

# Pattern and Outcome of Newborn Emergencies in a Tertiary Center, Lagos, Nigeria

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## ABSTRACT

**Background:** Neonatal mortality had not changed significantly in the last decade in African countries particularly in Nigeria; however, under-five mortality had reduced significantly. Nigeria with a quarter of maternal and under-five mortality is among ten countries with the highest neonatal mortality. Previous studies had shown patterns of newborn morbidity and mortality; however, no study has been conducted in this regard recently. The present study aimed to ascertain the current patterns of newborn morbidity and mortality.

**Methods:** A retrospective review of records of all newborn admissions over a period of one year was carried out. Extracted data include age, gender, diagnosis on admission outcome, and cause of mortality. The frequency of morbidity and outcome variables were analyzed and then calculated.

**Results:** The major reason for admission was jaundice 29.6% followed by asphyxia 25%, sepsis 16.1%, and prematurity 9%. The neonatal mortality rate was 12.5% with more than half of the deaths occurring within 24 hours and almost all within 72 hours. Causes of death were asphyxia 58.2%, jaundice 16.4%, sepsis 10.4%, and prematurity 3%. More than half of the neonates with asphyxia were likely to die within 24 hours.

**Conclusion:** Asphyxia, jaundice, sepsis, and prematurity were the major causes of morbidity. In addition, asphyxia is still a major cause of preventable death in newborns in Nigeria.

**Keywords:** Asphyxia, Jaundice, Newborn, Preterm, Sepsis

## Introduction

There has been a global decline in under-five and infant mortality rates in recent decades; however, the neonatal mortality rate remained relatively unchanged (1, 2). There has been slow progress for the neonatal mortality with 1.83% reduction over the last 12 years. While under-five mortality decreased by 3.5% with death during the first 28 days of life, now accounting for two-thirds of deaths in infants and nearly 40% of all deaths in under-fives (3-5). Out of 7 million neonates, 260,000 die within a month and 90,000 within 24 hours (1-3). In sub-Saharan Africa, neonatal mortality rates have not changed much, since Nigeria constitutes a quarter of the global maternal and neonatal mortality. In addition, Nigeria is among ten countries contributing to newborn deaths globally (1-3, 5-7). Currently, it is

estimated that 9% of the global neonatal deaths occur in Nigeria with a mortality rate of 32% (1-3). There were rural-urban and regional differences with more deaths occurring in rural areas and northern regions (7).

Neonatal mortality is a reflection of countries' state of health, especially obstetric care. In countries with poor obstetric care, inadequate or unsupervised deliveries, neonatal mortality will remain high. Although retrospective reviews of mortality and morbidity of emergency rooms in a similar geographical region found the highest mortality of 67% in infants, the proportion of newborns was not reported.

Jaundice and low birth weight were leading causes of morbidity and low birth weight was the leading cause of death (8-9). Jaundice, sepsis,

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asphyxia, and tetanus have a relatively lower mortality rate with case fatality being higher in outborn neonates. A decade ago, an audit in this center noted that over three-quarters of admissions were infants with neonatal mortality. This neonatal mortality accounted for thirty percent of the overall mortalities as asphyxia was the leading cause of mortality followed by jaundice, sepsis, and prematurity (10).

Despite the fact that different centers showed different mortality and morbidity rates, not until recently most researches focused on newborn mortality. Asphyxia due to poor obstetric care and prolonged labor is the major cause of neonatal mortality in most centers; however, recently there has been a shift, as low birth weight and sepsis had taken the lead. Although most of the previous studies in these centers focused on childhood mortality, there is a need to review neonatal mortality since it accounts for one-third of under-five mortality.

Furthermore, the results of the current study helped to identify areas of need in order to prevent neonatal mortality, as it is a reflection of the state of perinatal care in the community. The present study aimed to determine the patterns of neonatal morbidity and mortality of neonates in the children emergency center (CHEC) of the Lagos University Teaching Hospital (LUTH), Lagos, Nigeria.

## Methods

The current study was a review of records of all newborns who were admitted to the CHEC of the LUTH, over a period of one year from May 2016 to June 2017. The CHEC serves as a referral center for most general hospitals, maternal and child welfare centers, and private facilities in Lagos, Nigeria.

The patients spanned across diverse cultural, ethnic, religious, and socioeconomic groups. It is a crowded center with about 500 pediatric patients referring to it per month. Its newborns' section has an admission capacity of 20 neonates. The admissions are triaged by a nurse and stabilized by a doctor. The patients requiring admission were either admitted into the outborn neonatal ward or into the emergency center pending transfer to the ward within the shortest time. However, the admission fee should be paid first and this sometimes delays the neonates' transference. The extracted data include gender, age, length of stay in the hospital, medical diagnosis (based on history, clinical examination with supportive radiologic, or laboratory evidence where applicable). Diseases were classified based on disease classification using standard international classification for diseases (ICD 10).

The outcome of neonates was recorded as one of the five endpoints of discharged home, died, transferred to inborn ward, discharged against medical advice (DAMA), transferred to tertiary and subsequently admitted into the surgical wards. Data were stored in an access file and were analyzed using SPSS software (version 21). Percentages were calculated and disease's specific and overall mortality were also analyzed. Approval for the study was obtained from the Health Research and Ethics Committee of the LUTH, Lagos, Nigeria.

## Results

There were 2,710 admissions within the review period, 534 (19.7%) were newborns. Around 67.4% of the subjects were male neonates. The most common reasons for admission were, including jaundice 29.6% followed by asphyxia 25%, sepsis 16.1%, and prematurity 9% (Figure 1).

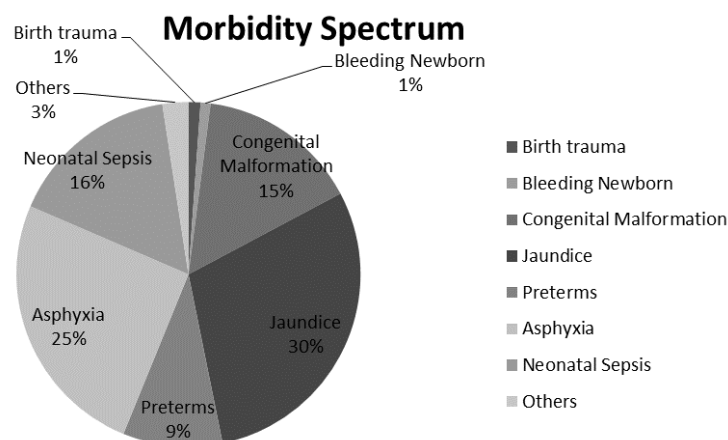
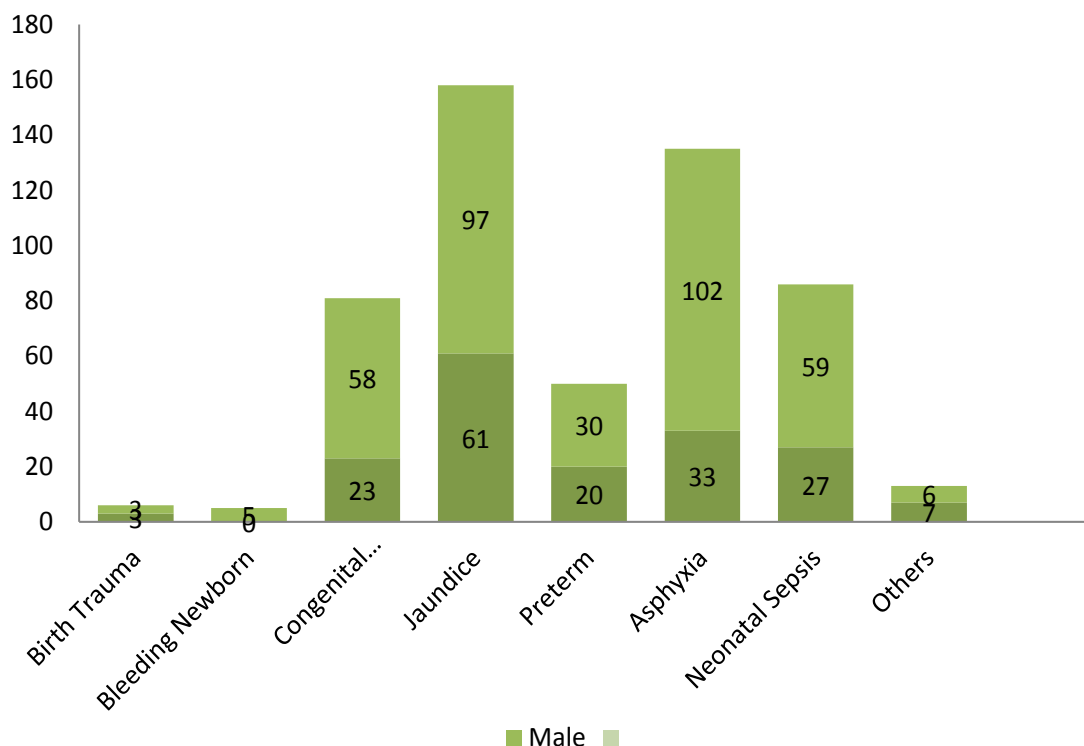


Figure 1. Morbidity spectrum among admitted neonates

## Morbidity and Gender Distribution



**Figure 2.** Morbidity and gender distribution

**Table 1.** Mortality rates according to disease spectrum

Diagnosis	Total	Alive	Died	Case fatality%
Jaundice	158	147	11	7
Preterm	50	48	2	4
Sepsis	86	79	7	8
Asphyxia	135	95	40	29
Birth trauma	6	6	0	0
Bleeding newborn	5	4	1	20
Congenital malformation	81	77	6	7.4
Others	13	11	0	0

More male neonates had asphyxia and sepsis, while jaundice was frequently observed in female neonates (Figure 2). The total mortality rate was 208, in which 153 (74%) were infants and half of them were neonates. The total neonatal mortality was 12.5% with 58% of the deaths occurring within 24 hours, 98.5% within 72 hours and 100% within 7 days. Asphyxia accounted for 58.2% of the neonatal deaths with a case fatality of 30% (Table 1).

Half of the mortalities from asphyxia occurred within 24 hours. Other causes of death were jaundice 16.4% and sepsis 10.4%, while prematurity constituted 3% of the mortalities. Figure 3 shows the outcome of the neonates with 39% admitted to the outborn ward, meanwhile 31% were discharged. A tenth of the neonates

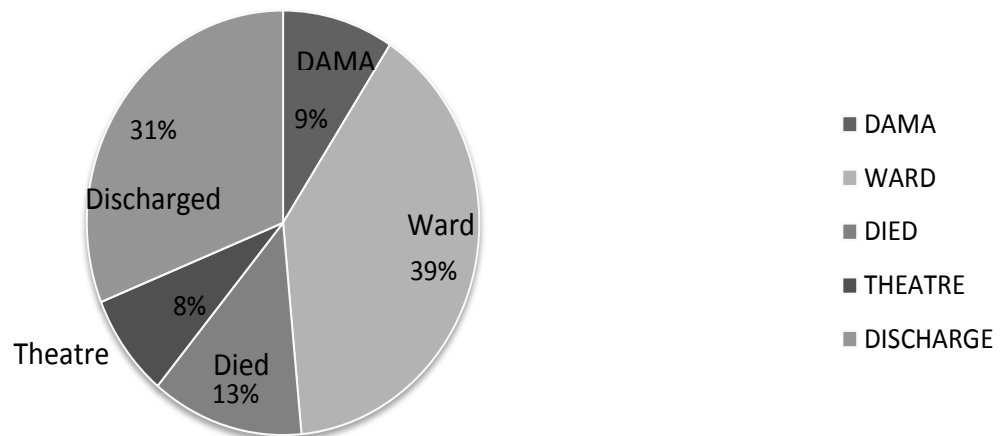
with sepsis and jaundice were discharged against medical advice.

### Discussion

The leading causes of morbidity in the present study were jaundice, asphyxia, and sepsis in descending order. Jaundice is a common cause for morbidity, possibly because of the similarity in location as it is performed both in the South and Western zones of Nigeria (9, 10). However, it is interesting to note that jaundice in Eastern Nigeria is not a common cause for morbidity and this can be attributed to use of iatrogenic substances (e.g., use of naphthalene balls, hot balms, and menthol), containing substances which are more common in the Southern part.

Other studies reported different causes of

## GENERAL OUTCOME OF BABIES



**Figure 3.** Outcome for neonates admitted into the emergency center  
DAMA: Discharged against medical advice

admission, as neonatal sepsis is the leading cause of mortality followed by asphyxia (11). Their finding was comparable to the study in Lagos; however, there was a reversal in the mortality trend. Reduction in asphyxia cases results in a reversal in the mortality trend, this could be due to differences in location and recent improvements in the delivery and resuscitation. Asphyxia was a common cause of morbidity in this study similar to other studies. Asphyxia followed by sepsis was the leading cause of death in a 6-year retrospective review in Northern Nigeria (12), it was interesting to note that neonatal tetanus was not a notable cause of mortality, compared to other studies in Western Nigeria.

In North Central Nigeria (13) causes of admissions are sepsis, prematurity, and asphyxia, while in the Eastern part of the country, asphyxia, low birth weight, and neonatal sepsis, in descending order are the main causes of admissions. However, neonatal jaundice did not make significant contribution to neonatal admission (0.06%) (14). In Tanzania and India main causes of morbidity were asphyxia, prematurity, sepsis, and fetal macrosomia (15-18)

The higher prevalence of sepsis which is the cause of admission in Northern Nigeria is probably because of cultural practices, religious beliefs, poor antenatal attendance, and a higher rate of home deliveries. In addition, poor cord care is common in these areas as various substances are usually applied.

Studies conducted in Ethiopia and rural Pakistan showed that sepsis, prematurity, and asphyxia (19, 20), in descending order were the most prevalent causes of mortality, while it was reported that prematurity, sepsis, and asphyxia, respectively were the commonest cause of mortality in urban Pakistan (21). However, in Bangladesh<sup>22</sup> asphyxia was the commonest cause of morbidity followed by sepsis. These variations could be due to sociocultural factors and types and levels of antenatal care of the mother and also the location of the study either rural or urban. A study in Northern Ethiopia<sup>23</sup> found that neonatal morbidity was caused mainly by hypothermia, sepsis, and prematurity; however, hypothermia was not detected as a cause of mortality in our study as the study was carried out in the emergency room and preterm neonates were not kept in the emergency room for long.

Consistent with the findings of other studies, asphyxia was the commonest cause of mortality, attributed to more than half of the population (9, 10-12, 15-17), in which one in every three neonates with asphyxia died. However, this rate was lower than the rate reported in a study conducted in a rural environment with poor health facilities in Africa (17). Findings of the present study signified that more birth attendants need to be trained to increase the availability of skilled birth attendants at all deliveries. Another likely cause of the lower death rate due to asphyxia may be because of the lack of hospital

delivery, although it was not assessed in the current study, the lower death rate due to asphyxia has been reported to be as high as 60% in Nigeria. In contrast to the results of the present study, other studies (13, 14, 18, 20, 22) reported that prematurity and low birth weight are the commonest cause of mortality. The reason for the low mortality from prematurity in the present study probably was due to that our study was conducted in the emergency room where preterm newborns were directly admitted into the wards with the policy of no preterm admissions in the emergency room.

Most of the previous studies were performed in inborn and outborn neonatal units and not in the emergency rooms. Over half of the mortalities occurred within 24 hours, this was similar to findings of other researches where twenty-five to over 55% (13-16) of newborns mortalities occurred within 24 hours of life. This emphasized that this period and indeed the first week of life is crucial for close monitoring of newborns, especially in the area of respiratory support, thermal care, feeding, and infection control.

There is a need to pay more vigorous attention to asphyxiated neonates as they are more vulnerable in the early days of admission and possibly providing an asphyxia corner for more critical and dedicated care. Other critical periods were with 72 hours of life up to the end of the first week (13, 15, 16, 23). In addition, good antenatal care, paying more attention to activities of traditional birth attendants, improving health care and girl child education will help to reduce mortality rates. The reason for prominent DAMA could be due to prolonged hospital stay which causes sepsis and cultural beliefs about jaundice. Some studies indicated a DAMA rate of 1.6% and others demonstrated a rate of 24.6%. However, sepsis and transient tachypnoea of newborns were the commonest causes of discharge (24, 25). Moreover, non-affordability, lack of improvement, poor prognosis, and inappropriate behavior of the health personals were major factors contributing to DAMA. However, the reasons for DAMA could not be ascertained as it was beyond the scope of the present study. A limitation to the current study was that mortality among preterm neonates could not be ascertained even though it is the largest cause of newborn death globally.

## Conclusion

There is a necessity to reduce neonatal mortality and improve neonatal care. Continuous training of health personals working at maternal

and child health centers and improvement of antenatal care played an important role in the reduction of the neonatal mortality. Newborn deaths, especially early neonatal deaths are reflection of the quality of the obstetric care. Therefore, antenatal care needs to be re-emphasized with more enlightenment campaigns.

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## Conflicts of interests

There is no conflict of interest regarding the publication of this study.

## References

1. Save the Children International. State of the world's mothers: surviving the first day. London: Save the Children; 2013.
2. Alkema L, New JR, Pedersen J, You D. Child mortality estimation 2013: an overview of updates in estimation methods by the United Nations Interagency Group for Child Mortality Estimation. *PloS One*. 2014; 9(7):e101112.
3. World Health Organization. Levels and trends for maternal mortality: 1990 to 2013. Geneva: World Health Organization; 2014.
4. Lawn JE, Blencowe H, Oza S, You D, Lee AC, Waiswa P, et al. Every Newborn: progress, priorities, and potential beyond survival. *Lancet*. 2014; 384(9938): 189-205.
5. Wang H, Liddell CA, Coates MM, Mooney MD, Levitz CE, Schumacher AE, et al. Global, regional, and national levels of neonatal, infant, and under-5 mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2014; 384(9947):957-79.
6. Shackman G, Wang X, Liu YL. Basic guide to the world: trends in infant mortality rates. Wisconsin: University of Wisconsin-Madison; 2014.
7. Akinyemi JO, Bamgboye EA, Ayeni O. Trends in neonatal mortality in Nigeria and effects of bio-demographic and maternal characteristics. *BMC Pediatr*. 2015; 15(1):36.
8. Ugwu GI, Okperi BO, Chinemelu UC. Pattern and outcome of presentation at the children emergency unit of a tertiary institution in the Niger Delta region of Nigeria: a one year prospective study. *J Med*. 2012; 13(2):170-3.
9. Owa JA, Osinaike AI. Neonatal morbidity and mortality in Nigeria. *Indian J Pediatr*. 1998; 65(3):441-9.
10. Ezeaka VC, Ogunbase AO, Awongbemi OT, Grange AO. Why our children die: a review of paediatric mortality in a tertiary centre in Lagos, Nigeria. *Nigerian Quart J Hosp Med*. 2003; 13(1):17-21.
11. Omoigberale AI, Sadoh WE, Nwaneri DU. A 4 year

- review of neonatal outcome at the University of Benin Teaching Hospital, Benin City. Niger J Clin Pract. 2010; 13(3):321-5.
12. Mukhtar-Yola M, Iliyasu Z. A review of neonatal morbidity and mortality in Aminu Kano Teaching Hospital, northern Nigeria. Trop Doctor. 2007; 37(3):130-2.
  13. Toma BO, Ige OO, Abok II, Onwuanaku C, Abah RO, Donli A. Pattern of neonatal admissions and outcome in a tertiary institution in north central Nigeria. Nigeria J Med Trop. 2013; 15(2):121-5.
  14. Ekwochi U, Ndu IK, Nwokoye IC, Ezenwosu OU, Amadi OF, Osuorah DI. Pattern of morbidity and mortality of newborns admitted into the sick and special care baby unit of Enugu State University Teaching Hospital, Enugu state. Niger J Clin Pract. 2014; 17(3):346-51.
  15. Mmbaga BT, Lie RT, Olomi R, Mahande MJ, Kvåle G, Daltveit AK. Cause-specific neonatal mortality in a neonatal care unit in Northern Tanzania: a registry based cohort study. BMC Pediatr. 2012; 12(1):116.
  16. Kumar MK, Thakur S, Singh B. Study of the morbidity and the mortality patterns in the neonatal intensive care unit at a tertiary care teaching Hospital in Rohtas District, Bihar, India. J Clin Diagnostic Res. 2012; 6(2):282-5.
  17. Ersdal HL, Mduma E, Svensen E, Perlman J. Birth asphyxia: a major cause of early neonatal mortality in a Tanzanian rural hospital. Pediatrics. 2012; 129(5):e1238-43.
  18. Ravikumar SA, Elangovan H, Elayaraja K, Sunderavel AKK. Morbidity and mortality profile of neonates in a tertiary care centre in Tamil Nadu: a study from South India. Int J Contemp Pediatr 2018;5:377-82.
  19. Ralkia A, Khan M, Memon AA, Daher SA. Pattern and outcome of neonatal ailments in a tertiary care hospital. Par J Med Res. 2014; 53(1):14.
  20. Walana W, Acquah Ekuban KS, Abdul-Mumin A, Naafu B, Aruk E, et al. Pattern, causes and treatment outcomes of neonatal admission in the tamale teaching hospital. Clinics Mother Child Health. 2016; 13:(252):2.
  21. Ali SR, Ahmed S, Lohana H. Disease patterns and outcomes of neonatal admissions at a secondary care hospital in Pakistan. Sultan Qaboos Univ Med J. 2013; 13(3):424.
  22. Hoque MS, Alam S, Ahmed AS. Pattern of neonatal admissions and outcome in an intensive care unit (ICU) of a tertiary care paediatric hospital in Bangladesh a one-year analysis. J Bangladesh Coll Physic Surg. 2013; 31(3):134-9.
  23. Demisse AG, Alemu F, Gizaw MA, Tigabu Z. Patterns of admission and factors associated with neonatal mortality among neonates admitted to the neonatal intensive care unit of University of Gondar Hospital, Northwest Ethiopia. Pediatr Health Med Ther. 2017; 8:57.
  24. Devpura B, Bhadesia P, Nimbalkar S, Desai S, Phatak A. Discharge against medical advice at neonatal intensive care unit in Gujarat, India. . International Journal of Pediatrics. 2016; 2016:1897039.
  25. Al-Turkistani HK. Discharge against medical advice from Neonatal Intensive Care Unit: 10 years experience at a University Hospital. J Fam Community Med. 2013; 20(2):113-115.