

## Anthropometric Studies of Cephalic Indices of the Ogonis in Nigeria

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**Abstract:** Cephalic index is an important parameter for classifying populations. The study was aimed at determining the cephalic indices among Ogonis. In the present study, eight hundred (800) subjects comprising 400 males and 400 females with age ranging from 25-45 years of Ogoni ethnic group by both parents and grandparents were measured. The subjects were measured for head length and head breadth and cephalic index was worked out by dividing the head breadth by head length and multiplying by 100. The cephalic indices were calculated and the result analyzed using z-test. On the average, the mean cephalic index was >80 which puts Ogonis in the brachycephalic population. The z-test analysis indicated that there was significant difference between Ogoni males and Ogoni females. Thus cephalic index is sexually dimorphic amongst the Ogonis. The result of this study will be of importance in forensic medicine, anthropology and in genetics.

**Key words:** Cephalic index, head length, head breadth, ethnic group, anthropology

### INTRODUCTION

Measurements are important tools for comparison. In order to achieve a more objective racial assessment, metrical studies have long been practiced. Internationally accepted techniques of craniometry/cephalometry have promoted a large number of comparable data for male and to a lesser extent, females (Berry *et al.*, 1976)

Cephalic index is very useful anthropologically to find out racial differences (Shah and Jadhav, 2004) It can also be utilized to find out sexual differences (Williams *et al.*, 1995). Comparison of changes between parents, offspring and siblings can give a clue to genetic transmission of inherited character (Shah and Jadhav, 2004).

Standardized cephalometric records enable diagnostic comparison between patients and the normal population (Rabey, 1971). Doliocephalic person have otitis media less often than brachycephalic person (Stolovitsky and Todd, 1990) It has also been reported that individuals with Apert's syndrome are hyperbrachycephalic (Cohen and Kreiborg, 1994).

A large number of reports exist on the cephalic index of Caucasians. Cephalic index of Japanese and Australia has been reported (Kasai *et al.*, 1993) while the mean cephalic index of 79.50 was reported for Kvangaja race (Basu, 1963). The mean cephalic index of 79.68 has been reported for Bhils race (Bhargav and Kher, 1960). Mean cephalic indices of 79.80 and 80.81 were reported for Barelis and Gujarat races of Indian respectively (Bhargav and Kher, 1961) .

Few reports however exist on the cephalic index of adult Africans. The studies on Africans have been mostly on fetuses (Obikili and Singh, 1992). A comparative study

between fetal cephalic indices of Nigerian and Caucasians with Nigerian showing significantly higher values has been done (Okupe *et al.*, 1984). The cranial index of Nigerian using autopsy was also studied (Ojikutu *et al.*, 1980). The cephalic index of Nigerians was also studied using living subjects (Obikili and Singh, 1992).

Anthropometric comparison of cephalic indices between the Urhobo and Itsekiri ethnic groups of Nigeria showed mean cephalic indices of 82.16 and 86.80 among the Itsekiris and Urhobos respectively (Oladipo and Paul, 2009).

The first comprehensive report on cephalic indices of Ijaws and Igbos, reported the mean cephalic indices of 80.98, 78.24, 79.04 and 76.83 for Ijaw males, Ijaw females, Igbo males and Igbo females, respectively (Oladipo and Olotu, 2006). Among the Ogonis, studies showed mean nasal indices of 106.1 and 90.9 in males and females respectively (Oladipo *et al.*, 2007).

However, no study of the cephalic indices of the ethnic group under investigation has been carried out. Thus, this study was aimed at documenting the cephalic indices of this Nigerian ethnic group which could be of importance in anthropological studies, forensic medicine and clinical practice.

### MATERIALS AND METHODS

In the present study, eight hundred (800) students were selected randomly from Kaa, Bori and Okwale, Communities, all in Rivers state of Nigeria. The eight hundred adult subjects comprised (400) males and 400 females. They were from Ogoni ethnic group by both parents and grand parents. The age of the subjects ranged from 25-45 years.

Subjects with craniofacial trauma and obstructive hairstyle were not used. The method used for assessing cephalic index was Hrdlicka's method 1952. The head length was measured with spreading caliper from glabellas to inions (Obikili *et al.*, 2004). The head breadth was measured as the maximum transverse diameter between the two fixed points over the parietal bones (Oladipo and Olotu, 2006). All measurements were taken in centimeters and to an accuracy of 0.10.

All measurement was taken with the subject sitting on a chair, in a relaxed mood and the head in the anatomical position. Cephalic index was calculated as biparietal diameter/length of cranium X 100. The data was subjected to statistical analysis using a z-test.

**RESULTS**

The values of the mean, Standard deviation (SD), Standard Error (SE), and variance were calculated for maximum head length (MHL), maximum head breadth (MHB) and cephalic index (C.I) and the summary of the results for the parameters were presented in Table 1-5. Comparisons of cephalic indices between various groups were also presented in Table 6.

The mean maximum head lengths in male and female Ogonis were found to be 18.55 cm and 17.86 cm respectively (Table 1) while the mean maximum head breadths were 20.39cm and 13.34cm respectively (Table 2). The mean cephalic indices in male and female Ogonis were found to be 111.18 and 75.09 respectively (Table 3 and 4). Thus Ogoni males had significantly higher cephalic index than Ogoni females (p<0.05). The Ogonis irrespective of the sex had mean maximum head length, maximum head breadth and cephalic index of 18.20, 16.87 and 92.63 cm, respectively (Table 5).

**DISCUSSION**

Racial variation in the cranium were recorded William *et al.* (1995), Oladipo and Paul (2009) and Jansen (1984). Variations in cephalic indices between and within populations have been attributed to a complex interaction between genetic and environmental factors (Kasai *et al.*, 1993). Bhils races (76.98) were reported as being mesocephalic (Bhargav and Kher, 1960). Similarly, Barelias of India, 79.80 (Bhargav and Kher, 1960) and Kvanga race, 79.50 (Basu,1963) were said to be brachycephalic (Shah and Jadjav, 2004).

Study on cephalic indices of Igbos and Ijaws males (80.98) and female (78.04) in brachycephalic group and mesocephalic group respectively while Igbo males with C.I of 79.04 and Igbo females with C.I of 76.93 were put in mesocephalic group (Oladipo and Olotu, 2006).

The cephalic indices of Ogoni people (present study) were at variance with those of the Itsekiris and Urhobos as the Ogoni males and females were in brachycephalic and mesocephalic group respectively. Brachycephalization is thought to be due to relative higher increase in the head breadth in comparison with the head length as a result of improvement in nutrition (Kouchi, 2000).

Table 1: Mean, standard deviation (SD) and standard error (SE) of maximum head length (MHL) of male and female Ogonis

MHL(cm)	N	Mean	SD	SE	t-value	DF	Critical t
Male	400	18.55	0.85	0.04			
Female	400	17.86	1.28	0.06	8.97	798	1.96

P<0.05

Table 2: Mean standard deviation (SD) and standard error (SE) of maximum head breadth (MHB) of male and female Ogonis

MHB(cm)	N	Mean	SD	SE	t-value	DF	Critical t
Male	400	20.39	19.27	0.96			
Female	400	13.34	0.67	0.33	7.34	798	1.96

P<0.05

Table 3: Mean standard deviation (SD) and standard error (SE) of cephalic index C.I) of male and female Ogonis cephalic index

C. I	N	Mean	SD	SE	Critical t	t-value	DF
Male	400	111.18	10.28	5.21			
Female	400	75.09	7.09	0.35	1.96	6.71	798

P<0.05

Table 4: Summary of results for all parameters used

Parameters evaluated	Mean	SD	SE	t-value	Critical t	DF	Level of significance
<b>C.I</b>							
Male	111.18	10.28	5.21	6.71	±1.96	798	0.05
Female	75.09	7.09	0.35				
<b>MHL(cm)</b>							
Male	18.55	0.85	0.04	8.97	±1.96	798	0.05
Female	17.86	1.28	0.06				
<b>MHB(cm)</b>							
Male	20.39	19.24	0.96	7.34	±1.96	798	0.05
Female	13.34	0.67	0.33				

P<0.05

Table 5: Overall mean and SD of maximum head length(MHL), maximum head breadth(MHB) and cephalic index(CI) of total population (male and female)

Parameters	Mean	SD
MHL(cm)	18.20	1.14
MHB(cm)	16.87	14.06
C I	92.63	75.92

Note: n=1600

Table 6: Comparative Data on Cephalic Indices of Various Populations.

Country/People	References	Cephalic Index
Kvangaja race	Basu (1963)	79.50
Bhils race	Bhargav and Kher (1960)	76.98
Barelias	Bhargav and Kher(1961)	79.80
Gujarat	Shah <i>et al.</i> , 2004	80.81
Ijaw males	Oladipo and Olotu, 2006	80.98
Ijaw females	Oladipo and Olotu, 2006	78.24
Igbo males	Oladipo and Olotu, 2006	79.04
Igbo females	Oladipo and Olotu, 2006	76.83
Urhobo males	Oladipo and Paul, 2009	86.50
Urhobo females	Oladipo and Paul, 2009	87.09
Itsekiri males	Oladipo and Paul, 2009	94.41
Itsekiri females	Oladipo and Paul, 2009	82.16
Ogoni males	Present study	111.18
Ogoni females	Present study	75.09

**CONCLUSION**

Variations in cephalic index between and within population have been attributed to a complex interaction between genetic and environmental factors (Kasai *et al.*, 1993).

Thus, the males and females in this study above belong to the same geopolitical region of Nigeria and they

have the same origin, but there is a significant difference between their cephalic indices. The Ogoni male were said to be brachycephalic or short head while Ogoni female were said to be mesocephalic.

The results of this study are expected to be of importance to anthropologists, forensic scientists and serve as the basis of comparison for future studies on other Nigerian ethnic groups.

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