

CROWN HEEL LENGTH MEASUREMENT USED FOR IDENTIFICATION OF LBW BABIES

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Abstract

The present study was undertaken at the Neonatal Unit, Department of Pediatrics, S.N. Medical College, Agra; from September 2005 to August 2007 to find out foot length measurement as an effective screening tool in the identification of low birth weight babies. Foot-length measurement is a cheap, easy to use, less prone to errors with no requirement of a technical aid or expertise and there is no necessity for any form of equipment or facility. The incidence of LBW babies was 45.82% with 65.9% Term SGA and 34.1% pre-term babies. Mean values for crown heel length, occipito-frontal circumference, chest circumference, mid-arm circumference and foot length were 47.4 ± 1.86 cm, 33.26 ± 1.28 cm, 31.08 ± 1.64 cm and 7.62 ± 0.26 cm respectively.

Key Words: LBW babies, Crown heel length, Neonatal and pre-term babies.

Introduction:

LBW is the single most important factor determining the survival chances of the child. Many of them die during their 1st year. The infant mortality rate is about 20 times greater for all LBW babies than for other babies. The lower the birth weight, the lower is the survival chance. Many of them become victims of protein-energy malnutrition and infection. LBW is thus an important guide to the level of care needed by individual babies.¹⁻³ LBW also reflects inadequate nutrition and ill-health of the mother. There is strong and significant positive correlation between maternal nutritional status and the length of pregnancy and birth weight. A high percentage of LBW therefore points to deficient health status of pregnant woman, inadequate prenatal care and the need for improved care of newborn.⁴

The Neo-natal mortality rate (NMR) of 43 per 1000 live births in India is exceeding high when compared to < 5 in developed countries. At least 17 million infants are born every year with low birth weight, representing about 16% of all newborns in developing countries. Nearly 80% of all intrauterine growth retarded newborns who are low birth weight and full term are born in Asia⁵ (mainly south-central Asia, with Bangladesh having the highest rate in the world (50%). Although there are many qualitative and quantitative limitations to available data, it is clear

that many developing countries exceed the internationally recommended cut-off levels which should trigger public health action. Incident rates of > 15% for low birth weight⁶ and > 20% for intrauterine growth retardation indicate a major public health problem.

2. EXPERIMENTAL METHODS:

2.1 ANTHROPOMETRIC MEASUREMENTS:

The study was conducted on five hundred and fifty newborns of either sex. The newborns were taken from the Neonatal Intensive Care Unit (NICU) of Department of Pediatric and those present in the post-natal and post-operative ward of Department of Obstetrics and Gynaecology, S.N. Medical College and Hospital. Agra. The study was conducted from September 2005 to August 2007.

Anthropometric measurements including Birth weight⁶, foot-length⁷ was recorded for all the newborns.

2.2 HISTORY:

A detailed maternal history from all cases was taken⁸⁻¹⁰.

- Age of mother at marriage and 1st pregnancy.
- Socio-economic status.
- Educational status of mother.

- Nutritional intake before and after the onset of pregnancy.
- Birth order of the newborn.
- Maternal weight and height.

2.3 SYSTEMIC EXAMINATION:

2.3.1 Anthropometric Examination:

1. Birth Weight :

Recorded on a beam type detects scale with an accuracy of ± 25 grams. The newborn was measured within 24 hours without clothes after correction of zero error. A minimum of three observations were taken to avoid observational error⁶.

2. Foot length :

Foot-length was measured with a 15 cm long steel tape. Heel of the neonates was fixed against vertical small tip of the tape and foot length estimated against the tip of the big toe after straightening the foot⁷.

2.4 STATISTICAL ANALYSIS:

The statistical tests applied were¹¹⁻¹²:

- Pearson's coefficient of correlation
- Combination matrix
- Regression analysis
- Paired 't' test
- Chi-square test

The statistical analysis was carried out by using SPSS version 12.1 for windows.

3. RESULT AND DISCUSSION:

3.1 Observations:

The present study was conducted in the Department of Pediatrics, S.N. Medical College & Hospital, Agra. Five hundred and fifty newborns of either sex were studied. Anthropometric measurements including birth weight and foot-length were recorded on all the newborns within 24 hours of delivery. The study group newborns comprised a majority i.e. 464 (84.37%) terms babies and only 86 (15.6%) were preterm.

Table 1: Distribution of cases according to maturity status

Maturity status	No. of cases (n)	Percentage (%)
Preterm	86	15.63
Term	464	84.37
Total	550	100

Table 2: Distribution of cases according to gestational age

Gestation age weeks)	No. of cases (n)	Percentage (%)
<28	6	1.09
28-34	23	4.18
34-37	57	10.36
37-40	460	83.64
>40	4	0.73
Total	550	100
Mean \pm SD	38.62 \pm 1.58	

Table-2 shows distribution of cases according to gestational age. Maximum cases 460 (83.64%) belonged to term gestation between 37-40 weeks followed by 57 (10.36%) cases between 34-37 weeks and 23 (4.18%) cases had a gestational age < 28 wks. While only 0.73% cases had a gestational age > 40 weeks. The mean gestational age was 38.62 \pm 1.58 weeks.

Table 3: Distribution of LBW cases according to maturity status

Maturity status	No. of cases (n)	Percentage (%)
Preterm	86	34.1
Term (SGA)	166	65.9
Total	252	100

The above table shows that a majority 166 (65.9%) LBW cases were term SGA and only 86 (34.1%) preterm babies.

Table 4: Distribution of cases according to crown heel length

Crown heel length (cm.)	No. of cases (n)	Percentage (%)
<38	23	4.18
38-42	87	15.82
42-46	154	28.18
46-50	251	45.45
>50	35	6.36
Total	550	100
Mean \pm SD	47.4 \pm 1.86	

5. SUMMARY AND CONCLUSION:

The present study was undertaken at the Neonatal Unit, Department of Pediatrics, S.N. Medical College, Agra; from September 2005 to August 2007 to find out foot length measurement as an effective screening tool in the identification of low birth weight babies. Various anthropometric measurements were recorded on 550 (Five hundred fifty) newborns within 24 hours of birth. The incidence of LBW babies was

45.82% with 65.9% Term SGA and 34.1% pre-term babies. Mean values for crown heel length, occipito-frontal circumference, chest circumference, mid-arm circumference and foot length were 47.4 ± 1.86 cm, 33.26 ± 1.28 cm, 31.08 ± 1.64 cm and 7.62 ± 0.26 cm respectively. Foot length of 6.26, 6.88 and 7.4 cm were identify from linear regression analysis as the cutoff point corresponding to a birth weight of 1500, 200 and 2500 gms respectively. Highest correlation ($r = 0.863$) was observed with foot length with regards to birth weight as compared to other anthropometric measurements.

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