RESEARCH ARTICLE

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The Study of Cephalic Index of Medical Students of Central India

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Abstract

Background: Cephalic index is also called as cranial index or Index of breadth. It is calculated as the breadth of the skull multiplied by 100 divided by the length. Comparison of changes in cephalic index between parents, offspring and siblings can give a clue to genetic transmission of inherited characters.

Methods: This study was carried out on 480 medical students (296 male and 184 female students). The cranial index was measured using Hardlika's method.

Results: Maximum numbers of subjects were Mesocephalic (having cephalic index 75 – 79.9). 43.58% boys as well as 42.93% girls were mesocephalic. Mean cephalic index for boys was 81.24 ± 3.66 and for girls was 80.31 ± 4.28. Mean cephalic index irrespective of gender was found to be 81.21 ± 3.68.

Conclusion: 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. So it can be utilized in various anthropological studies.

Keywords: Anthropology, Races, Anthropologists, siblings.

INTRODUCTION

Cephalic index also called as cranial index or Index of breadth[3] is one of the important parameter that helps to differentiate between different human races. This was widely used by anthropologists in the early 20th century to categorize human populations[1]. It can also be utilized to find out sexual differences[2]. The cephalic index was defined by Swedish professor of Anatomy Anders Retzius (1796–1860) and first used in physical anthropology to classify ancient human remains found in Europe[3].

The cephalic index (CI) is calculated as the breadth of the skull multiplied by 100 divided by the length[4]. Cephalic index is classified in three broad categories- dolichocephalic (<75), mesaticephalic (75-80) and brachycephalic (>80). Australian aborigines and native southern Africans are dolichocephalic, Europeans and the Chinese skulls are mesaticephalic and Mongolians and the Andaman Islanders have brachycephalic skulls[4].

Now a days, cephalic index is commonly used to describe individuals' appearances and for estimating the age of fetuses for legal and obstetrical reasons[1]. So it can be used widely in various Forensic investigations. Comparison of changes in cephalic index between parents, offspring and siblings can give a clue to genetic transmission of inherited characters[2]. 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[5].

MATERIALS AND METHODS

The present study was carried out on medical college students during 2 years period (January 2010 to December 2012). Study sample was the medical students of our medical college. Total 480 students (296 male and 184 female students) were included in this study.

The age of the patients ranged from 17-24 years, average being 19.8 years. 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. The cranial index was measured using Hardlika's method[6]. 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. Collected data was analyzed using Microsoft Excel.

The study was carried out on 480 students including 296 male and 184 female students of the medical college. The cephalic index was calculated and presented in tabular form as shown in tables.

The distribution of the subjects according to the cephalic index is shown below in table no. I. Table I shows that maximum number of subjects were Mesocephalic (75 – 79.9) followed by Brachycephalic (80 -84.9). Least subjects were ultradolochocephalic (55.0-59.9).

Type	Cephalic Index	Number of Subjects
Ultradolichocephalic	55.0 - 59.9	2
Hyperdolichocephalic	60.0 – 64.9	3
Dolichocephalic	65 – 74.9	69
Mesocephalic	75 – 79.9	208
Brachycephalic	80 -84.9	153
Hyperbrachycephalic	85 – 89.9	35
Ultrabrachycephalic	> 90.0	10
		480

Table 1: Distribution of the subjects according to the cephalic index

Type	Cephalic Index	Boys		Girls	
		No.	%	No.	%
Ultradolichocephalic	55.0 - 59.9	1	0.34	1	0.54
Hyperdolichocephalic	60.0 – 64.9	2	0.68	1	0.54
Dolichocephalic	65 – 74.9	42	14.19	27	14.67
Mesocephalic	75 – 79.9	129	43.58	79	42.93
Brachycephalic	80 -84.9	101	34.12	52	28.26
Hyperbrachycephalic	85 – 89.9	16	5.41	19	10.34
Ultrabrachycephalic	> 90.0	5	1.68	5	2.72
Total		296	100	184	100

Table 2: Distribution of cephalic index according to the sex
Table II depicts that maximum number of boys (43.58%) as well as girls (42.93%) were mesocephalic i.e. cephalic index ranging between 75 and 79.9

Gender	No. of students	Cephalic index		
		Minimum	Maximum	Mean ± SD
Boys	296	58.6	93.1	81.24 ± 3.66
Girls	184	56.3	93.8	80.31 ± 4.28
Total	480	58.3	93.8	81.21 ± 3.68

Table 3: Comparison of Cephalic Index in both sexes
Mean cephalic index for boys was 81.24 ± 3.66 and for girls was 80.31 ± 4.28. Mean cephalic index irrespective of gender was found to be 81.21 ± 3.68

DISCUSSION

In our study, mean cephalic index (± standard deviation) was found to be 81.21 ± 3.68. so according to Stewarts classification[7] this population belongs to the mesocephalic. Similarresults were found by Shah GV et al[2] who found mean cephalic index for Gujarati population 80.81 and classified it as mesaticephalic. Bhargav and Kher[8] in 1960 found mean CI as 76.9 in Bhils population. Further Bhargav and Kher[9] in 1961 found it to be 79.80 in Barelas population in central India. Kate BR[10] found mean CI of sickle cell anaemic patients as 77.9.

Mean CI for boys in present study was 81.24 ± 3.66. Anitha et al[3] found mean CI for central Indian boys 79.14 ± 4.72. In the present study, mean CI value for girls was 80.31 ± 4.28, while Anitha et al[3] found it to be 80.74 ± 3.97. So we can conclude that our values for CI of girls correlate well with Anitha et al.

CONCLUSION

Our study concludes that values of CI in different genders varies but not to great extent. The mean cephalic index (± standard deviation) was found to be 81.24 ± 3.66 for boys and 80.31 ± 4.28 for girls. This shows that there was no significant gender difference in the Cephalic Index. This data can be utilized by anthropologists or forensic experts for various anthropological purposes.

ACKNOWLEDGEMENT

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