

# AN ANTHROPOMETRIC STUDY OF CEPHALIC INDEX AMONG SCHOOL GOING CHILDREN'S IN TRIBAL BELT OF CHHATTISGARH, INDIA.

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## ABSTRACT:

**Background:** All living beings undergo changes in varying degrees during their life and the features are variable in the individuals of the same species. No two persons are similar in their measurable character. Anthropometry evolved as a standard scientific technique for measuring human body dimensions. The cephalic index is calculated as the breadth of the skull multiplied by 100 divided by the length.

**Aim:** To evaluate the cephalic index by anthropometric measurement in tribal belt school going children's.

**Materials and Methods:** 500 healthy students in three tribal belt school children's of the age 9 – 15 years of both sexes were selected at random in the study. Head length and breadth was measured using a spreading caliper. Those students with any history of bone diseases like Rickets and Osteomalacia, any obvious physical deformity, cranial trauma & obstructive hair style and students from other states, affecting the result, was excluded from the study.

**Result:** Dominant type of Head shape in tribal students showed more in hyperbrachycephalic. The mean Cephalic index is 83, in Male is 82 and in Female is 83. The mean Head length in Male is 20 cm, in Female is 22 cm. The mean Head breadth in Male is 18 cm, in Female is 20 cm.

**Conclusion:** In tribal student we observed significant gender difference in Cephalic index. This present research immense important for anthropology, comparative and evolutionary studies, forensic science and upcoming scientist.

**Key Words:** Tribal belt, Spreading calipers, anthropometric, Dominant, Evolutionary studies.

## INTRODUCTION:

Cephalic Index is the terminology used in Anthropology for having in easy identifying module or numerical to distinguish the given sample or individual, either into race or sex or even as identity of the individual<sup>1</sup>. The cephalic index was defined by Swedish professor of Anatomy (1796- 1860) and first used in physical anthropology to classify ancient human remains found in Europe. Cephalic index also called as cranial index or index of breadth is one of the important parameter that helps to differentiate between different human races<sup>2</sup>.

The cephalic index is calculated as the breadth of the skull multiplied by 100 divided by the length. Cephalic index is classified in five broad categories – dolichocephalic (<75), mesocephalic (75-80) and brachycephalic (80-85), Hyperbrachycephalic (85 – 90), Ultrabrachycephalic (> 90). Australian aborigines and native southern Africans are dolichocephalic, Euroeans and the Chinese skulls are mesaticephalic and Mongolians and Andaman Islanders have brachycephalic skulls<sup>3</sup>. Human body dimensions are affected by ecological, geographical, racial, sex and age factors<sup>4</sup>. Change in cephalic index with increasing age of fetus has been reported<sup>5</sup>.

Presently so many references are available in this subjects. C.I. is commonly used to describe individuals appearances and for estimating the age of fetuses for legal and obstetrical reasons<sup>6</sup>. Cephalic index is very useful anthropologically to find out racial differences. It can also be utilized to find out sexual differences. It has a role in forensic science comparison of changes in cephalic index between parents, offspring's and sibling can give a clue to genetics transmission of inheritor characters<sup>7</sup>.The cephalometric results can also be of great assistance while evaluating patients in various fields of medicine like medical imaging, pediatrics, craniofacial surgery<sup>8</sup> and also for studying growth trends in various castes/ races within a defined geographic zone<sup>9</sup>. Anthropometric study of head is useful in designing various equipment of head and faces such helmets, headphones, and goggles<sup>10</sup>.The current research was designed to the norms of cephalic indices, the types of head shapes and sexual dimorphism in school going children's.

**METHODS:**

This study was carried out on 500 tribal belt school students of age group 9 – 15 years Grades 5 to 8 from Govt. school Amoda, Govt. school Murhipar, Govt. girls ashram Raipur Chhattisgarh. The present study was explained to them and informed consent was taken to the school head. All the measurements were taken at a fixed time to avoid any possible diurnal variations and with the subject sitting in relaxed condition and head in Anatomical position, straight and looking forward. Head length and breadth was measured using a spreading caliper. The maximum antero-posterior diameter or head length is measured from glabella to inion. Head breadth is the maximum transverse diameter calculated between two fixed points right and left Eurion. The method used for assessing cranial index was Hrdlicka's method<sup>11</sup>. Those students with any history of bone diseases like Rickets and Osteomalacia, any obvious physical deformity, cranial trauma & obstructive hairstyle and students from other states, affecting the result, was excluded from the study. Collected data was analyzed using Microsoft Excel.

**RESULTS:**

In our current study, from the obtained data, statistics were analyzed and observations and results are presented in tabular form. We found minimum Cephalic index was 71 and maximum 94. The mean Cephalic index was 83. The mean Cephalic index in Female was 83 and in Male was 82. The Head length in Male and Female from 10 to 29 cm. In case of Male, the mean Head length was 20 cm. In case of Female, the mean Head length was 22 cm. The Head breadth in Male and Female from 8 to 27 cm. In case of Male, the mean Head breadth was 18 cm. In case of Female, the mean Head length was 20 cm.

Dominant type of Head shape in tribal students in both sexes was hyperbrachycephalic and brachycephalic. The mean Cephalic index was 83 belongs to brachycephalic type.

Table: 1 this table showing the incidence and the relation of the sex with Cephalic index.

S.N	Cephalic Index	Male	Female	Total
1.	71-72	7	22	29
2.	72-73	7	3	10
3.	73-74	1	6	7
4.	74-75	7	18	26
5.	75-76	5	18	23
6.	76-77	4	5	9
7.	77-78	7	6	13
8.	78-79	0	2	2
9.	79-80	8	28	36
10.	80-81	5	15	20
11.	81-82	5	10	15
12.	82-83	12	26	38
13.	83-84	4	14	18
14.	84-85	7	17	24
15.	85-86	7	18	25
16.	86-87	1	12	13
17.	87-88	4	26	30

18.	88-89	5	2	7
19.	89-90	27	23	60
20.	90-91	9	20	29
21.	91-92	18	38	56
22.	92-93	3	0	3
23.	93-94	2	5	7

Table: 1 this table showing the Head length, Head breadth in Males and Females.

S.N.	Range(cm)	Length(cm),no of case(500)		Breadth(cm ),no of case(500)	
		Males	Females	Males	Females
1.	8-9	-	-	10	19
2.	9-10	-	-	13	28
3.	10-11	8	17	12	9
4.	11-12	10	18	7	18
5.	12-13	4	12	2	14
6.	13-14	8	9	10	12
7.	14-15	6	7	5	7
8.	15-16	4	18	7	13
9.	16-17	2	18	6	12
10.	17-18	4	17	13	18
11.	18-19	12	5	15	12
12.	19-20	13	9	22	55
13.	20-21	11	13	7	29
14.	21-22	16	33	9	32
15.	22-23	11	20	8	29
16.	23-24	13	33	8	14
17.	24-25	15	45	5	8
18.	25-26	7	30	4	6
19.	26-27	8	16	2	0
20.	27-28	10	12	-	-
21.	28-29	2	4	-	-

## DISCUSSION;

Morphology of all living beings undergoes changes in varying degrees during their life and the features are variable in the individuals of the same species. No two persons are similar in their measurable character. Anthropometry evolved as a standard scientific technique for measuring human body dimensions. In respect to the variation of head shape in various races and geographical zones, we believe that hereditary factor primarily affects the head shape; however environment has a secondary effect on it .It must be remembered that the reaction to a given environment represents the interaction of the genotype of the population being studied with the environment<sup>12</sup>.The current study showed the anthropometrical variations in Cephalic index in tribal students taking Head length, Head breadth, Cephalic index as parameters.

In the current research the mean Cephalic index is 83.The mean Cephalic index in Female is 83 and in Male is 82, ranging from 71 to 94. Mahajan et al<sup>13</sup>. found mean Cephalic index 85.53 and in Male was 81.34 and in Female was 85.75. Our finding was lower than Mahajan et al<sup>13</sup>. Bhargav and Kher<sup>14</sup> found mean Cephalic index was 76.98 for bills, 79.80 for barelas. Shah and Jadav<sup>7</sup> found Cephalic index in Gujarati's Male students was 80.42. Shema K.Nair<sup>15</sup> found to be mean Cephalic index 81.21, and in boys were 81.24, in girls was 80.31. Anith et al<sup>2</sup> found mean Cephalic index for central Indian boys 79.14, girls 80.74. Yagain V.K. et al<sup>16</sup> found in mean Cephalic index in Male was 77.92 and in Female 80.85. Our finding was higher than Bhargav and Kher<sup>14</sup>, Shah and Jadav<sup>7</sup>,Shema K.Nair<sup>15</sup>, Anith et al<sup>2</sup>.

In the current research, the rang of length in Male and Female was 10 – 29.The mean Head length in Male was 20 and in Female was 22. The rang of Head breadth was 8 – 27 and mean breadth in Male was 18, in Female was 20. Shah and Jadhav<sup>7</sup> the mean Head length in Male was 17.67, in Female 16.5. Yagain V.K. et al<sup>16</sup> found mean Head length in male 18.76 and in Female 17.67.

The mean breadth in male was 14.59, in Female was 14.17. In present study head length was short head to long in both the sexes and very short head length was absent. Our finding of head length and breadth was more than other authors.

The current research show that more students in hyperbrachycephalic but dominant type of Head shape in Males is hyperbrachycephalic and in Females was brachycephalic type. Our finding was similar to Mahajan et al<sup>13</sup>, Gopalipour<sup>17</sup>. But not similar with the study done by Shah and Jadhav<sup>7</sup> they observed Mesocephalic Head shape. Our finding in Females the dominant type of Head shape brachycephalic was similar to Mahajan et al<sup>13</sup>, Yagain V.K. et al<sup>16</sup>, Shah and Jadhav<sup>7</sup>, Abolhasanzadeh and Farahsni<sup>18</sup>, Vojdani et al<sup>19</sup>.

#### **CONCLUSION:**

The current research show that more students in hyperbrachycephalic. The mean Cephalic index was found to be 83 for Females and 82 for Males. In tribal student we observed significant gender difference in Cephalic index. There are no published data found on Cephalic index of tribal students in Chhattisgarh. This present research immense important for anthropology, comparative and evolutionary studies, forensic science and upcoming scientist.

**Conflict of Interest:** None declared.

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