Original Research Article

A STUDY OF NEONATAL MORTALITY IN A SPECIALIST HOSPITAL IN GUSAU, ZAMFARA, NORTH-WESTERN NIGERIA

Abstract

Introduction: The first 28 days of life is a critical time for survival of any child; more than 4 million newborns die yearly within the first four weeks of life with 3 million of these deaths occurring in the early neonatal period. Nigeria's neonatal mortality rate is the highest in Africa and second highest in the world.

Objectives: This study was done to determine the causes of neonatal mortality and mortality rate among newborns admitted to the special care baby unit (SCBU) of a specialist hospital in Gusau, Zamfara State, Nigeria.

Materials and methods: A retrospective descriptive study of causes of mortality among newborns admitted into the SCBU over a three year period. The case notes of all mortalities were reviewed and data on place of birth, age on admission, diagnosis and duration of hospital stay were ~~retrieved.~~ extracted.

Results: A total of 853 neonates were admitted, of which 20.4% died. Males predominated (56.9%) and 56.3% died within the first 24 hours. The leading causes of death were birth asphyxia 65(37.4%), prematurity 45(25.9%) and neonatal sepsis 42(24.1%). Odds of mortality when born outside the hospital was not significant when compared with those born inside the hospital (OR=1.26, 95% CI= 0.86-1.85, *P*=.22).

Conclusion: The mortality rate observed in this study was high, majority occurred within the first 24 hours of life and attributable to preventable causes. Health education on importance of hospital delivery by trained personnel with training of healthcare personnel on neonatal resuscitation is advocated is advocated. ~~Early presentation to health care facility with sick neonates is highly recommended~~

Key words- neonatal, newborns, mortality, Zamfara

1. Introduction

The first 28 days of life (the neonatal period) is a critical time for survival of any child [1]. It has been estimated that more than 4 million newborns die yearly within the first four weeks of life, with 3 million of these deaths occurring in the early neonatal period. Sadly, 98% of these deaths occur in developing countries [1].

Globally, neonatal mortality rate has reduced steadily from 1990 to 2015, with a decline in the neonatal deaths [2]. However, the decline in neonatal mortality during that period has been slower than that of post-neonatal under-five mortality [2,3].

In 2013, globally an estimated 6.3 million children died before reaching the age of five years of which 44% died within the neonatal period. Furthermore, 73% of all neonatal deaths occurred within the first week of life with 36% occurring on the day of birth [4].

In developing countries, the risk of death in the neonatal period is six times greater than in developed countries; and over eight times higher in the least developed countries [1]. The risk of neonatal death is highest in Africa, having 41 neonatal deaths per 1000 live births [1].

In Nigeria, about 700 babies die daily (around 30 every hour) which is the highest in Africa, and second highest in the world, hence ~~ranks~~ Nigeria contributes about 8% of the world's annual neonatal deaths [3].

Early neonatal deaths are due to obstetric origins while intra partum deaths are closely linked to place of delivery and care at delivery [1]. In most developing countries, about 40% of deliveries occur in health facilities and few actually take ~~s~~ place with the assistance of trained health personnel [1].

There has been no published hospital based study in Zamfara State that documented the pattern of neonatal mortality. In view of this, the study was aimed to identify the causes of neonatal mortality and mortality rate among newborns admitted to the special care baby unit (SCBU) of Ahmad Sani Yariman Bakura Specialist Hospital (ASYBSH), Gusau, Zamfara State, Nigeria.

2. Materials and methods

2.1 Methods

The ASYBSH is a specialist hospital of the Zamfara State Government which commenced work on 18th March 2013. This is a retrospective descriptive study of causes of mortality among newborns admitted into the SCBU over a three year period between April 2013 and March 2016.

The case notes of all mortalities were reviewed and information retrieved included place of birth i.e. within (inborn) and outside (out born) our hospital, age on admission, duration of hospital stay and diagnosis at time of death (not primary cause of death).

The SCBU is managed by 1 permanent Consultant who also manages the emergency paediatric unit and paediatric medical ward, 2 visiting Consultants, 1 medical officer, 1 house officer and 7 nurses. Available facilities in the unit include 10 cots, 2 incubators and 2 phototherapy units, due to the lack of space; inborn and out born are not separated. However, there are no facilities for mechanical ventilation, blood gas analysis or intensive monitoring.

2.2 Ethical approval

Ethical approval was obtained from the hospital ethical committee.

2.3 Data analysis

The data was analyzed using Statistical Package for Social Sciences software version 20~~, for cleaning and analysis~~ (SPSS Inc., Chicago, IL, USA). Categorical variables were analyzed using the Chi-square test and Fisher's exact test (for sample size less than 5 in a cell) for association between categorical variables. The level of statistical significance was set at $p<0.05$. ~~= .05.~~

3. Results

A total of 853 neonates were admitted during the study period, of which 174 died; giving a mortality rate of 20.4%. There were 99 males and 75 females, giving a male: female ratio of 1.32:1. The mean age at admission was 3.32±0.06 days, minimum age of admission was at birth and maximum age was at 28 days.

Inborn neonates were 77(44.3%) while out borns were 97(55.7%). More males died in both inborn and out borns categories, however, there was no significance in gender specific mortality rate ~~it was not significant~~ ($\chi 2$=1.38, *P*=0.24).

Half of the newborn~~s~~ deaths ~~dead~~ occurred within ~~died less than~~ 24 hours of admission, while 95.4% died within seven days as shown in table 1 below.

Table 1: Duration of admission

Duration	Frequency	Percentage
<24 hours	98	56.3
24-48 hours	41	23.6
3-7 days	27	15.5
8-14 days	7	4.0
>14 days	1	0.6
Total	174	100

The mean duration of hospital stay was 1.78±2.47 hours, with a minimum of 20 minutes and maximum of 16 days.

Birth asphyxia, prematurity and neonatal sepsis were the commonest causes of mortality as shown in table 2 below.

Table 2: Causes of mortality according to place of delivery

Diagnosis	Inborn no(%)	Out born no(%)	Total no(%)
Birth asphyxia	41(23.6)	24(13.8)	65(37.4)
Prematurity	24(13.8)	21(12.1)	45(25.9)
Neonatal sepsis	5(2.9)	37(21.2)	42(24.1)
Congenital malformations	3(1.7)	4(2.3)	7(4.0)
Neonatal tetanus	0(0.0)	6(3.4)	6(3.4)
Meconium aspiration syndrome	3(1.7)	1(0.6)	4(2.3)
Post term	1(0.6)	0(0.0)	1(0.6)
Rhesus isoimmunisation	0(0.0)	1(0.6)	1(0.6)
Icthyosis	0(0.0)	1(0.6)	1(0.6)
Subgaleal haemorrhage	0(0.0)	1(0.6)	1(0.6)
Persistent hypoglycaemia	0(0.0)	1(0.6)	1(0.6)
Total	77(44.3)	97(55.7)	174(100.0)

no=number, %=percentage

More males died from asphyxia, sepsis and prematurity; however ~~it~~ was not statistically significant ($\chi 2$=0.67, *P*=0.71).

The odds ratio of mortality when born outside the hospital was not significant when compared to those born inside the hospital (OR=1.26, 95% CI=0.86-1.85, *P*=0.22). More inborn died from asphyxia and more out borns died from neonatal sepsis as shown in table 3, both were significant.

Table 3: Association between place of delivery and leading causes of mortality

Cause of mortality	Inborn no(%)	Out born no(%)	Total no(%)	p value
Birth asphyxia	41(63.1)	24(66.9)	65(100.0)	0.000
Neonatal sepsis	5(11.9)	37(88.1)	42(100.0)	0.000
Gestational age				
term	52(40.6)	76(59.4)	128(100.0)	0.178
preterm	24(53.3)	21(46.7)	45(100.0)	
post term	1(100.0)	0(0.0)	1(100.0)	

no=number, %=percentage

4. Discussion

The mortality obtained in this study is the first that has been reported from a hospital in Zamfara State.~~; and it was found to be lower than the national average despite our hospital being a new hospital with few infrastructures and staff.~~ The mortality rate of 20.4% obtained in this study is similar to 20.3% obtained in Benin [5] and 19.3% in Calabar [6]. It is however, higher than 13.3% reported from Abuja [7]. Majority of the newborns that died were males, similar to what was observed in Benin [5] and the WHO 2006 report [1]. Most of the newborns that died were out borns though the difference in the mortality rates between inborn and out born babies was not statistically ~~not~~ significant, it is however similar to the finding in Benin [5]. A study in Kano [8] found the risk of dying was higher in out borns compared to inborns. The reason for lack of significance between inborn and out borns in this study could be due to the sample size and the difference between the two categories was not much.

Most deaths in this study occurred less than 24 hours similar to what has been reported in the Nigerian Demographic and Health Survey 2013 [9], Ibadan [10], Enugu [11] and Sagamu [12]. ~~Ninety five percent of deaths~~ Majority of the neonatal deaths occurred within 7 days, which is similar to what was observed in Calabar [6], Ibadan [10], Pakistan [13], South Africa [14] and Burkina Faso [15].

Birth asphyxia, prematurity and neonatal sepsis were the commonest cause of death in neonates in Gusau, which is in keeping with ~~to~~ what was declared by the Federal Ministry of Health[3] and also reported in Benin [5], Calabar [6], Abuja [7] and other studies[10-13, 16,17].

More inborns died from birth asphyxia in this study, which can be explained by the fact that our hospital is a referral centre for the entire General and peripheral hospitals in the state; hence complications of pregnancy and labour are referred. More out borns died from neonatal sepsis which could be due to the fact that home deliveries or deliveries in other places are conducted without strict asepsis and such babies may present late to the hospital.

Death from neonatal tetanus in this study was low, which is not in conformity to what was observed in Benin [5] and Calabar [6]. Reason may be due to increase vaccination of pregnant women, increase awareness on cord care and avoidance of harmful traditional practices. Death from congenital malformations was ~~is~~ also low, which may be as a result of ~~this due to the fact that due to the~~ lack of availability of a paediatric surgeons in our hospital, hence all congenital malformations amenable to surgery are referred appropriately.

In a developing country like ours, neonatal morbidity and mortality are threats to child survival and poses serious challenges. Despite the fact that no significant difference in mortality between inborn and out borns, it has been shown that unsupervised home deliveries and late referrals contribute to poorer outcome even when the newborn is eventually admitted. This study serves as an audit of our neonatal admissions which would aid to improve our clinical management of all neonates in order to reduce the neonatal mortality.

4.1 Conclusion

The mortality rate observed in this study was high, most deaths occurred within the first 24 hours of life and attributable to preventable causes. ~~comparable to studies in other parts of the country.~~ Health education on importance of hospital delivery by trained personnel with training of healthcare personnel on neonatal resuscitation is advocated. Proper training of traditional birth attendants is recommended as home deliveries still occurs in our setting.

4.2 Limitations

We were unable to determine the factors that could influence mortality as the study was retrospective such as risk factors of prematurity, asphyxia and sepsis. The cause of death was clinically determined based on diagnosis of the newborn; as autopsy is not done in our hospital to determine the specific cause of death due to lack of parental consent.

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Competing interest- None.

Authors' contributions

Garba BI and Muhammad AS conceptualised and designed the study, performed statistical analysis and interpreted the data, drafted the manuscript and critically revised the manuscript and gave approval for final version. Mohammed BA, Obasi AB and Adeniji AO critically revised for important intellectual content, interpreted data and carried out the literature search. All authors read and gave approval for the final version of the manuscript.

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