A RETROSPECTIVE ANALYSIS OF MATERNAL DEATHS IN ZAMBIA (2019-2020)

Perspective

By : ML Phiri, M Chasaya, MA Ngomah
Zambia National Public Health Institute

Abstract

Maternal mortality is still a public health concern in Zambia and globally. It is an important measure of the strength of a health care system. The current study was anchored on exploring the prevalence of maternal mortality in Zambia and report on the factors contributing to maternal mortality in order to identify areas of need in terms of intervention development and improvement of health care in Zambia. Using descriptive analysis of results in Excel and Tableau, the findings showed that overall, about 528 maternal deaths were recorded in a period of 10 months. Obstetric Hemorrhage and Hypertension were still the major causes of Maternal mortality. Geographical location and sociodemographic aspects seemed to have a role to play in the occurrence of maternal deaths in Zambia with Lusaka leading the number of cases. Another interesting finding was that the time factor by month did not show so much variation except in one month of November 2019 where the mortality deaths escalated to about 130 while the rest remained within the mean of 50 cases. The study identified consistent trends of associated causes with other previous studies indicating that there is need for increased attention in mortality rates as response to strengthening the health system of Zambia. So far, maternal mortality deaths are still high and this calls for attention even in the midst of an outbreak such as COVID-19.

Introduction

Maternal mortality continues to be a major public health concern both locally and globally. Many countries worldwide are working tirelessly to reduce these numbers. It is estimated that 303,000 women die during pregnancy and childbirth every year in the world and that most deaths occur in developing economies. Maternal mortality in Zambia is estimated at 183 deaths per 100,000 live births [1]. Reducing preventable maternal deaths has been a major concern even to the United Nations community as reflected in the sustainable development goals 3.1 which aims at reducing the global maternal mortality ratio to less than 70 per 100 000 live births by 2030 [1].

Many researchers from within Africa and outside have embarked on identifying factors associated with maternal mortality in order to aid possible intervention. Zambia is not an exception in the fight against maternal deaths and the ministry of health has been investing significant amount of resources to try and reduce these rates. There are unverified assumptions that the era of the COVID-19 pandemic may have an impact on maternal mortality.

Part of African research from Malawi has assessed how delay factors are associated with maternal mortality. These delay factors include reaching the health facility and receiving care. Using the three delays framework, data were analyzed for women who had; 1) died at a healthcare facility, 2) died at home but had previously accessed care and 3) died at home and had not accessed care. The findings suggest 62.2% (94/151) of maternal deaths occurred in a healthcare facility and a further 21.2% (32/151) of mothers died at home after they had accessed care at a healthcare facility. More than half of all women who died at a healthcare facility (52.1%) had experienced more than one type of delay. The researchers showed that improving quality of care at healthcare facility level was central to reducing maternal mortality [2].

Most recent research on Zambia shows correlates of maternal mortality in Zambia in the last three years dating from 2018 based on data in the Maternal Perinatal Death Surveillance of 2018 [1]. The primary correlates of maternal deaths have been found to be obstetric hemorrhage and indirect causes. Obstetric hemorrhage was the most common cause of death among women aged 30-49 and women who had experienced more than one pregnancy, while indirect causes attributed to the most deaths among pregnant women aged 10-29 and first-time pregnant women [1].

Researchers have described maternal death as an important measure of the strength of a health system [3, 4]. Due to this factor, other countries have introduced maternal death surveillance and response systems which involve the identification and reporting pathways for maternal deaths, review of deaths, aggregation of data, interpretation of findings, and formulation and implementation of recommendations for action. Kenya is among the countries that have implemented the maternal death surveillance system. However, several challenges have been encountered including underreporting of data, difficulties with reviewing the data, and suboptimal aggregation of data on cause of death. Experts have recommended that to ensure progress toward a full national enquiry of all maternal deaths, improving the notification of maternal deaths, ensuring regular audits and feedback at referral hospitals can lead to continuous quality improvement, and strengthening community linkages with health facilities to expedite maternal death reporting [3].

Most recent studies have reported the existence of COVID-19 related maternal mortality which already calls for concern to public health and the fight to reducing maternal mortality. Data from Brazil shows that the number of COVID-19 related mortality is on the rise [7]. This increase has been associated inadequate preventive preparedness for the pandemic by healthcare systems. Researchers predict a rise in maternal mortality if Covid-19 does not take a step backwards [7].

Part of existing literature has concen-

trated on factors associated with maternal mortality. A number of studies both within Africa and globally have found obstetric hemorrhage to be a huge contributing factor to maternal mortality [8, 9, 10]. Another common factor associated with high mortality rate is hypertension [9]. Some public health researchers have found that the impact of hypertension and obstetric hemorrhage on maternal mortality is most profound in low- and middle-income countries due to sub-standard maternal healthcare and sub-optimal use of evidence-based strategies to prevent and treat morbidity [8]. Moreover, a section of literature on management of obstetric hemorrhage has suggested that giving Tranexamic Acid to women who are hemorrhaging within 3 hours after delivery reduced the risk of death resulting from bleeding with no increase in thromboembolic complications [11, 12].

Further African studies have pointed out that one of the major challenges facing maternal death surveillance and response systems in Africa is politicization. Health workers and bureaucrats struggle to balance conflicting demands among the specific challenges such that when implementing the MDSR system, they are required to meet conflicting demands such as report all deaths; to deliver perceived success in maternal mortality reduction by reporting as few deaths as possible; and to avoid personalized accountability for deaths. Fear of personal and political accountability for maternal deaths strongly influences not only reporting practices, but also the care given in the health centers. Health workers report maternal deaths in ways that minimize their number and deflect responsibility for adverse outcomes. They attribute deaths to community and infrastructural factors, which are often beyond their control [4].

Despite having huge maternal deaths in developing countries, research from more developed nations with stronger health systems have not been spared from maternal mortality. For instance, a US literature revealed that despite the United Nations Millennium Development Goal for a 75% reduction in maternal mortality by 2015, the estimated maternal mortality rate for 48 states and Washington D.C. increased from 2000–2014, while the international trend was in the opposite direction. The authors expressed the need to redouble efforts to prevent maternal deaths and improve maternity care for the 4 million U.S. women giving birth each year [5].

Some countries have recorded success stories in the provision of maternal health services and reduction of maternal mortality. For instance, China between 1997 and 2014 reduced maternal mortality by about 8.9% leading to the satisfaction of the 2015 millennium development agenda. Among some of the factors that contributed to the success story was China's highly medicalized model of maternity care and a health delivery model were maternity care is provided close to the women's homes. However, despite remarkable progress in maternal survival in China, substantial disparities remain, especially for the poor, less educated, and ethnic minority groups in remote areas in western China [6]. The findings of this study also reveal that socio-economic and demographic characteristics have an impact on maternal mortality. The evidence also shows that mortality rate can vary with socioeconomic characteristics of a geographical area. Based on the available IDSR data, the current study aimed at describing the prevalence of maternal mortality in Zambia and report on the factors contributing to maternal mortality in order to identify areas of need in terms of intervention development.

Methods

Data was extracted from the Integrated Disease Surveillance and Response (IDSR) system for the period August 2019 to June 2020. This data is national data that is submitted to the Zambia National Public Health Institute every week. This time zone was chosen because it was the data available so far and it was intended to observe in order to provide direction towards problem areas surrounding the fight against maternal mortality in Zambia which is a strong indicator of strength in a health care system of a country. The data was analyzed using Tableau and Microsoft Excel. Maternal deaths were presented using graphs generated from Microsoft Excel and Tableau and descriptive statistical data was presented using reports from Microsoft Excel.

Results

The table below shows results computed in Microsoft excel, 2013 which shows that there was a total of 528 cases of maternal deaths between August 2019 and June 2020 with a mean (×) 52.8 and SD (s) 31.77. Descriptive data also shows that the minimum number deaths per month was 14 and the maximum was 130 countrywide.

Figure 1: Descriptive statistics for maternal deaths occurring in Zambia between August 2019 and June 2020

Total Maternal Deaths	
Mean	52.8
Standard Deviation	31.76930734
Minimum	14
Maximum	130
Sum	528

Figure 2: Overall IDSR reported maternal deaths occurring in Zambia between August 2019 and June 2020 by month.

The data below on maternal mortality by province shows trends for the period between August 2019 and June 2020. From graph 1 below, the study shows that Lusaka had the highest reports of maternal mortality amounting to about 38 deaths followed by southern(18) and northern province(17), then central province(16), Copperbelt(13), Western(13), Eastern(11), North-western(8), Luapula(7) and Muchinga(6).

The findings in figure 3 below shows that the highest monthly number of cases was about 130 deaths in November 2019 which represented (24.6%) of the overall maternal mortality cases recorded. The data further shows a significant drop in maternal mortality to about 10.8% (57) in March and most of the months recording around 57 deaths and below. These monthly death statistics also mean that on average, about two lives of Zambian mothers are lost due to death.

Then figure 4.1 below shows cumulative estimated causes of maternal death by percentage from January 2019 to November 2019. Similarly, the main causes of deaths indicate that indirect causes (24%) and obstetric hemorrhage (30.4%) were the major contributors of maternal deaths. These factors were followed by hypertensive disorders (14.4%). About 9% of the deaths were caused by abortive outcomes,8% by caused by pregnancy related infection.

Based on figure 4.2 below, the findings are indicative that the major cause of maternal death were indirect causes (32.4%) and obstetric hemorrhage (36.3%). The rest of the causes share (35.3%) of the attribution which include abortive outcomes (9.7%), hypertensive disorders (11.9%), pregnancy related infections (5.0%) while the rest falling below 2% which includes unanticipated outcomes, incidentals, undetermined causes and unknown causes.

Discussion

The rates of maternal mortality seem to have reduced slightly compared to the findings of a similar study in 2018 [1]. Despite the reduction, maternal deaths are still relatively high in Zambia. Monthly data revealed that an average of 52 mothers died every month from August 2019 to June 2020. This finding raises concerns and calls for increased attention from the stakeholders.

Another striking finding which has been consistent in previous studies is that Obstetric hemorrhage is the greatest contributing factor to maternal mortality [1]. This consistency means that this is a factor that calls for attention among policy makers and intervention developers towards reducing this cause. Research has shown that some of the interventions that can be used to manage obstetric hemorrhage can include vaginal delivery, maternal resuscitation, delivery of the fetus, and uterine hemostasis (e.g., contraction, tamponade, embolization of hypogastric surgical repair of tissue lacerations, and possibly hysterectomy) [10, 8].

Another factor that seemed as a strong predictor of maternal mortality in Zambia is hypertensive disorders. This suggests that there are a lot of women in Zambia who die as a result hypertension at pre-natal and perinatal stage. These findings are consistent with previous findings from East Africa that found that high morbidity was attributable to hypertensive disorders in pregnancy [9]. This suggests the need to prevent such deaths early interventions such as antihypertensive therapy and prophylactic magnesium sulphate treatment.
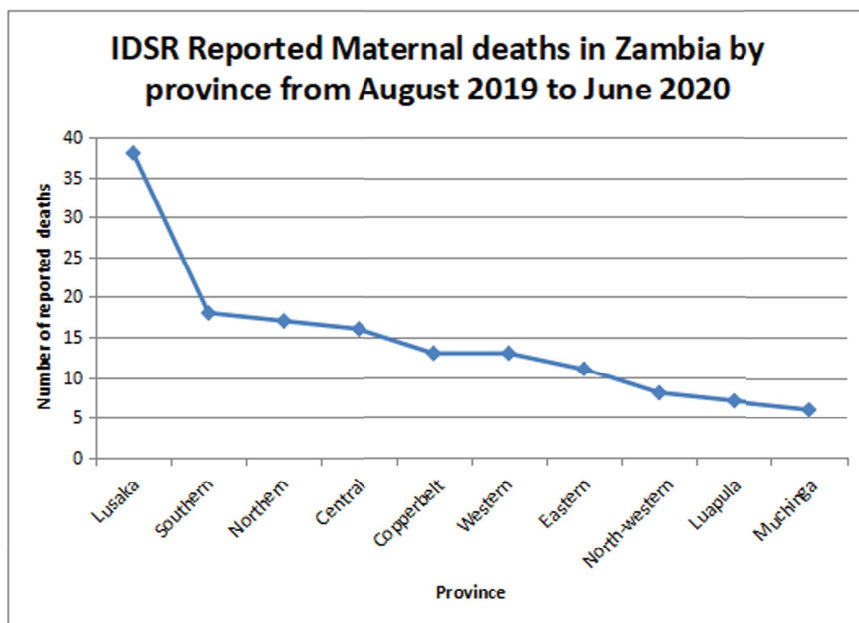

Figure 2.2: IDSR reported maternal deaths occurring in Zambia between August 2019 and June 2020 Visualized by sum of deaths per province.
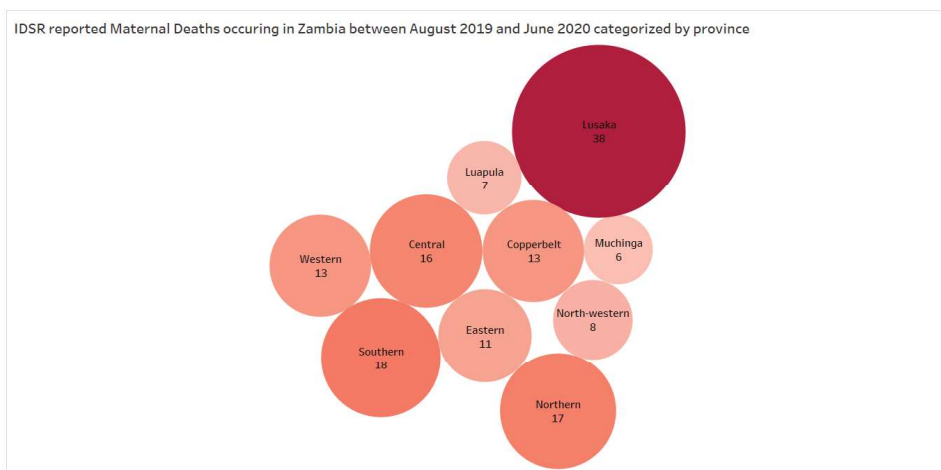

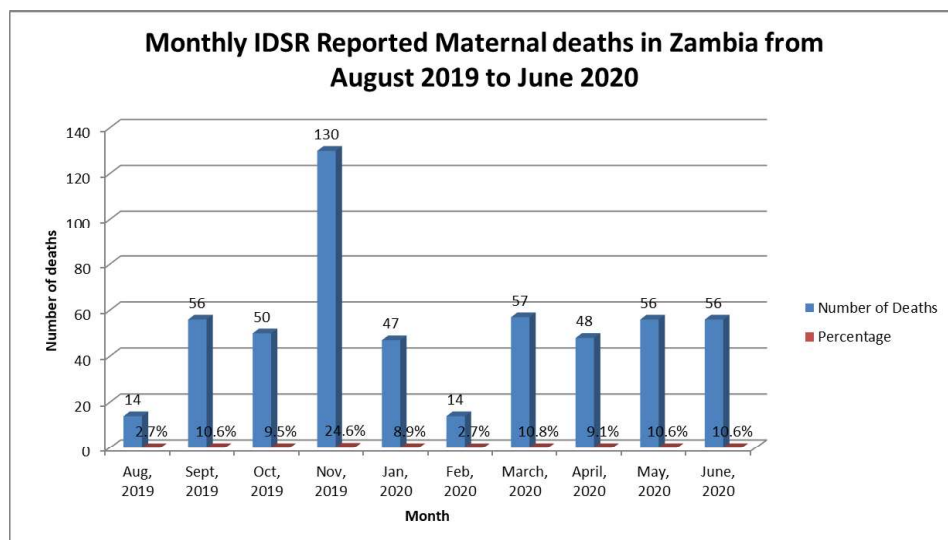Figure 3: Monthly IDSR reported maternal deaths occurring in Zambia between August 2019 and June 2020

Figure 4.1. IDSR report on estimated causes of maternal deaths occurring in Zambia between January 2019 and November 2019.
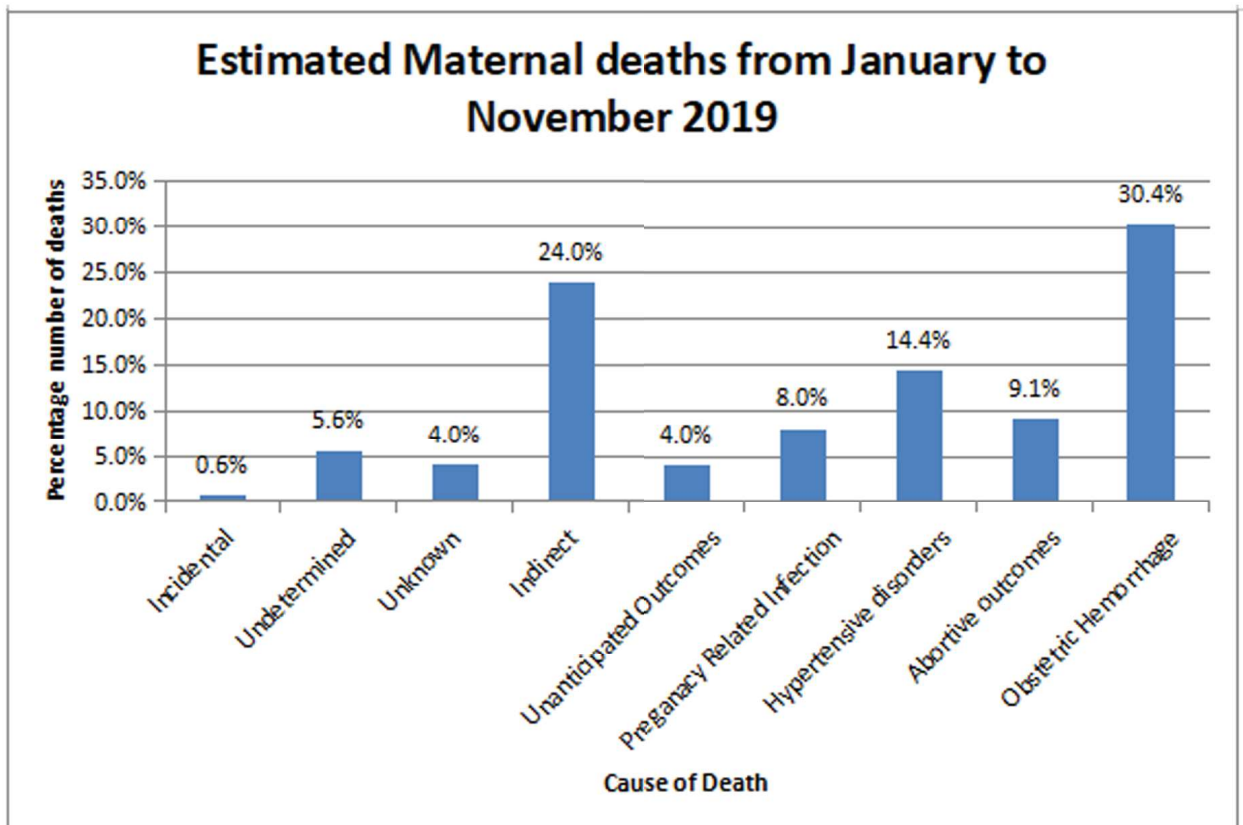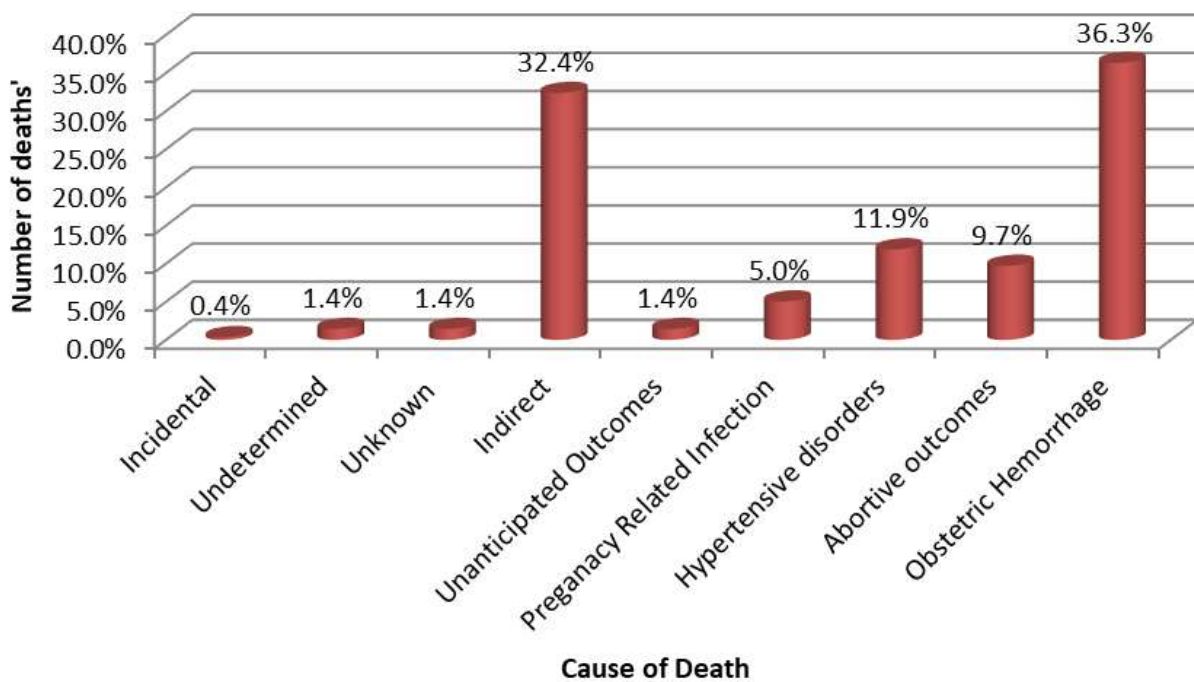
Figure 4.2: IDSR estimated causes of maternal deaths occurring in Zambia between January 2020 and June 2020.

The study did not show significant changes in cases by month for the months that have been hit by the Covid-19 pandemic. This is in contrast with Brazilian context that has recorded an increase in Covid-19 related maternal deaths. The reason why we have no Covid-19 related maternal deaths is uncertain because the IDSR data used for this study does not have a graduation of such deaths yet. Increased surveillance by health care stations could help in making this particular aspect of the result clearer. On the positive side the absence of such deaths may mean the Zambian health care system is making significant effort in controlling the effect of COVID-19 on other areas of health such as maternal health.

Furthermore, the study also revealed that geographical factors can contribute to the differences in maternal mortality cases. For instance, data on cases of maternal death by province show that Lusaka recorded the highest cases of maternal mortality while Muchinga recorded the smallest proportion from August 2019 to June 2020.

The reasons behind Lusaka having the highest cases is subject to research but roughly it can be assumed that maybe the population size among the provinces could be a factor or it could be healthcare factors or even health seeking behaviors among expecting mothers. Additional studies could add more flesh to this finding.

The Ministry of Health is committed to reducing the global mortality rate to 70per 100,000 live births by 2030 [1]. However, this target is most likely to be achieved if surveillance can be strengthened and attention can be given to all factors showing stronger attribution towards maternal mortality. For instance, increasing attention to the prevention of severe blood loss during and after delivery and hypertensive therapy before and after giving birth may lead to a significant drop in maternal mortality rates in Zambia.

Conclusion
Maintaining high rates of maternal mortality implies that a country is struggling to achieve its public health goals of improved women and infant's health.

It is important for a developing nation like Zambia and other nations in similar contexts to strengthen review processes that are utilized to assess potential preventability. Another important factor is to increase usage of evidence-based management strategies and increase capacity through increased budget allocation towards strengthening of healthcare systems and intervention development. Frequent studies on maternal mortality can provide direction in the process of developing interventions that may seek to reduce maternal mortality significantly.

Limitations
Just like any other study, this one had its own weaknesses. Firstly, was the sole reliance on the IDSR data and descriptive analysis because it may not give us full insight into the causes or significant differences or contribution like some inferential analyses could do. However, the study provides a good reminder of problem areas that are limiting the effectiveness of the Zambian healthcare system in protecting the health and lives of women in maternity and children.

LIST OF REFERENCES

1. Gianett B, Musakanya KE, Ngomah Moraes A, Chizuni C, Groeneveld C, Kapina M, Hamoonga R, Mazaba ML, Mukonka V. (2019). Maternal mortality trends and correlates in Zambia. Health Press Zambia Bull, 3(4&5); pp 12-16.

2. Mgawadere, F., Unkels, R., Kazembe, A., & van den Broek, N. (2017). Factors associated with maternal mortality in Malawi: application of the three delays model. BMC pregnancy and childbirth, 17(1), 1-9.

3. Smith, H., Ameh, C., Godia, P., Maua, J., Bartilol, K., Amoth, P., … & van den Broek, N. (2017). Implementing maternal death surveillance and response in Kenya: incremental progress and lessons learned. Global Health: Science and Practice, 5(3), 345-354.

4. Melberg, A., Mirkuzie, A. H., Sisay, T. A., Sisay, M. M., & Moland, K. M. (2019). 'Maternal deaths should simply be 0': politicization of maternal death reporting and review processes in Ethiopia. Health policy and planning, 34(7), 492-498.

5. MacDorman, M. F., Declercq, E., Cabral, H., & Morton, C. (2016). Is the United States maternal mortality rate increasing? Disentangling trends from measurement issues short title: US maternal mortality trends. Obstetrics and gynecology, 128(3), 447.

6. Gao, Y., Zhou, H., Singh, N. S., Powell-Jackson, T., Nash, S., Yang, M., … & Pan, J. (2017). Progress and challenges in maternal health in western China: a Countdown to 2015 national case study. The Lancet Global Health, 5(5), e523-e536.

7. Takemoto, M. L., Menezes, M. D. O., Andreucci, C. B., Nakamura Pereira, M., Amorim, M. M., Katz, L., & Knobel, R. (2020). The tragedy of COVID 19 in Brazil: 124 maternal deaths and counting. International Journal of Gynecology & Obstetrics.

8. Geller, S. E., Koch, A. R., Garland, C. E., MacDonald, E. J., Storey, F., & Lawton, B. (2018). A global view of severe maternal morbidity: moving beyond maternal mortality. Reproductive health, 15(1), 98.

9. Nakimuli, A., Nakubulwa, S., Kakaire, O., Osinde, M. O., Mbalinda, S. N., Kakande, N., … & Kaye, D. K. (2016). The burden of maternal morbidity and mortality attributable to hypertensive disorders in pregnancy: a prospective cohort study from Uganda. BMC pregnancy and childbirth, 16(1), 205.

10. Clark, S. L. (2016, March). Obstetric hemorrhage. In Seminars in Perinatology (Vol. 40, No. 2, pp. 109-111). WB Saunders.

11. Pacheco, L. D., Hankins, G. D., Saad, A. F., Costantine, M. M., Chiossi, G., & Saade, G. R. (2017). Tranexamic acid for the management of obstetric hemorrhage. Obstetrics & Gynecology, 130(4), 765-769.

12. Fardelmann, K. L., & Alian, A. A. (2020). Anesthesia for Obstetric Disasters. Anesthesiology Clinics, 38(1), 85-105.