PATTERN OF NEONATAL ADMISSION AND OUTCOME AT A NIGERIAN TERTIARY HEALTH INSTITUTION

By

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SUMMARY

Aim: To describe the pattern of neonatal admission in a tertiary health institution in a developing country and to identify factors associated with its outcome.

Subjects and Methods: A retrospective review of 447 neonates admitted at Federal Medical Centre Abakaliki, Nigeria over a 3-year period (November 2000-October 2003).

Results: A total of 447 newborn babies were admitted into the Newborn Special Care Unit (NBSCU) with the inborn and out born babies constituting 89.3% and 10.7% respectively. Neonatal sepsis (32.4%), prematurity (28.6%) and neonatal asphyxia (14.8%) were the commonest indication for admission. The overall mortality was 19.5% with majority of the deaths occurring in the first week of life. The identified risk factor for neonatal death included birth weight less than 1500g, place of birth, mode of delivery, certain maternal-related factors such as ignorance, low socioeconomic status, non-attendance to antenatal clinic and low parity.

Conclusions: Improved access to antenatal care, maternal health education and upgrading existing infrastructure in tertiary institutions will significantly reduce neonatal mortality.

Key Words: *Neonatal admission pattern, outcome, tertiary institution, Nigeria.*

INTRODUCTION

There has been a remarkable improvement in the outcome of pregnancy the world over especially in developed countries. On the contrary most developing countries are still faced with horrendous level of maternal and neonatal morbidity and mortality because of the social and economic problems besetting these countries. While maternal mortality is now attracting attention in sub-Saharan African [1, 2], there is still paucity of information on neonatal mortality.

Previous study [3] in Ilesha, Nigeria showed an overall mortality of 13 percent. This mortality was noted to be higher in out-borns than in in-borns and the main causes of death were low birth weight, neonatal jaundice, infections and birth asphyxia. In another study [4] in Enugu, Nigeria where the major indications for admission were birth asphyxia, prematurity, low birth weight, and instrumental delivery, a high overall mortality of 10.5 percent was recorded, with low birth weight been a major contributor. The standard of available services in the hospital was reported as a factor contributing to the high mortality.

In contrast, a study in a national referral centre in Malaysia on neonatal mortality recorded a mortality rate of between 1.2 and 1.1 percent in a 2-year study period. Low birth weight also was a major contributor to the total neonatal death. With advances in neonatal intensive care, the factors determining neonatal admission and outcome in the developing world may be quite different from those of developed countries [5].

The present study is aimed at providing information on factors such as indication for admission, maternal circumstances, place of

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birth, mode of delivery and outcome of admission to neonatal care unit at a tertiary health institution in Abakaliki, southeast Nigeria. These data are important in planning health care services and preventing avoidable neonatal death in most developing countries.

MATERIALS AND METHODS

The medical records of 447 newborn babies admitted into Newborn Special Care Unit (NBSCU) of the Federal Medical Centre Abakaliki, Nigeria over the period November 2000 to October 2003 were evaluated. Pertinent data obtained from the patients' case notes included socio-demographic characteristics of mothers, neonatal characteristics, place and mode of delivery of the babies, indications for admission and neonatal outcome.

The data was analysed by simple percentage. Odd ratio at 95 percent confidence interval was used to compare the neonatal outcome in relation to place of birth. Graph pad software was used in the analysis.

Federal Medical Centre is one of the two tertiary health institutions serving Abakaliki, the capital of a newly created Ebonyi state in southeast Nigeria. It has a population of about 0.5 million and mainly civil servants and farmers inhabit it. The out born in this study were those newborn babies delivered outside our hospital while those delivered in our hospital were regarded as in born. Birth asphyxia is defined as Apgar score < 7 at 5 minutes while low birth weight (LBW) babies are those weighing less than 2500grams.

RESULTS

During the period under review (November 2000-October 2003), three hundred and ninety-nine (15.8%) of the 2520 babies delivered in the hospital were admitted into the NBSCU (in born). Sixty-four (2.5%) other babies admitted into NBSCU went home against medical advice as their parents refused the admission. Additional 48 newborn babies delivered outside the hospital (out born) were also admitted into the NBSCU within the review period. The in born and out born babies therefore constituted 89.3% and 10.7% respectively of the total admission into the NBSCU. All neonates resulting from multiple deliveries were treated as individual admission.

Table I shows the demographic characteristics of the mothers of these neonates. Majority (63.7%) of the mothers of these neonates were in their twenties and para one and two constituted 58.4% of them. Three hundred and fifteen (70.5%) of the mothers attended antenatal care (booked) while 132 (29.5%) had no antenatal care (unbooked). These 132 mothers constituted 83.5% of the total 158 unbooked mothers delivered in our hospital within the period under review. Twenty-six (16.5%) unbooked mothers had normal healthy babies that were not admitted into NBSCU. They were of mixed socio-economic class with social class• and • constituting majority (75.2%) of them. Only 26.2% (n=117) of these mothers had pre-term delivery. Of the 64 parents that refused admission for their neonates, fifty-two (81.3%) belonged to social class • and •. The remaining were in social class • (n=2), • (n=3), and • (n=7) respectively.

The characteristics of the newborn babies admitted into the NBSCU are shown in table•. Sixty-seven percent (n=300) of the newborn babies weighed more than 2.5kg. Also 78.1% (n=349) of them had Apgar score of 7 and above. There were more male than female (59.7% Vs 40.3%) and spontaneous vertex delivery (60.4%) was the predominant mode of delivery. Table• shows the indications for admission into NBSCU. Neonatal sepsis was the commonest (32.4%) indication for newborn admission.

Of the 399 in borns and 48 out borns admitted, there were 60 deaths (15%) among in borns and 27 deaths (56.3%) among out borns. The causes of death in both groups were prematurity (44.4%), neonatal sepsis (20.7%), asphyxia (17.2%), congenital abnormality (13.8%) and neonatal jaundice (6.9%) The overall mortality was 19.5%. Table• showed the relationship between in born and out-born babies with neonatal death. Inborn babies had

increased odds of death from prematurity (OR=1.64) and congenital abnormality (OR=1.41) compared with out-born babies. The remaining diseases: neonatal sepsis, neonatal asphyxia and neonatal jaundice had odds ratio < 1 implying that death among neonates with the disease tend to occur more among out borns.

Majority (66.7%) of the neonatal death occurred in the first week of life. Most death under seven days of age was related to prematurity (55.2%), asphyxia (20.7%) and congenital abnormality (15.5%) while neonatal sepsis (51.7%) accounted for most deaths in babies aged between 7 and 28 days (figure 1).

Table 1 Characteristics of the mothers of the newborn babies

	INBORN n=399	(%)	OUTBORN n=48	(%)	TOTAL n=447	(%)
Age (years)						
10-19	19 (4.76)		5 (10.42)		24 (5.40)	
20-29	255 (63.91)		30 (62.50)		285 (63.70)	
30-39	123 (30.83)		12 (25.00)		135 (30.20)	
40-49	2 (0.50)		1 (2.08)		3 (0.70)	
Parity						
1-2	229 (57.40)		32 (66.67)		261 (58.40)	
3-4	110 (27.57)		10 (20.83)		120 (26.80)	
>4	60 (15.04)		6 (12.50)		66 (14.80)	
Booking Status						
Booked	312 (78.20)		3 (6.25)		315 (70.50)	
Unbooked	87 (21.80)		45 (93.75)		132 (29.50)	
Gestational age at delivery (weeks)						
<30	13 (3.26)		2 (4.17)		15 (3.40)	
30-33	44 (11.03)		4 (8.33)		48 (10.70)	
34-36	49 (12.28)		5 (10.42)		54 (12.10)	
>36	293 (73.43)		37 977.08)		330 (73.80)	
Social Class[14]						
I	25 (6.27)		5 (10.42)		30 (6.70)	
II	124 (31.08)		20 (41.67)		144 932.20)	
III	174 (43.61)		18 (37.50)		192 (43.00)	
IV	64 (16.04)		3 (6.25)		67 (15.00)	
V	12 (3.00)		2 (4.17)		14 (3.10)	

Table 2 Characteristics of newborn babies

	INBORN (%) n = 399	OUTBORN (%) n = 48	TOTAL (%) n = 447
Weight (grams)			
<1500	43 (10.80)	2 (4.20)	45 910.100
1500-1999	41 910.30)	7 (14.60)	48 (10.70)
2000-2499	39 (9.80)	15 (31.20)	54 (12.10)
>2499	276 (69.10)	24 (50.00)	300 (67.10)
Sex			
Male	242 (60.70)	25 (52.10)	267 (59.70)
Female	157 (39.30)	23 (47.90)	180 (40.30)
Apgar Score (5min)			
0-3	1 (0.30)	5 (10.40)	6 (1.30)
4-5	20 (5.00)	28 (58.30)	48 (10.70)
6	34 (8.50)	10 (20.80)	44 (9.80)
>6	344 (86.20)	5 (10.40)	349 (78.10)
Mode of delivery			
Spontaneous vertex delivery	236 (59.10)	34 970.80)	270 (60.40)
Vacuum extraction	5 (1.30)	1 (2.10)	6 (1.30)
Breech delivery	11 (2.80)	10 (20.80)	21 (4.70)
Caesarean section	147 (36.80)	3 (6.30)	150 (33.60)

Table 3 Indication for admission of the newborn

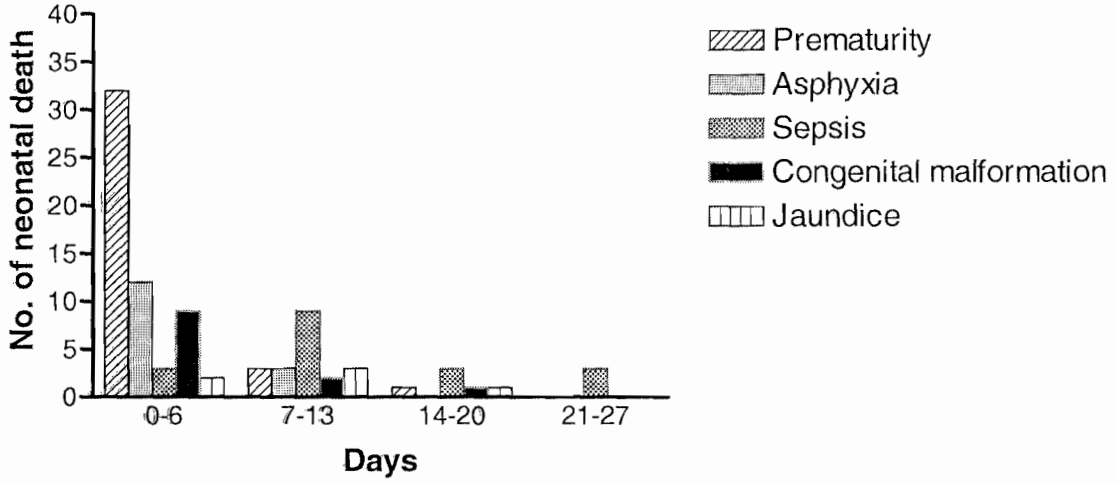
INDICATION	INBORN (%) n = 399	OUTBORN (%) n = 48	TOTAL (%) n = 447
Neonatal sepsis	137 (34.30)	8 (16.60)	145 (32.40)
Prematurity	117 (29.30)	11 (22.90)	128 (28.60)
Neonatal asphyxia	51 (12.80)	15 (31.30)	66 (14.80)
Neonatal jaundice	50 (12.50)	9 (18.70)	59 (13.20)
Low birth weight	18 (4.50)	1 (2.10)	19 (4.20)
Aspiration pneumonia	14 (3.50)	1 (2.10)	15 (3.40)
Congenital malformation	12 (3.00)	3 (6.30)	15 (3.40)

Table 4 Relationship between inborn and out born babies with Neonatal death

Cause of Death	Inborn (%) (n=60)	Out born (%) (n=27)	OR	95% C.I
Prematurity	27 (45)	9 (33.3)	1.636	0.6339-4.224
Neonatal sepsis	12 (20)	6 (22.2)	0.875	0.2894-2.645
Neonatal asphyxia	9 (15)	6 (22.2)	0.618	0.1953-1.954
Congenital malformation	9 (15)	3 (11.1)	1.412	0.3502-5.692
Neonatal jaundice	3 (5)	3 (11.1)	0.4211	0.0792-2.237

OR= Odd ratio
C.I= Confidence interval

Figure 1 Causes of neonatal death in the first 28 days of life



DISCUSSION

Sixteen percent of the total hospital deliveries in this review were admitted into the NBSCU of the hospital. This figure was lower than 44.7 percent reported among in borns from western part of Nigeria a decade ago [3]. The difference may be attributable to improvement in prenatal care and increased awareness about antenatal care among the populace, which ensures wider utilization of these services. Improvement of antenatal care in the community and upgrading of perinatal services have been suggested as a way of lowering the morbidity and mortality due to preventable causes [6].Also refusal of admission into the ward by some parents may have contributed to the difference noted between this and previous reports.

Maternal socio-demographic characteristics influenced the admission pattern in this study with low social class associated with refusal of neonatal admission in this study. This could account for the higher number of those in social class• and • among the population admitted into the NBSCU. Previous report [7] has shown that families with income below 200 percent of the poverty lines were associated with lower utilization and expenditure on health care services. Eighty four percent of the mothers that had no antenatal care (unbooked) had their babies admitted into the neonatal ward. The under-utilization of prenatal care by these mothers has been associated with sub-optimal fetal outcome [8]. The higher percentage of neonates of low- parity mothers especially primiparous mothers in this study may be because of difficult labour in this group of mothers and where such labour are poorly supervised as was the case in most of the unbooked mothers [9], delivery of asphyxiated babies often result. It was therefore not surprising that 31.3 percent of out borns were asphyxiated as against 12.8 percent among in borns. Although a study [10] has shown that low parity and young maternal age affect the birth outcome, the effect of maternal age on birth outcome could not be determined in this study.

Neonatal sepsis, prematurity and neonatal asphyxia were the commonest indication for admission and also the leading cause of neonatal death in this study. Neonatal sepsis remains a major clinical problem in neonatalogy, as the host defense against infection is immature in the newborn infant making the child more susceptible to invasive infection. Factors found to be significantly associated with sepsis were fetal distress, low Apgar score at five minutes, requirement for mechanical ventilation and umbilical catheterization [11]. These features were common among out born infants because of the poorly equipped delivery environment and

inexperienced personnel that conducted the delivery.

The risk factors for neonatal death in this study include birth weight, place of birth and mode of delivery. Infants that weighed less than 1500grammes at birth had been shown to have significantly higher mortality [12]. Also neonatal mortality was lower for in born babies (15%) compared to out borns (56.3%) in this study. Apart from the sub-optimal delivery environment, delay in conveying the babies to hospital, absence of specially designed ambulance with good transport incubator and exposure of the babies to infection on the way to hospital must have contributed to the high mortality among the out born babies. It therefore would have been easier, safer and cheaper to transfer the pregnant mother to the hospital with the baby in utero. There were more neonatal deaths from neonatal sepsis, neonatal asphyxia and neonatal jaundice among out borns than in born babies, while prematurity and congenital abnormality accounted for more death among in-borns. Congenital malformation, which ranked fourth among the most common problems in the neonates [13], was higher among the in borns because mothers with high-risk pregnancy tended to register and deliver in the hospital. Babies delivered by breech, vacuum extraction or caesarean section had significantly higher mortality than those that had normal delivery and this is related to the indications that necessitated the use of these other modes of delivery. Also total lack or where available limited essential equipment in our neonatal unit is a factor in neonatal survival.

Majority (66.7%) of the neonatal death occurred in the first week of life and they were related to prematurity (55.2%), asphyxia (20.7%) and congenital abnormality (15.5%). Inability to maintain spontaneous respiration resulting in hypoxaemia and presence of abnormality incompatible with extra-uterine life in babies with congenital malformation were responsible for most deaths in the first week of life. After the first week of life, sepsis became a major contributor to neonatal death. Delayed presentation and recognition of neonatal sepsis has been shown to be associated with rapid development of multi-organ dysfunction and increase risk of mortality [12].

It is concluded that maternal socio-demographic characteristics, infant condition at birth, mode and place of birth as well as availability of essential equipment for intensive care of newborn babies were factors determining neonatal admission and outcome in tertiary health institutions in developing countries. Health care service providers should take this into account in providing basic supportive care facilities that is affordable. This will ensure wider access to antenatal and neonatal care, which will ultimately reduce neonatal morbidity and mortality in developing countries.

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