<td>23</td>
<td>16.7</td>
<td>169.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>170</td>
<td>100</td>
<td>1,092.1</td>
<td>135</td>
<td>100</td>
<td>993</td>
</tr>
</tbody>
</table>

Others* - Indirect causes of maternal mortality, #CSFR - Cause Specific Fatality Rate

As shown in Table IV, in 2019, deaths from all causes occurred more within the first 3 days of life. In 2020, all perinatal deaths from perinatal asphyxia (100%) and most from congenital abnormality and prematurity occurred in the first 3 days of life 73.9% and 89.4% respectively. However, 60% of deaths from sepsis occurred between 4 to 7 days of life.

IV. DISCUSSION

The highest proportion of deaths across the two years occurred in the Tertiary and Specialist Hospitals. This could be explained by the urban location of these centres and the higher client load. Most complicated cases are referred to larger hospitals which evidently have more expertise, manpower and equipment for service delivery. It also explains why smaller facilities such as the cottage hospitals had fewer maternal and perinatal deaths. In addition, the challenges we faced with obtaining complete, consistent and correct data from the selected facilities could have influenced the number of deaths recorded in these facilities.

Nigeria still accounts for a high proportion of Maternal deaths worldwide with worsening indices from 2008 till date. In 2013 Nigeria has shown an upward trend in MMR, 545 deaths per 100,000 live births in 2008, 576 deaths per 100,000 live births in 2013 and 814 deaths per 100,000 live births in 2018 [10], [15]. Although we observed a downward trend in MMR in Gombe state which is keeping with worldwide trend showing a 38% reduction in MMR from 342 deaths per 100,000 live births in 2000 to 211 deaths per 100,000 live births in 2017 [16], the figures obtained in Gombe State are still unacceptably high and worse than the National figures. Disparities exist across regions in Nigeria with the North East being only second to the North West with regards to poor maternal and child health indices compared to other zones in the country. Therefore, probably giving an insight to the high MMR recorded in the state [10]. In addition, the level of literacy, economic instability and insecurity which has ravaged the region for over a decade could have negatively influenced accessibility, availability and utilization of maternal and child health services which would invariably lead to poorer maternal and child health indices in these region [10].

Furthermore, we observed that most of the women died in the third trimester or after delivery and presented in an unstable state in the facility. This reiterates the need for emphasis on birth preparedness and complication readiness and the necessity for more concerted effort in improving quality of care during pregnancy, delivery, and postpartum period. Also, all facilities must be well equipped with improved manpower strength to offer Emergency Obstetric Care (EOC) services within the few hours of presentation in order to save more lives. In both years, toxemia in pregnancy and PPH accounted for most deaths, similar to report from WHO which states that PPH, sepsis, toxemia and unsafe abortion account for 75% of maternal deaths [17]. Similarly, findings from MPDSR in Ogun state showed that 43.4% and 36.9% of maternal deaths were as a result of haemorrhage and eclampsia/pre-eclampsia respectively [18]. This was also corroborated from findings in Lagos state MPDSR report which showed eclampsia/pre-eclampsia, PPH, obstructed labour and puerperal sepsis accounted for most of the maternal deaths [19]. Despite interventions such as the use of misoprostol and anti-shock garments to reduce morbidity and mortality from PPH, it still continues to lead in the direct cause of maternal mortality indicating the need for more
targeted interventions at facility and community level to reduce this preventable cause of death. Furthermore, improving nutrition among pregnant women could increase calcium levels and reduce morbidity and mortality from toxemia.

Maternal and perinatal death review and documentation of the causes and circumstances surrounding a maternal death plays a significant role in improving the quality health care services for other pregnant women and their unborn babies. Unfortunately, less than 20% of these deaths were reviewed in 2019 and 2020 in Gombe state. This could be resulting from the dormancy in MPDSR activities over the past few years in the state due to poor funding and low human resource for maternal health services as mentioned by some stakeholders. Placing emphasis on review and documentation would provide better insight to the causes and contributory factors of mortality, it will promote better service delivery, funding and policies which will improve maternal health indices in the state.

Majority of the perinatal deaths were stillbirths further emphasizing the neglect of still births, a quarter of these still births were fresh still births indicating poor management of labour. Also, birth asphyxia accounted for majority of early neonatal deaths which could indicate delayed presentation and/or poor neonatal resuscitation. The proportion of low-birth-weight babies could explain the early neonatal death especially as a result of prematurity. This finding is similar to other studies conducted in South African where the major causes of early neonatal deaths were prematurity and birth asphyxia, accounting or 48.7% and 40.6% of deaths respectively [20]. In addition, a study conducted in public health facilities in Abuja Municipal also showed that Birth asphyxia, neonatal infection and prematurity accounted for 34%, 20% and 17.3% of perinatal deaths respectively [21]. Congenital anomaly also accounted for a significant proportion of early neonatal deaths in Gombe state unlike Sokoto state which had no death from congenital mortality [22], this therefore signifies the need to improve prenatal health care services in Gombe State.

V. CONCLUSION

Although MMR and NMR have been on a decline in Gombe state from 2019 till date, these figures are still far from the SDG 2030 target. The MMR for 2019 and 2020 were 1,092/100,000 livebirths and 993/100,000 live births respectively while the NMR were 78.3/1,092/100,000 livebirths and 993/100,000 live births respectively while the NMR were 78.3/1,092/100,000 livebirths and 993/100,000 live births. There is therefore the need for concerted effort of the state Government, facility heads and health workers offering maternal newborn and child health care services in improving the quality of care and achieving SDG 3.

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CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

REFERENCES


