Post-natal Growth Failure in Preterm Infants Born 700 to 1750g in Nigerian Neonatal Intensive Care Units

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BACKGROUND

- Worldwide, preterm births rates are highest in sub-Saharan Africa.
- Post-natal growth failure is common in preterm infants.
- Post natal growth failure is well reported in high income countries, but not in Sub-Saharan countries.

STUDY OBJECTIVE

To determine the proportion of, and clinical factors associated with post-natal growth failure in Nigeria NICU’s.

DEFINITIONS

- Growth failure:** Discharge weight <10th percentile for corrected gestational age.
Or
- Discharge Z-Score ≤-2 for corrected gestational age.
- Severe growth failure:** Discharge weight <3rd percentile for corrected gestational age.

STUDY METHODS

- Design:** Retrospective cohort study.
- Population:** All infants with birthweight ≤1750 grams enrolled in the Nigerian Neonatal Registry who survived to hospital discharge.
- Exclusion:** Infants admitted >14 days of life, admitted <15 days, with congenital anomalies, missing data.
- Analyses:** Univariate analysis to compare demographic and clinical characteristics by growth failure status and logistic regression analysis for growth failure predictors.

DATA SOURCE

The Nigerian Neonatal Registry

- Collaboration between Lagos University Teaching Hospital, National Hospital Abuja and University of Benin Teaching Hospital in Nigeria.
- Started June 2017.
- Collects clinical information on all patients admitted to the Neonatal Intensive Care Unit of these hospitals.

RESULTS

Subjects Enrolled June 2017 to Oct 11th 2018
N=2528

- Excluded: 2300 subjects**
- Weight>1750 n=1819
 - Missing data n= 82
 - Congenital anomaly n=21
 - Died n=234
 - LOS<15days n=95
 - Admitted >14 DOL= 49

Evaluated N=228

RESULTS

Discharge Weight Percentile for Corrected Gestational Age

■ ≥10th %ile ■ <10th %ile

Discharge Weight Percentile for Corrected Gestational Age

■ ≥3rd %ile ■ <3rd %ile

Discharge Z Scores for Corrected Gestational Age

■ >2 ■ ≤-2

Figure : Post-Natal Growth Failure Categories by Discharge Weight Percentile and Z-Score

Table 1: Infant and Maternal Demographic and Clinical Characteristics by Extrauterine Growth Failure Status

Factors	Discharge weight ≥10%ile (N=26)	Discharge weight <10%ile (N=202)	P. Value
Female, n (%)	16 (62)	107 (53)	0.41
Birth weight, (g), median (IQR)	1280 (1180-1400)	1300 (1120-1460)	0.82
Gestational age at birth, weeks, mean (SD)	28 (2)	31 (2)	<0.001
Appropriateness for gestational age, n (%)			
• SGA	0 (0)	53 (26)	<0.001
• AGA	22 (85)	147 (73)	
• LGA	4 (15)	2 (1)	
Z-score at birth, mean (SD)	0.6 (0.9)	-0.8 (0.9)	<0.001
Birthweight percentile, median (IQR)	67 (47-82)	24 (10-42)	<0.001
Inborn, n (%)	12 (46)	138 (68)	0.03
Length of hospital stay, days, median (IQR)	20 (17-24)	33 (23-46)	<0.001
Vaginal delivery, n (%)	19 (73)	95 (47)	0.01
APGAR score at 5 min, median (IQR)	8 (7-9)	8 (7-9)	0.55
Received any blood transfusion, n (%)	8 (31)	111 (55)	0.02
Number of blood transfusion, median (IQR)	0 (0-1)	1 (0-1)	0.03
Culture proven sepsis (blood, urine or cerebrospinal fluid), n (%)	1 (4)	35 (17)	0.08
Positive malaria parasitemia, n (%)	5 (19)	14 (7)	0.03
Highest respiratory support, n (%)			
• Nasal cannula	2 (8)	10 (5)	0.92
• CPAP/NIPPV	22 (85)	171 (86)	
• Mechanical ventilator	0 (0)	1 (1)	
Duration of respiratory support, days, median (IQR)	7 (3-32)	7 (4-13)	0.46
Feed type			
• Breast milk only	16 (64)	118 (61)	0.67
• Formula only	2 (8)	9 (5)	
• Mixed	7 (28)	67 (35)	
Time to full volume feeds, days, median (IQR)	8 (5-11)	9 (6-13)	0.29
Use of human milk fortification, n (%)	2 (8)	6 (3)	0.45
Maternal age, years, mean (SD)	28 (7)	32 (7)	0.02
Married women, n (%)	23 (89)	194 (96)	0.09
Use of prenatal steroids, n (%)	11 (42)	92 (46)	0.76
Study site, n (%)			
• Site A	6 (23)	82 (41)	0.001
• Site B	14 (54)	42 (21)	
• Site C	6 (23)	78 (39)	

Table 2: Multivariate Logistic Regression Model of Predictors of Extrauterine Growth Failure

Predictor	Odds Ratio, 95% CI
Length of stay	1.2 (1.1-1.3)
Birth weight Z-score	0.03 (0.01-0.1)

Conclusions: Post-natal growth failure is common in preterm infants who survive to hospital discharge. Each additional hospital day increased the odds while every point increase in birth Z-score reduced the odds of post-natal growth failure.