ORIGINAL RESEARCH

CAUSES OF PERINATAL MORTALITY IN PUBLIC SECONDARY HEALTH FACILITIES IN PORT HARCOURT, NIGERIA: A 3-YEAR RETROSPECTIVE REVIEW

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Abstract

Background: Perinatal mortality (PM) remains a major public health problem in developing countries with multifaceted consequences. Epidemiological data on perinatal deaths among secondary health facilities in Nigeria is scarce and this study aimed to determine the Perinatal Mortality Rate (PMR) and associated risk factors in public secondary health facilities in Rivers State.
Method: A retrospective review of case records was conducted from 2018 to 2020 at Obio Cottage Hospital and Military Hospital, Port Harcourt, Nigeria. Data extracted were analysed using IBM SPSS version 23. P-value < 0.05 was considered significant. The chi-square test was used to identify associations between perinatal mortality and the presence of maternal comorbid conditions.
Results: Of 12,894 births there were 207 (Stillbirths and Early Neonatal Deaths) giving a PMR of 16.1 [CI:16.045 – 16.152] per 1000 total births. There was a slight increase in PMR from 15.1 per 1000 in 2018 to 17.3 per 1000 in 2020 (p=0.737). Perinatal asphyxia (54.5%), prematurity (18.2%) and respiratory distress syndrome (27.3%) were the leading causes of perinatal mortality. Mothers with comorbid conditions had 2.5 [CI: 1.9 – 3.3] times higher odds of perinatal deaths. The top six maternal comorbid conditions were hypertension (14.61%) and antepartum haemorrhage (13.48%), postdate pregnancy and ruptured uterus (11.24%) each, cord prolapse and preterm labour (10.11%) each.
Conclusion: Perinatal mortality is relatively high in public secondary health facilities in Port Harcourt. Interventions targeted at reducing identified risk factors like early ANC booking and early obstetric interventions should be encouraged.

Keywords: Perinatal mortality, Risk factors, Rivers State, Secondary Health facilities

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INTRODUCTION

The total number of deaths during the perinatal period is referred to as perinatal mortality (PM). It is the sum of foetal deaths (or stillbirths) from the age of viability and early neonatal deaths (ENND) i.e., deaths within the first seven days of life.[1] The point in pregnancy at which the delivery of a foetus is considered birth rather than abortion varies by country. It is determined by the perceived viability of the foetus, which is based on the availability of modern neonatal care facilities and expertise. The legal foetal age of viability in developing countries such as Nigeria is 28 weeks.[2] According to the World Health Organisation (WHO), 5.9 million perinatal deaths occur worldwide each year and more than 4 million of the 1300 million infants born every year die during the first week of life, with about 98% of these deaths occurring in developing countries.[3] These untimely deaths are a major public health issue in many developing countries, with significant economic, social, and health consequences for families and society.[4] Reducing perinatal mortality and promoting neonatal health in health services is critical,

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and most countries' health development plans are geared toward lowering child mortality rates.[5]

While the under-5 mortality rate has decreased in Sub-Saharan Africa over the last two decades, the rate of reduction in neonatal mortality has been much slower, owing to large contributions from perinatal fatalities. The 2018 Nigeria Demographic Health Survey (NDHS) reported declines of 10% and 20%, respectively, in infant and under-5 mortality over the past 10 years; however, the perinatal mortality rate (PMR) increased from 41 per 1000 births in 2013 to 49 per 1000 births in 2018, representing a 20% increase over the five years.[6] The recent PMR trend in Nigeria is projected to provide a significant barrier to the attainment of Sustainable Development Goal 3 on health, which strives to ensure healthy lives for all and prevent avoidable deaths of new-borns and children under the age of five by the year 2030.[7]

Perinatal mortality is caused by a complex interaction of individual-level factors related to a mother's lifestyle and obstetric complications, which may be made worse by underlying community-level factors. These include a lack of access to high-quality maternal and newborn health services, clean water supply, proper antenatal and postnatal nutrition for the mother and the newborn, poor hygiene during delivery and the first crucial hours after birth, and poor environmental hygiene.[8] Perinatal mortality is a sensitive measure of the quality of care given to expectant mothers and their newborns. Perinatal mortality is a thorough indicator for determining the exact degree of mortality around the time of delivery, unlike neonatal mortality, which simply takes into account deaths to live births.[8]

PMR among studies in Nigeria, are largely reported from tertiary facilities which can be likened to the iceberg effect. However, not much is known about perinatal deaths among public secondary health facilities in Nigeria where an arguably significant proportion of women deliver their babies. A study in Abuja[7], Nigeria reported an unusually high PMR of 129.5 per 1000 total births signifying this sector of health services needs a closer look. Therefore, since epidemiological data on perinatal deaths is scarcely reported among secondary health facilities, this study aimed to determine the perinatal mortality rate and associated risk factors in public secondary health facilities in Port Harcourt Metropolis, Rivers State, Southern Nigeria.

MATERIALS AND METHODS

Study area

This study was carried out in Port Harcourt Metropolis, Rivers State. Port Harcourt, the capital and largest city of River State, Nigeria is made up of Port Harcourt (PHALGA) and Obio-Akpor (OBALGA) Local Government Areas. It lies along the Bonny River and is located in the Niger Delta. Rivers State is a three-tier state and each tier has a particular level of responsibility to the healthcare sector. The Local Government Authorities are responsible for primary healthcare which should be environmental sanitation, management of local dispensaries, routine and supplementary immunization etc. The State Governments are in charge of the secondary healthcare system – general hospitals, comprehensive health centres and state tertiary healthcare services. The Federal Government concentrates on the tertiary and top referral institutions such as the national hospital, the teaching/ specialist hospitals and the Federal Medical Centres. Port Harcourt Metropolis has two functioning public secondary health facilities which include the Military Hospital, Port Harcourt [an Armed Forces health facility] and Obio Cottage Hospital, Rumuobiakani, Port Harcourt.

Study Design

This was a retrospective review of case records in the public secondary health facilities in Port Harcourt from 1st January 2018 to 31st December 2020.

Study Population

The study population were babies delivered after 28 weeks gestation between 1st January 2018 and 31st December 2020, in the selected public secondary health facilities in Port Harcourt, Rivers State and their mothers.

Eligibility Criteria

Inclusion Criteria: All live babies or stillbirths occurring after 28 weeks of gestation, as well as, babies born after 28 weeks who died within 7 days of birth between 1st January 2018 and 31st December 2020 in the selected health facilities.

Exclusion criteria: Babies born in any of the two facilities with incomplete records and those with inestimable gestational ages were excluded.

Method of data collection

Data was extracted from the delivery registers of mothers as well as the admission records of the babies from the special care baby unit of the selected health facilities. The data collected was put into a structured data collection form. Information gathered where classified under three subsections: M***aternal characteristics:*** mothers' age, parity, gestational age, maternal complication on admission, pregnancy stage, stage of labour, presence of birth attendant at delivery, booking status, ANC and tetanus toxoid adequacy and type of delivery. ***Obstetric history***: included outcome at birth, first and fifth-minute APGAR scores, birth weight, gender, and possible causes of death. ***Prenatal interventions/treatments:*** specific interventions and treatments used.

Data analysis

Data analysis was done using IBM SPSS version 23. Descriptive statistics were displayed in tables and graphs to describe the study population. The data retrieved were used to calculate the annual perinatal mortality rates. Bivariate analysis was used to assess the association between maternal/obstetric factors and perinatal mortality and test the significance of the association. For all statistical analyses, p-value <0.05 was considered significant.

Ethical consideration

Ethical clearance to carry out this research was requested and obtained from the Ethical Committee of Military Hospital [MHPH/G1/300/42/2] and permission was granted by the Chief Medical Director of Obio Cottage Hospital to conduct the study. No patient interaction was needed in this study.

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RESULTS:

The distribution of the number of births recorded in the public secondary health facilities sampled revealed a total of 12,894 births, with a slight male predominance of 6,540 and female of 6,354. The distribution of the births is shown in Table 1. Obio Cottage Hospital (OCH) had a statistically significantly (X^2 = 22.501, p = <0.0001) higher number of births when compared to Military Hospital (MH) in the three years studied.

Table I Distribution of Births in hospitals sampled

Year	OCH	MH	Total
2018	**3339**	**1055**	**4394**
2019	**3501**	**962**	**4463**
2020	**3239**	**798**	**4037**
Total	**10079**	**2815**	**12894**

There were 207 (Stillbirths + Early Neonatal Deaths) and 12,687 live births, giving an overall perinatal mortality rate of 16.1 per 1000 total births [CI:16.045 – 16.152] per 1000 total births. As displayed in Figure 1, there was a slight increase in PMR from 15.1/1000 in 2018 to 17.3/1000 in 2020. There was no not statistically significant difference (X^2 = 0.612, p= 0.737) in PMR across the years studied.

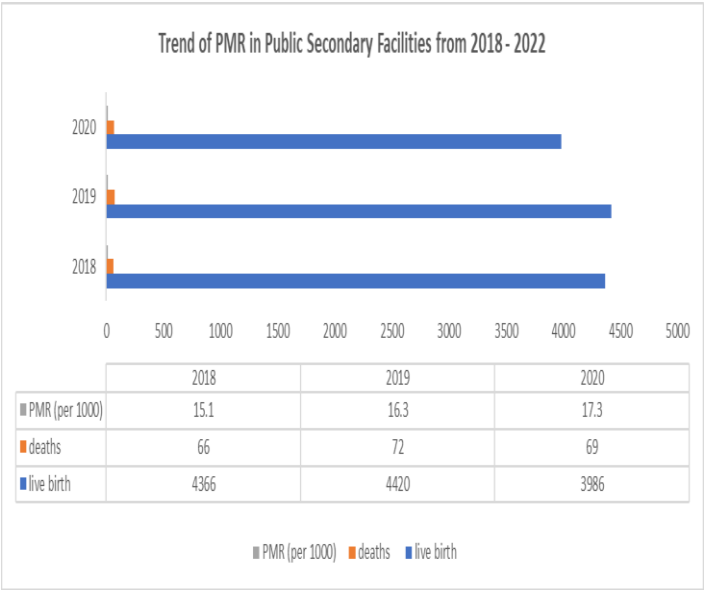

Figure 1: Trend of perinatal mortality rate in public secondary facilities in Port Harcourt, Rivers State from 2018 – 2020.

Table II shows that the proportionate perinatal mortality was 3.4% in MH compared to 1.2% in OCH respectively and the estimate in MH was significantly higher (p <0.0001) compared to that in OCH.

Table II: Comparison of proportionate perinatal mortality in public secondary facilities

Parameter	OCH n (%)	MH n (%)	X^2 (p-value)
Live births	**9988 (98.9)**	**2699 (96.7)**	**61.830 (<0.0001) ***
Deaths	**116 (1.1)**	**91 (3.3)**	
Total	**10,104 (100.0)**	**2790 (100.0)**	

Table III shows there was a statistically significant association between perinatal mortality and maternal morbidity (p=<0.0001) with 2.5 higher odds (CI: 1.9 – 3.3) of perinatal deaths occurring when there is a maternal comorbid condition.

Table III: Association of perinatal mortality and maternal morbidity

Variable/ Maternal comorbid condition	Death n (%)	Live birth n (%)	Total n (%)	X^2 (p-value)	OR (95% C.I)
Yes	**89 (3.0)**	**2922 (97.0)**	**3011 (100.0)**	**45.35 (<0.0001)***	**2.5 (1.9-3.3)**
No	**118 (1.2)**	**9765 (98.8)**	**9883 (100.0)**		

*OR: Odds ratio; *statistically significant (p <0.05)*

As regards the maternal comorbid conditions found in this study, it was revealed that the top six maternal comorbid conditions were hypertension (14.61%), antepartum haemorrhage/ placenta previa (13.48%), postdate and ruptured uterus (11.24%) each, cord prolapse and preterm labour (10.11%) each. The least comorbid conditions were urinary tract infections (2.25%) and transverse lie (1.12%) as displayed in Figure 2.

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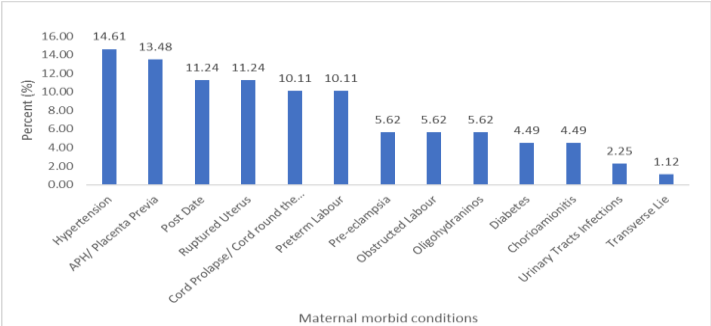

Figure 2: Distribution of maternal comorbid conditions associated with perinatal mortality (n=89)

The causes of perinatal mortality identified in this study were severe perinatal asphyxia (54.5%), prematurity (18.2%), and respiratory distress syndrome (27.3%).

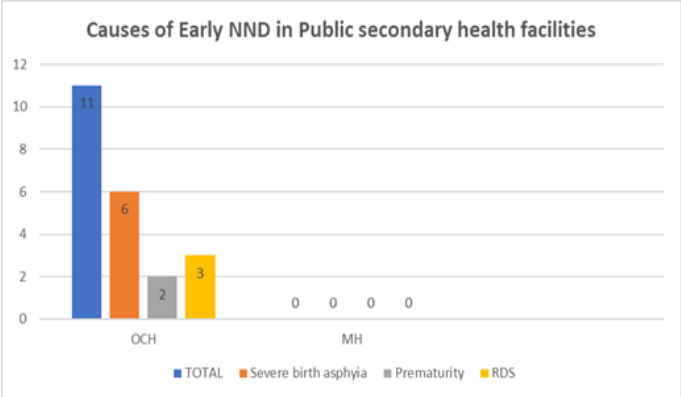

Figure 3: Causes of Early neonatal death in Public secondary health facilities.

DISCUSSION

This study found a perinatal mortality rate (PMR) of 16.1 /1000 total births. This was similar to the PMR observed by Ghorat and colleagues[5] in India with a rate of 16.6 per 1000 total births but was higher than that recorded by Dessu and Dawit[9] in Ethiopia with a PMR of 12.6 per 1000 total births. However, some studies in other parts of Nigeria recorded remarkably higher PMRs ranging from 129.5/ 1000 total births in Abuja, central Nigeria[7] and 130/ 1000 with a stillbirth rate of 85 /1000 as reported by Suleiman and colleagues, in Northwestern Nigeria.[10] These discrepancies could be because both were public secondary health facilities that also served as referral centres from both primary and other secondary health centres which then impacts on the PMRs reported.

The relatively high perinatal mortality rate observed in this study was predominantly from the MH which had significantly higher perinatal deaths. This is explainable because the public health facility did not have a resident paediatrician and a functioning special care baby unit. Although the MH provided secondary level healthcare services including managing complicated obstetric cases and newborn resuscitation, was at the time of the study duration, unable to provide comprehensive newborn care services for sick newborns. OCH on the other hand was initially a cottage hospital but had been upgraded to a secondary health facility in collaboration with the Shell Petroleum Development Company. This partnership provided first-time mothers in Port Harcourt the opportunity to have significantly subsidized ANC booking services provided registration was within the first trimester. This afforded the low and middle socioeconomic classes of the populace to benefit from comprehensive maternal and newborn care services.

Findings from the study revealed 2.5 times higher odds of perinatal deaths occurring among mothers with comorbid conditions. Those found in this review were hypertension, antepartum haemorrhage/ placenta previa, postdate pregnancies, uterine abruptio, cord prolapse and preterm deliveries. Our findings were somewhat similar to reports by other studies within and outside Nigeria[7,10,11]. However, our findings differed from the report by Ghorat and colleagues[5] in North Eastern Iran which found cardiovascular diseases (18.4%) and Diabetes (11.7%) as their major maternal morbid conditions. Our findings buttress the fact that maternal morbidity in pregnancy does affect the perinatal outcome and the leading obstetric factors are antepartum haemorrhage and hypertensive disorders in pregnancy.

We found that the major causes of early neonatal death in public health facilities in Port Harcourt metropolis were severe perinatal asphyxia, respiratory distress syndrome secondary to meconium aspiration syndrome and prematurity. Thus, severe birth asphyxia still contributes to over half of early neonatal deaths in secondary health facilities in Port Harcourt. This further emphasizes the need for training and retraining of healthcare workers in basic newborn resuscitation.[12] Similarly, Nwokoro[7], in Abuja, Nigeria also identified birth asphyxia and prematurity as the leading cause of perinatal deaths in their series. The authors noted that asphyxiated babies were mainly due to late referral of intra-uterine hypoxic cases and poor early neonatal resuscitation. Our finding was consistent with reports by Ghorat and colleagues[5] where perinatal asphyxia and sepsis were the major causes of perinatal mortality. Similarly, the study by Roro and colleagues[11]in Ethiopia found perinatal asphyxia comprised one-third of early neonatal deaths. This was because most of their births occurred at home and were monitored by unskilled birth attendants and untrained personnel with no equipment to resuscitate babies and reduce birth asphyxia. It was also observed that a previous history of neonatal mortality was a strong determinant of perinatal mortality.

Our study also revealed that there were few documented cases of stillbirths. Although these were most likely largely underreported in this study, it is worthy of mention and need not be overlooked. Stillbirths contribute significantly to perinatal mortality globally and the absence of skilled birth attendants at delivery or lack of the needed equipment to perform neonatal resuscitation, impairs the ability to salvage a considerable proportion of this statistic and so remains a public health problem. In a study in Nigeria, it was observed that during the intrapartum period, macerated stillbirths occurred twice as much as fresh stillbirths. Bayou et al[13] reported that more than 85%

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of the perinatal deaths were still births and greater than 80% of them came to the hospital with absent fetal heartbeat. Weiner et al[14] highlighted that complications of labour which include haemorrhage, premature rupture of membranes/ premature labour and obstructed labour/ malpresentation were linked to about 53% of all perinatal deaths. Recently, findings from a global birth registry[15] that examined trends and determinants of stillbirths in developing countries concluded that extremes of ages, illiteracy, nil or higher order parity, poor antenatal visits and place of birth were independent risk factors for stillbirth.

Limitations: The retrospective nature of the study design, the paucity of data and poor record keeping in the Military Hospital especially in the neonatal section which could have underestimated our reported PMR were the main limitations of this study. However, this is the first study of this kind in South-south Nigeria and serves as a yardstick for public health enlightenment and serve as a tool for advocacy for training and retraining of health workers and proper record keeping in the public secondary health care facilities in Port Harcourt, Rivers State.

Conclusion: Perinatal mortality is still high among the public secondary health facilities in Port Harcourt, Rivers State. The top causes of perinatal mortality were severe perinatal asphyxia, respiratory distress syndrome from meconium aspiration syndrome, and prematurity. Maternal comorbid conditions were significantly associated with increased perinatal mortality. The top comorbid conditions identified were hypertension, antepartum haemorrhage, prolonged pregnancies, uterine rupture and cord accidents, and preterm labour. Interventions targeted at reducing identified risk factors like early ANC booking and early obstetric interventions should be encouraged.

Competing Interests

The author declares no competing interests.

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