Assessment of Anthropometric Measurements in Newborn Babies

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ABSTRACT
The scientific study of measurements is referred to as anthropometry. Anthropometric measures of neonates are an important clinical technique for diagnosing newborns that are unusually large or petite. The birth weight and length of a full-term child can vary significantly. Different parts of the world use specific norms and practices. The significant variations in the typical height and weight ranges among different ethnic groups make it impractical to utilize the standards created by Western workers in this nation. This potential study was conducted at the anatomy department of a hospital. A total of 360 live singleton babies delivered between 28 and 42 weeks of gestation were included in this study. There were a total of 196 males and 164 females within the group. Individuals with congenital defects, diabetes, hypertension (diastolic blood pressure greater than 90 mmHg on two readings) and any other chronic diseases were prohibited from giving birth to infants. Anthropometry includes measurements such as head circumference, chest circumference, birth weight and the length from the crown to the heels. A grand number of 360 infants were included in this study. Among them, 196 persons were male, making up 54.44% of the total, while 164 individuals were female, accounting for 45.56%. In this study, the weight values corresponding to the 5th and 95th percentiles for gestational age greater than 37 weeks were 2280 grams and 3600 grams, respectively. Similarly, at gestational ages above 37 weeks, the 5th and 95th percentiles for length were 46.8 cm and 53.6 cm, respectively. Likewise the 5th and 95th percentiles for head circumference were 31.4 cm and 36 cm, respectively. The chest size was 29.6 cm at the 5th percentile, 29.6 cm at the 95th percentile, and 33.9 cm for gestational age over 37 weeks. The results of the five measurements head size, chest size, heel length at the top and birth weight provide the information and benchmarks necessary for the care of newborns.

INTRODUCTION

The scientific study of measurements is referred to as anthropometry. Anthropometric measures of neonates are an important clinical technique for identifying newborns that are unusually large or tiny[1]. The aim of this study was to find out the typical physical measurements of infants in northern India and to identify any connection between these measurements and characteristics related to the mother and father[2]. This is the most cost-effective, non-intrusive, portable and widely applicable method for estimating the measurements, mass and composition of the human body. The assessment predicts performance, long-term well-being and survival while indicating nutritional status and overall health[3].

The birth weight and length of a full-term child can vary significantly. Different parts of the world use specific norms and practices. The significant variations in the typical height and weight ranges across different ethnic groups prevent the use of standards created by Western professionals to this country. Several factors contribute to these differences, including poverty, dietary patterns, digestive and other diseases, and a lack of health knowledge, all of which result in malnutrition and impaired growth[4-7].

Anthropometric measurement standards can be found extensively in the literature. Regarding infants from the perspective of the Western world. Achar and Yankauer[8], Singh and Venkatachalam[9], Ghosh *et al*.[4] Prasad[5], Paul and Ahluwalia[6], Lenskaye *et al*.[7] and Athavale[10] have also made significant contributions in India. Because this measurement relies on ethnic, cultural and regional factors, it cannot be universally used. Eleven Thus the aim of this study was to establish guidelines for the anthropometric measurements of our infants.

MATERIALS AND METHODS

The study was conducted in the Anatomy department of a teaching hospital. A total of 360 consecutive live singleton children born between 28 and 42 weeks of gestation were included in this study. Among them, 196 were males and 164 were females. Infants with congenital abnormalities and those born to mothers with elevated blood pressure (diastolic BP >90 mm Hg on 2 assessments), diabetes, and any other chronic conditions were excluded.

Anthropometry:

- **Birth weight:** The weight of the baby at birth was measured in grams using an electronic scale, with a margin of ±10 gm, within 12 hours following birth
- **Crown-heel Measurement:** The crown-heel measurement was taken using an infantometer,

with a precision of 0.1 cm. The infant was reclining, with their knees completely straightened and the bottoms of their feet securely pressed against the footboard. The infant's head was in contact with the stationary board
- **Head Circumference:** The head circumference was measured by placing a tape that does not extend over the back of the head at the occipital protuberance and the front at the supraorbital ridges
- **Chest Circumference:** It was measured at the level of the nipple using a tape that does not stretch

The new Ballard scoring method was used to evaluate the gestational age. Statistical methods were employed to compute the average, variability, and distribution values for important body measurement indicators among different stages of pregnancy.

RESULTS AND DISCUSSIONS

The study was carried out on a total of 360 newborns in total. Among them, there were 196 males, representing 54.44% of the total, while the number of females was 164, comprising 45.56% of the overall population. In this research, the 5th and 95th percentiles for weight (Table 1) were 2280 grams and 3600 grams for gestational age over 37 weeks, respectively. In Table 2 the 5th percentile for length was 46.8 cm and the 95th percentile for length was 53.6 cm for gestational age over 37 weeks. In Table 3, it is clear that the 5th and 95th percentiles for head circumference were 31.4 cm and 36 cm for gestational age greater than 37 weeks, respectively. Table 4 shows that the 5th percentile for chest circumference is 29.6 cm, whereas the 95th percentile for chest circumference is 29.6 cm for gestational age greater than 37 weeks and 33.9 cm.
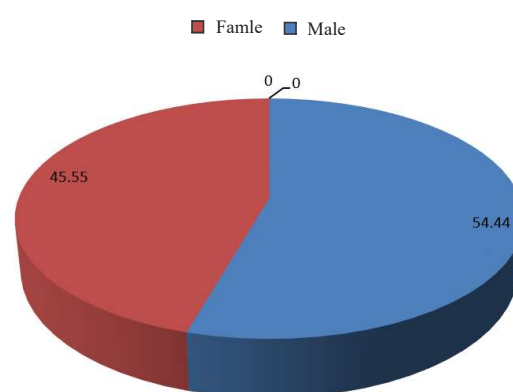

Fig. 1: Distribution of patients by gender

Table 1: Percentile values for weight

Gestational age	Percentiles for weight (gm)				
	5th	10th	50th	90th	95th
28-32 weeks	1220	1340	1720	1960	2020
33-37 weeks	2010	2010	8360	2650	3400
>37 weeks	2280	2440	2800	3380	3600

Table 2: Percentile values for length

Gestational age	Percentiles for length (cm)				
	5th	10th	50th	90th	95th
28-32 weeks	38.22	39.46	42.8	44.2	45
33-37 weeks	45.2	45.2	47	48	48.6
>37 weeks	46.8	48.2	51.1	53	53.6

Table 3: Percentile values for head circumference

Gestational age	Percentiles for head circumference (cm)				
	5th	10th	50th	90th	95th
28-32 weeks	24.4	25.1	28	29.4	30
33-37 weeks	30.1	30.1	32	33.6	34.4
>37 weeks	31.4	32.3	34.3	35.4	36

Table 4: Percentile values for chest circumference

Gestational age	Percentiles for chest circumference (cm)				
	5th	10th	50th	90th	95th
28-32 weeks	24.3	24.8	27.1	28.1	28.3
33-37 weeks	28.6	28.6	30.1	31.2	33
>37 weeks	29.6	30.2	32.3	34	33.9

A grand total of 360 infants were part of this research, with 196 being boys and 164 being girls. In this study, we have tried to establish benchmarks for our population. This study discovered the mean weight, length and head circumference of a cohort of newborn infants. The findings of our study on the growth parameters of newborn infants align with the data reported by Abdel Rahman and Ibrahim. A study was carried out in 2010 on 310 Sudanese infants, 11 where their growth statistics were compared to those from a study conducted in 1982[12,13]. In 2006, the World Health Organization updated its growth charts and released a new set of growth standards that were designed to be more appropriate for nations with less development[14]. A survey carried out by the World Health Organization (WHO) at several places revealed that the average birth weight for babies in India, Nepal and Sri Lanka was 2630, 2780 and 3840, respectively[15].

We have analyzed the birth weight, height, cranial size and chest size of the babies. The weight of a newborn is not only an important component in determining their likelihood of survival, growth, and development but it also acts as a key indicator of their general health, nutrition, and the quality of prenatal care delivered[16]. Several authors in our country have previously conducted research on it[17,18]. In this study, we did not investigate maternal attributes such as socioeconomic status, consanguinity, gravid status, and paternal factors that might impact birth weight. Thus, we cannot merely consider the difference in average birth weights observed in various research. Nevertheless, insufficient nourishment during

pregnancy can perhaps account for the reduced levels observed in our study. This is also seen as an important component that affects birth weight in the later stages of pregnancy. The measurement of a newborn's height is often used to assess prenatal growth and identify infants who require extensive testing and close supervision in the neonatal period[19]. We have analyzed the size of the crown's heel. It has also been analyzed by several authors in our country previously. Our study suggests that the length of the body is less affected by malnutrition in the womb when compared to body weight. The literature indicates that body length is a more dependable measure of fetal age than body weight in later stages. The height of both parents may influence the length of newborns.

Cranial size is an important predictor of diagnostic and prognostic information that goes beyond what is provided by birth weight alone, similar to birth length[20]. Several writers in our nation have also carried out research on cranial size. Similarly, the rate at which the size of the fetus's chest may fluctuate can be used as a fast and reliable method to identify potential health problems for both the fetus and the mother[21].

CONCLUSION

The results from five measurements, including birthweight, crown heel length, head size and chest circumference, provide important information and recommendations for the care of infants. These body measurements are helpful for both epidemiological and clinical objectives. From a medical standpoint, anthropometry is a technique employed to identify neonates who may be more prone to health problems throughout the neonatal and postnatal stages, as well as to track their developmental development. It is necessary to determine the usual range of body dimensions in infants in order to accurately assess their birth weights, lengths and head circumferences. A comprehensive evaluation of the baby should encompass anthropometric measurements upon birth, as well as fetal ultrasonography and Doppler velocimetry. Currently, further clinical studies are needed to get a consensus on how to combine neonatal and prenatal data in order to distinguish between different neonates.

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