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Research Article

Anthropometric Profile of Children Attending a Tertiary Care Paediatric Clinic in Southern India

Vadlamudi Jaswanthi Durga[1]*, Pothireddy Saipriya[1], Edwin Dias[2] and Shreyas TS Phayde[3]

[1]Junior Resident, Department of Pediatrics, Srinivas Institute of Medical Sciences, Mangalore, Karnataka, India

[2]Professor and HOD, Department of Pediatrics, SIMS and RC, Mangalore, Karnataka, India

[3]Senior Resident, Department of Pediatrics, SIMS and RC, Mangalore, Karnataka, India

***Corresponding Author:** Vadlamudi Jaswanthi Durga, Junior Resident, Department of Pediatrics, Srinivas Institute of Medical Sciences, Mangalore, Karnataka, India.

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Abstract

Background: Anthropometry plays a vital role in assessing growth, nutritional status, and overall health of children and adults in India. As a developing country with diverse socioeconomic and cultural backgrounds, India faces a dual burden of undernutrition and obesity. Anthropometric measurements such as height, weight, body mass index, head circumference, and mid-upper arm circumference are essential tools for early identification of malnutrition, stunting, wasting, and growth abnormalities. These measurements help in monitoring child development, planning public health programs, and evaluating the effectiveness of nutritional interventions. Therefore, anthropometry is indispensable in improving healthcare outcomes and promoting healthy growth in the Indian population.

Methods: A cross sectional descriptive study done in pediatric OPD in a tertiary care hospital, Southern India. Anthropometric parameters of 100 children attending routine clinical visits including weight, length/height and head circumference were measured according to standard procedures. These values are plotted in WHO growth charts and compared with international and previously published regional norms.

Results: Maximum participants belong to age group of 0 - 6 months (82%) while most of the children fall within normal ranges of percentile for WHO weight for age centiles. The cohort demonstrated a mean weight of 5.26 kg with a standard deviation of 2.8 kg mean length of 59.6 cm with a standard deviation of 15 cm and mean head circumference is 36.0 cm with standard deviation of 3 cm.

Conclusion: The study findings demonstrate that the majority of patients had anthropometric measurements within the normal ranges of the WHO percentile charts, indicating generally appropriate growth patterns in the study population. Strong positive correlations were observed between age and all anthropometric parameters, indicating consistent growth trends across the study population.

Keywords: *Anthropometric Parameters; Growth; Children*

Introduction

Anthropometry, derived from two Greek words; anthropos-"man" and metros-"measurement" is a branch of anthropology that involves the quantitative measurement of the human body [5]. The core elements of anthropometry are height, weight, head circumference, Weight for height/ length, body mass index (BMI), body circumferences to assess for adiposity (waist, hip, and limbs), and skin fold thickness. Anthropometric measurements in pediatric populations are vital indicators of growth, nutrition, and health status. According to the American Academy of Pediatrics and the Child Health and Disability Prevention (CHDP) Program Health Assessment Guidelines, accurate serial anthropometric measurements can help identify underlying medical, nutritional, or social problems in children [4]. While internationally recognized growth standards, such as those from the WHO, provide valuable benchmarks, regional differences in genetics, nutrition, and socioeconomic contexts necessitate local growth references [2]. Periodic updates identify growth trends and detect deviations. WHO recommends global standards, but local curves better capture regional/genetic influences. This study evaluates the anthropometric profiles of pediatric patients from a clinic in Southern India to highlight regional trends.

Objectives of the Study:

1. To measure weight, length, and head circumference in children attending a tertiary care clinic in Southern India.
2. To establish local percentile values and compare them with WHO growth standards and previously published regional references.

Materials and Methods

The present study is a cross sectional descriptive study done in pediatric OPD in a tertiary care hospital, Southern India. After obtaining permission from the institutional ethical committee (IEC) samples were collected. A total of 100 pediatric patients attending outpatient department, including boys and girls between age group of newborns to 12 years have been included in the study. Children with birth defects and who do not give consent for the study has been excluded from the study. Informed consent was taken before examining the child. Anthropometric parameters of children including weight, length/ height and head circumference were measured according to standard procedures by the primary author during their routine clinical visits. These values are plotted in WHO growth charts and compared with international and previously published regional norms for accurate Paediatric assessment.

Statistical analysis

Data was entered in MS excel analyzed by Statistical Package for Social Sciences (SPSS) software version 16. Descriptive statistics, including means, standard deviations, and percentiles (3^{rd}, 10^{th}, 25^{th}, 50^{th}, 75^{th}, 90^{th}, and 97^{th}) were calculated. Outliers and correlations between parameters and age were explored.

Results

A total of 100 children participated in this study. The age wise distribution among children can be seen in table 1, as maximum participants belong to age group of 0 - 6 months (82%) while most of the children fall within normal ranges of percentile for WHO weight for age centiles.

Variable	Mean	SD	3rd	10th	25th	50th	75th	90th	97th
Weight (kg)	5.8	2.8	2.3	2.6	3.5	5.6	8.3	10.4	10.6
Length (cm)	74	15	55	60	65	72	89	89	89
Head Circumference (cm)	37	3	34	34	35	36	40	41	41

Table 1: *Anthropometric measurements: Mean, standard deviation, and percentile distribution.*

The cohort demonstrated a mean weight of 5.26 kg with a standard deviation of 2.8 kg mean length of 59.6 cm with a standard deviation of 15 cm and mean head circumference is 36.0 cm with standard deviation of 3 cm. Strong positive correlations existed among all anthropometric measures and age ($r > 0.95$). Most patients were under 6 months, with a minority representing older age groups. Several statistical outliers exceeding the 97th percentile were identified. Compared to international and Turkish references, the broader age range yielded higher mean values.

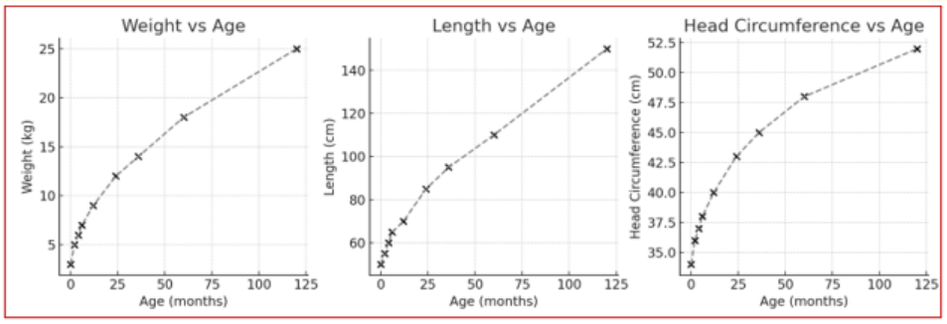

Figure 1: *Scatter plots showing the relationship of weight, length, and head circumference with age. The plots demonstrate age-related increases in anthropometric measures, with most values clustering within normal ranges.*

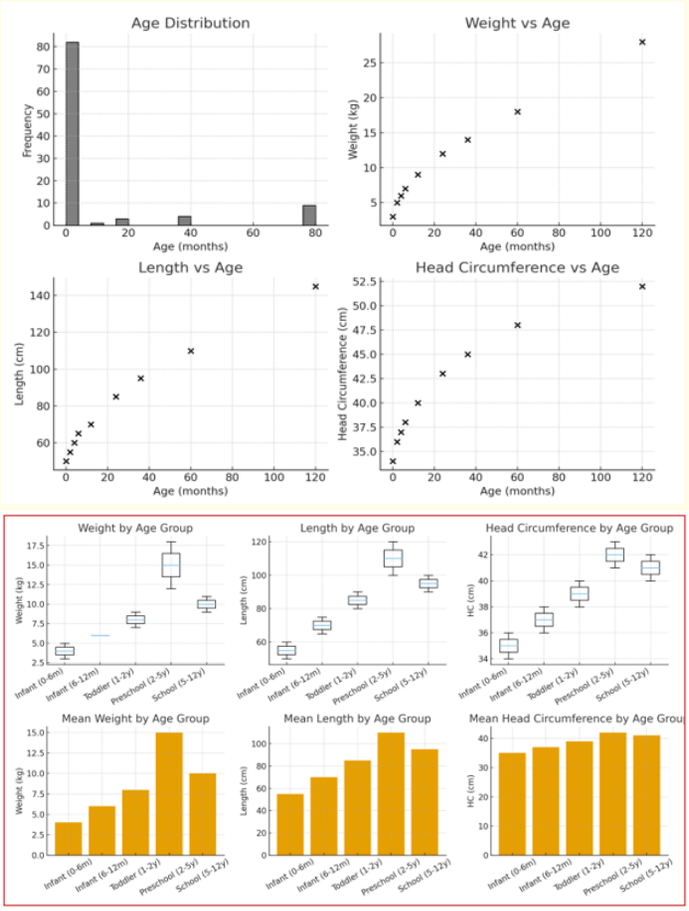

Figure 2: *Box plots (Top row) and bar charts (Bottom row) showing weight, length, and head circumference across age groups. Growth parameters increase progressively with age, with expected variability in older children.*

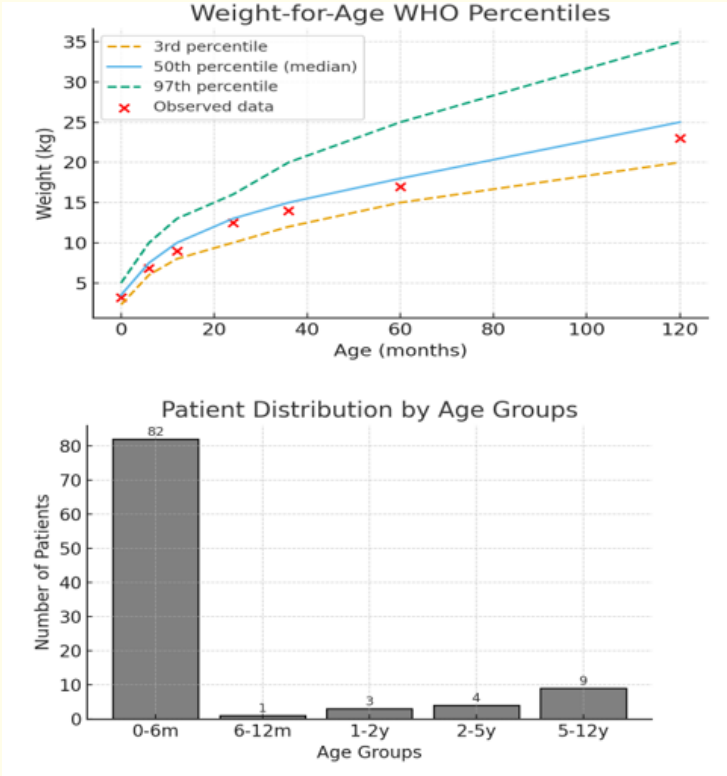

Figure 3: *WHO percentile chart findings: Most patients fall within normal ranges while some outliers lie above the 97th percentile. Dataset is heavily skewed toward newborns (0-6 months: 82 patients). Visualizations show normal growth patterns with age-related increases in all measurements.*

Discussion

In the present study, weight, length, and head circumference were assessed in 100 children attending a pediatric clinic in Southern India, ranging from neonates to 12 years, though the majority (82%) were infants aged 0 - 6 months. This age clustering significantly influenced overall mean values and percentile distribution.

Our study demonstrated progressive increases in all anthropometric parameters with age, consistent with established pediatric growth physiology. Weight ranged from 1.68 - 32.4 kg, length from 42 - 142 cm, and head circumference from 30 - 54 cm, indicating a wide representation of developmental stages.

When compared with the study by Telatar., *et al*. [1] which evaluated term neonates and reported a mean birth weight of 3.33 kg and mean length of 48.3 cm, our observed averages were comparatively higher. This difference is expected because our sample included not only neonates but also infants, toddlers, and older children up to 12 years. Therefore, direct comparison of pooled means is limited, emphasizing the importance of age-stratified analysis. Comparison with WHO Child Growth Standards showed that most participants clustered within normal percentile ranges, suggesting overall satisfactory growth among the clinic population. However, a few children exceeded the 97th percentile, possibly reflecting early overnutrition, familial macrosomia, or constitutional growth variation. Such outliers warrant further longitudinal follow-up to exclude obesity, endocrine disorders, or syndromic causes. A notable finding in our study was

the heavy skew toward the 0 - 6 months age group. This reflects routine pediatric clinic attendance patterns, where infants are brought more frequently for immunization, growth monitoring, and minor illnesses [6-10].

Conclusion

This study provides preliminary descriptive anthropometric data among children attending a tertiary care centre in Southern India. This study also emphasizes the importance of region-specific growth references to avoid misclassification in pediatric assessments. Although limited by sample size and age distribution, our findings highlight the value of ongoing, localized growth monitoring for optimal pediatric healthcare.

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