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Prevalence and pattern of perinatal maternal deaths in a tertiary hospital in Enugu, Southeast Nigeria

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Abstract

Background: Maternal mortality ratio (MMR)- the number of maternal deaths per 100,000 live births has continued to be on the increase in Sub-Saharan Africa despite efforts at improved obstetric care. Maternal mortality ratio as high as 1895 per 100,000 live births has been reported in Nigeria. Obstetric haemorrhages and hypertensive disorders of pregnancy have continued to lead the primary causes of maternal deaths in several studies.

Objective: The objective of this study is to assess the prevalence, causes, and pattern of perinatal maternal deaths in the Obstetrics and Gynaecology Department of Enugu State University Teaching Hospital, Parklane, Enugu.

Methodology: This is a 10-year retrospective study covering January 2014-December 2023. Data related patients' age, parity, booking status and diagnosis/cause of death were collected using a structured proforma from the prenatal, labour, and the postnatal ward records as well as the records from the theatre. Data was analyzed using SPSS version 25.0 and the results presented in tables and charts as frequencies, and means with standard deviations.

Results*:* A total of 16,137 live births occurred during the study period while 69 maternal deaths were recorded. Majority of the women that died were between 25-39years. Most of them 63 (91.3%) were married, 30.4% were para 1 while 58 (84.1%) presented as unbooked emergencies. The prevalence of perinatal maternal deaths from 2014 – 2023 is less than 1%. The trends in perinatal deaths over the 10-year period showed that most deaths (10 deaths for each year) occurred in the first 3 years of this study (2014-2016) and was followed by a gradual but unsteady reduction in the number of deaths in the subsequent years. The commonest causes of perinatal maternal deaths were Obstetric haemorrhage (mostly postpartum haemorrhage PPH) (43.5%) followed by Hypertensive disorders -Eclampsia/Severe Preeclampsia (39.1%) and Septicaemia/puerperal sepsis (17.4%) in that order. There was no significant association between demographic characteristics of the subjects and causes of perinatal maternal death ($p > 0.05$).

Conclusion*:* The death of a woman during childbirth has remained a public health challenge especially in the low resource settings like ours. Obstetric haemorrhages and hypertensive disorders of pregnancy have remained the leading causes of this catastrophe. Strategies to promote awareness, improve women education and empowerment, enhance the availability, accessibility, equipment of available health facilities as well as training, retraining and motivation of available health personnel will go a long way in cubbing this menace.

Keywords: Pattern; Perinatal; Maternal; Deaths; Enugu.

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1. Introduction

The death of a woman while pregnant, during or after delivery is a catastrophic disaster of unimaginable proportion. That a woman should sacrifice her life in the process of bringing out another is akin to the biblical sacrificial crucifying of Jesus Christ for the salvation of mankind. Worldwide, maternal deaths remain a burning public health issue with global statistics suggesting that a woman dies from pregnancy related causes every two minutes with most of these deaths resulting unfortunately from preventable complications of pregnancy and their managements.[1]

Sub-Saharan Africa accounts for approximately two-thirds of all maternal deaths globally. African Region accounted for 69% of global maternal deaths in 2020.[1,2] Nigeria, in particular, contributes significantly to this burden, ranking among the top countries with the highest maternal mortality rates. Three countries -South Sudan (1223), Chad (1063), and Nigeria (1047) have the highest reported maternal mortalities in excess of 1000 deaths per 100,000 live births in 2020.[3] In Nigeria, maternal mortality ratio (MMR) has remained on the rise, increasing from 545/100,000 live births in 2008 through 576/100,000 live births in 2013 to the present 825/100,000 live births.[3-6] But a recent systematic review showed that the pooled maternal mortality ratio (MMR) across Nigerian health facilities remain alarmingly high at 1,470 per 100,000 live births, with the lowest regional estimates reported in the South-East region at 1,449 per 100,000 live births.[7] Nigeria contributes 19% of global burden of maternal mortality such that the lifetime risk of a woman dying in pregnancy in Nigeria is 1:22, compared to the estimated1:5,400 for developing countries.[8]

The major causes of maternal deaths accounting for almost 75% of cases remain hypertensive disorders of pregnancy (pre-eclampsia/eclampsia), obstetric haemorrhages, puerperal sepsis, obstructed labour, and unsafe abortions.[5,9,10] In Enugu State University Teaching Hospital Parklane, a 5-year retrospective study of maternal mortality from between 2004 -2008 when the hospital was transitioning from a Specialist Hospital to a Teaching Hospital showed that there were 7146 live births and 60 maternal deaths giving an overall MMR of 840/100,000 livebirths. The MMR was shown to rise from 411to1,137/100,000 livebirths as a specialist hospital with a decline to 625/100,1000 livebirths as a Teaching Hospital with Preeclampsia/Eclampsia as the leading cause (29.63%) of maternal death.[11] It has been shown that most maternal deaths occurred among unbooked patients (85.4%) and those of low socio-economic status, particularly in rural and semi-urban areas.[10,12] In Ebonyi State, Southeast Nigeria, obstetric haemorrhage (28%) and hypertensive disorders (13%) were leading causes of maternal deaths, with the highest burden seen among grand multiparous and unbooked women.[10] The contributory risk factors are multi-dimensional including socio-cultural, economic and institutional barriers culminating into the primary, secondary and tertiary delays (Types 1-3 delays) as propounded by Thaddeus and Maine.[13] These include delays in recognizing an obstetric emergency and deciding to seek care, delays in locating and reaching an adequate healthcare facility, and delays in receiving adequate care when the woman gets to the healthcare facility.[13] Other contributory factors including widespread poverty, illiteracy, ignorance, high transportation cost and inadequate road network access to health facilities, poorly trained and poorly motivated medical personnel and birth attendants, inefficient and ineffective referral systems, inadequate and poorly equipped health facilities, all combined to facilitate maternal mortalities in our environment.[14,15] A study from the University of Nigeria Teaching Hospital (UNTH) Enugu showed that most of the women who died during pregnancy were less than 40 years old, poorly educated, unemployed, and typically presented as unbooked emergencies.[16]

Despite international and national preventive measures and frameworks to reduce maternal deaths, Nigeria has failed to meet up with Millenium Development Goal 5 as of 2015 and is poised not to achieve the target by 2030. The prevalence of maternal deaths has been increasing and may get worse with the latest trend of high-level emigration of trained medical personnel in what is now called the 'Jappa Syndrome'.

Teaching hospitals have remained the centres for specialized management of high-risk pregnancies and an important source of primary data on maternal deaths. This retrospective study was aimed at reviewing the pattern of perinatal maternal deaths in the Enugu State University Teaching Hospital (ESUTH) Parklane, Enugu with a view to providing insights into the common causes and the pattern of presentation and risk factors associated with maternal deaths in the hospital over a ten-year period. The findings would provide better understanding of the effectiveness of the existing maternal care protocols in the hospital, identify areas where improvements were needed, and assist in the formulation of strategies to address the persistent issues that lead to maternal mortality.

2. Methodology

This is a10-year retrospective study from 1st January 2014 to 31st December, 2023 conducted at the Obstetrics and Gynaecology Department of Enugu State University Teaching Hospital (ESUTH) Parklane, Enugu. Data was obtained from prenatal, labour, and postnatal wards as well as the theatre records. Data was restricted to perinatal maternal

deaths only. Women whose pregnancies were less than 28 weeks at the time of death and other deaths arising from gynaecological causes like ruptured ectopic pregnancies and complications of abortions were not included. A structured proforma was used to collect data on sociodemographic characteristics of patients, parity, booking status, and cause of death.

Data was analysed using SPSS version 25.0 and the results presented in tables and charts as frequencies, and means with standard deviations. Chi-Square was used to ascertain the level of association of sociodemographic variables and maternal deaths. Level of significance was set at $p < 0.05$.

3. Results

A total of 16,137 live births were recorded during the study period while 69 maternal deaths occurred.

Table 1 Demographic characteristics of the study participants

	Frequency	**Percent**
Age group		
20 - 24	10	14.5
25 - 29	20	29.0
30 - 34	21	30.4
35 - 39	14	20.3
40+	4	5.8
Marital Status		
Single	6	8.7
Married	63	91.3
Parity		
1	21	30.4
2	10	14.5
3	13	18.8
4	10	14.5
5+	15	21.7
Booking Status		
Booked	11	15.9
Unbooked	58	84.1

Table 1 shows that majority of the women were aged between 25 and 39 years. The mean age and standard deviation were 30.39 ± 5.20, minimum age was 20 years while the maximum age was 42 years. Most of the women (91.3%) were married, 30.4% of them were para 1 while 84.1% presented as unbooked emergencies.

Table 2 Perinatal maternal death trend from 2014 - 2023

Year	No. of perinatal maternal deaths	Total No. of live births	Percentage of perinatal maternal deaths
2014	10	1368	0.7%
2015	10	1582	0.6%
2016	10	1780	0.6%
2017	8	1893	0.4%
2018	10	1869	0.5%
2019	4	1885	0.2%
2020	8	1624	0.5%
2021	4	1363	0.3%
2022	1	1442	0.1%
2023	4	1331	0.3%

Table 2 shows that the prevalence of perinatal maternal deaths from 2014 – 2023 are less than 1%.

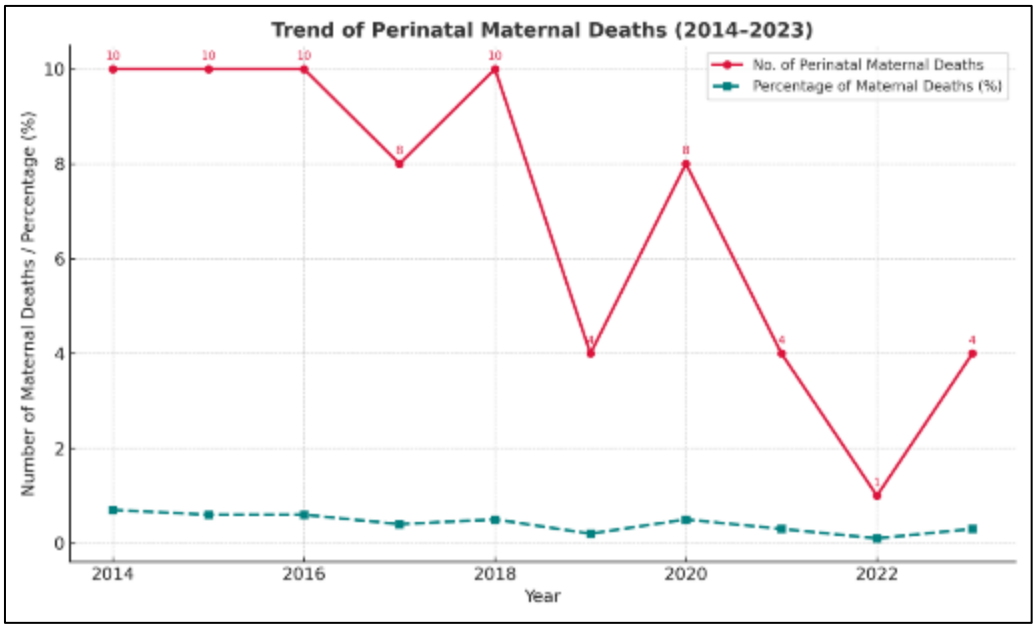

Figure 1 The diagrammatic trends in the perinatal deaths over the 10-year period. A total of 10 deaths were recorded in 2014, 2015, 2016 and 2018, followed by a total of 8 deaths recorded in 2017 and 2018.

Table 3 Major causes of death perinatal maternal death 2014 – 2023

	Frequency	percent
Eclampsia/Severe Preeclampsia	27	39.1
Obstetric Haemorrhage/PPH	30	43.5
Septicaemia (puerperal sepsis, Immunosuppression & others)	12	17.4

Table 3 shows that the commonest cause of perinatal maternal death was from 2014 to 2023 was Obstetric Haemorrhage/PPH (43.5%) followed by Eclampsia/Severe Preeclampsia (39.1%) and Septicaemia/puerperal sepsis (17.4%) in that order.

Table 4 Association between demographic characteristics and causes of perinatal maternal death

	Causes of perinatal maternal death				
	Eclampsia/Severe Preeclampsia	Obstetric Haemorrhage/PPH	Septicaemia (puerperal sepsis, Immunosuppression & others)	χ^2	P value
Age group					
20 – 24	6 (60.0)	4 (40.0)	0 (0.0)	6.534	0.588
25 – 29	8 (40.0)	8 (40.0)	4 (20.0)		
30 – 34	7 (33.3)	10 (47.6)	4 (19.0)		
35 – 39	5 (35.7)	7 (50.0)	2 (14.3)		
40+	1 (25.0)	1 (25.0)	2 (50.0)		
Marital Status					
Single	3 (50.0)	3 (50.0)	0 (0.0)	1.406	0.495
married	24 (38.1)	27 (42.9)	12 (19.0)		
Parity					
1	14 (66.7)	4 (19.0)	3 (14.3)	15.516	0.050
2	4 (40.0)	5 (50.0)	1 (10.0)		
3	5 (38.5)	5 (38.5)	3 (23.1)		
4	2 (20.0)	5 (50.0)	3 (30.0)		
5+	2 (13.3)	11 (73.3)	2 (13.3)		
Antenatal					
Booked	4 (36.4)	5 (45.5)	2 (18.2)	0.042	0.979
Unbooked	23 (39.7)	25 (43.1)	10 (17.2)		

Table 4 shows no significant association between demographic characteristics of the subjects and causes of perinatal maternal death ($p > 0.05$).

4. Discussion

A total of 69 perinatal deaths were recorded within the 10 years of this study (2013-2024) with 16,137 live births during the same period. Most of the maternal deaths (43.5%) result from obstetric haemorrhages (antepartum and postpartum haemorrhages) and hypertensive disorders of pregnancy disorders (Severe preeclampsia/Eclampsia) at 39.1%. This result agreed with most other reports that haemorrhage along with hypertensive disorders is still the leading cause of maternal mortality in our environment.[10,12,14,16,17] Antepartum haemorrhages especially those resulting from abruptio placentae and extensive uterine rupture often complicated with Disseminated Intravascular Coagulopathy (DIC), are the major culprits in this category. Most of the deaths from postpartum haemorrhage are due to cardiovascular collapse from shock arising from intractable bleeding from uterine atony, deep cervical and extensive perineal lacerations as well as from subinvolution of the uterus from retained placental tissues and membranes. These complications are worsened by delays in seeking care, delays in getting to health centres when care is sought, prolonged decision-intervention time on getting to the health centres, inadequate emergency-facility readiness and manpower, and delays in referring patients to secondary and tertiary centres when necessary.

Hypertensive disorders of pregnancy especially preeclampsia and eclampsia are the leading indirect causes of maternal mortality worldwide.[12,18] Some of the risk factors including genetic predisposition, primiparity especially at the extremes of reproductive ages (<20,>35), multiple gestations, renal diseases among others may be modifiable. Deaths often result from cardiovascular, renal or respiratory collapse, as well as shock from DIC secondary to HEELP Syndrome (Hemolysis, Elevated liver Enzymes and Low Platelet levels). Timely detection of rising blood pressure and significant proteinuria in pregnant women may be lifesaving.

Most of the women who died were between 25-34 years (59.4%), married (94.3%) and mostly presented as unbooked patients (84.1%). These results were not surprising considering that the peak age of maternal deaths according to the World Health Organization (WHO) is 20-34 years group, representing the peak reproductive age group.[18] Only 4 (5.8%) deaths occurred in women who were 40 years and older. This shows that the reproductive capacity of women declines with age and fewer women conceive after this age. This is without prejudice to the present spate of Assisted Reproductive Technologies (ARTs). This observation agreed with a similar report by Oladipo & Akinwade where the peak maternal deaths occurred at (24-29) year bracket.[12]

This study agreed with others that most maternal deaths in this case 96%, were from unbooked women who were referred after receiving some form of care from elsewhere especially from the traditional birth attendants (TBAs). Women who did not book for antenatal care or those that sort care from unskilled birth attendants are more likely to die from pregnancy complications due to paucity of knowledge needed to triage these women and detect early signs of danger needed to effect prompt referral. Referral delays are major contributory factor to perinatal maternal deaths. According to Onah and co referral delays accounted for 46.4% of all cases of type 3 delays and were major causes of maternal mortalities.[19] Ozumba et al earlier reported that 19.1% of the maternal deaths were attributable to type 1 delays in seeking care for a health concern.[20]

Most of women who died were primiparous 21(30.4%) and grandmultiparous 15 (21.7%) women. Both primiparity and grandmultiparity were identified as high-risk pregnancies and correlated positively with increased maternal deaths in Nigeria. This agreed with a seventeen-year review by Ujah el al that showed that parity-specific maternal mortality ratio was highest in the grandmultiparous women.[21] The increased risk of death among young women in their first ongoing pregnancies may be related to hypertensive disorders of pregnancy, poor antenatal attendance, uncoordinated uterine contractions, prolonged obstructed labour, and major postpartum haemorrhage often from PPH and major degree cervical/perineal lacerations. Grandmultiparous women are more likely to die during labour and delivery as a result of intractable obstetric haemorrhages from uterine atony, uterine rupture often from injudicious use of oxytocics, as well as hypertensive and other coexisting medical disorders.

Most of the maternal deaths (10 each) occurred in 2014, 2015 and 2016 and in 2018 with gradual reduction over the subsequent years. These years coincided with the transitioning of the hospital from a specialist to the teaching hospital status with the attendant reduced manpower compared with the number of emergency referrals at the time. The reduction in maternal deaths in 2019-2021 may be related to the Covid-19 pandemic with reduced admissions and isolation of suspected cases. Overall, the reduced maternal deaths in the last three years of the study (2021-2023) may be related to some degree of improved health services in the hospital as evidenced by improving manpower and healthcare facilities even as the total livebirths also reduced. The availability of alternative specialist healthcare service centres within the Enugu metropolis rendering maternal and childcare services may have influenced these reductions.

The sociodemographic characteristics of the mothers have no significant causal association with perinatal maternal deaths. This did not agree with the findings by Oriji et al who reported that perinatal mortality was significantly associated with age of the women (X2=15.52; p-0.001) and their marital status (X2=105.48; p-0.001) among others.[22]

Our findings suggest that maternal deaths remain unpredictable and can occur at any age and parity irrespective of marital status and antenatal attendance. The fact that most perinatal maternal deaths were among the unbooked emergencies showed the importance of prompt referral and timely interventions on arrival. Compliance with antenatal attendance enables pregnant women to participate in antenatal health talks and education. Focused antenatal care can then be offered to those that needed it. Early danger signs of perinatal morbidity and mortality like rising blood pressure, proteinuria and glucosuria are promptly detected and requisite treatments and or referrals affected on time.

5. Conclusion

The death of a woman during childbirth has remained a public health challenge especially in the low-resource settings like ours. Obstetric haemorrhages and hypertensive disorders of pregnancy have remained the leading causes of this catastrophe. Even though the trend appears to be on the decline but the results are still far from imagination especially

when the rural and semi-urban areas are considered. Strategies to promote awareness, improve women education and empowerment, enhance the availability, accessibility of healthcare, equiping the available health facilities as well as training, retraining and motivation of available health personnel will go a long way in cubbing this menace. A multi-dimensional approach must be activated and government at all levels especially the Local Governments must prioritize healthcare services to reduce types1&2 delays. Women should no longer be allowed to commit suicide and sacrifice their lives on the altar of procreation.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest to declare.

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