RESEARCH ARTICLE

STUDY OF CEPHALIC INDEX IN VINDHYA REGION OF MADHYA PRADESH

Meghana Mishra, Amrish Tiwari, Deepak Chandrasen Naik
Department of Anatomy, Shyam Shah Medical College and SGM Hospital, Rewa, Madhya Pradesh, India

Correspondence to: Amrish Tiwari (dramrishtiwari@gmail.com)

DOI: 10.5455/ijmsph.2014.120920141 Received Date: 30.07.2014 Accepted Date: 24.08.2014

ABSTRACT
Background: Study of an individual's cephalic length, cephalic breadth and cephalic index is useful in clinical practice, forensic medicine, anthropology and genetic study. It is a useful tool to distinguish race and sex in medico-legal cases. Cephalic index also varies geographically.
Aims & Objectives: To study the cephalic index, in Vindhya region of Madhya Pradesh.
Materials and Methods: Present study is carried out in the Shyam Shah Medical College and S.G.M. Hospital, Rewa (Madhya Pradesh). For this study, total 309 subjects were selected randomly, which included 191 males and 118 females, between 22 to 27 years of age. Cephalic length and breadth were measured using standard anthropometric instruments and cephalic index was determined using standard methods. Data analysis was done by using statistical method.
Results: Cephalic index of males and females belong to the mesocephalic group. In our observations, mean value of cephalic index are 75.8419 for male, 79.05 for female and 77.791 for both sexes.
Conclusion: In Vindhya region of Madhya Pradesh, there is predominance of mesocephalic head.
Key Words: Cephalic Index; Head-Length; Head-Breadth; Anthropometry

Introduction

Ever since the human life came into existence, constant changes are occurring in the morphological appearances. Evolution is simply defined as Genetic change over time. Physical anthropology is a science founded on evolutionary principles.[1] Cephalic index is very useful anthropological tool to find out racial and sex differences.[2,3] Even it can also be utilized as identity of the individual. Cephalic index or index of breadth is the percentage of breadth to length in any skull. The index is calculated from measurements of the various diameters of the skull. The length of the skull is the distance from the glabella (the midpoint between the eyebrows) and the most projecting point at the back of the head (inion). The breadth of the skull is the distance between the most projecting points at the sides of the head, usually a little above and behind the ears.

The cephalic index is calculated by using the breadth multiplied by 100 divided by the length. It is a useful tool for identification in anthropometric analysis, and was first identified by Swedish Professor of Anatomy Anders Rezitus (1796-1860). The index was widely used by anthropologists in the early twentieth century to categorize human populations and by Carleton S. Coon in the 1960s. 4 Today it is mainly used to describe individual's appearances and for estimating the age of foetuses for legal and obstetrical reasons.[4,5]

Materials and Methods

The present study was carried out in the Shyam Shah Medical College and S. G. M. Hospital, of Rewa city of Madhya-Pradesh. For this study, total 309 subjects were selected randomly, out of which, 191 were males and 118 were females. The age of all the subjects was between 22 to 27 years. We selected this age group, because the measurements remain constant after 22 years of age.

Following anthropometric measurements were taken using standard anthropometric instruments.

- Head Length: The straight distance between the glabella to the inion measured by blunt end type spreading calliper.
- Head-breadth: The maximum transverse diameter between two fixed points over the parietal bones is measured by blunt end type spreading calliper.

All the measurements were taken with the subject sitting in chair, in relaxed condition and head in anatomical position. All measurements were taken in centimetres, to an accuracy of 0.10.

Results

Collected data was statistically analyzed. The observations and results are presented in the tabular form. The results are expressed as numbers and percentages.

Table-1: Distribution of cephalic phenotypes of males and females

Cephalic Phenotype	Cephalic Index	Male		Female	
		N	%	N	%
Ultradolichocephalic	55.0 - 59.9	0	0	0	0
Hyperdolichocephalic	60.0 – 64.9	0	0	0	0
Dolichocephalic	65 – 74.9	62	31.41	32	27.20
Mesocephalic	75 – 79.9	86	45.06	40	34
Brachycephalic	80 -84.9	36	18.86	28	23.8
Hyperbrachycephalic	85 – 89.9	04	2.09	09	7.65
Ultrabrachycephalic	90.0 – 94.9	03	1.57	09	7.65
Total		191	100	118	100

Discussion

Anthropometric measurements are important tools for comparison and to achieve a more objective racial assessment. Standardized cephalometric records enable diagnostic comparison between patients and the normal population.[6] Comparison of changes in cephalic index between parents, offspring and siblings can give a clue to genetic transmission of inherited characters.

It has been observed that Dolichoocephalic person have otitis media less often than brachycephalic person.[7] It is also reported that individual with Apert's syndrome are hyperbrachycephalic.[8]

In present study, 191 male and 118 female subjects were studied for distribution of cephalic index from Vindhya region of Madhya Pradesh. The mean cephalic index in both sexes is 77.79, ranging from 65.95to 94.81. In males, 31.41% were dolichocephalic, 45.06% were mesocephalic, 18.86% were brachycephalic, 2.09% were hyperbrachycephalic, and 1.57% were ultrabrachycephalic. In females, 27.2% were dolichocephalic, 34% were mesocephalic, 23.8 were brachycephalic, 7.65% were hyperbrachycephalic and 7.65% were ultrabrachycephalic.

The mean cephalic index was 75.84 for male, and 79.21 for female subjects. The predominance of mesocephalic head was noticed in both sexes, with cephalic index between 75 to 79.9. According to Stewart's classification (1935), these subjects can be called mesati-cephalic. [9]

According to Bhargav & Kher (1960), cephalic index is 76.98for Bhils and 79.80 for Barelas Kher.[10,11] According to Shah and Jadhav, the mean cephalic index in Gujarati is 80.81, ranging from 71.10 to 89.77. According to Anitha, Vijayanath, Raju and Vijayamahantesh, the mean cephalic index of the students of northern Indian origin is 79.72.[12]

Conclusion

To conclude, in Vindhya region of Madhya Pradesh, there is predominance of mesocephalic head, with mean cephalic index of 77.79 (75.84 in male and 79.21 in female). Present study can be used in forensic medicine and anthropology for comparative and evolutionary studies.

References

1. Stewart TD. Hrdlicka's Practical Anthropometry. 4th edition. Philadelphia: The Wistar Institute of Anatomy & Biology; 1952. P. 87-89
2. Shah GV, Jadhav HR. The study of Cephalic Index in students of Gujarat. J Anat Soc India 2004;53(1):25-26.
3. Williams P, Dyson M, Dussak JE, Bannister LH, Berry MM, Collins P, et al. Skeletal System. 38th ed. London: Elbs with Churchill Livingston; 1995. Gray's Anatomy; pp. 607–12.
4. Reddy KS. The Essentials of Forensic medicine and Toxicology. 26th ed. Hyderabad: K. Saguna Devi; 2007.
5. Rao NG. Text Book of Forensic Medicine & and Toxicology. 2nd ed. New Delhi: Jaypee brothers Medical Publisher (P) Ltd., 2010. P. 93-94.
6. Rabey GP. Craniofacial morphanalysis. Proc R Soc Med 1971;64:103-11.
7. Stolovitzky JP, Todd NW. Head shape and abnormal appearance of Tympanic membrane. Otolaryngol Head Neck Surg 1990;102(4):322-5.
8. Cohen MM Jr, Kreiborg S. Cranial size and configuration in the Apert syndrome. J Craniofac Genet Dev Biol 1994;14(3):153-62.
9. Stewart TD. Anthropometric nomenclature: II. The indices of head height. Am J Phys Anthropol 1942;29:23–39. doi: 10.1002/ajpa.1330290103
10. Bhargava I and Kher GA. An anthropometric study of CentralIndia Bhils of Dhar district ofMadhya Pradesh. Journal ofAnatomical Society of India 1960;9:14-19.
11. Bhargava I, Kher GA. A comparative anthropometric study of Bhils and Barelas of Central India. J Anat Soc India 1961;10:26-33.
12. Anitha MR, Vijayanath V, Raju GM, Vijayamahantesh SN. Cephalic Index of North Indian Population. Anatomica Karnataka - an International Journal 2011;5(1):40-43.

Cite this article as: Mishra M, Tiwari A, Naik DC. Study of cephalic index in Vindhya region of Madhya Pradesh. Int J Med Sci Public Health 2014;3:1464-1465.
Source of Support: Nil
Conflict of interest: None declared