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# Determination of Cephalic Index of the Yakurr People of Cross River State, Nigeria.

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## ABSTRACT

Cephalic Index is an important parameter for deciding the age, sex and race of an individual whose identity is unknown. This study determined the mean cephalic index of 500 children and adolescents of the Yakurr people of Cross River State, Nigeria. Male and female subjects with no anomalies in their facial features and head circumference were randomly selected from schools in Yakurr Local Government Area of Cross River State, Nigeria; ages ranging from 3 to 18 years (250 males and 250 females). Sex variation in the values of the cephalic index was determined. The result of the study showed that the mean cephalic index of Yakurr male subjects is 80.90-$^{+}$1.96 while that for females is 80.54-+1.22.Therefore the Yakurr people of Cross River State have brachycephalic head shape. Statistical analysis ( using the z score) demonstrates that males had significantly higher values than females ($P<0.05$), indicating sexual dimorphism. This result compliments the sexual variation in cephalic index that has been reported in Ijaw and Igbo ethnic groups in Nigeria.

**Keywords:** Cephalic index, Yakurr people, Cross River State, Nigeria.

## INTRODUCTION

The Yakurr people of Cross River State constitute the largest ethnic group in the state. Yakurr lies between latitudes 5°40 and 6°10 north of the equator and longitude 8°2 and 6°10, east of the Greenwich meridian and 120km northwest of Calabar the capital of Cross River State, Nigeria.

Cephalic index is a useful anthropological tool in individual identification, in view of its sex and racial variations. It is one of the most frequently investigated clinical anthropometric parameters recognized in the investigation of craniofacial geometry[1]. Cephalic index utilizes the length and breadth of the head which are useful measurements in the study of secular trend in the size and shape of the skull[2,3]. The capacity of the skull is greatly affected by the growth of the brain[4]. However, the shape of the skull is not directly related to the growth of the brain but to independent genetic and also nutritional factors. Research has shown in living persons, experimental animals, and also a number of archaeological findings where dietary change is well documented, that a change in diet from harder to softer foods has had a significant effect on the morphology of the skull[2,5]. Cephalic index is of considerable anthropological interest especially in the classification of populations, since it varies among races. Hence it is possible to establish the relationship that exits in ancestors in different racial groups in the world[1]. Cephalic index is also a useful tool in determination of sexual differences and racial variations from skeletal remains of unknown persons[6]. However, determination of cephalic index from skeletal remains requires an adjustment to the value to compensate for the absence of cranial soft tissue.

Cephalotypes , which are partly determined by the cephalic index, can be grouped into four internationally accepted categories namely: Dolicocephalic (<75), Mesocephalic (75 – 79.9), Brachycephalic (80 – 84.9) and Hyperbrachycephalic (85 – 89.9)[7].

Several reports of the cephalotypes of Nigerians have been published. Oladipo and Olotu reported that Ijaw males were brachycephalic while Ijaw females, Igbo males and females were mesocepalic[8]. Also Fawehinmi and Eroje reported that Benin males and females are brachycephalic[9].

## MATERIALS AND METHODS

This study comprised of five hundred subjects (250 males and 250 females) ranging in age from 3 years to 18 years. The subjects were randomly selected from schools in Yakurr local government Area of Cross River State, Nigeria. All subjects had a normal craniofacial configuration and no history of congenital craniofacial anomaly or hydrocephalus. The parents of all subjects were Yakurr.

The cephalic index was determined by the equation:

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

The Maximum Head Breadth was measured by means of a spreading calliper as the maximum transverse diameter between two fixed points of the parietal bone. The Maximum Head Length (Glabello-occipital length) was measured from the glabella to the opisthocranium. All measurements were taken by the same investigator to ensure uniformity. Measurements were taken when subjects were relaxed, sitting upright with the head in anatomical position. Data collected was processed by simple analytical method involving the determination of means and percentage occurrences of head shapes.

**RESULTS**

The results are presented in Tables 1 – 3.

**Table 1:** Mean values of cephalic indices of children and adolescent of Yakurr people of Cross River state.

| AGE | CEPHALIC INDEX (MALES) | | CEPHALIC INDEX (FEMALES) | |
|---|---|---|---|---|
| | N | MEAN SD | N | MEAN |
| 3 - 10 | 125 | 79.65±2.91 | 125 | 80.74±1.80 |
| 11 - 18 | 125 | 82.84±1.02 | 125 | 80.53±0.65 |

**Table 2:** Comparison of mean cephalic index of male and female subjects

| CEPHALIC INDEX | MALES | FEMALES |
|---|---|---|
| MEAN | 81.24 | 80.63 |
| STANDARD DEVIATION | 1.96 | 1.22 |
| NO. OF SUBJECTS | 250 | 250 |

**Table 3:** Percentage occurrence of head types in male and female subjects of Yakurr people of Cross River State.

| Head Type | Males (n=250) NO. | % | Females (n=250) NO. | % |
|---|---|---|---|---|
| Dolicocephalic | 7 | 2.8 | 8 | 3.2 |
| Mesocephalic | 50 | 20 | 78 | 31.2 |
| Brachycephalic | 132 | 52.8 | 124 | 49.6 |
| Hyperbrachycephalic | 61 | 24.4 | 38 | 15.2 |

**DISCUSSION**

The present study investigated the cephalic index of children and adolescents (3 – 18 years) of Yakurr people of Cross River State, Nigeria. In the present study, the mean cephalic index of males was 81.24 while that for females was 80.63. From this finding it was observed that most Yakurr people have heads which are of the bracycephalic type. The growth in shape of the head is of considerable anthropological interest especially in the classification of populations, but this varies among races[1]. The finding in this present study was similar to those of Ijaw males[8], Gujarat Indians[6] and Benin youths[9]. However, the present study shows that the cephalotype of the Yakurr people is different from the cephalotype of the Ijaw females, Igbo males and Igbo females which were all mesocephalic in shape[8].

From the study (Table 3), the order of frequency of occurrence of cephalotype for males was brachycephalic (52.8%), hyperbrachycephalic (24.4%), mesocephalic (20%) and dolicocephalic (2.8%). That for females was brachycephalic (49.6%), mesocephalic (31.2%), hyperbrachycephalic (15.2%).

Comparing the results of this study to that of other parts of the world shows that there are racial and regional differences in the order of occurrence of cephalotypes. The results of North Iranians shows: hyperbrachycephalic (52%), brachycephalic (25%), mesocephalic (21.5%) and dolicocephalic (1.5%)[7].

Among Turkman males, the order is brachycephalic (42.4), mesocephalic (40.9), dolicocephalic (8.1%) and hyperbrachycephalic (7.6%)[10]. Also results of two Indian populations gave the order as: dolicocephalic (58.5%), mesocephalic (21%), hyperbrachycephalic (19.2%) and brachycephalic (1.3%); mesocephalic (41%), brachycephalic (37%), hyperbrachycephalic

(14%) and dolicocephalic (7%)[10].

The present study demonstrated significant differences in the male population between ages 3 – 10 years (79.65) and ages 11 – 18 years (82.84). This shows that age has an effect on the cephalic index.

In conclusion, this study establishes the mean cephalic index for Yakurr people and shows that cephalic index which varies with age, could also be influenced by nutrition, racial, ethnic, geographical variations and genetic factors.

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