



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2018; 4(5): 215-217
www.allresearchjournal.com
Received: 02-03-2018
Accepted: 03-04-2018

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An anthropometric study of cephalic index in female students of Jhalawar region

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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 and head shape in female students of age group between 18 to 25 years of Jhalawar district Rajasthan State.

Materials and Methods: Present study is carried out in the Govt. Girls PG College Jhalawar (Raj.). For this study, total 100 females subjects were selected randomly, between 18 to 25 years of age. Cephalic length and breadth were measured using spreading calliper and cephalic index was determined using standard methods. Data analysis was done by using statistical method.

Results: Cephalic index of females belong to the dolicocephalic group. In our observations, mean value of cephalic index is 74.39 for females.

Conclusion: In Jhalawar region of Rajasthan, there is predominance of dolicocephalic head of females.

Keywords: Cephalic index, head-length, head-breadth, anthropometry

Introduction

Evaluation and measurement of human body dimensions are achieved by physical anthropometry [1]. The human body dimensions are affected by ecological, biological, geographical, racial, gender and age factors [2]. Cephalic index is very useful anthropological tool to find out racial and sex differences [3]. Cephalic index is the percentage of breadth to length in any skull. The index is calculated from measurements of two diameters of the skull. The length of the skull is the distance from the glabella 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 (parietal tuber), a little above and behind the ears. cephalic index is calculated by using the breadth multiplied by 100 divided by the length. On basis of cephalic index head shapes classified four international categories Doliocephalic (CI up to 74.9), Mesocephalic (CI 75-79.9) Brachiocephalic (CI 80- 84.9), Hyperbrachiocephalic (CI > 85) [4]

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. Today it is mainly used to describe individual's appearances and for estimating the age of foetuses for legal and obstetrical reasons [5, 6].

This study provides a data base of cephalic index measurements useful for forensic medicine, plastic surgery, orofacial surgeons in craniofacial reconstruction. By noticing, the effect of age, gender and geographical factors on head dimensions and no documented research in this area, for the first time, this study was done to determine the cephalic index and types of head shapes in 18-25 years old native female in Jhalawar district of Rajasthan. Also, compare this study with other similar studies.

Material and Methods

The present study was conducted on 100 female students selected as subject. College students was selected because of the easy availability. The age of the range were 18-25 years

selected randomly. The study was conducted on the Govt. Girls PG College Jhalawar (Raj.). The method was used for assessing the cephalic index is Hrdlicka's Method [7]. Measurements which have been taken are, head width & head length. All the measurements were taken with spreading calliper.

Cephalic Index = Head Width/Head Length x100
 Head Breath: - Maximum Horizontal Diameter
 Head Length: - Summit of Glabella to Inion

All the measurement was taken with the subject sitting in the chair in the relaxed condition and head in the anatomical position.

Observations and Results

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

Table 1: Cephalic index of the study subjects

Cephalic index (cm)	Female	Total (%)	Cephalic index (cm)	Female	Total (%)
68.01 to 69	3	3	75.01 to 76	8	8
69.01 to 70	1	1	76.01 to 77	14	14
70.01 to 71	6	6	77.01 to 78	6	6
71.01 to 72	16	16	78.01 to 79	12	12
72.01 to 73	11	11	79.01 to 80	2	2
73.01 to 74	8	8	80.01 to 81	1	1
74.01 to 75	12	12	Total	100	100 (100%)

Table 2: Analysis of female students of age group between 18 to 25 years cephalic index variable.

Sr. No.	Male	
1.	No. of Case	100
2.	Cephalic Index Range (cm)	62.92 - 80.11
3.	Mean (cm)	74.39
4.	S.D.	3.009
5.	S.E.	.300

Table 3: Result from head shape classification for the female students of age group between 18 to 25 years

Head Shape	Number	(%)
Dolichocephalic	56	56%
Mesocephalic	33	33%
Brachycephalic	1	1%
Hyperbrachycephalic	0	0%

Table 4: Comparison of cephalic index (Mean) with other population:

Sr. No.	People / Country	Research workers	Mean Cephalic Index
1.	Bhils of central India	Bhargava & Kher, 1960	76.98
2.	Berelas of central India	Bhargava & Kher, 1961	79.80
3.	Gujrati Students	Shah & Jadhav, 2004	80.81
4.	Igbo male	Oladipo and Olotu, 2006	79.04
5.	Medical students of Panjab	Anupama <i>et al.</i> , 2009	85.53
6.	Ogbia, Niegria	Eroje <i>et al.</i> , 2010	72.96
7.	Srilankan males	Ilayperuma I, 2011	78.04
8.	Indians students(Males)	Yagain VK <i>et al.</i> , 2012	77.92
9.	Haryanvi Baniyas(Males)	Mahesh Kumar <i>et al.</i> , 2012	66.72
10.	Students of vindhya region of madhya prades (male and female)	Meghana Mishra, <i>et al.</i> 2014	77.79
11.	Student of Jhalawar district, Rajasthan (Female)	Present Study, 2013	74.39

Discussion

Anthropometric measurements are important tools for comparison and to achieve a more objective racial and gender assessment. In present study, 100 females subjects were studied for distribution of cephalic index from Jhalawar region of Rajasthan. The mean cephalic index in females is 74.39±3.009. (Table 3) 56% were dolichocephalic, 33% were mesocephalic, 1% were brachycephalic (table 4) The mean cephalic index was 74.39 for female subjects. The predominance of head was noticed dolicocephalic, with cephalic index up to 74.9. According to Stewart's classification (1935), these subjects can be called dolicocephalic. (10) In this study mean cephalic index was 74.39±3.009. The cephalic index was study higher than Eroje *et al.*, 2010 study in Ogbia, Niegria with 72.96 [8], Mahesh Kumar *et al.*, 2012 study in Haryanvi Baniyas (Males) with 66.72 [9].

Cephalic index from the present study was lower than Bhargava & Kher, 1960 study in Bhils of central India with 76.98, [11] Bhargava & Kher, 1961 study in Berelas of

central India with 79.80, [12] Shah & Jadhav, 2004 study in Gujrati Students with 80.42, [13] Oladipo and Olotu, 2006 study in Igbo male with 79.04, [14] Anupama *et al.*, 2009 study in Medical students of Panjab with 85.53. [15] Ilayperuma I, 2011 study in Srilankan males with 78.04, [16] Yagain VK *et al.*, 2012 study in Indians students (Males) with 77.92. [17], Meghana Mishra, *et al.* 2014 study Students of vindhya region of Madhya Pradesh (male and female) with 77.79 (75.84 in male and 79.21 in female) [18]

In our study, dominant type of head shape was dolichocephalic (56%) Mesocephalic (33%) and rare Brachycephalic (1%).

Conclusion

To conclude, in Jhalawar region of Rajasthan, there is predominance of dolicocephalic head, with mean cephalic index of 74.39 (female). Present study can be used in forensic medicine and anthropology for comparative and evolutionary studies.

Abbreviation: CI – Cephalic Index

Acknowledgments

The author and co-authors acknowledge the support and assistance given by the Department of Anatomy, Jhalawar Medical College, Jhalawar (Raj.) India. The participants of Govt. Girls PG College Jhalawar (Raj.) and other individuals to ensure the successful completion of this study.

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