Contemporary Profile of Neonatal Outcomes in a Newly Established Private Tertiary Healthcare Facility in Southwest Nigeria: An 18-Month Clinical Audit

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ABSTRACT

Background: The neonatal period is defined as the duration from the time of birth to the end of the first 28days of life. Events preceding this period and the perinatal events can have a lasting impact on the outcome

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of the neonates. The study aimed to describe the indications for neonatal admission and the outcomes at a new tertiary healthcare facility.

Materials and Methods: Descriptive, retrospective study which reviewed the electronic medical records of all neonates admitted into the neonatology unit of the Redeemer's Health Village, Ogun State, Nigeria between June 2024 and November 2025. Data extracted include age (in days), gender and the primary diagnosis at admission. The main outcome was either discharge or death.

Results: The total number of neonates admitted during the period reviewed was 41. There were 18 males which accounted for 43.9% of the admission. The male to female ratio was 1.0:1.3. Majority (61%) were inborn. Prematurity accounted for majority of the cases (39.0%), closely followed by neonatal jaundice (34.1%). The least cases that were admitted include infants of diabetic mother (4.9%) and tracheo-esophageal atresia (2.4%). The median duration of admission was 6 days (IQR 3,19 days). The survival rate was 82.9% while mortality accounted for 17.1% of the total admissions. Majority of the neonates that died were outborn and most deaths occurred within the first week of life.

Conclusion: Neonatal morbidity and mortality are distinct entities that deserve more attention in order to attain the third item of the sustainable development goal. Prematurity remains a leading cause of admission at neonatal units globally. Extreme prematurity (gestational age at birth < 28weeks) is very challenging to manage especially in resource-limited settings. Neonatal outcomes can be greatly improved upon with adequately supervised obstetric care as a specific intervention measure.

Keywords: Contemporary, Neonatal, Gestational age, Prematurity, Jaundice

INTRODUCTION

The neonatal period is defined as the duration from the time of birth to the end of the first 28 days of life.[1–3] It has been described as the most vulnerable period in a child's life, with the early neonatal period (0-7 days) being the time of greatest risk.[4–8] Events preceding this period and the perinatal events can have a lasting impact on the outcome of the neonates.[9–14] Approximately 7,000 newborn deaths occur daily worldwide with most deaths being recorded in the low and middle income countries.[5] Access to skilled health services during pregnancy, labour and in the immediate period after delivery will not only enhance the health of the pregnant women but also ensure that the newborns are delivered in optimal conditions that will engender their survival.[5,15]

Preterm delivery (i.e live birth before 37 completed weeks of gestation) is one of the major determinants of outcomes during the neonatal period and it accounts for a substantial burden of under-five morbidity and mortality.[4,5,16,17] Globally, about 15 million babies are born too soon annually.[10,16] The global preterm birth rate is put at 10.6% (range: 8.7% - 13.4% across regions).[16] This implies that at least one out of every ten live births is likely to be preterm.[18]

Neonatal jaundice, birth asphyxia and neonatal sepsis are also common indications for admission during the neonatal period.[14,15,19] In recent times, there appears to heightened awareness about neonatal jaundice, therefore, parents and caregivers are more likely to come to the hospital for intervention rather than apply home remedies as was rife in the past.[14] Perinatal (or birth) asphyxia still occurs largely due to the unavailability skilled birth attendance at delivery centres like those of the traditional birth attendants and faith-based homes.[20]

Appropriate government policies that will ensure unhindered access to supervised healthcare during the pregnancy and child birth periods (as already itemised in Sustainable Development Goal, SDG #3) will go a long way in enhancing optimal neonatal outcomes because "healthy mothers imply healthy babies."[6,15] Therefore, the study aimed to describe the indications for neonatal admission and the outcomes at a new tertiary healthcare facility. The essence is to identify areas requiring targeted interventions and to generate baseline data for subsequent studies.

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MATERIALS AND METHODS

Study Setting Description

This was a descriptive, retrospective study conducted at the Redeemer's Health Village (RHV), a newly established private tertiary hospital in Ogun State, Southwest Nigeria, between 01 June 2024 and 30 November 2025. All the neonates (aged 0-28days) who were admitted into the neonatal ward of the study centre were included. The RHV is located within the grounds of the Redemption City. The expanse of land hosting the Redemption City sprawls along the Ogun axis of the Lagos-Ibadan Express way, Mowe, Obafemi-Owode Local Government Area of Ogun State, Nigeria. There are two units within the neonatal ward viz: a 10-bed **inborn section** (for neonates who were born in the hospital and required admission within the first 24 hours of life) and a 8-bed **outborn section** (for neonates who were: born outside the hospital; those who were born in the hospital but later required admission after being nursed by their mothers' sides for at least 24hrs; those who were born in the hospital and had been allowed home after being nursed by their mothers' sides but later re-presented for admission). The essence of the separation of the neonatal units into inborn and outborn sections was to ensure adequate infection control. Neonates who were born outside the hospital were quickly assessed by the medical officers at the children's emergency and subsequently transported to the outborn section of the neonatal ward in a mobile incubator or baby cots and mobile oxygen cylinders (if the neonates required supplemental oxygen). Neonates in the neonatal wards are under the care of primarily Neonatologists, Paediatric Medical Officers and Paediatric-trained nurses with other support members of staff like health care assistants and trained housekeepers (who ensure continuous cleanliness of the wards). Neonates who require surgical intervention are also admitted into the neonatal ward. The facility always had at least one Paediatric Surgeon who was available to review the cases that required surgical intervention. The 18-month audit aimed to identify the following: the total number of neonatal admissions, age at presentation, gender distribution, diagnosis, duration of admission and outcomes.

Data Collection Process

Data on demographics, diagnosis, length of stay, and outcomes were extracted from patients' electronic medical records using a structured proforma. Diagnoses were based on the clinical notes as documented by the attending physicians. The final (or discharge) diagnosis took precedence over the admitting diagnosis (wherever the final diagnosis differed from the initial diagnosis). For the purpose of analysis, when a neonate was managed for more than one clinical condition, the one with the perceived significant burden was recorded. Trained medical records personnel (under the supervision of at least two senior physicians) helped with the data collection.

Data Analysis

Data were analysed using descriptive statistics (frequency tables, pie chart, median and interquartile range) in Excel Software 2024 version. Comparisons were then made with similar studies in Nigeria, sub-Saharan Africa and globally.

Inclusion/Exclusion Criteria

- All the neonates aged 0-28 days who were admitted during the study period were included in the analysis
- None was excluded

There were no cases of incomplete records

Ethical Clearance

Ethical approval for this retrospective study was waived by the hospital's Research and Ethics Committee with the caveat that strict compliance be adhered to with respect to data de-identification.

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Results: The total number of neonates admitted during the period reviewed was 41. There were 18 males which accounted for 43.9% of the admission. The male to female ratio was 1.0:1.3. Majority (61%) were inborn. Prematurity accounted for majority of the cases (39.0%), closely followed by neonatal jaundice (34.1%). The least cases that were admitted included infants of diabetic mother (4.9%) and tracheo-esophageal atresia (2.4%). The median duration of admission was 6 days (IQR 3,19 days). Three quarters (12 out of 16) of the neonates that were managed for prematurity survived while a quarter (4 out of 16) died. All the preterm neonates that died were extreme pre terms (gestational age at birth < 28weeks). Out of the 14 cases that were managed for neonatal jaundice, two presented with hazardous level of hyperbilirubinaemia and had features of advanced acute bilirubin encephalopathy at presentation. The overall survival rate was 82.9% while mortality accounted for 17.1%. Majority of the neonates that died were outborn (5 out of 7) and most deaths occurred within the first week of life.

Table 1: Summary Statistics

Subject	**Number (n)**
Total admissions	41
Male	18
Female	23
Inborn	25
Outborn	16
Minimum duration of admission (days)	2
Maximum duration of admission (days)	58
Survived	34
Died	7
*Inborn	*2
*Outborn	*5

Table 2: Primary diagnosis and their corresponding frequencies.

Diagnosis	**Frequency (n = 41)**	**Percentage (%)**
Prematurity	16	39.0
Neonatal Jaundice	14	34.1
Severe Perinatal Asphyxia	4	9.8
Neonatal Sepsis	4	9.8
Infant of Diabetic Mother	2	4.9
Trachea-esophageal atresia	1	2.4
Total	41	100.0

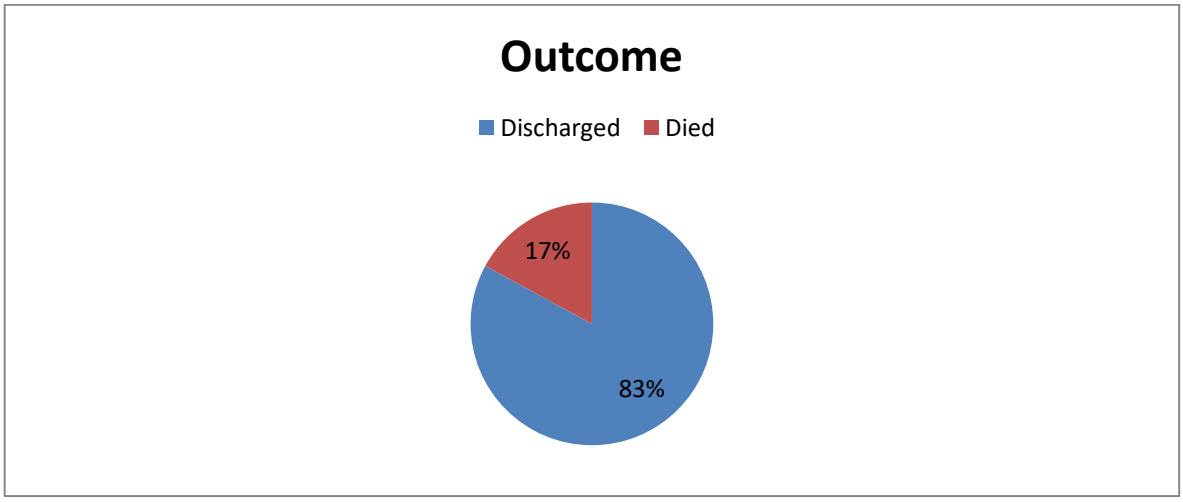

Figure 1. Summary of the outcome of neonatal admissions.

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Table 3: Description of the cause of death

Cause of death	Frequency	Contribution to overall mortality (%)
Prematurity	4	57.1
Neonatal Jaundice with Acute Bilirubin Encephalopathy	2	28.6
Tracheo-esophageal atresia	1	14.3
Total	7	100.0

DISCUSSION

The indications for admissions in this study were: prematurity, neonatal jaundice, severe perinatal asphyxia, neonatal sepsis, infant of diabetic mother and a life-threatening congenital anomaly. The overall survival rate was slightly more than four-fifths of the total number of admissions. Extreme prematurity and the place of birth (specifically, being born outside the hospital) were major identifiable factors that determined outcome in this study.

Prematurity accounted for about two-fifths (majority) of the total admissions unlike in some other studies (both in Nigeria and sub-Saharan Africa)[1,2] that had neonatal jaundice as the bulk of the admission. The prevalence of prematurity recorded in this study was however comparable to those reported by similar studies in Northern Nigeria.[21,22] When children are born too soon, they are predisposed to a lot physiological challenges that contend gravely with their survival and they are also at risk of chronic lung disease over their life course.[8,18] In sub-Saharan Africa, the outlook of prematurity is poorer than in high income countries where the facilities to provide a thermoneutral environment that enhances the survival of the premature neonates are readily available.[8] However, in recent years, practice of the concepts of exclusive breastfeeding, kangaroo mother care and the use of continuous positive airway pressure (CPAP) devices have improved outcomes of premature neonates in the lower and middle income countries (including Nigeria).[23] In spite of these gains however, extreme prematurity still has a high mortality rate.[8,18,23]

Neonatal jaundice (due to hyperbilirubinaemia) has been observed to be a leading cause of hospital admission especially in the first week of life.[24] In this study, it accounted for about a third of the total number of admissions; although it was not the leading cause of admission. Usually, in the majority of cases of neonatal jaundice, the condition is benign. However, for neonates with severe hyperbilirubinaemia, without prompt intervention and close monitoring, they develop various degrees of acute bilirubin encephalopathy which result in significant morbidity and often mortality.[14,24] Two of the mortalities recorded in this study were sequelae of advanced acute bilirubin encephalopathy from hazardous hyperbilirubinaemia (i.e serum bilirubin level >30mg/dL) at presentation.

Severe perinatal asphyxia usually follows in utero foetal heart rate abnormalities due to factors such as maternal hypertensive disorders, infection (e.g chorioamnionitis), placenta abruption and opioids administered perinatally coupled with unskilled birth attendance or home deliveries.[25] Neonates that are not able to initiate spontaneous respiration after delivery require prompt and appropriate resuscitation measures.[25] Where the skill for neonatal resuscitation is lacking, such neonates are severely depressed perinatally, often resulting in death shortly after birth or prolonged hospital admission and in the survivors, long term neurodevelopmental abnormalities (e.g cerebral palsy).[20] The number of cases of severe perinatal asphyxia was about a tenth of the total admissions in this study and there was no mortality recorded among this group. This good outcome was due to the prompt intervention the neonates received on presentation at the facility.

Although accounting for less than a tenth of the admissions in this study, neonatal sepsis has been identified as a major contributory factor to morbidity and mortality during the neonatal period.[7,26,27] Its incidence is significantly higher in the low and middle income countries compared to the high income countries.[26–28] Predisposing factors include prolonged rupture of membranes, maternal infection, prematurity, home deliveries, unskilled birth attendance and unsterile cord care practices.[19,29] Apart from its threat in the immediate neonatal period, survivors of neonatal sepsis are at significant risk of lifetime morbidity and

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suboptimal quality of life, hence the need for effective treatment.[30] All the children with neonatal sepsis in this study were discharged alive; although the number of cases in this study was relatively few in comparison to other previous studies.[26,29] This, perhaps, is a reflection of the strict sepsis protocol being followed in the unit.

Congenital anomalies also determine to a very large extent the outcome of the neonatal period.[14,23] Birth defects, especially those involving the gastrointestinal tract are often common reasons for referral to tertiary healthcare facilities with poor outcomes more often than not.[22] According to Audu *et al*[22] in a study in North Central Nigeria, congenital anomalies had the highest case-specific fatality ratio of all the neonatal clinical conditions reviewed.

Just as have been highlighted in previous studies, most neonatal deaths occur in the first week of life.[1,3,7,10] Extreme prematurity contributes significantly to mortality among newborns.[1,2,7,23] The mortality rate reported in this study was comparable to similar studies in Nigeria and in sub-Saharan Africa.[1–3,14,15,22] Unlike similar studies in Lagos and Sagamu, Nigeria (which recorded higher neonatal admissions from outborn babies), majority of the neonates in our study was inborn.[2,14] As similarly observed in some studies in Nigeria and in Western Uganda, the place of birth contributes significantly to the outcome of the neonates with more deaths recorded among the out born children.[2,8,14,22] Factors responsible for this among others include unskilled birth attendance, poor attention to provision of warmth, poor adherence to asepsis, late referral, long distance coupled with difficult terrain of the road from the referring facility to the referral centre and suboptimal transport conditions.[2,6,8,15,22] Therefore, measures such as encouraging antenatal care follow ups, good nutrition during pregnancy, improving accessibility to supervised delivery in approved healthcare facilities will greatly enhance optimal neonatal outcome.[3,10,12,16,31]

The number of cases analysed over the course of an 18-month period was relatively few (being a recently established tertiary healthcare facility) and this being a single-centre study design limits the possibility of making definite conclusions and generalisations. However, variety of cases that were reviewed closely mirrors those in other centres within the Nigerian setting and other countries in the sub-Saharan African region. This lends some credence to the reliability and repeatability of the study.

CONCLUSION

Neonatal morbidity and mortality are distinct entities that deserve more attention in order to attain the third item of the sustainable development goal. Prematurity remains a leading cause of admission at neonatal units globally. Extreme prematurity (gestational age at birth < 28weeks) is very challenging to manage especially in resource-limited settings. Neonatal outcomes can be greatly improved upon with adequately supervised obstetric care as a specific intervention measure.

Disclosures

The authors have no conflicts of interest to declare.

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Author Contributions

LPO, PKA, OFO and OOO designed the conceptual framework of the study. LPO, OOA, SCA and ATO were involved in data curation and analyses. LPO, PKA and OIO contributed to the draft of the preliminary manuscript. All the authors read and approved the final manuscript for its intellectual content.

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