

Research

Corresponding author

Ekezie Jervas, PhD

Senior Lecturer

Department of Anatomy

School of Health Technology

Federal University of Technology

P.M.B 1526 Owerri, Nigeria

Tel. +234 806 5430037

E-mail: ekeziejervas@gmail.com

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Cephalic Index of The Igbos, Nigeria

Ekezie Jervas, PhD, FCBET^{1*}; Anele Theresa Ihejihuka, MBBCH, FMCR, FCBET²; Iwuoha Greg, MSc³; Eke CC, MSc⁴; Osuchukwu IW, BSc⁴

¹Department of Anatomy, School of Health Technology, Federal University of Technology, Owerri, Nigeria.

²Department of Radiology, Federal Medical Center, Owerri, Nigeria

³Department of Public Health, Federal University of Technology, Owerri, Nigeria

⁴Department of Prosthetics and Orthotics, Federal University of Technology, Owerri, Nigeria

ABSTRACT

Cephalic Index (CI) is an important tool for the classification of human beings.

Objectives: This study examines the CI of the Igbos schooling at Federal University of Technology Owerri in order to establish the head pattern.

Materials and methods: A total of 202 subjects participated in the study (males n=114, females n=84) after obtaining informed consent. Measurement of the maximum head breadth (MHB) and maximum head lengths (MHL) of the subjects were taken. The data were analyzed using SPSS 17.0.

Results: The mean CI of the Igbos (both gender put together) was 71.57±14.81 while that of the males and females were 68.80±12.33 and 73.60±16.15 respectively. The most prominent CI was Dolichocephalic 'head length longer than width', males (76.2%) and females (59.6%). Mesocephalic 'head is round' and Brachycephalic 'head wider than length' were more common in the females than males. Sexual dimorphism was established at $p < 0.02$ with females having higher values.

Conclusion: The documented head pattern or shape would be useful to Forensic Anthropologist and Craniofacial surgeons.

KEYWORDS: Head breadth; Head length; Igbos.

ABBREVIATION: CI: Cephalic Index; MHL: Maximum Head Length; MHB: Maximum Head Breath.

INTRODUCTION

Genetic change overtime results to evolution. Evolutionary processes arise due to natural selection, nutrition, genetic drifts and genetic flow. These processes affect the human body.¹ The change on the human body overtime has to be documented using simple anthropometric measurement.

Anthropology deals with the measurement of the physical sizes and shapes of human body.² Data obtained from such measurements have been very useful in differentiating people of diverse ethnic groups, nutritional status, economic status and gender. Several measurable anthropometric variables have been developed over the years. Cephalic Index (CI) is one of such very important anthropometric variable used in physical anthropology to determine geographical gender, age and racial variations.³

CI is the most investigated craniofacial parameters as it uses the length and breadth of the head which are useful indices in the study of secular trend.^{4,5} The ratio of the maximum head breadth (MHB) to the maximum head length (MHL) i.e. $(\text{HB} \times 100/\text{HL})$, can be used to measure the size of the head.⁶ CI gives an idea of how genetic characters are transmitted

between parents, offspring and siblings.⁷ It is inherited in a unitary fashion.⁸

Three basic classifications of CI that can be used to describe the human head patterns have been documented. These include dolichocephaly, mesocephaly and brachycephaly.⁹

In this study we attempted to investigate the pattern of head distribution of the study population using the above basic classifications for the consumption of the Forensic Anthropologists and Craniofacial Surgeons.

STUDY LOCATION AND DURATION

The present study was carried out at Federal University of Technology Owerri, Nigeria and it covered a period of five months as follows:

- (i) Four months for field work.
- (ii) One month for data analysis and interpretations.

Demographics

The subjects gave information on their age, sex, and state of origin.

Exclusion criteria

Subjects who were not of Igbo extraction and subjects with bushy/artificial hairs were not included in the study.

Anthropometrics

The following measurements (cm) were taken when the subjects were sitting in a relaxed manner and head held in Anatomical position.

Maximum Head Length (MHL)

Measures the straight distance between glabella (the most prominent point on the frontal bone above the root of the nose, between the eyebrows) and the opisthocranium (the most prominent portion of the occiput, close to the midline on the posterior

rim of the foramen magnum).

Maximum Head Breadth (MHB)

Measures the distance between the most lateral points of the parietal bone. It is also called maximum bi-parietal diameter.

The CI was then calculated as $\frac{MHB}{MHL} \times 100$

DATA PRESENTATION AND ANALYSIS

The data analysis was carried out using Statistical Package for Social Sciences (SPSS 17.0 software).

In summarizing the data, the Minimum, Maximum, Mean and Standard deviations of the age, MHB and MHL were established and presented. Also the value and the percentages of various cephalic phenol type are presented too.

RESULT

The standard deviation, the mean, the maximum and minimum values of the anthropometric variables of the study population are shown in Table 1. In overall, females were more varied with higher mean values than males.

The cephalic phenotype indicates that 66.7% of the study population was Dolichocephalic, 21.7% was Brachycephalic, While 11.6% was Mesocephalic (Table 2).

The cephalometric dimensions measured directly showed statistically significant differences between females and males ($p < 0.02$), with females having higher mean values than males (see Tables 1 and 3).

DISCUSSION

This study showed that the Cephalometric dimensions of the females were significantly higher than those of the males ($p < 0.02$), the reason for this difference cannot be immediately explained but it agrees with sexual dimorphism. The mean CI (71.57) of this study was lower than that (79.80) observed et al¹⁰ and that (74.39) documented et al¹¹ for the Yoruba population of Nigeria.

	Total				Female				Male			
	Mean	Std.dev	Min	Max	Mean	Std. dev	Min	Max	Mean	Std.dev	Min	Max
Age	23.48	4.82	17	45	23.62	5.13	17	45	23.30	4.38	18	43
MHL	32.02	4.82	20	59	31.99	5.48	20	59	32.07	3.79	22	38
MHB	22.36	2.70	15.5	31	22.86	2.91	15.5	31	21.69	2.21	16	29
CI	71.57	14.81	35.59	120.83	73.60	16.15	35.59	120.83	68.80	12.33	47.89	120.83

CI: Cephalic Index, MHL: Maximum Head Length, MHB: Maximum Head Breadth.

Table 1: Descriptive statistics of the study population.

Cephalic Phenotype	Cephalic Index (CI) (in cm)	Female		Male		Combined	
		Count	Percentage	Count	Percentage	Count	Percentage
Dolichocephalic 'head length longer than width'	Female: <75 Male: <75.9	68	59.6%	64	76.2%	132	66.7%
Mesocephalic 'head is round'	Female: 75-83 Male: 76-81	15	13.2%	9	10.7%	23	11.6%
Brachycephalic 'head wider than length'	Female: >83 Male: >81.1	31	27.2%	11	13.1%	43	21.7%
Total		114	100%	84	100%	198	100%

Table 2: Different types of cephalic phenotypes of males and females.

	Mean	Std. dev	Std. err	95% Confidence Interval		T	p-value
Female	73.60	16.15	1.51	70.61	76.60		
Male	68.80	12.33	1.35	66.12	71.47		
Difference	4.81		2.02	0.81	8.80	t=2.374	0.0185

Df(Satterhwaite)=195.7

Table 3: Sex differences in cephalic phenotype.

Base on the basic classification of CI, the population under study was predominantly Dolichocephalic.

The CI for the present study was lower than that (75) reported by Abolhasanzadeh et al¹² in a study in Tehran- Iran; 80.42 in a study in India⁷, and 80.42 in a study in Chile.¹⁸ The CI from our study is also lower than a study in native Fars males with 84.8.⁹

In the present study, we observed gender difference with females having a higher CI of 73.60 compared 68.80 of the males.

Investigations carried out on the CI of the males and females of Gurung community in Nepal revealed a significant gender difference,¹³ with males having a CI of 83.1 which is lower than female with a CI of 84.6.

In their study using Indian population¹ also observe a higher CI in females (80.74±3.97) and lower value in the males (79.14±4.72).

In their study of Haryani population¹⁴ noted a mean CI of 66.72 in males and 72.25 in the females.

In another study by Raveendranath et al¹⁵ in Indian cadavers, the CI for the males was 76.97 while that of the females was 79.23.

The foregoing which agreed with our findings indicate that CI seems to be higher in the females than in males in most studies except those carried out by Oladipo et al¹¹, Joy et al¹⁶ who noted a mean CI of 75.02±4.76 for males and 73.75±5.13 for female in Yoruba population.

This observed variation in the mean CI in the studies

sighted above is due to the peculiarity of the populations, however, mean CI is higher in the females in most studies.

The dominant type of head shape observed in this study was dolichocephalic (76.20%). This finding is similar to a study in India¹⁷ in which 58.5% of population was dolichocephalic. The dominant type of head from this study was not similar to the following studies.^{7,9-11,18,19}

CONCLUSION

The mean CI for the population was 71.57(66%) in the males, it was 68.80 (59%) and 73.60(76.2%) in the females. Dolichocephalic phenotype was more common in the overall population and in both sexes.

The Mesocephalic phenotype was 10.7% in the males and 13.2% in the females; while Brachycephalic phenotype was 13.1% in the males and 27.2% in the females. These observed values/head patterns would be of utmost importance to the Forensic Anthropologist and Craniofacial Surgeons.

CONFLICTS OF INTEREST: None.

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