Original Research Article

Causes Of Neonatal Morbidity And Mortality In Bingham University Teaching Hospital, Jos Plateau State, Nigeria

ABSTRACT

Aims: To ascertain the morbidity and mortality trends of neonates admitted to the inborn Special Care Baby Unit (SCBU) at Bingham University Teaching Hospital (BHUTH), Jos.

Study design: Retrospective Hospital based study.
Place and Duration of Study: Inborn Neonatology Unit of the Department of Paediatrics, Bingham University teaching Hospital, Jos, Plateau State, Nigeria.
Methodology:A retrospective analysis of the records of babies admitted into the inborn SCBU of BHUTH over an 18-month period of January 2021 to June 2022was done.We included 195babies(99males, 96females)

Results:A total of 196 patients were admitted into the inborn SCBU of BHUTH during the period reviewed and 195 (99.5%) had complete records. There were 99 (50.8%) males and 96 (49.2%) females with M: F of 1.03:1. The leading causes of admission were prematurity (51.3%), asphyxia (21.5%) and neonatal jaundice (10.8%). Nine (4.6%) infants had severe birth asphyxia, while 33 (16.9%) had moderate birth asphyxia. Twenty-eight deaths were recorded over the 18-month period giving a mortality rate of 14.4%. Prematurity (71.4%) and severe birth asphyxia (17.9%) were the leading causes of death. Of all the deaths that occurred, 9 (32.1%) occurred within the first 24 hours of hospitalization, while 3 (10.7%) of them died after 7 days of admission.

Conclusion: In our community, the neonatal mortality rate is still very high. This death rate can be decreased with the support of concerted efforts to guarantee appropriate antenatal care, close monitoring of labour, and enhanced neonatal unit facilities for newborn care.

Comment [M1]: The introduction should be written more fully and not just the purpose.

Comment [M2]: The methodology should be explained more, who exactly were included in the study? Code of ethics?

Keywords: Morbidity, Mortality, Neonatal, Prematurity

1. INTRODUCTION

The most crucial time for a child's survival is the first month [1]. In 2020, 2.4 million children died in their first month of life worldwide. Every day, over 6700 newborns die accounting for nearly half (47%) of all under-five mortality, up from 40% in 1990 [2].

Neonatal morbidity and mortality continue to be serious public health issues in developing countries, where it also has a considerable impact on the under-five mortality rate because worldwide under-5 mortality is dropping faster than neonatal mortality [2,3].

Sub-Saharan Africa has the world's highest neonatal mortality rate (27 deaths per 1000 live births), accounting for 43% of worldwide newborn deaths, followed by Central and Southern Asia (23 deaths per 1000 livebirths), accounting for 36% of global newborn deaths [2].

Nigeria had a neonatal mortality rate of 34.9 deaths per 1,000 live births in 2021. Nigeria's neonatal mortality decreased considerably over time, going from 63.7 deaths per 1,000 live births in 1972 to 34.9 deaths per 1,000 live births in 2021 [3].

The majority of neonatal deaths (75%) occur during the first week of life, and almost 1 million babies died during the first 24 hours in 2019. The majority of neonatal deaths in 2019 were caused by preterm delivery, birth asphyxia, infections, and birth abnormalities [2].

Periodic neonatal auditing is essential since disease patterns vary from place to place and over time, even within the same location [4].Assessing the pattern of morbidity and mortality among newborns coming to this facility is very desirable and crucial in determining the quality of medical care offered and identifying inadequacies in their overall management. It will also help policymakers plan more effectively. Therefore, this study aims to ascertain the morbidity and mortality trends of neonates admitted to the inborn Special Care Baby Unit (SCBU) at Bingham University Teaching Hospital (BHUTH), Jos.

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2. MATERIAL AND METHODS

This is a retrospective study of newborns admitted into the inborn SCBU of BHUTH between January 2021 and June 2022. Being a tertiary centre, the hospital serves as a referral centre for patients from neighbouring states of Kaduna and Bauchi and even from other secondary and tertiary facilities within the state. The newborn unit is located within the maternity complex and caters for the needs of babies born in the hospital's delivery suite. On the average about 750 to 800 childbirths occur per annum in our delivery room. The SCBU is equipped with 4 incubators, 2 cots, 4 phototherapy units, and one radiant warmer. There is a nursing room attached to the unit where mothers of the babies on admission can breast feed their babies without having to enter into the main ward. Basic facilities for care in the form intravenous fluid therapy, phototherapy, naso-gastric feeding and respiratory support in the form of intermittent AMBU bagging and oxygen therapy as well as non-invasive respiratory support [bubble continuous positive airway pressure (BCPAP) are available. The hospital has a separate outborn SCBU which is located within the paediatric complex.

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The medical records of these babies were reviewed and the following data were abstracted: the age at presentation, the gender, the reason for admission, duration of admission, and the outcome of admission.

Socioeconomic classification of the study population was not ascertained as most of the case record files did not capture information on parental educational backgrounds and occupation/employment status.

Ethical clearance for the study was obtained from Health Research Ethics Committee of Bingham University Teaching Hospital with reference number NHREC/21/05/2005/00971.

The data retrieved were entered into a personal computer and analyzed with SPSS Version 21. Data were arranged in charts and associations were tested for statistical significance using chi- square. The level of significance was set at 0.05.

3. RESULTS

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During the period reviewed, a total of 196 patients were admitted into the unit of which 195 (99.5%) had complete records and were included in the study. There were 99 (50.8%) males and 96 (49.2%) females with M: F of 1.03:1. Table 1 shows the diagnostic criteria for some common neonatal problems seen in our hospital.

Table 1: Diagnostic criteria for some common neonatal problems

Disease	Criteria
Prematurity	Babies born before 37 completed weeks of gestation
Severe birth asphyxia	Apgar score 0-3,* As well as clinical signs of Central nervous system depression
Moderate birth asphyxia	Apgar score 4-6
Jaundice	Clinical jaundice plus serum bilirubin greater than the norm on the normogram for the babies gestational age and weight
Neonatal sepsis	Maternal or neonatal risk factors for sepsis with laboratory evidence of infection †

*Facilities for blood gases and PH are not available

†Complete blood count, blood and surface swab cultures, urine culture

The leading causes of neonatal admissions were prematurity (51.3%) and perinatal asphyxia (21.5%). Nine (4.6%) infants had severe birth asphyxia, while 33 (16.9%) had moderate birth asphyxia (Table 2).

Table 2: Causes of admission into inborn SCBU of Bingham University Teaching Hospital

Causes of Admission	Frequency (%)
Prematurity	100 (51.3)
Moderate birth asphyxia	33 (16.9)
Severe birth asphyxia	9 (4.6)
Neonatal Jaundice	21 (10.8)
Neonatal sepsis	13 (6.7)
Others	19 (9.7)
Total	195 (100.0)

The other causes of morbidity accounting for 10.3% of the cases are as listed in Table 3.

Table 3: Other Causes of Admission into SCBU

Causes of Morbidity	N (%)
Meconium Aspiration Syndrome	3 (15.8)
Aspiration syndrome	1 (5.3)
Congenital Pneumonia	2 (10.5)
Transient tachypnoea of the newborn	5 (26.3)
Congenital anomalies	2 (10.5)
Hypoglycaemia	4 (21.0)
Haemorrhagic disease of the newborn	1 (5.3)
Dehydration Fever	1 (5.3)
Total	19 (100.0)

A total of 152 (77.9%) babies were discharged home and 15 (7.7%) were Discharged Against Medical Advice (DAMA). Twenty-eight deaths were recorded over the 18-month period giving a mortality rate of 14.4%. Of these, 19 (67.9%) were males and 9 (32.1%) females giving a male to female ratio of 2.1:1. The sex specific mortality rate was 19.2% for males and 9.4% for females. Prematurity (71.4%) and severe birth asphyxia (17.9%) were the leading causes of death (Table 4). The case fatality rate (CFR) was highest for severe birth asphyxia followed by congenital malformations (Table 4).

Table 4: Causes of Death and Case Fatality Rate of Morbidities

Morbidity	Total No. Admitted	Mortality (%)	CFR (%)
Prematurity	100	20 (71.4)	20.0
Severe Birth Asphyxia	9	5 (17.9)	55.6
Respiratory disorders	13	2 (7.1)	15.4
Congenital Malformations	2	1 (3.6)	50.0
Total	124	28	

CFR = case fatality rate

Of all the deaths that occurred, 9 (32.1%) occurred within the first 24 hours of hospitalization, while 3 (10.7%) of them died after 7 days of admission (Table 5).

Table 5: Duration of Hospitalization of Newborns That Died

Duration of Hospitalization	Frequency (%)
< 24 hours	9 (32.1)
1 – 3 days	9 (32.1)
4 -7 days	6 (21.4)
> 7 days	3 (10.7)
Missing record	1 (3.7)
Total	28 (100)

4. DISCUSSION

Neonatal death remains a major public health issue in underdeveloped nations, like Nigeria, despite technological advancement and interventions for improving the quality of life of newborns. The rates of neonatal morbidity and mortality reflect a country's socioeconomic status as well as the efficiency and effectiveness of its healthcare systems. These critical factors can help plan for better healthcare delivery [5].

This study showed a male preponderance in both the morbidity and mortality patterns which is consistent with findings from previous studies done both within Nigeria [4, 6-7]and in other countries including Ethiopia, Bangladesh and Pakistan [1,5,8-9].The sex specific mortality rate for males in this study was as high as 19.2%, more than twice that of their female counterparts which was 9.4%. The increased risk of mortality in male neonates is most likely owing to the high number of neonatal deaths occurring in the first week of life, when gender differences in neonatal mortality are most prominent. A study in Pakistan on gender variability in neonatal mortality had shown that the risks of stillbirths, and early neonatal mortality were higher among male infants than their female counterparts [10].

Prematurity accounted for over half of the admissions in our study. An otherwise well, term baby would not be admitted. By default, preterm babies would naturally be admitted and this will account for it being the commonest cause of admission. Other studies have also shown that the commonest cause of morbidity is prematurity [6,8,11].

Prematurity, birth asphyxia and neonatal jaundice were the three most prevalent morbidities recorded in this study. This pattern is similar to that of another study carried out in Abuja, Nigeria [6].Other studies carried out in northern Nigeria reported birth asphyxia, neonatal sepsis and prematurity as the commonest indications for hospital admissions in newborns [7,12].A number of studies have reported neonatal sepsis as the leading morbidity this was however, not the case in this study possibly because we recruited only inborn infants most of whom were admitted from birth as a result of prematurity or asphyxia [13-16].The burden of neonatal sepsis in this study may have been reduced by the fact all the participants were delivered in the hospital.

The mortality rate of 14.4% in this study is high and comparable to findings from studies done in other parts of Nigeria that ranged between 13.3% and 16.9%,[4,7,13,17-19] though some authors have reported mortality rate as high as 20.4% in Gusau[20]and 25.9% in Azare [15].However, certain studies have reported lower mortality rate as low as 6.8% in Pakistan [8],2.1% in China [21]. This pattern of mortality further highlights the need for concerted efforts to improve the quality of health care delivery both during the antenatal and perinatal period to reduce the rate of deaths from preventable causes.

Close to 90% of the neonates that died in this study died within the first week of life. This finding is in consonance with that from other studies [16,22] as well as the WHO report on newborn mortality [2]. Early neonatal death is usually linked to maternal health, thus emphasizing the need for close monitoring of pregnancies and skilled supervision of deliveries.

The DAMA rate in our study as 7.7% which is much higher than the 1.5% reported by Also et al[16]in Dutse, 1.7% by Onazi et al [23]in Gusau and 5.2% by Imoudu et al [15]in Azare. The reason for the high rate of DAMA in our facility may not be unrelated to the higher cost of assessing health care there, being that ours is a private University Teaching Hospital unlike these other studies [15,16,23] that were carried out in Government funded hospitals.

While acknowledging the restricted generalizability due to a small sample size and the exclusion of neonates born and died at home, the study provides valuable insights into institution-based neonatal deaths during the study period. Like other retrospective studies, the cost-effectiveness and time efficiency of utilizing existing records contribute to the study's strengths as hospital records offer data for in-depth analysis of medical history, treatment, and outcomes. It also offers valuable insights into neonatal mortality within the hospital setting and serves as a foundation for future research.

5. CONCLUSION

In conclusion, neonatal morbidity and mortality have remained high in our community, and the primary causes, which are essentially preventable has remained the same over the years. Measures such as ensuring adequate funding, optimizing the affordability of services, and enhancing the availability of essential supplies and equipment are crucial steps towards reducing neonatal deaths. Additionally, fostering a supportive and motivated healthcare workforce can contribute significantly to improving outcomes. By addressing these factors within the government-funded and privately-funded teaching hospitals, better neonatal health outcomes will be achieved.

ETHICAL APPROVAL

Ethical clearance for the study was obtained from Health Research Ethics Committee of Bingham University Teaching Hospital with reference number NHREC/21/05/2005/00971.

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