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A five-year review of maternal mortality in federal medical centre, Asaba delta state

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Abstract

Background: Maternal mortality, though preventable has continued to increase in many nations of the world, especially in low and medium income countries as a result of low socio-economic development.

Objective: To assess the yearly trend and the impact of socio-demographic characteristics on maternal mortality in Federal Medical Centre, Asaba.

Methods: A retrospective study of all cases of maternal mortality that occurred at Federal Medical Centre, Asaba from July 1, 2016 to June 30, 2021 was conducted. Data collected with the aid of data entry forms designed for this purpose were analyzed using SPSS version 26.

Results: There were 6,247 deliveries with 44 maternal deaths giving a ratio of 704 per 100,000 deliveries. Forty one (95.3%) of those who died were unbooked and 51.2% had below secondary level of education. About 39.5% were 35 years of age and above. Over seventy per cents of maternal mortality cases were among multiparous women while 11.6% were grand multipara. Over half of maternal death occurred postpartum. Hypertensive disorders in pregnancy was the commonest direct cause of death (46.5%), followed by obstetric haemorrhage (27.9%), and others. Low socioeconomic status and unbooked status were some of the identifiable risk factors of maternal mortality.

Conclusion: The study showed maternal mortality ratio of 704 per 100,000 live births, major causes were hypertensive disorder of pregnancy and obstetrics haemorrhage. A major determinant was unbooked and low socioeconomic status.

Keywords: Trends, determinants, causes and maternal mortality

Introduction

Maternal mortality is the death of a woman while pregnant or within 42 days of termination of the pregnancy irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from incidental or accidental causes [1-3]. Sub-Saharan Africa and South Asia account for 86% of maternal deaths worldwide. Sub-Saharan Africans has maternal mortality ratio (MMR) of 533 maternal deaths per 100,000 live births or 200,000 maternal deaths a year [2, 3]. This is over two thirds (68%) of all maternal deaths per year worldwide [2]. Maternal mortality is higher in women living in rural areas and among poor communities [1]. However, regional and global averages tend to mask large disparities both within and between countries [3]. Globally, the number of women and girls who died each year from complications of pregnancy and childbirth declined from 451,000 in 2000 to 295,000 in 2017 [3]. Over 800 women die daily from preventable complications in pregnancy and childbirth [2], and also for every woman who dies, approximately 20 others suffer serious injuries, infections or disabilities [2]. In year 2017, the country with the highest estimated number of maternal death was South Sudan with maternal mortality rate of 1,150 per 100,000 live births while Nigeria was ranked the 4th country with a rate of 917 per 100,000 live births.

Between 2000 and 2017, maternal mortality worldwide dropped by almost 50% [3]. Despite this progress, the world still fell short of the millennium development goals target of a 75% reduction in global MMR by 2015 [3]. Though, a significant decline of maternal mortality was observed from 2000 onwards however a reduction of the global maternal mortality ratio to less than 70 per 100,000 births, with no country having a maternal mortality rate of more than twice the global average is one of the objectives of the Sustainable Development Goals by the year 2030 [3, 4]. In Nigeria the overall maternal mortality ratio was estimated to be 814 per 100,000 live births and it varies within the country [1].

There were states and health facilities mostly in the northern Nigeria that had higher levels of maternal mortality compared to the national average in 2019. Absulkarir M and Rainis R recorded a ratio of 1,362 per 100,000 live births [6], a study done in the general hospitals in Jigawa between 2010 to 2019 compared to the study done by Fawole *et al.* reported a ratio of 927 maternal deaths per 100,000 live births in general hospital in Ibadan [7]. Though Nigeria has one of the worst records of maternal mortality in the world and this situation is worsening with time.

In developing countries, the most common cause of maternal death is obstetric haemorrhage, while in high income countries it is thromboembolism. Like many countries in Sub-Saharan Africa, more than 70% of maternal deaths in Nigeria could attributed to five major complications: hypertensive disease of pregnancy, obstetric haemorrhage, infection, unsafe abortion and obstructed labour [8]. Also poor access to the utilisation of quality reproductive health services contributes significantly to the high maternal mortality level in Nigeria. Causes of maternal deaths can therefore be classified into medical factors, health system factors, reproductive factors, unwanted pregnancy and socioeconomic factors [8]. Medical factors include direct obstetric deaths, indirect obstetric deaths and unrelated deaths. Other contributory factors to maternal mortality in Nigeria include maternal age, illiteracy, non-utilisation of antenatal services and grandmultiparity [9].

The global aim of the Sustainable Development Goal (SDG3) initiative is to reduce the maternal mortality ratio to a fewer than 70 maternal deaths per 100,000 live births by 2030 with the national target that no country should have an MMR greater than 140 maternal deaths per 100,000. However it has been expressed that the world's mortality ratio is declining slowly to meet the SDG target [3]. While an annual decline of 6.4% in maternal mortality ratio between 2000 and 2017 is required to achieve SDG3, figures released by WHO, UNICEF, UNFPA and World Bank show an annual decline of 2.9% [3].

Aim

To review the prevalence, sociodemographic characteristics and the predictors of maternal morbidity in Federal Medical Centre, Asaba over a five-year period.

Materials and Methods

Forty-four cases of women died in pregnancy, labour or within 42 days of delivery between 1st July 2016 and 30th June 2021 and 43 case files were retrieved from the medical records department and supplementation from the theatre records. 1 folder could not be retrieved, making the retrieval rate to be 98% Information obtained from the case records included the number of maternal deaths, booking status, age, parity, highest level of educational attainment, cause of death and mode of delivery. No post mortem examination was carried out. The cause of death was therefore determined clinically.

Statistical Analysis

Data were analyzed using statistical package SPSS 26. The results were given in the forms of frequency, tables, percentages, bar chart and pie chart.

Ethical Approval

Approval for the study was granted by the ethics and research

committee of federal medical centre, Asaba.

Results

There were 6,247 live births and 44 maternal deaths during the 5 years' study period given a maternal mortality rate of 704 per 100,000 live births. Hypertensive disorder in pregnancy was the commonest direct cause of death with eclampsia and pre-eclampsia having 30.2% and 16.3% respectively making a total of 46.5%. This was followed by obstetric haemorrhage (postpartum and Antepartum haemorrhage) with a total of 27.9%, sepsis and uterine rupture had 7% each while early pregnancy death from unsafe abortion and ectopic pregnancy were 4.7% each. The non-medical causes and contributory factors to maternal mortality were analysed using the delay model.

Type 1 delay which is the delay in decision making to seek care had the highest percentage of 93.4% while type 2 which is the delay in reaching care stood at 20.9% and type 3, delay in receiving adequate health care was 11.7%.

Table 1: Sociodemographic data

	Frequency	Percentage	Chi-Square
Age			
15-19	1	2.3	P = 0.823
20-24	2	4.7	
25-29	11	25.6	
30-34	12	27.9	
35-39	11	25.6	
40 and above	6	13.9	
Booking Status			
Booked	2	4.7	P<0.001
Unbooked	41	95.3	
Parity			
0	3	7.0	P=0.19
1	2	4.7	
2	11	25.6	
3	14	32.6	
4	8	18.6	
5 and above	5	11.6	
Educational Status			
No formal education	1	2.3	P<0.001
Primary school	21	48.8	
Secondary school	16	37.2	
Tertiary education	5	11.6	

Table 2: Determinants and indicators of maternal mortality

	Frequency	Percent	
Duration on admission			
<12hours	9	20.9	P<0.001
12hours to 24hours'	24	55.8	
2days	5	11.6	
3days	2	4.7	
>5days	3	7.0	
Mode of Delivery			
SVD	16	37.2	P <0.001
Emergency CS	8	18.6	
Elective CS	1	2.3	
Still pregnant	15	34.9	
Emergency laparotomy	3	7.0	
Period of death			
Antepartum death	10	23.3	P=0.045
Intrapartum death	11	25.6	
Postpartum death	22	51.2	
Total	43	100.0	

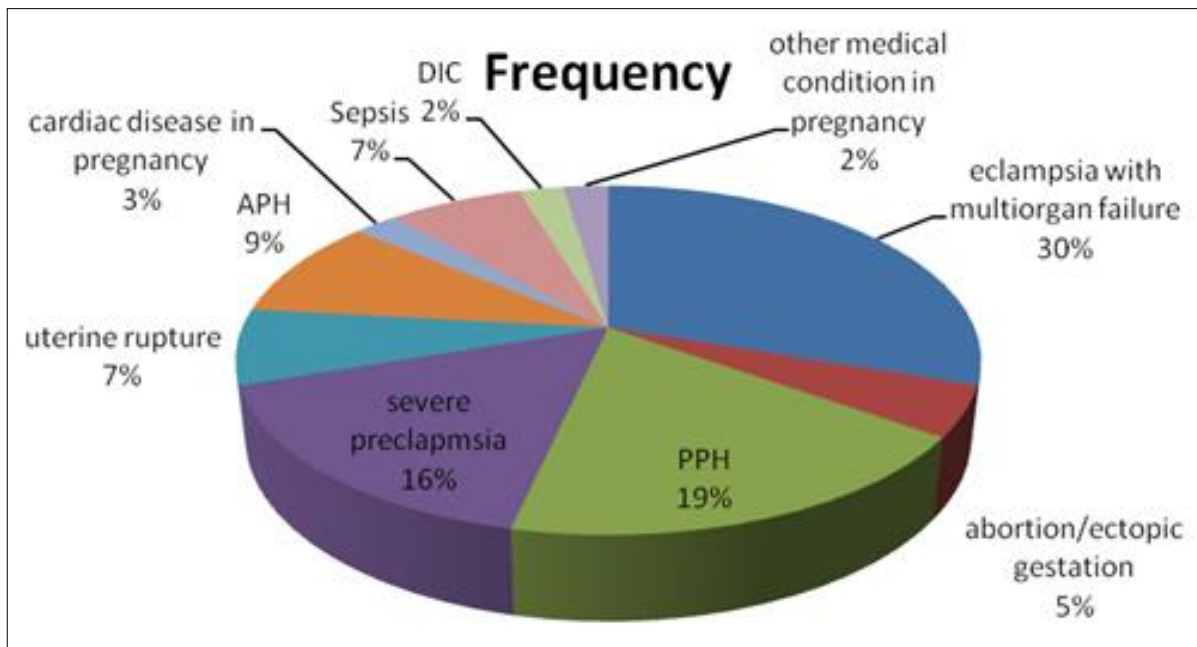


Fig 1: Causes of maternal death

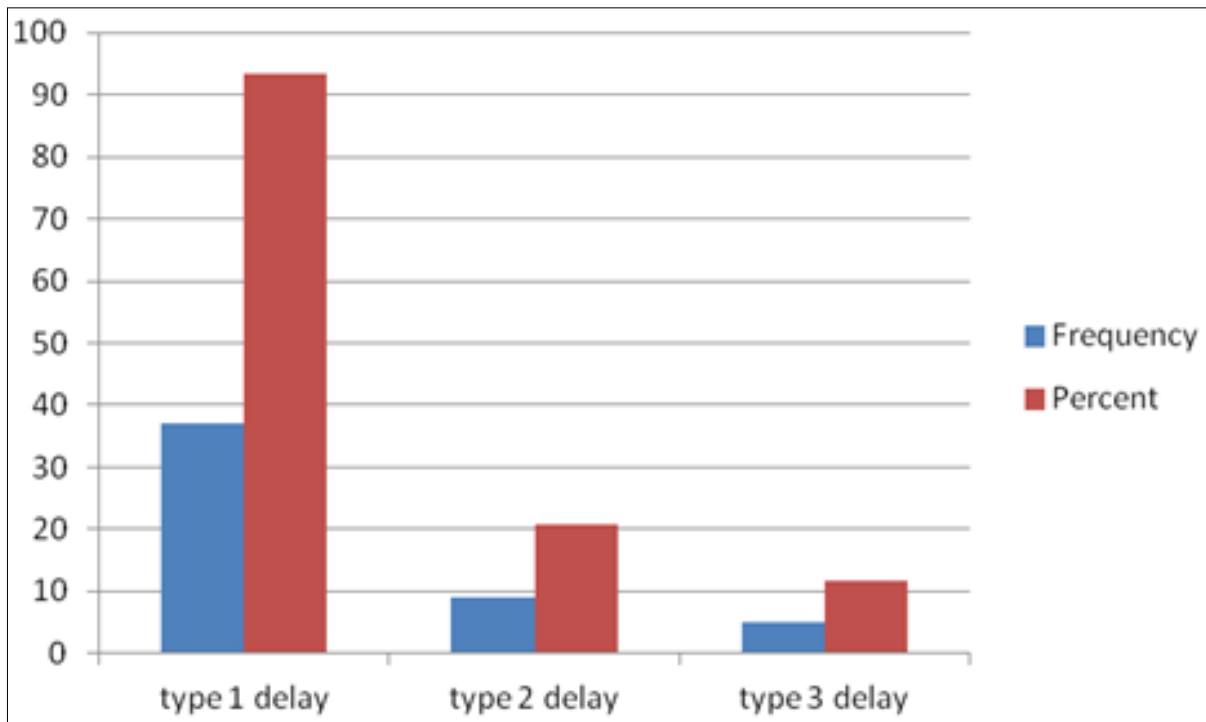


Fig 2: Types of delay

Discussion

The maternal mortality ratio of 704 per 100000 live births was reported in this study with pre-eclampsia and eclampsia as major causes followed by obstetric haemorrhage. This was less compared to 814 per 100000 live births released by World Health Organization in 2020 for Nigeria [1]. It is also higher than 518/100000 in a study done in Benin [10]. However, it was also lower than 902.7/100000 live births in Ebonyi State [11]. 1513.4 per 100000 live births in Calabar [12]. as well as all the values from the survey conducted by SOGON in 2004 in six teaching hospitals across Nigeria in Maiduguri, Enugu, Jos, Calabar, Lagos, and Kano. It was also lower than the WHO estimated average maternal mortality ratio in Africa 800/100000 live births 2017 [2, 3]. Maternal mortality ratio is much higher in some parts

of the country when compared with other parts. For example it is estimated that maternal mortality is much higher in the North Eastern Nigeria accounting for 75% of the country’s maternal deaths when compared to the South East and South West regions. Also, the wide variation in maternal mortality rates reported from various centres in the country may also result from the fact that most of the studies were Hospital based studies which are affected by socio-economic and cultural factors prevalent in the areas as well as admission policies of the Hospital and efficient records keeping.

This high maternal mortality is similar to what obtains in other parts of the Sub-Saharan Africa, for example Cameroun 690/100000 live births, sierra Leone 890/100000 and Somalia 1000/100000 [13]. The situation is better in North Africa, Algeria

97/100000, Egypt 66/100000, Tunisia 56/100000^[14]. This situation is unacceptable when compared to the values in developed countries United Kingdom 12/100000, Ireland 6/100000, United States of America 21/100000, Estonia and Greece 2 and 3/100000 respectively^[2, 3, 13, 14]. The maternal mortality ratio was increasing per year over the 5-year period of the study.

This could be accounted for by the massive increase in the toll of patients that sought medical services from the Federal Medical Centre within the 5 years under study and the era of covid-19 viral infection. This might have resulted from major expansions both in infrastructure and manpower recruitment. In addition, the attainments of full status of a referral centre for other smaller Hospitals within Asaba and its neighbourhood.

Furthermore, the Government of Delta State established a free Maternal Health Policy in 2007 as a means of achieving a target of 75 percent reduction in maternal mortality in 2015. This programme when reviewed in 2012 was noted to have been successfully implemented in 57 state hospitals and was said to have reduced maternal mortality from 456/100000 to 221/100000 within 5 years of implementation^[15]. As laudable as this project was, it was noted that the volume of patients' turnout to these health facilities was overwhelming and to the free delivery. This led to increased delay in presentation to this facility with patient having worsened condition. Mojekwu *et al.*, identified that attempts to introduce free maternal care, usually through user-fee waiver policy by many of the states of the federation in their bid to reduce maternal mortality do not seem to be adequately planned for and are consequently unsustainable^[16]. The main challenge is usually provision of adequate number of skilled health care personnel to handle the huge influx of pregnant women who come to avail themselves of free maternal care services^[16, 17]. Also large volume of drugs is used up in a very short period of time with overwhelming demand on the clerical staff for adequate distribution and use^[16, 17].

Finally, about 95.3% of the maternal deaths were unbooked cases, many of whom were referred in moribund state and a majority of whom die shortly after they get to the hospital as captured in this study (88.4% died within 48 hours of admission). Many other unbooked emergencies usually come to the hospital as a last resort after exhausting unorthodox alternatives for the relief of serious complications of labour.

On admission the patients may be severely anaemic, septic, dehydrated or even in hypovolaemic shock. Despite all the efforts at resuscitation of such patients they still usually succumb to death, sometimes even still undelivered of her fetus as identified by 76.7% of maternal death occurring within 24 hours of arrival in the hospital. Omo-Aghoja^[18], *et al.* in Benin, Agan *et al.*^[12] in Calabar, Guerrier *et al.*^[19], in northern Nigeria, all identified unbooked status and late referral from the primary centres where the patients were receiving medical care as the major causes of maternal mortality. WHO has also identified that in high income countries where maternal mortality ratio is very low, virtually all pregnant women receive at least 4 antenatal care visits, are attended by skilled birth attendant during child birth and receive postpartum care. While in low income countries, just over a 3rd of all pregnant women have the recommended 4 antenatal care visits^[3]. Abe and Omo-Aghoja^[18] identified that MMR was 30 times higher in the unbooked as compared with booked patients.

Maternal mortality was highest in women 35 years and above. Guerrier *et al.*^[19], in Northern Nigeria found that MMR was highest in those aged below 20 years. In northern Nigeria there is a greater burden of maternal death in the youngest age groups

than other age groups^[19]. This may be due to the generally tender age at marriage which is a typical occurrence in the rural northern Nigerian setting^[19]. A study on maternal death conducted by UNPF revealed that the risk of death at child birth is 3 times higher among adolescent girls between the ages of 15-19 years than their older cohorts (20-24). However, generally age specific mortality ratio for all women is especially high after the age of 40 years. In a study in the South-Eastern Nigeria by Nwagha *et al.*, this fact was reflected clearly^[11]. Highest number of death (78.6%) occurred in the age bracket 25-39 years. These findings were in agreement with that of Omo-Aghoja *et al.* in Benin City South-South Nigeria^[18]. The enormous contribution made by women 35 years and above to maternal mortality in this study is shown by the fact that maternal mortality is highest in this group because they are more at risk of hypertensive disorder, diabetes mellitus in pregnancy, antepartum and postpartum haemorrhage, malpresentation, difficult labour and uterine rupture.

Maternal mortality increased steadily from the 5th to the 10th pregnancy^[11-18]. Approximately 30% of the maternal deaths in this study were in their 4th pregnancy. Many of these deaths are young women who are not yet empowered and therefore lack capacity for appropriate health seeking behaviour.

The importance of formal education with respect to maternal mortality is evident in many studies on maternal mortality. Societies where illiteracy or very low levels of formal education is predominant, witness high maternal mortality ratio. This is a major reason for the disparity between the MMR in the developed and the developing countries. In the northern Nigeria where there is high MMR, early marriage at the adolescent age hinders acquisition of formal education and promotes mass illiteracy among the women. The goal of SDG was to promote gender equality and women empowerment which is essential to the achievement of better health. Maternal deaths and pregnancy-related conditions cannot be eliminated without the empowerment of women. Empowerment ensures access to health information and control of resources such as money which is important in achieving health equity. Education gives women knowledge based control over their lives and emboldens them to take proper decisions in their health seeking behaviour. Bolaji *et al.*^[22], Guerrier *et al.*^[19], Omo-Aghoja *et al.*^[18], all identified higher maternal mortality rates in those with highest level of education being primary compared to those who had tertiary education.

Approximately 21% of women had caesarean delivery, this was not the cause of maternal death in these women as the indications and other conditions associated with the operation itself are usually responsible for the mortality. In suboptimal conditions, caesarean section is potentially lethal^[20]. Adequate antenatal care, availability of blood, strict asepsis, safe anaesthesia and adequate preoperative resuscitation are measures that could reduce mortality from caesarean section, caesarean hysterectomy and emergency laparotomy^[20]. Majority of the Emergency laparotomy were carried out as a last ditch response to save the woman that had ruptured uterus. Usually at this point, the woman's body reserve to withstand surgery would have deteriorated *yet all* the same the surgery must be carried out to enhance her chances of survival. Anaesthetic death has also been identified as a cause of maternal mortality in many of the studies^[14, 15, 19]. In the study in Benin City^[18] Anaesthetic death contributed up to 3.5% of the total maternal death while in this study there was no record of anaesthetic death over the studied period. Maternal death from complications of anaesthesia is the 6th leading cause of death in the United States

^[21]. Contributing risk factors include obesity, presence of hypertensive disease and emergency caesarean delivery ^[16].

In this review, Hypertensive disorder in pregnancy was the commonest direct cause of death with eclampsia and preclampsia having 30.2% and 16.3% respectively making a total of 46.5%. This was followed by obstetric haemorrhage (postpartum and Antepartum haemorrhage) with a total of 27.9%, sepsis and uterine rupture had same number of maternal mortality cases (7%) while early pregnancy death (unsafe abortion and Ectopic pregnancy) was 4.7%. In a WHO systematic analysis of global causes of maternal death between 2003 and 2009, obstetric haemorrhage, hypertensive disorder and sepsis in that order were identified to be responsible for more than half of maternal death world-wide ^[25]. More than a quarter of deaths were also attributed to indirect causes. In this series however, indirect causes contributed only about 2.3% on the whole. While direct causes are more predominantly the cause of maternal mortality in the developing countries, the indirect causes contribute more to maternal deaths in the developed countries. Thromboembolism is the commonest cause of maternal mortality in the developed countries. In this study, it was not captured as a cause of maternal death during the 5-year study period. The decline in maternal mortality in the developed countries is attributed to improved medical technologies, improved asepsis, fluid management, blood transfusion and better perinatal care. In the development of medical technologies in the developing countries the non-pneumatic anti-shock garment, low-technology pressure device has helped adequate emergency care during obstetric haemorrhage ^[22, 23].

It is interesting to note that 51.2% of the maternal deaths in this study occurred post-partum. This calls for greater monitoring post-partum especially for those cases with associated high morbidity.

Conclusion

Maternal mortality ratio is unacceptably high. A major contributor is hypertensive disorder of pregnancy and obstetric haemorrhage. Un-booked status, low socioeconomic status and late presentation are major predictor of maternal death. As a way forward to attaining goal 2030 of the SDG agenda, these can help in policy and improving strategy.

Conflict of Interest:

Not available

Financial Support:

Not available

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