

# Risk Factors and Outcome of Preterm Admissions in a Special Care Baby Unit of a Tertiary Hospital in North Central Nigeria

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## Abstract

The main objective of this study was to determine the prevalence of preterm births, risk factors and the outcome in a Tertiary Hospital in North Central Nigeria. **Setting and Methods:** The study was based on the data of records of all preterm admissions over a three-year period at Benue State University Teaching Hospital (BSUTH), Makurdi, Benue State. **Results:** During this period, a total of 778 neonates were admitted out of which 95 (12.0%) were preterm with gestational ages ranging from 21 - 36 weeks with an average mean gestational age 31.27 weeks ( $\pm 3.2$ ) and birth weights from 500 - 2490 g with a mean of 1440 g ( $\pm 0.45$ ). There were 48 males and 47 females (M: F 1.02). 76 (80.0%) were delivered by spontaneous vaginal delivery while 19 (20.0%) were delivered by caesarean section. 37 (39.0%) were delivered in BSUTH while 58 (61.0%) were delivered elsewhere and referred or brought into Special Care Baby Unit (SCBU). The duration of hospital stay ranged from 1 - 90 days, with a mean duration of 17 days ( $\pm 15.2$  days). The commonest risk factor for prematurity was premature rupture of membrane followed by multiple pregnancy and lack of Ante natal care (ANC). The commonest morbidity in the patients in the present study was sepsis followed by respiratory problems and jaundice. Of the 95 preterm, 60 (63.2%) were discharged, 27 (28.4%) died, while 8 (8.4%) were discharged against medical advice (DAMA). **Conclusion:** Prematurity remains a major cause of morbidity and mortality in our SCBU. There is urgent need for the establishment of a neonatal intensive care unit with adequate manpower and appropriate equipment so as to improve the survival rates of this vulnerable group of patients.

## Keywords

Preterm, Outcome, Gestational Age, Risk Factors, Morbidity

## 1. Introduction

Preterm birth is defined as birth before 37 completed weeks or 259 days of gestation. This constitutes a major health issue and survivors face a life time of disability including learning disabilities and visual and hearing problems [1] [2] [3]. Infants born as preterms experience difficulty with feeding, blood glucose control, jaundice, temperature instability, apnoea, respiratory distress and sepsis either singly or in combination [4]. In 2010, an estimated 14.9 million babies (uncertainty range 12.3 - 18.1 million) were born preterm, 11.1% of all livebirths worldwide, ranging from 5% in several European countries to 18% in some African countries and the number is increasing [5]. Preterm birth complications are the leading causes of death among children under 5 years of age, responsible for nearly 1 million deaths in 2015. More than 60% of preterm births occur in Africa and South Asia but preterm birth is a global problem. In the lower income countries, on average, 12% of babies are born too early compared with 9% in higher income countries [5]. The national estimate of preterm births in Nigeria was put at 773,600 as at 2010 [6].

Several factors influence the management of prematurity and include level of prenatal care, gestational age at birth, sex, availability of resources and adequate and well trained personnel [7]. Neonatal intensive care is one of the recent advances in neonatal care that ensures survival of the preterm neonate but this is not readily available in most developing countries [8].

The Special Care Baby Unit (SCBU) of Benue State University Teaching Hospital (BSUTH), Makurdi was established in 2014 and we designed this study to determine the prevalence of preterm births, the risk factors and the outcome of inception.

## 2. Patients and Methods

The study was carried out at the Special Care Baby Unit (SCBU) of the Benue State University Teaching Hospital (BSUTH), Makurdi, Benue State. The SCBU is the neonatal unit of the hospital where children less than 28 days of age are admitted. The unit is further divided into an out born subunit comprising of 4 cots, 2 incubators, 1 resuscitaire and two phototherapy units and the in born unit which is equipped with 4 cots, 2 incubators, 4 phototherapy units, 2 replaceable oxygen cylinders, 1 resuscitaire and 1 apnoea monitor. The unit is manned by 1 Paediatrician, Paediatric residents and Nursing staff.

Ethical approval for the study was obtained from the BSUTH Health Research Ethical Committee. This was a retrospective descriptive study. The records of all preterm admissions over the 3-year period spanning from January 2014 to December 2016 were retrieved from the hospital records department and information were extracted. All preterm babies admitted into the SCBU of BSUTH born at gestational ages of less than 37 completed weeks of gestation were included into the study while those born at or after 37 completed weeks were excluded. Information obtained from the patient's hospital records include gestational age

at birth, sex, birth weight, whether inborn or out born, risk factors for preterm birth, duration of hospital stay, medical problems during the period of admission and outcome. The gestational ages at birth were confirmed by the new Ballard score system [9]. The birth weights were taken as the first recorded weight at birth for the in born or the weight on admission for out born who presented within 24 hours of life. They were classified into three 3 main categories according to gestational age at birth with those born between 32 to 36 weeks classified as mild and 28 to 31 weeks very preterm and less than 28 weeks as extremely preterm for birth.

Statistical Analysis: Data was analyzed using SPSS version 15 statistical package and significance was determined at  $P < 0.05$ .

### 3. Results

During the study period, a total of 778 neonates were admitted out of which 95 (12%) were preterms with gestational ages ranging from 21 - 36 weeks (**Table 1**) and birth weights from 500 g to 2490 g. The average mean gestational age was 31.27 ( $\pm 3.2$ ) with a mean birth weight of 1.44 kg ( $\pm 0.45$ ). There were 48 males and 47 females (M: F 1.02) (**Table 2**). 76 (80.0%) were delivered by spontaneous vaginal delivery while 19 (20.0%) were delivered by caesarean section. A total 37 (39.0%) were delivered in BSUTH while 58 (61.0%) were delivered elsewhere and referred or brought into SCBU of BSUTH hence were considered as out born. The duration of hospital stay ranged from 1 - 90 days, with a mean duration of 17 days ( $\pm 15.2$  days).

**Table 2** shows the sex distribution according to the gestational age. More females were born at 35 weeks gestation as compared to males at 31 weeks.

**Table 1.** Gestational ages of the patients.

GA in weeks	Number of Babies	Percent
21	1	1.1
24	3	3.2
27	8	8.4
28	5	5.3
29	5	5.3
30	13	13.7
31	19	20.0
32	4	4.2
33	4	4.2
34	13	13.7
35	13	13.7
36	7	7.4
<b>Total</b>	<b>95</b>	<b>100.0</b>

**Table 2.** Gestational age & sex distribution.

GA in weeks	Sex N (%)		Total
	F.	M	
21	1 (100.0)	0 (0.0)	1 (100.0)
24	1 (33.3)	2 (66.7)	3 (100.0)
27	6 (75.0)	2 (25.0)	8 (100.0)
28	2 (40.0)	3 (60.0)	5 (100.0)
29	3 (60.0)	2 (40.0)	5 (100.0)
30	5 (38.5)	8 (61.5)	13 (100.0)
31	6 (31.6)	13 (68.4)	19 (100.0)
32	3 (75.0)	1 (25.0)	4 (100.0)
33	2 (50.0)	2 (50.0)	4 (100.0)
34	6 (46.2)	7 (53.8)	13 (100.0)
35	7 (53.8)	6 (46.2)	13 (100.0)
36	6 (71.4)	2 (28.6)	8 (100.0)
Total	47 (49.5)	48 (50.5)	95 (100.0)

$\chi^2 = 9.435$ ;  $p = 0.582$ .

Among the preterm babies, 40 (42.1%) very low birth weight (VLBW), while 13 babies (13.7%) extreme low birth weight (ELBW) (**Table 3**).

Of the 95 preterm, 60 (63.2%) were discharged, 27 (28.4%) died, while 8 (8.4%) were discharged against medical advice (DAMA) (**Table 4**).

As shown in **Table 5**, the commonest risk factor for preterm birth was preterm rupture of membranes (PROM) in 52 (54.7%) of the patients followed by multiple pregnancy 29 (30.5%) and lack of ANC 24 (25.3%) respectively.

**Table 6** shows the clinical outcome according to the gestational age; the outcome was better at gestational ages between 31 - 36 weeks and worst at gestational age below 30 weeks.

**Table 7** shows the Morbidity and Mortality Pattern, sepsis was the commonest condition in 33 (34.7%) followed by respiratory problems 19 (20.0%) and jaundice 14 (14.7%) of the patients.

#### 4. Discussion

In the present study, preterm admissions constituted 12% of all the admissions at the special care baby unit of the BSUTH. This is less than 16.4% reported by McGil Ugwu [10] at the Delta State University Teaching Hospital and 24.0% reported by Kunle-Olowu *et al.* [11] at the Niger Delta University Teaching Hospital (NDUTH), Okolobiri, Bayelsa state all in Southern Nigeria. Onwuanaku *et al.* [12] in Jos University Teaching Hospital, North central Nigeria from the same geopolitical zone reported 31.3% which is higher than that reported in our study. The reasons for these differences are not clear but maybe due to

**Table 3.** Birth weight of Patients.

Birth Weight (kg)	Number	Percent
0.50 - 0.99	13	13.7
1.00 - 1.49	40	42.1
1.50 - 1.99	28	29.5
2.0 - 2.49	14	14.7
<b>Total</b>	<b>95</b>	<b>100.0</b>

**Table 4.** Outcome according to birth weight of patients.

Birth Weight (kg)	Outcome n (%)			
	Discharged	DAMA	Died	Total
0.50 - 0.99	4 (30.8)	0 (0.0)	9 (69.2)	<b>13 (100.0)</b>
1.00 - 1.49	24 (60.0)	6 (15)	10 (25.0)	<b>40 (100.0)</b>
1.50 - 1.99	19 (67.9)	2 (7.1)	17 (25.0)	<b>28 (100.0)</b>
2.00 - 2.49	13 (92.9)	0 (0.0)	1 (7.1)	<b>14 (100.0)</b>
<b>Total</b>	<b>60 (63.2)</b>	<b>8 (8.4)</b>	<b>27 (28.4)</b>	<b>95 (100.0)</b>

**Table 5.** Risk factors for preterm delivery.

Risk Factors	Number	Percentage
Preterm Rupture of Membrane	52	54.
Multiple Pregnancy	29	30.5
Lack of Maternal Antenatal Care	24	25.3
Hypertension in Pregnancy	17	17.9
Maternal Febrile Illness	17	17.9
Artificial Rupture of Membrane	8	8.4
Previous Preterm delivery	4	4.2
Birth Defect	4	4.2
Maternal Chorioamnionitis	3	3.2
Abdominal Massage	2	2.1
Teenage Mother	1	1.1
Illicit Drug Intake	1	1.1

differences in the incidence of preterm births in the different geopolitical and ethnic differences in these study populations or a higher rate of preterm delivery. The number of male babies were more than the females and comparable to that reported by Kunle-Olowu *et al.* [11], McGil Ugwu [10] and Zeleke *et al.* [13] in Ethiopia reported more preterm females.

Preterm babies stay longer in hospital than term babies. The mean duration of hospitalization of babies in the present study was 17 days and similar to that documented by Ugochukwu *et al.* (16.7 days) at Nnewi [14]. In the US, National

**Table 6.** Clinical outcome according to gestational age.

GA in weeks	Outcome N (%)			
	Discharged	DAMA	Died	Total
21	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)
24	0 (0.0)	0 (0.0)	3 (100.0)	3 (100.0)
27	4 (50.0)	0 (0.0)	4 (50.0)	8 (100.0)
28	2 (40.0)	0 (0.0)	3 (60.0)	5 (100.0)
29	1 (20.0)	1 (20.0)	3 (60.0)	5 (100.0)
30	8 (61.5)	1 (7.7)	4 (30.8)	13 (100.0)
31	14 (73.7)	2 (10.5)	3 (15.8)	19 (100.0)
32	1 (25.0)	1 (25.0)	2 (50.0)	4 (100.0)
33	2 (50.0)	1 (25.0)	1 (25.0)	4 (100.0)
34	9 (69.2)	1 (7.7)	3 (23.1)	13 (100.0)
35	13 (100.0)	0 (0.0)	0 (0.0)	13 (100.0)
36	6 (85.7)	1 (14.3)	0 (0.0)	7 (100.0)
Total	60 (63.2)	8 (8.4)	27 (28.4)	95 (100.0)

$\chi^2 = 35.394$ ;  $p = 0.035$ .

**Table 7.** Associated medical problems during admission & the outcome.

Medical Problems	Outcome N (%)			
	Discharged	DAMA	Died	Total
Sepsis	22 (66.7)	4 (12.1)	7 (21.2)	33 (100.0)
Respiratory Problems	7 (33.3)	2 (11.1)	10 (55.6)	19 (100.0)
Jaundice	10 (71.4)	0 (20.0)	4 (20.6)	14 (100.0)
Asphyxia	4 (50.0)	0 (0.0)	4 (50.0)	8 (100.0)
Anaemia	3 (75.0)	0 (0.0)	1 (25.0)	4 (100.0)
Hypoglycaemia	1 (50.0)	1 (50.0)	0 (0.0)	2 (100.0)
Necrotizing enterocolitis	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)
Total	48 (59.3)	7 (8.6)	26 (32.1)	81 (100.0)

Institute of Child Health and Human Development Neonatal Research Network found duration of admission was 68 days but was due to the large number of ELBW babies in the cohort [15].

The commonest risk factor for Prematurity was PROM followed by multiple pregnancy and lack of ANC. This is similar to findings by Kunle-Olowu *et al.* [11]. Other studies in Nigeria [16] [17] [18] have reported multiple pregnancy as a risk factor for preterm delivery. Multiple pregnancy has been shown to contribute to the high percentage of preterm deliveries [19] with an average gestational age of twin births at 35 weeks [20]. Medical conditions such as hypertension are documented risk factor for preterm delivery and this was established in

the present study. This is similar to reports from other authors in Nigeria [17], Nepal [21] and Thailand [22]. A study was carried out on neonatal morbidity pattern in infants born to mothers with hypertensive disorders in pregnancy in Benin City, Nigeria [23] where the rate of preterm delivery was significantly higher in the hypertensive mothers compared to their normotensive counterparts.

Interestingly the commonest morbidity in the patients in the present study was sepsis followed by respiratory problems and jaundice. This is similar to reports by Khan *et al.* [24] in Karachi, Pakistan who reported jaundice and sepsis as the commonest morbidity in their preterms. Onwuanaku *et al.* [12] in Jos, Nigeria, reported sepsis as the commonest morbidity followed by jaundice. Onalo and Olateju [25] in Abuja, Nigeria also reported jaundice as the commonest morbidity in their preterm patients. Infection control is very crucial in the management of preterm babies who are a high-risk group as a result of their immature immune system [26].

Gestational age and birth weight are two major determinants of neonatal survival and morbidity. In the present study, the outcome was better in patients with gestational age above 30 weeks and this was statistically significant ( $p = 0.035$ ). Outcome according to birth weight was also better amongst patients with birth weight greater than 2000 g. Other studies corroborate this finding to this fact [27] [28] [29]. The mortality was quite high in our study 27 (28.4%) this is at variance to reports from Netherlands 2007 reports and Qatif Central Hospital, Saudi Arabia where the mortality was low. This further buttresses the importance of establishment of neonatal intensive care units in developing countries like Nigeria with adequate equipment like portable x-rays and ventilators for more detailed evaluation of this high-risk population.

## 5. Conclusion

Prematurity remains a major cause of morbidity and mortality in our SCBU. There is urgent need for the establishment of a neonatal intensive care unit with adequate manpower and appropriate equipment so as to improve the survival rates of this vulnerable group of patients.

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## Authors' Contribution

All the authors: for the proof reading of this article; Ochoga, M.O and Michael, A.: for initiation, protocol drafting, data collection, writing of report and article

draft; Abah, R.O., Dabit, O. and Ikuren, I: data collection and report writing; Ebonyi, A: report writing.

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