Original Article

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Craniofacial Anthropometric Measurement of Full Term Newborns in Tertiary Care Hospital

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Abstract

Introduction: The face is important part of many syndromes of dysmorphogenesis. Main aim of anthropometric studies are to obtain the characteristics of ethnic groups and provide the basis for a comparison among different races. Our study is being conducted totake craniofacial measurements in newborn of rural India and to find corelation between different parameters. It also adds normograms for all the craniofacial anthropometric measurements studied. *Method:* 97 normal neonates comprising 49 male and 48 female were measured 48 hours after birth. The measurement for different cranio-facial dimensions were obtained using verniercalliper and non-stretchable measuring tape. Unpaired 't' test was utilized to compare the parameters. *Result:* The mean value and range for all the parameters was determined.Mean birth weight of studied neonate was 2.52±0.318 and gestational age being 37.95 ±1.27. A statistically significant sexual dimorphism was noted to exist in ear length ($p<0.05$). The mean intercanthal distance was 17.55±3.00 in male and 17.64±2.73 in female, philtrum width were 5.06±1.72 in male and 5.02±1.48 in female and commissural distance were 23.44±4.50 in male and 22.95±3.97 in female. Ear length measurements were 32.46±3.79 in male and 31.25±2.24 in female. *Conclusion:* We here present a reference data set for the newborn population of rural area in India.

Keywords: Newborn; Anthropometric; Craniofacial; Dysmorphogenesis.

Introduction

The literal meaning of anthropometry is the measurement of the human individual for the purpose of understanding physical variation. The face is most important part of many syndromes of dysmorphogenesis [1]. Normative data of facial measurements are very important for knowing degree of deviations from the normal [2]. There are many anthropometric indices of head and face useful in different streams of medical education [3]. Anthropometric measurements are also helpful for other observations in evaluating intrauterine growth, development and in detecting neonatal health problems. The philtrum of the upper lip has a unique dimension and is a characteristic landmark of individual distinction [4]. Since it is frequently involved in disfiguring oro-facial malformations, it is important that a thorough understanding of its anatomical relationships be established so that functional and aesthetic surgical corrections can be accomplished. Another important antropometric parameter is commissural distance which also found to have the best single correlation with the philtrum [5]. Ear length is important in the evaluation of congenital anomaly syndrome such as Down's syndrome. There is impact of geographical location, racial and environmental factors on the growth and body composition. Anthropometric studies are mostly conducted with the aim of obtaining the characteristics of ethnic groups in a particular geographical region. It not only assist in understanding the frequency distribution of human morphologies but also in providing the basis for a comparison among different races [6].

Newborn anthropometric data against which deviations from normal could be assessed are

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generally lacking in developing countries. Aim of our study is to take craniofacial measurements in newborn of rural India and to find correlation between different parameters. It will also help in development of noemogram of craniofacial antropometric parameters of rural India.

Material and Methods

The study was conducted in Department of Pediatrics of Jawaharlal Nehru Medical College, Sawangi (M), Wardha. It was a cross-sectional study undertaken in 3 month (January 2018 to March 2018) duration. Study was started after approval from ethical committee.

Full term (37-40 weeks of gestation) healthy babies born by any means during the period older than 48 hours. Babies devoid of any gross congenital anomalies were included in studyafter a written informed consent from one of the parents (Preferably the mother) of the neonates. Sick Full term neonates admitted in NICU, those with birth weight less than 2 kg and unable to get written inform consent were excluded.

Study Procedure

After getting written informed consent following information was collected: Name, Age (days), Birth weight (kg), Sex, Mode of delivery, Gestational Age (weeks). All neonates have undergone craniofacial measurements with the help of vernier caliper and non-stretchable measuring tape.

Facial measurements were taken by pediatric resident and during daytime, when the cases were sleeping to avoid variation due to facial expression. The head circumference was measured using a non stretchable measuring tape in centimeters. The parameters were measured in millimeters using vernier caliper. Measurements of newborn babies were delayed for 48 hours to allow facial swelling and distortions to recede.

Craniofacial measurements will be under following subheadings:

1. Horizontal parameters
2. Vertical parameters

1. Horizontal parameters (Figure 1)

Head Circumference: The lower edge of measuring tape was placed just above the child's eyebrows, above the ears and around the occipital prominence with the objective of measuring the maximal head circumference [7].

Intercanthal Distance: was measured in mm between the median angles of the palpebral fissures [8].

Philtrum Width: Two points were marked at the base of the philtrum, i.e. at the junction of the vertical ridge of philtrum and vermillion border of upper lip. The width between these points was taken as the philtral width [9].

Commissural distance: was measured between the corners of the mouth [5].

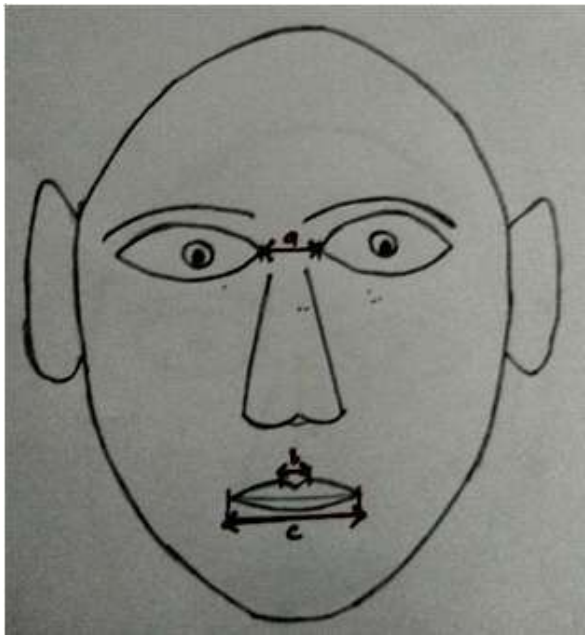

Fig. 1: Measurement of horizontal facial parameters

a = Intercanthal distance
b= Philtrum width
c= Commisural distance

2. Vertical Parameters (Figure 2)

A. Ear Length: from superior to inferior aspects of the ear [10].

B. Philtrum length: from base of columella to midline depression of the vermillion border [11].

C. Lower Lip to Chin: between junction of skin and mucous membrane of lower lip and the lowest point of the chin with mouth closed [11].

D. Nose Length: Nasion to a point at the tip of the nose in line with the upper edge of both nostril [11].

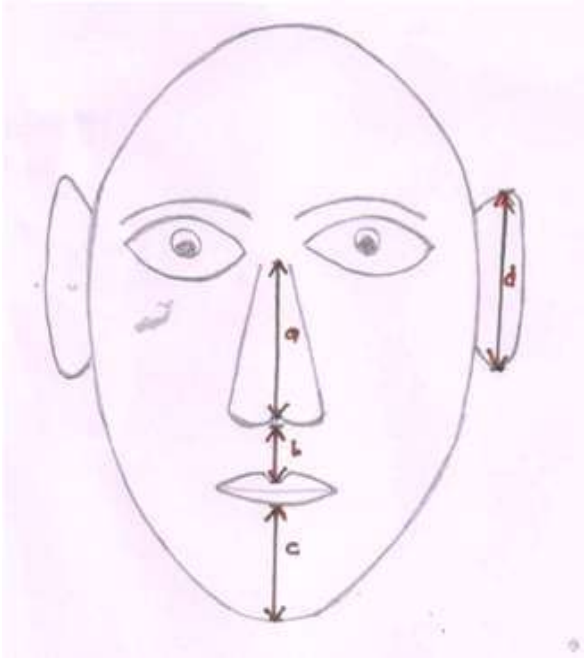

Fig. 2: Measurement of vertical facial parameters

a = Nasal Length
b= Philtrum length
c= Lower lip to chin length
d= Ear length

Statistical Analysis

STATA software was used for statistical analysis. Unpaired 't' test was utilized to compare the parameters as measured for males and females and the 't' distribution table was consulted.

Results

Total 97 neonates were studies. Mean birth weight of studied neonate was 2.52±0.318 and gestational age being 37.95±1.27. Mean head circumference of neonates were 33.44±1.54 with mean head circumference of male was 33.6±1.54 and female 33.26±1.53.

Total 49 male and 48 female were studied. All measurements were taken by vernier caliper except head circumference which was taken by non-stretchable measuring tape. The mean intercanthal distance was 17.55±3.00 in male and 17.64±2.73 in female. Measurements of philtrum width were 5.06±1.72 in male and 5.02±1.48 in female. Readings of commissural distance were 23.44±4.50 in male and 22.95±3.97 in female.

Ear length measurements were 32.46±3.79 in male and 31.25±2.24 in female. Philtrum length were 6.81±1.86 in male and 6.25±2.12 in female.Lower lip to chin measurements were 13.37±3.52 in male and 12.77±3.30 in female. Nose length were 16.31±2.59 in male and 15.95±2.43 in female (Table 1).

Discussion

The present study was conducted to obtain a baseline craniofacial dataset for the newborn population of rural India where it is still lacking. Most important implication of our study is to get normal values of these measurements in healthy subjects which are useful for dysmorphologists in the early identification of some craniofacial syndromes and in planning intervention. There is influence of genetic, cultural, environmental and racial factors on craniofacial landmarks. This implies that local values derived from well-defined populations should be used as reference in the evaluation of a case with dysmorphogenesis. Similar studies were done in different part of India with variation in different geographical population.

In a study by Ghosh A et al. [12] done shows, philtum width was 5.2±0.07, 5±0.08 in male and female respectively where as in our study it was 5.02±1.71 and 5.02±1.48 values being almost close. Another study by Soni P et al. [13] conducted in Himachal Pradesh get values 6.75±0.98 in male and 6.65±0.87 in female. Also variation was found in nose length in these studies as it was 15.3±0.11 and 15±0.14 in a study by Ghosh A et al[12] with values

Table 1: Mean values (standard deviation) and comparison in sexes for neonates

	Total Parameters	Male	Female	p- value
Horizontal parameters (mm)	Intercanthal distance	17.52(3.02)	17.64(2.73)	0.42
	Philtrum Width	5.02(1.71)	5.02(1.48)	0.50
	Commissural distance	23.35(4.50)	22.95(3.97)	0.32
Vertical parameters (mm)	Ear length	32.31(3.66)	31.25(2.24)	0.026
	Philtrum Length	6.72(1.78)	6.25(2.12)	0.09
	Lower lip to chin	13.37(3.52)	12.77(3.30)	0.21
	Nose length	16.31(2.59)	15.95(2.43)	0.24

16.31±2.59 in male and 15.95±2.43 in female in our study whereas it was 21.04±2.31 in male and 20.82±2.00 in female in a study by Soni P. et al. [13].

Agnihotri G et al. [1] reported intercanthal distance was 20.05±1.43, 20.10±1.56 in male and female respectively whereas in our study values these values are 17.52±3.02 and 17.64±2.73 [1]. Soni P. et al. [13] reported that 19.93±1.43 and 19.47±1.93 with values higher than our study. Ear length 32.31±3.66 in male and 31.25±2.24 in female whereas in study by Agnihotri G et al. [1] these are 37.55±2.24 and 35.21±2.61 respectively which was highly significant.

Conclusion

This study is a small initiative for preparing a reference data set for the newborn population of rural area in India and to provide a ready database to Paediatrician. We here present a set of reference value for the newborn population of rural India.

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