

Cephalic Index of Ogbia Tribe of Bayesla State

Índice Cefálico de la Tribu Ogbia del Estado de Bayesla

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SUMMARY: A study on Cephalic Index was carried out on subjects from Ogbia tribe of Bayesla State in the Niger Delta region of Nigeria. Four hundred and forty individuals were randomly selected from the community comprising of 219 males and 221 females respectively. The ages of the subjects ranged from 2-18 years. The length and breadth of the head was measured using a sliding caliper from standard bony landmarks. The measurable point for head length was measured between the glabella and opisthocranium while the head breadth was the widest biparietal diameter from euryon (eu) on one side of the head to euryon (eu), on the other side. Mean values of cephalic index, standard deviation and standard error of mean were calculated for both sexes. The result showed that the mean cephalic index was 72.96 ± 6.12 . Male had a cephalic index of 73.68 ± 6.53 while female had a cephalic index of 72.24 ± 5.60 . The difference in cephalic index between male and female was significant ($p=0.007$). Based on the cephalic index, the head form of 66.82% of individuals were Dolichocephalic, 21.59% Mesocephalic, 10.23% Brachycephalic and 1.36% Hyperbrachycephalic. This research showed that Ogbia children have Dolichocephalic phenotype. The data from this research will be useful in anthropology, genetics and forensic medicine.

KEY WORDS: Cephalic index; Dolichocephalic; Ogbia; Forensic Medicine.

INTRODUCTION

Ogbia people are an indigenous people of Bayesla state in the Niger Delta region of Nigeria. Ogbia town is noted for its large deposit of crude oil as it houses the first oil well in Nigeria. Cephalic index is a useful anthropometric parameter utilized in the determination of racial variations. It is also used to determine sexual differences especially in individuals whose identity are unknown (Shah & Jadhav, 2004). It is one of the clinical anthropometric parameter recognized in the investigation of craniofacial skeleton because of its validity and practicality (Grant & Peter, 2003).

Cephalic index is the most frequently investigated craniofacial parameters as it utilizes the length and breadth of the head which are useful indices in the study of secular trend (Larsen, 1997; Kouchi, 2000). The ratio of the maximum head breadth to the maximum head length can be used to measure the size of the head (Kelly *et al.*, 1999). Cephalic index gives an idea of how genetic characters are transmitted between parents, offspring and siblings (Shah & Jadhav). It is inherited in a unitary fashion (Sekla & Soukup, 2005).

On basis of cephalic index, head shapes group to four international categories, which are dolichocephal, brachycephal, mesocephal and hyperbrachycephal (Williams *et al.*, 1995; del Sol, 2005). Cephalic index is recognized in determining the variations in shape of the head and face in newborns (Golalipour *et al.*, 2005). It is also useful in determining head dimensions in fetuses (Rajlakshmi *et al.*, 2001).

In a work on secular changes in head dimensions of Japanese females over eight decades cephalic index was found to have decreased over the last two decades in adult Japanese females (Golam *et al.*, 2004). Investigations carried out on secular change in body height and cephalic index of Croatian medical students revealed a significant increase of dolichocephalic and mesocephalic and a significant decrease of brachycephalic head shape in both sexes suggesting a continuity of the debrachycephalization process (Buretic'-Tomljanovic' *et al.*, 2003).

In a study in Gurung community of Nepal (Lobo *et al.*, 2005) calculated cephalic index for male as 83.1 while

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that of female was 84.6, this was statistically significant. They were classified as brachycephalic. In another study by Oladipo & Olotu, 2006, on cephalic indices of Ijaw and Igbo ethnic groups of Nigeria, Ijaw male was found to belong to brachycephalic group while Ijaw female, Igbo male and Igbo female were mesocephalic. Futher more, cephalic index was recorded as 80.4 ± 4 amongst Turkman Males in Gorgan-North of Iran (Golalipour *et al.*, 2007)

The cephalic index of Ogbia people of Bayelsa state has not been documented. This study aimed at applying internationally accepted methods to ascertain the standard value of the cephalic index of Ogbia people of Bayelsa state in the Niger Delta region of Nigeria to provide a baseline data of cephalic index which could be vital in forensic and anthropological studies.

SUBJECTS AND METHOD

For the present study, 440 school children (221 Female and 219 Male) were selected as subjects. The age of the students ranged from 2 to 18 years. The Head Length (Greatest anteroposterior diameter) was measured with the help of spreading caliper, from glabella to opisthocranium. The head-breadth was measured as the maximum transverse diameter between two fixed points of the parietal bone. All the measurements were taken with the subject in relaxed condition and head in anatomical position. For subjects with their heads done, they had their hair parted before measurement. Measurements were taken to the nearest centimeter and parallax was avoided in the visual read out so as to reduce error in the measurement. Cephalic index was calculated using the following equation (Golalipour *et al.*, 2003).

$$\text{Cephalic index} = \frac{\text{Maximum head breadth} \times 100}{\text{Maximum head length}}$$

The data collected was statistically analyzed using student t-test.

RESULTS

Mean and SD of cephalic index in Ogbia people of Bayelsa State was 72.96 ± 6.12 . The morphological classification of the head was done according to the cephalic index. Among Ogbia people, the dominant type was dolichocephalic with a frequency of 66.82% and the rare type was hyperbrachycephalic with frequency of 1.36% (Table I). The mean cephalic index for male is 73.68 ± 6.53 (S.E. 0.44) and for female is 72.24 ± 5.60 (S.E. 0.38). This difference was statistically significant ($p=0.007$) using student t-test from Graphpad Instat Demo Software. Table II shows comparison of cephalic index from different studies.

Table I. The distribution of different head types.

Head type	N	%
Dolichocephalic	294	66.82
Mesocephalic	95	21.59
Brachycephalic	45	10.23
Hyperbrachycephalic	6	1.36

DISCUSSION

This study showed that the cephalic index of male was significantly higher than those of female ($p=0.007$), the reason for this difference cannot be immediately explained but it agrees with sexual dimorphism as reported by Olotu *et al.* (2009). The cephalic index of this study was lower than Fawehinmi *et al.* study in Port Harcourt, Nigeria with 79.80 (Fawehinmi *et al.*, 2008).

Oladipo & Olotu determined the cephalic index for Ijaw male and female as 80.98 and 78.24 respectively. They also worked out the cephalic index of Igbo male and female as 79.04 and 76.83 respectively. Their findings were higher than that of Ogbia male and female.

Table II. Comparison of cephalic index with other population.

1	Bhargava & Kher, 1960.	Bhils of Central India	76.98
2	Bhargava & Kher, 1961.	Berelas of Central India	79.80
3	Shah & Jadhav, 1960.	Gujarat, India	80.81
4	Del Sol, 2005.	IX Región of Chile	80.42
5	Golalipour <i>et al.</i> , 2007.	Turkman, Iran	80.40
6	Fawehinmi <i>et al.</i> , 2008.	Port Harcourt, Nigeria	79.80
7	Present study.	Ogbia, Nigeria	72.96

Cephalic index from the present study was lower than Abolhasanzadeh & Farahani (2003) study in Tehran- Iran with 75, Shah & Jadhav study in India with 80.42, and a study in Chile (80.42) by del Sol. Cephalic index from our study was also lower than a study in native Fars males with 84.8 (Golalipour *et al.*).

In our study, we observed gender difference with male (73.68) having a higher cephalic index compared to female (72.24). Investigations carried out on the cephalic index of male and female of Gurung community in Nepal revealed a significant gender difference (Lobo *et al.*), with male having a cephalic index of 83.1 which is lower than female with cephalic index of 84.6. This implies that cephalic index can be higher in any sex depending on the peculiarity of the population under study.

In our study, dominant type of head shape was dolichocephalic (66.82 %). This finding is similar to another study in India (Bhatia *et al.*, 1995) in which 58.5% of population was dolichocephalic. Dominant type of head from this study is not similar to del Sol study in Chile, Bhargava & Kher study in central Indian (Bhargava & Kher, 1960), Oladipo's study of Ijaw and Igbo tribes of Nigeria (Oladipo & Olotu) and Fawehinmi's study in Port Harcourt, Nigeria (Fawehinmi *et al.*) with mesocephalic type (Table II).

Also, the dominant head type was reported as brachycephalic in Turkman of Iran (Golalipour *et al.*, 2007), IX Region of Chile (del Sol) and in Gujarat, India (Shah & Jadhav).

It is worthy to note that the percentage of head types also varies in different populations. In a study on 50 individuals in the IX Region of Chile, del Sol reported that 66% of the individuals were mesocephalic, 28% brachycephalic, 4% hyperbrachycephalic and 2% dolichocephalic.

Besides, in a study in India on 302 male students, it was shown that 41% of the students were mesocephalic, 37% brachycephalic, 14% hyperbrachycephalic, and 7% dolichocephalic (Shah & Jadhav). In the present study, 66% of subjects were dolichocephalic, 21% mesocephalic, 10% brachycephalic while 1% hypercephalic.

The percentage of head shape observed in the different study may not be unconnected with hereditary factor. Environment may also have a secondary effect (Golalipour *et al.*, 2007). The kind of diet taken could also play a role in influencing the dominant head shape.

Head shapes can also change from one generation to the other. For instance, in the first generation of Japanese immigrants in Hawaii it was noticed that they had an increased head breadth, a decreased head length and a higher cephalic index than their parents (Heravi & Zieae, 2002).

In conclusion, this study shows a significant increase of dolichocephalic and mesocephalic and a significant decrease of brachycephalic and hyperbrachycephalic head shape in both sexes. Our results suggest a continuity of debrachycephalization process.

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RESUMEN: Se estudió el índice cefálico en sujetos de la tribu Ogbia del estado de Bayelsa en la región del Delta del Níger de Nigeria. Fueron seleccionados al azar 440 individuos de la comunidad (219 hombres y 221 mujeres), con edades entre 2 y 18 años. La longitud y el ancho de la cabeza se midió utilizando un caliper de referencias óseas estándar. La longitud de la cabeza se midió entre la glabella y el opistocranium, y el ancho a nivel parietal desde un euryon a otro. Los valores medios de índice cefálico, la desviación estándar y el error estándar de la media se calcularon para ambos sexos. El resultado mostró que el índice cefálico promedio fue de $72,96 \pm 6,12$. Los hombres tenían un índice cefálico de $73,68 \pm 6,53$, mientras que las mujeres mostraron un índice cefálico de $72,24 \pm 5,60$. La diferencia en el índice cefálico entre hombres y mujeres fue significativa ($p=0,007$). Con base en el índice cefálico, el 66,82% de los individuos eran dolicocefálicos, el 21,59% mesocefálicos, el 10,23% braquicefálicos y el 1,36% hiperbraquicefálicos. Esta investigación mostró que los niños Ogbia tienen un fenotipo dolicocefálico. Los datos de esta investigación pueden ser útiles en antropología, genética y medicina forense.

PALABRAS CLAVE: Índice cefálico; Dolicocefálico; Ogbia; Medicina forense.

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