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AN ANTHROPOMETRIC RESEARCH ESTIMATING THE CEPHALIC INDEX OF THE PEOPLE OF TELANGANA STATE.

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ABSTRACT

Background: The cephalic index also known as the Cranial Index or Index of breath is an important parameter in craniometrical studies that help to differentiate human races and sex. It is a useful tool in forensic medicine, anthropology, and genetics.

Aim and Objectives: - In the present study attempts have been made to discover the Cephalic index in males and females of Telangana.

Material and Methods: - This study was carried out on 296 males and females of Telangana in the age group 20 – 25 years. Cranial length and breadth were taken and the Cephalic index was calculated.

Results – The mean value for the cephalic index is 78.42 ± 6.75 for males and 81.14 ± 6.66 for females.

Conclusions – The majority of the population in this study group is mesocephalic.

Keywords – Cephalic index, Anthropology, Head Length, Head Breadth.

INTRODUCTION –

The cephalic index analyses racial and gender characteristics within a population. Data on the cephalic index is crucial for designing cranial remodelling bands (or helmets) as durable medical equipment, particularly for treating positional head deformities in infants. These deformities may result from premature birth, restricted intrauterine positioning, cervical abnormalities, birth trauma, torticollis, or sleeping positions. Cranial banding typically begins between 4 and 12 months of age. The cephalic index is also employed to address asymmetry in infants with synostotic plagiocephaly, either as a post-surgical correction or non-surgical treatment [1].

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All measurements are taken with the subjects seated in a chair, in a relaxed state, with the head positioned anatomically. Each measurement is recorded to the nearest millimetre [2, 3]. Head measurements, obtained using a Martin spreading calliper, include:

- Head length: Distance from the summit of the glabella to the furthest occipital point (opithocranium).
- Head breadth: Maximum width at right angles to the median plane, measured from Orion to eurion.

The present study was conducted to find the cephalic index in males and females at the tertiary care hospital of Telangana.

MATERIAL AND METHODS

The present study was conducted in tertiary care hospitals in Telangana, involving a total of 296 participants aged 20-25 years. All participants were exclusively born and raised in Telangana. Among the 296 subjects, 152 were male and 144 were female. To ensure consistency, all measurements were taken by the same individual at a fixed time to avoid diurnal variation.

Head length and head breadth were measured using a spreading calliper with blunt ends while subjects were seated in a relaxed position.

- Head length: The straight distance from the glabella to the inion.
- Head breadth: The maximum transverse diameter between two fixed points over the parietal bones.

All measurements were recorded in centimetres with an accuracy of 0.10 cm. The collected data was entered into a predesigned proforma and statistically analysed using Microsoft Excel and SPSS 20. Data analysis was performed using an independent sample t-test. The cephalic index was calculated using Hardlika's method.

Cephalic Index (CI) = [Cranial breadth/ Cranial Length] X 100.

RESULTS:

In the present study, the majority of the people were female followed by male. Head length in males ranged from 17.0 to 21.2 cm, and head breadth from 13.0 to 18.7 cm. In females, head length ranged from 15.9 to 19.1 cm, and head breadth from 11.0 to 17.0 cm. A statistically significant difference was observed in the mean cranial indices between males and females.

The mean cephalic index was 75.32 ± 5.71 for males and 76.24 ± 6.56 for females, indicating that females had a higher mean cephalic index compared to males.

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In terms of cephalic type, the most common classification in this study was mesocephalic, followed by dolichocephalic and brachycephalic.

DISCUSSION:

In present study, male was 144 followed by female 152 respectively. As per the length of head in male & female, 17.0 to 22.2 & 16.9 to 20.1 with mean average of 20.17 ± 0.85 & 18.68 ± 0.79 (p = 0.001) and both ranging of 16.9 to 22.2 with mean average of 19.32 ± 1.168. the Breadth of head in male & female, 14.0 to 19.7 & 11.0 to 17.0 with mean average of 15.43 ± 0.82 & 13.40 ± 1.002 (p = 0.001) and both ranging of 12.0 to 17.7 with mean average of 14.79 ± 1.149. and Cephalic Index in male & female, 63.42 to 103.44 & 64.32 – 98.61 with mean average of 78.42 ± 6.75 & 81.14 ± 6.66 (p = 0.221) and both ranging of 61.33 – 100.54 with mean average of 76.74 ± 6.26 (Table 2).

Based on the type of cephalic, in male majority of cephalic index observed was mesocephalic 66 (45.83%) followed by Dolichocephalic 54 (37.5%), Brachycephalic 16 (11.11%), Hyperbrachycephalic 04 (2.77%), Hyperdolichocephalic & Ultrabrachycephalic 02 (1.38%). (Table 3).

In female majority of the cephalic index observed was Mesocephalic 64 (42.10%), followed by dolichocephalic 36 (23.68%) brachycephalic 34 (22.36%), Hyperdolichocephalic & Hyperbrachycephalic 02 (5.26%) and ultrabrachycephalic 02 (1.31%) respectively (Table 4)

Among the participants, the mesocephalic head shape was the most common, followed by dolichocephalic and brachycephalic types. Bhargave and Kher (1960) [4] reported a mean cephalic index of 76.98 in their study on the Bhil population of Madhya Pradesh. In a subsequent study on the Barelas of Central India (1961), [5] the same authors found a mean cephalic index of 79.80.

In our study, the mean cephalic index for males was 75.32, while for females, it was 76.24. Megha Mishra et al. (2014) [6] found a mean cephalic index of 75.84 for males and 79.21 for females, with a predominance of the mesocephalic head type. Our findings are consistent with those of Megha Mishra et al., and Shah and Jadhav [7], who observed a cephalic index of 80.81 in the Gujarati population. Anitha Vijayanath et al (2022) [8]. reported a cephalic index of 79.72 in their study on a northern-origin population.

CONCLUSION:

The present study, conducted on the population of Telangana, revealed a predominance of the mesocephalic head type. While the mean cranial index for females was higher than for males, the difference was not statistically significant. This data provides valuable insights for

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anthropologists and forensic experts, aiding future anthropological research and assisting in the identification of unknown bodies in forensic investigations.

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Table 1 Tabular column represents the gender difference.

Gender	Number of patients	Percentage of patients
Male	144	48.64%
Female	152	51.35%
Total no of patients	296	100.00%

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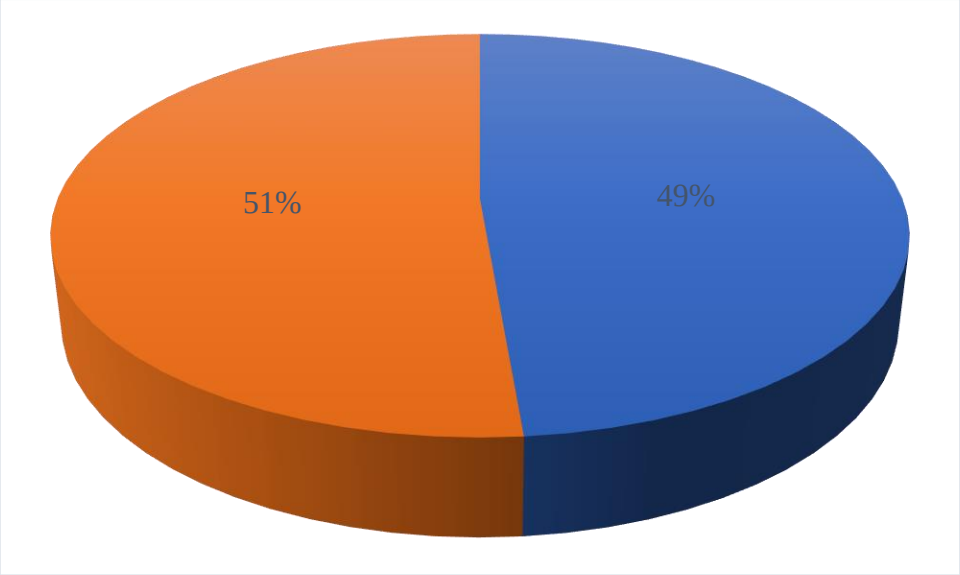

Table 2: Description statistic showing different parameters.

Variables	Male (MD ± SD)	Female (MD ± SD)	Both male and female (MD ± SD)	P value
Head Length	20.17 ± 0.85	18.68 ± 0.79	19.37 ± 1.168	P = 0.001
Head Breadth	15.43 ± 0.82	13.40 ± 1.002	14.79 ± 1.149	P = 0.001
Cephalic Index (Male)	78.42 ± 6.75	81.14 ± 6.66	76.74 ± 6.26	P = 0.221

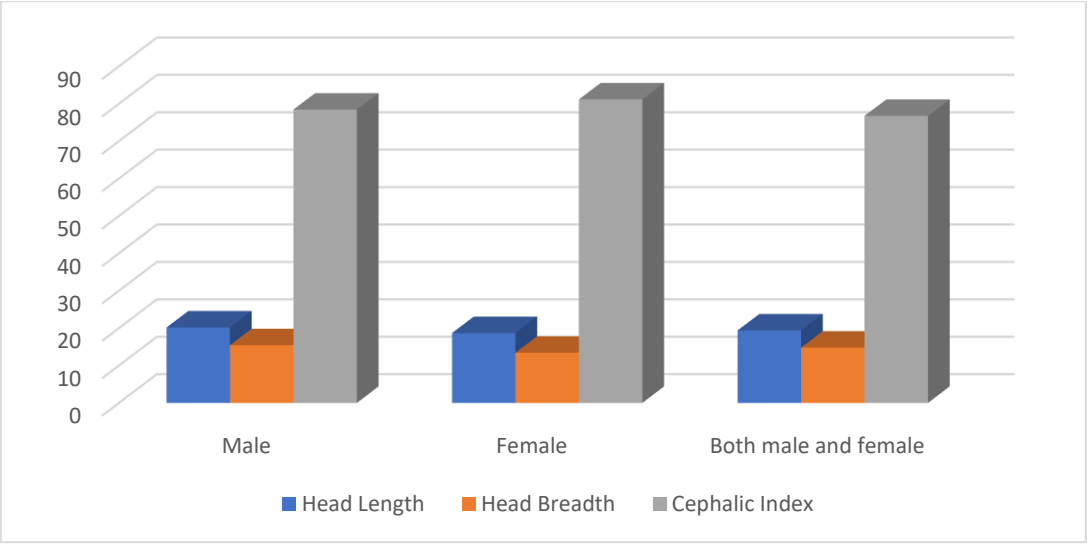

Table 3: Types of cephalic with its index in male.

Types	Cephalic index	Number of males	Percentage number of males
Ultradolichocephalic	55.0 to 59.9	00	00
Hyperdolichocephalic	60.0 to 64.9	02	1.38%

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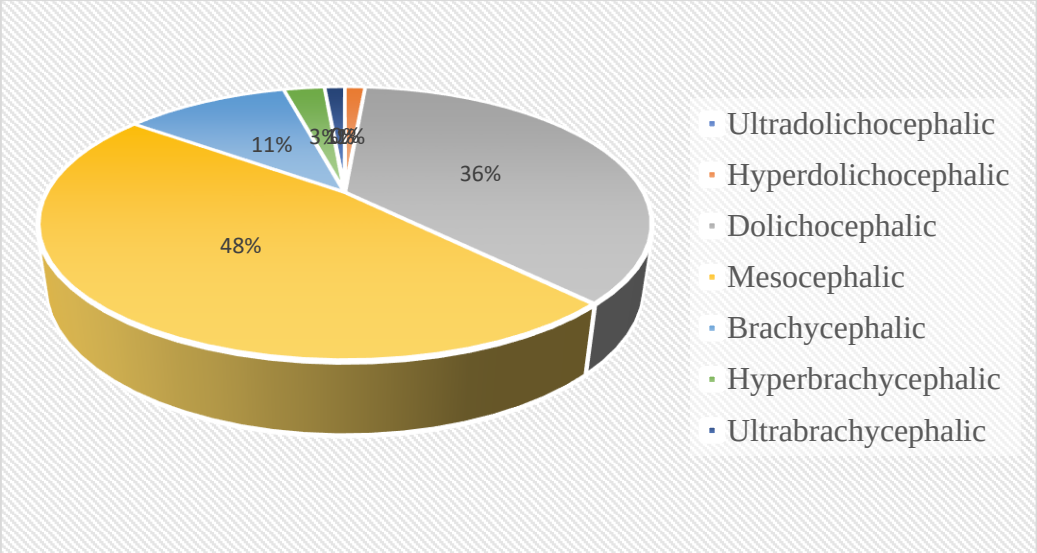
Dolichocephalic	65 to 74.9	54	37.5%
Mesocephalic	75 to 79.9	66	45.83%
Brachycephalic	80 to 84.9	16	11.11%
Hyperbrachycephalic	85 to 89.9	04	2.77%
Ultrabrachycephalic	>90.0	02	1.38%
Total		144	100%



Pie diagram represents the percentage in cephalic index in male

Table 4: Types of cephalic with its index in female.

Types	Cephalic index	Number of Female	Percentage number of female
Ultradolichocephalic	55.0 to 59.9	00	00
Hyperdolichocephalic	60.0 to 64.9	08	5.26%
Dolichocephalic	65 to 74.9	36	23.68%
Mesocephalic	75 to 79.9	64	42.10%
Brachycephalic	80 to 84.9	34	22.36%
Hyperbrachycephalic	85 to 89.9	08	5.26%
Ultrabrachycephalic	>90.0	02	1.31%
Total		152	100%

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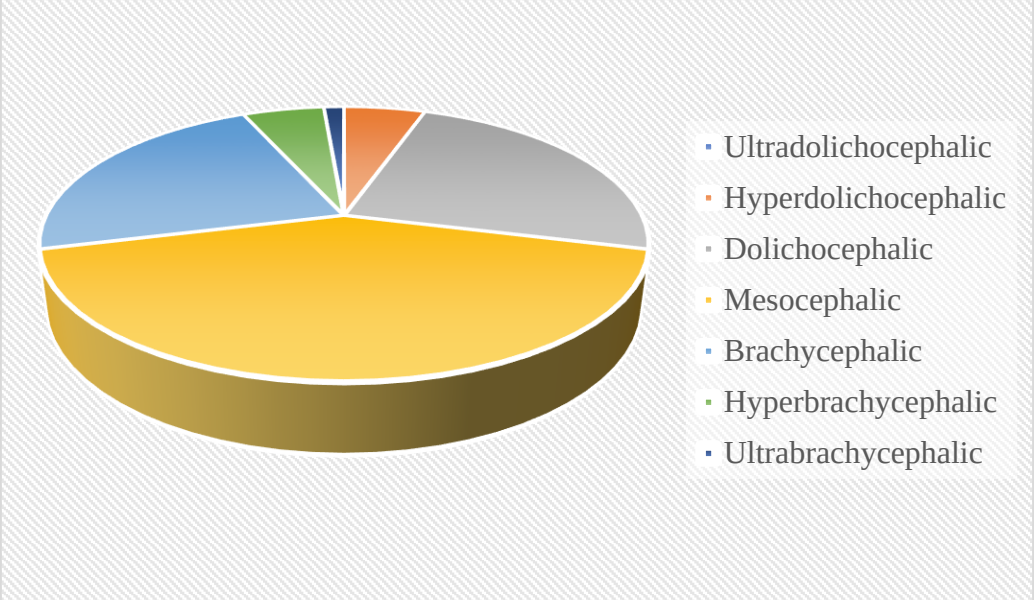

Pie diagram represents the percentage in cephalic Index in female