

## ***Preterm Admissions in a Special Care Baby Unit: The Nnewi Experience***

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### **Summary**

**Ugochukwu EF, Ezechukwu CC, Agbata CC, Ezumba I. Preterm Admissions in a Special Care Baby Unit: The Nnewi Experience.** *Nigerian Journal of Paediatrics* 2002;29:75. A review of all preterm admissions into the Special Care Bay Unit of the Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, over a period of 29 months (May 1998 – October 2000) was carried out. Out of a total of 699 neonatal admissions, 133 (19 percent) were preterms with gestational ages ranging from 24 to 36 weeks and birth weights from 600g to 2490g. Male: female ratio was 1:1.5. Seventy-three patients (54.9 percent) were referred from other health establishments, while 60 (45.1 percent) were born in NAUTH. Thirty-three patients were delivered by Caesarean section, out of which one died. Factors contributing to morbidity were sepsis, asphyxia, jaundice, anaemia and haemorrhagic disease of the newborn. Duration of hospital stay ranged from two hours to 54 days with a mean of 16.7 days. Twenty-four (18 percent) of the 133 patients died. Mortality-associated events were respiratory distress syndrome (40.0 percent), severe birth asphyxia (33.4 percent), neonatal sepsis (13.3 percent), severe neonatal jaundice (6.7 percent) and severe anaemia and haemorrhagic disease of the newborn (3.3 percent) each. The referred cases contributed 75 percent of the mortality. During the period between hospital discharge and one year corrected age, 2.8 percent of the babies died, 1.8 percent developed hydrocephalus, 1.8 percent had cerebral palsy, 2.8 percent had recurrent acute respiratory infections requiring hospital admission and 13.8 percent were lost to follow up. This study illustrates the impact of a newborn unit on a programme designed to reduce perinatal mortality.

### **Introduction**

IN the developed world, prematurity and conditions associated with it, cause more than half of neonatal deaths, and is an important factor in the aetiology of probably up to a third of cases of cerebral palsy.<sup>1</sup> It represents a major burden on neonatal services, hence it is of considerable clinical importance. In developing countries like Nigeria, prematurity brings to bear a greater strain on the meagre resources available for healthcare delivery and family financing. Ill-equipped hospitals with lack of experienced health personnel,

in addition to poor transportation facilities for referral, further worsen the outcome of preterm deliveries.<sup>2</sup>

The Special Care Baby Unit of the Nnamdi Azikiwe University Teaching Hospital, Nnewi was established in May 1998. Prior to this period, all paediatric patients were managed together in the general ward without proper categorization and record-keeping. The aim of this study was to review all preterm admissions and their outcome since the inception of a distinct neonatal unit with its own separate nursing and domestic staff.

### **Patients and Methods**

This unit consists of three wards designated for in-born babies, out-born babies (referrals) and isolation. There are 17 cots, an infant radiant warmer, five incubators, two oxygen cylinders, five phototherapy units, one apnoea monitor and four resuscitation kits. The study was retrospective and descriptive in design

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and covered a period of 29 months, from May 1998 to October 2000. The case notes of all preterm admissions as recorded in the ward register, were retrieved and reviewed. Data extracted from the case notes included gestational age, sex, mode of delivery, birth weight, whether in-born (in NAUTH) or referred, date of admission, date of death or discharge, duration of hospital stay, critical events during admission, and terminal events surrounding death. Birth weights of out-born babies were obtained from the referral notes and weight on admission (for those admitted within a few hours of birth). Gestational age was confirmed by the method of Dubowitz *et al.*<sup>3</sup> Data analysis was by means of the Chi-square test and significance was determined at  $p < 0.05$ .

### Results

During the period under review, a total of 699 neonates were admitted. Out of this number, 133 were preterms (19 percent) with gestational ages ranging from 24-36 weeks and birth weights from 600g to 2490g. Among the preterm babies, 37 were very low birth weight (VLBW; 1000-1499g) giving a rate of 27.8 percent, while 11 babies (8.3 percent) were extremely LBW (<1000g). Sixty-five percent of the preterm babies (86) were LBW appropriate for gestational age (AGA) and 35 percent (47) were LBW small for gestational age (SGA). There were 53 males and 80 females, M:F = 1:1.5. Sixty of these

**Table I**

*Gestational Ages of the Patients*

<i>Gestational Age (weeks)</i>	<i>Number of Babies</i>	<i>Percentage of Total</i>
24	3	2.3
25	3	2.3
26	4	3.0
27	3	2.3
28	10	7.5
29	3	2.3
30	16	12.0
31	9	6.7
32	14	10.5
33	37	27.8
34	19	14.3
35	6	4.5
36	6	4.5
<b>Total</b>	<b>133</b>	<b>100.0</b>

**Table II**

*Birth Weights of the Patients*

<i>Birth weight (kg)</i>	<i>Number of Babies</i>	<i>Percentage of Total</i>
0.50-0.99	11	8.3
1.00-1.49	37	27.8
1.50-1.99	62	46.6
2.00-2.49	23	17.3
<b>Total</b>	<b>133</b>	<b>100.0</b>

**Table III**

*Comparison of Attributes of In-born and Out-born Babies*

<i>Attribute</i>	<i>In-born Babies</i>	<i>Out-born Babies</i>
Number (%)	60(45.1)	73(54.9)
Gestational age range (weeks)	25-35	24-36
Birth weight range (grams)	800-2490	600-2490
VLBW rate (%)	22.5	46.0
ELBW rate (%)	7.5	12.0
AGA rate (%)	67.5	51.1
SGA rate (%)	32.5	48.9
Male: female ratio	1:2.3	1.1:1
Mortality rate (%)	10.0	24.7
Morbidity rate (%)	65.0	72.3
Survival rate (%)	85.0	73.6

patients (45.1 percent) were born in NAUTH while 73 (54.9 percent) were referred from peripheral centres. Tables I and II outline the gestational ages and birth weights of the babies.

Thirty-three babies (24.8 percent) were delivered by Caesarean section, while 100 (75.2 percent) were delivered vaginally. Duration of hospital stay ranged from two hours to 54 days, with a mean of 16.7 days. Twenty-four babies died (18 percent case fatality). Out of this number, 18 were referred to NAUTH (24.7 percent of referred babies) and six were in-born (10 percent of in-born babies; Table III); referred cases contributed to 75 percent of the mortality. Other comparative attributes of in-born vs out-born babies are shown in Table III. Mortality-associated

Table IV

*Survival Rates According to Gestational Ages*

<i>Gestational Age (weeks)</i>	<i>Number of Deaths</i>	<i>Number of Survivors</i>	<i>Percentage Survival</i>
24	3	0	0.0
25	3	0	0.0
26	4	0	0.0
27	3	0	0.0
28	4	6	60.0
29	1	2	66.7
30	3	13	81.3
31	0	9	100.0
32	1	13	92.9
33	1	36	97.3
34	0	19	100.0
35	0	6	100.0
36	1	5	83.3

$$\chi^2 = 855.4417; p < 0.0001$$

events were respiratory distress syndrome (40.0 percent), severe birth asphyxia (33.4 percent), neonatal sepsis (13.3 percent), severe neonatal jaundice (6.7 percent), severe anaemia (3.3 percent) and haemorrhagic disease of the newborn (3.3 percent).

Of the twenty-four dead babies, only one was delivered by Caesarean section. Their gestational ages ranged from 24 to 36 weeks (Table IV) and birth weights from 600g to 2000g (Table V). The male to female ratio was 1.7:1. 73.3 percent of the dead babies were AGA and 26.7 percent SGA. Referrals arrived anytime from a few hours to seven days after delivery.

Factors responsible for morbidity included sepsis, asphyxia, jaundice, anaemia and haemorrhagic disease. During the period between hospital discharge and one year corrected age, three (2.8 percent) of the 109 initial survivors died, two (1.8 percent) developed hydrocephalus, two (1.8 percent) had cerebral palsy, three (2.8 percent) had recurrent admissions for acute respiratory infections and 15 (13.8 percent) were lost to follow up. The remaining 84 are still being followed up and are developing normally.

### Discussion

The preterm admission rate of 18 percent is comparable with 21.2 percent reported in an Indian study<sup>4</sup> although a much higher rate of 54 percent was obtained in South Africa.<sup>2</sup> This may either be due to a higher rate of preterm delivery in the South African centre or lower rates of other perinatal or neonatal problems requiring hospitalization. The SGA rate of 35 percent in this study is much lower than 69 percent observed by workers in Port Harcourt.<sup>5</sup> This may be explained by the fact that the latter study was not restricted to preterms as this was. Preterm babies tended to stay long in hospital. The mean duration of hospitalization in this group of babies was 16.7 days. This is however, far shorter than 68 days noted by the US National Institute of Child Health and Human Development Neonatal Research Network.<sup>6</sup> The longer duration of admission in the latter case

Table V

*Survival Rates according to the Birth Weights of the Patients*

<i>Birth Weight (kg)</i>	<i>Number of Deaths</i>	<i>Number of Survivors</i>	<i>Percent Survival</i>
0.50-0.99	11	0	0.0
1.00-1.49	11	26	70.3
1.50-1.99	1	61	98.4
2.00-2.49	1	22	91.3

$$\chi^2 = 266.388; p < 0.0001$$

was due to the large number of ELBW babies in the cohort.

The case fatality rate of 18 percent recorded in this study was high when compared to 11 percent in India,<sup>4</sup> 4.8 percent in Melbourne<sup>7</sup> and 10 percent in Enugu.<sup>8</sup> Seventy-five percent of the mortality was contributed by out-born babies. Separate analysis of the data on the referrals revealed higher rates of ELBW, VLBW and SGA babies who naturally have a high morbidity and mortality. The awareness of mothers to the dangers of premature delivery could be improved by antenatal health promotion, rapid response to warning signs and subsequent access to effective clinical response. Specialized neonatal transport and advanced techniques have not removed the significant advantage of decreased morbidity, mortality, and length of hospital intervention resulting from maternal (*in utero*) transport.<sup>9</sup> Mortality was higher in males than females as is the case in other studies.<sup>6,10</sup> In more advanced countries, the main causative factors in mortality were lethal congenital anomalies,<sup>7</sup> while in our series, respiratory distress, asphyxia and sepsis were paramount.

Survival rates improved with increasing birth weight and gestational age. Other studies have also attested to this fact.<sup>6,7,11-14</sup> It is noted that many survivors of the newborn intensive care units who were preterms generally did well.<sup>15</sup> During the period between hospital discharge and one year corrected age, only two babies died. The post-discharge mortality in this study was low compared to that obtained in South Africa with 15 out of 113 babies dying.<sup>16</sup> Readmission is common after very preterm birth<sup>17</sup> as was the case with three of our babies. Antenatal steroids, inhalation surfactants and dexamethazone for bronchopulmonary dysplasia as standard therapies have improved survival rates in very preterm infants in the developed world, but the incidence of major impairments such as cerebral palsy remains unchanged.<sup>18</sup> The 2.8 percent incidence of cerebral palsy post-discharge in our series, is therefore, in keeping with what obtains elsewhere.<sup>12,16</sup>

Another problem to contend with, is loss to follow up. As high as 13.8 percent of the babies were lost to follow up. This is also comparable with 15 out of 113 lost to follow up in a South African study.<sup>16</sup> It was difficult to trace them since many lived in the villages with no addresses.

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