

A Comparative Analysis of Head Shape of Ekowe Indigenes, Bayelsa State

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Abstract

Introduction: Craniofacial anthropometric parameters are believed to specify sex, age and racial existence of an unknown person. **Aim:** The aim of this study is to assess and identify the head shape of Ekowe people and to ascertain whether there is sexual difference. **Materials and Methods:** Cranial measurements such as biparietal diameter and occipitofrontal diameter were carried out on 300 subjects, comprising of 179 males and 121 females of Ekowe indigenes and were between the age range of 18 years and above. In addition, cephalic index was calculated from these parameters. **Results:** The resultant mean values of biparietal diameter B(head breadth) was 16.50 ± 1.82 and 16.23 ± 1.73 for males and females. Mean values of occipitofrontal diameter (head length) for males and females were 28.03 ± 1.35 and 27.58 ± 1.04 . Cephalic index was 59.07 ± 7.17 and 58.98 ± 6.91 for males and females. Sexual dimorphism was observed in occipitofrontal diameter and the difference was statistically significant ($p < 0.05$). The percentage of head shape analysis indicates that only 0.3% each for the males and females sampled population were mesocephalic in shape (moderate or medium head shaped). None was brachycephalic for both males and females. About 59.3 % of the male sample and 40% of the female sample were dolichocephalic in shape (long head). **Conclusion:** We conclude that the Ekowe people are long headed. The findings from this study have shown to be very useful in forensic medicine, genetics and craniofacial surgery.

Keywords: Dolichocrphaly, Mseocephaly, Brachycephaly, Cephalic Index, Sexual Dimorphism.**Copyright © 2021 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Human skull has shown to be dimorphic sexually. Cephalic index or cranial index is the ratio of biparietal diameter divided by the fronto-occipital length multiplied by 100. These dimensions have shown reliance in calibrating or categorizing animals into broad, long and medium head shapes. Variations in craniofacial character indicates its unique and many asymmetries found in each individual [1]. The cephalic index is used in anthropology for determining the head contour in the horizontal plane. When the index is under 74.9 it is called dolichocephalic; between 75.0 and 79.9, mesocephalic; and above 80.0, brachycephalic [2]. The relevance of conducting craniometric or cephalometric studies cannot be quantified especially in the areas of pediatrics, plastic surgery, oral surgery, and forensic medicine [2, 3]. Cranial Index (CI) is one of the clinically recognized anthropometric parameters used in the investigation of a

craniofacial skeleton, because of its validity and practicability [4].

The cranial index is the most investigated craniofacial parameter, as it utilizes the length and breadth of the head which are very useful in specific studies [5-7]. The cranial index is used to determine variations in the shape of the head and face in newborns [8], and to determine the head dimensions in fetuses [9]. On the basis of anthropometric measurements, it was possible to conclude that mentally retarded children have a specific and recognizable anthropometric pattern with significantly expressed deviation mesocephalic to dolichocephalic head shape [10]. There is a significant ($p < 0.001$) association between low cephalic index with mentally retarded children when compared with normal group. The mean cephalic index points to dolichocephaly amongst mentally retarded children while mesocephaly amongst normal children [10]. The mean Cephalic Index for normal growing children with normal brain development was 79.82 ± 3.35 and that of the children

with abnormal brain development was 77.78 ± 2.95 and the difference between the two groups was not statistically significant ($P > 0.05$).¹¹ Cranial index does not change in children with neurodevelopmental disorders [11]. Cephalic index is a highly useful method for planning surgical procedures, as well as assessing their effectiveness in correcting cranial deformations in children [12]. Cephalometric studies on head types are useful in pediatrics, forensic medicine, plastic surgery, oral surgery and diagnostic comprehension between patient and normal populations [13]. This study is aimed at comparing and ascertaining the head type possessed by the Ekowe aborigines.

MATERIALS AND METHOD

A total of 300 subject were randomly selected comprising of 179 males and 121 females of Ekowe indigenes and were between the age range of 18 years and above. The measured parameters in this study includes, head breadth, head length using standardized

spreading (venier) caliper. Cephalic Index was calculated out from the measured parameters as head breadth/head length multiplied by 100. Data obtained for these variables were documented. All measurements were taken with the subjects sitting on a chair in a relaxed mood and the head in an anatomical position. The head length was measured by placing one end at the glabella and the other end at the inion (Occipitofrontal diameter) [9]. The head breadth was measured as the distance between the two parietal bones (Biparietal diameter). Verbal informed consent was sought from subjects before measurement procedure. Subjects were free from any form of craniofacial deformity.

RESULTS

The data obtained from somatometric measurements of the cranial parameters were analyzed statistically and the resultant observations are presented below in tables.

Table-1: Mean Value of Males and Females

S/N	PARAMETER	MALE	FEMALE
1	HEAD BREADTH	16.50±1.82	16.23±1.73
2	HEAD LENGTH	28.03±1.35	27.58±1.04
3	CEPHALIC INDEX	59.07±7.17	58.98±6.91

Table-2: Showing Mean±S.D, Z-test for the Studied Parameters of Ekowe males and females

S/N	PARAMETER	MALE	FEMALE	Z- CALCULATED	INFERENCE
1	HEAD BREADTH	16.50±1.82	16.23±1.73	-1.44	p>0.05
2	HEAD LENGTH	28.03±1.35	27.58±1.04	-3.19	p<0.05*
3	CEPHALIC INDEX	59.07±7.17	58.98±6.91	-0.24	p>0.05

Key: All values for male and female = Mean±S.D, * = statistically significant

Table-3: Frequency (percentage) of head shapes of ekowe males and females

S/N	HEAD SHAPE	FREQUENCY (%)		
		TOTAL	MALE	FEMALE
1	DOLICHOCEPHALIC	298(99.3)	178 (59.3)	120 (40)
2	MESOCEPHALIC	2(0.7)	1 (0.3)	1 (0.3)
3	BRACHYCEPHALIC	0 (0)	0 (0)	0 (0)

This table indicates that, dolichocephalic head type is predominant (99.3 %) followed by

Mesocephalic which is rare (0.7%) in the Ekowe population.

Table-4: Comparison of mean values of cephalic indices of ekowe aborigines and other nigerian tribes

RESEARCHER/YEAR	TRIBE	MALE (CI)	FEMALE (CI)	HEAD TYPE
Oladipo and Olotu (2006)	Ijaw	80.98	78.24	M: Brachycephalic F: Mesocephalic
Oladipo <i>et al.</i> (2009)	Ogoni	111.18	75.09	M: Brachycephalic F: Mesocephalic
Oladipo and Paul (2009)	Itsekiri	94.41	82.16	Both: Brachycephalic
Jervas <i>et al.</i> (2016)	Igbos	68.80	73.60	Both: Dolichocephalic
Oladipo and Paul (2009)	Urhobo	86.50	87.09	Both: Brachycephalic
Present Study (2021)	Ekowe	59.07	58.98	Both: Dolichocephalic

Keys: CI= Cephalic Index, M=Male, F= Female

Table-5: Comparison of mean values of cephalic index of ekowe with various races

RESEARCHER/YEAR	RACE	MALE (CI)	FEMALE (CI)	HEAD TYPE
Anitha <i>et al</i> (2011)	Caucasians	79.14	80.74	M: Mesocephalic F: Brachycephalic
Yagain <i>et al.</i> (2012)	Mongoloid	77.92	80.85	M: Mesocephalic F: Brachycephalic
Sunita <i>et al.</i> (2015)	Australoid	77.28	78.38	Both: Mesocephalic
Jervas <i>et al.</i> (2016)	Negroes	68.80	73.60	Both: Dolichocephalic
Present Study (2021)	Ekowe (Negroes)	59.07	58.98	Both: Dolichocephalic

Keys: CI= Cephalic Index, M=Male, F= Female

DISCUSSION

Anthropometry of craniofacial parameters is of great deal in assessing deformities and other congenital defects. In this study, the Ekowe males had significant higher head length than their female counterparts ($p < 0.05$). There was no statistical difference in their head breadth ($p > 0.05$).

The mean cephalic index of adult Ekowe population is 59.07 ± 7.17 cm for male and 58.98 ± 6.91 cm for female. The value for the mean cephalic index of the Ekowe population is much lower than other tribes and races. The India/ Haryanvi cephalic index is 66.67cm for male and 72.25cm for female as reported by Kumar and Gopichand (2013). The Nigerian Igbos possesses a cephalic index of 68.80 for male and 73.60cm for female according to Jervas *et al.* (2016). Esomunu *et al.* (2012) gave values as 81.41cm and 80.41cm for male and female respectively.

Dolichocephalic head type was seen as the predominant type of head in this study with a percentage (99.3%) of the studied population which confirms Jervaset *al.* (2016) findings that majority of Africans fall under dolichocephalic head type. This means, they are long headed.

Results presented by Oladipo *et al.* (2009) of the Ogoni people of the South-South Nigeria being brachycephalic males and mesocephalic females. The Edo and the Urhobo being Mesocephalic in head shape is an indication that craniofacial parameters are tribe and race specific with nutrition, environmental, genetic factor playing central role. Sexual dimorphism observed in the craniofacial parameters can be attributed to genetic and environmental factors, as well as differences seen across age and ethnic background (Oyinbo *et al.*, 2008).

CONCLUSION

The present study has provided a normative data for Ekowe indigenes which has previously not been investigated and provided. In addition the ascertainment of the dolichocephalic head shapes.

The relevance of this study in forensic medicine, genetics and craniofacial surgery cannot be

overemphasized, because of its usefulness in the preparing human face and head gadgets.

Hospitals should have database of craniofacial dimensions that are age, sex and race specific to ensure precision in craniofacial surgeries.

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