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Nasofacial Forms among the Idoma Ethnic Group of Benue State, Nigeria

Authors
Oria, Rademene S., Nandi, Michael E., Obun, Cletus O., Ogu, Thompson.
Department of Anatomy and Forensic Anthropology,
Cross River University of Technology (CRUTECH), Okuku Campus.
Corresponding Author
Oria, Rademene S.
Department of Anatomy and Forensic Anthropology,
Cross River University of Technology (CRUTECH), Okuku Campus
Email: *radysolutions@yahoo.com*

Abstract
Anthropometric measurement of parameters like Facial and nasal indices provides vital information which can be used in plastic surgery and understanding the diagnosis between patients and the normal population. This study was carried out to establish the facial and nasal indices in Idoma ethnic group of Benue state. Four hundred (400) subjects (200 male and 200 females) between the ages of 18-35yrs were used for this study. Facial measurement was done using a spreading caliper and nasal measurement was done using vernier caliper. Our result revealed that mean facial index for male and female of Idoma ethnic group was 96.94 ± 0.80 and 95.00 ± 0.87 respectively and t-Test result revealed that the difference was statistically significant at p>0.05. Furthermore, the mean nasal index for male and female subjects of Idoma ethnic group was 85.60 ± 1.15 and 84.62 ± 0.73 respectively and the difference was statistically significant (p>0.05). However, the mean nasal index for the Idoma ethnic group was 85.11 ± 1.70 whereas their mean facial index was 95.97 ± 1.83. Consequently, from the nasal and facial indices calculated, the Idoma ethnic group can be classified under platyrrhine nose type and hyperleptoprosopic face type respectively.This study will be useful to the bioanthropologist, forensic scientist and plastic surgeons.
Keywords: *Anthropometry, facial index, nasal index, Platyrrhine, Hyperleptoprosopic, Idoma ethnic group.*

Introduction

The face is the anterior aspect of the head from the forehead to the chin and from one ear to the other. The face provides our identity as an individual human. The basic shape of the face is determined by the underlying bones. The individuality of the face results primarily from anatomical variation: variations in the shape and relative prominence of the features of the underlying cranium; in the deposition of fatty tissue; in the color and effects of aging on the overlying skin; and in the abundance, nature, and placement of hair on the face and scalp (Maina *et at.*, 2012). The nose is the part projecting above the mouth on the face of a person or anaimal containing the nostrils and is used for breathing and smelling. The shape of the nose can be determined by environmental climatic conditions (Last, 1981). The narrower noses are ideal in cold and dry climates but broader noses are favored in

warmer, moister ones as a result of natural selection in human evolution (Hall and Hall, 1995). The nose can be grouped into three categories based on the nasal index; these are Leptorrhine with a Nasal Index of 69.90 or less, Mesorrhine with a Nasal index between 70 and 84.90 and Platyrrhine (broad nose) with a nasal index of 85 and above (Williams et al., 1995; Porter and Olson, 2003).

Facial anthropometry is helpful in forensic medicine, plastic surgery, clinical diagnosis and treatment planning (Heidari et al, 2004). Five categories of face based on Prosopic index are: Hypereuryprosepic, Euryproscopic, Mesopro-scopic, Leptoproscopic and Hyperleptoproscopic (Williams et al., 1995). Nasofacial anthropometry is a specific component of the anthropometric field that focuses on the facial and nasal regions which is also vital for sex determination, forensics uses, quantifying nasofacial dysmorphology, facial surgery, and diagnostic comprehension. By using accurate anthropometric measurements in craniofacial region, we can treat and reconstruct congenital or post traumatic facial disfigurements successfully (Farkas *et al* 2005).

The shape of the nose and the face is believed to be a unique feature of the ethnic origin of an individual as such, the nasal and facial anthropometric features when studied can provide useful information to a rhinoplastic surgeon especially when nasal reconstruction is sort for by an individual who desire to change his nasal morphology to that of other race.

A study of the nasal features of the Igbo ethnic group In Nigeria was carried out by Akpa et al., (2003). Their study revealed that the Igbos have Platyrrhine nose type. A morphometric study of nasal parameters of the Igbos, Ijaws and Yorubas in southern Nigeria was carried out by Oladipo et al., (2007). Their findings revealed that the Ijaws had the highest nasal index (96.4) followed by Igbos (94.1) while the lowest was seen in Yorubas (89.2). They also reported sexual dimorphism as the males had a higher nasal index than the females in all the ethnic groups with the differences being statistically significant ($p<0.05$). Oladipo et al., (2009) also reported that the Andoniethnic group have a mesorrhine nose type. More so, Omotosho et al (2011) in their work on Bini people reported sexual dimorphism in the parameters of the face and nose they studied with male subjects having higher values than their female counterparts. The predominant face type in their study was mesoproscopic whereas the major nose type was platyrrhine.

Benue state as it exists today is a surviving legacy of an administrative entity which was carved out of the protectorate of northern Nigeria at the beginning of the 20th century. The state derives its name from River Benue, the second largest river in the country and the most prominent geographical feature in the state. It geographical coordinates are longitude 7^0 47' and 10^0 0' east. Latitude 6^0 25' and 8^0 8' and shares boundaries with five other state namely; Nasarawa to the north, Taraba to the east, Cross river to the south, Enugu to the south-west, and Kogi the west. The state also shares common boundaries with Cameroun on the south-east. Benue has a population of 4,780,389 (2006 census) and occupies a land mass of 32,518 square kilometers. Idoma is one of many ethnic groups in Benue State. The Idomas are known to be warriors, and hunters of class, and there are hospitable and peace loving people. An extensive literature search revealed that there is no published studies on nasal and facial types of the Idoma people of Benue State. Thus the aim of this work was to ascertain the predominant facial and nasal forms in the Idoma ethnic group of Benue State, Nigeria.

Materials and Methods

This research was carried out on the Idoma ethnic group in Benue State. Four hundred (400) subjects (200 male and 200 females) between the ages of 18-35yrs were used for this study. The study was carried out between April and October, 2016. The five hundred (400) subjects were made up of males and females who were residing in the study area and whose parents and grandparents were of

Idoma ancestry. The subjects who presented with trauma of the nose or cleft lips and any other nasofacial defects were excluded from the study.

The nasal height (NH) was measured from nasion to nasospinale with the aid of a sliding caliper. The nasal width (NW) was measured at right angle to the nasal height from ala to ala. Nasal index was calculated using the equation below (Romo and Abraham, 2003).

$$\text{Nasal Index} = \frac{\textbf{Nasal Width}}{\textbf{Nasal Height}} \times \frac{\textbf{100}}{\textbf{1}}$$

The facial length was measured from the Trichion to the Gnathion, whereas the facial width was measured as the byzygomatic width, between the right and left Zygion. The facial index was calculated using the equation below (Heidari*et al*, 2004; William *et al.*,1995).

$$\text{Facial Index} = \frac{\textbf{Facial lenght}}{\textbf{Facial width}} \times \frac{\textbf{100}}{\textbf{1}}$$

All the measurements were taken with the subject sitting in chair in a relaxed condition and head in the anatomical position. The measurement was done by one observer to prevent inter-observer error. The data were subjected to statistical analysis using student T-test.

Statistical Analysis

Statistical Package for Social Sciences (SPSS) Version 17.0 (Chicago, SPSS, Inc.)was used for the statistical analysis. Results were expressed as Mean ± Standard error of mean. Comparisons were made of the nasal and facial dimensions studied between males and females using the Student's *t*-test. The differences were considered significant at 95% confidence level (that is, when $P< 0.05$).

Ethical Consideration

The objectives of the research was explained to each subject and written informed consent was obtained from each of them before commencement of measurement. In line with Helsinki Declaration of 1975, as revised in 2000, ethical approval was obtained from the Ethics/Research Committee of the Faculty of Basic Medical Sciences, Cross River University of Technology, CRUTECH Okuku Campus, Yala, Nigeria.

Results

The results obtained in the present study are presented on Table 1 and 2.The mean nasal width for Idoma males and females were 4.21±0.16cm and 4.09±0.12cm respectively while the nasal height for both male and females were 4.87± 0.18cm and 4.76 ± 0.11cmrespectively. The nasal indices for Idoma males and females were 85.60± 1.15 and 83.41 ± 0.73respectively(Table 1).t-Test carried out to ascertain if there was difference between the nasal parameters measured and calculated in Idoma male and female revealed that the difference in the nasal parameters was significant ($p<0.05$) higher than those of females suggesting the existence of sexual dimorphism (Table 1). The result also shows that the Idoma male has a Platyrrhine type of nose whereas their female has mesorrhine type of nose.

Furthermore, the mean facial width for the Idoma male and female was 12.11 ± 0.80cm and 11.99 ± 0.84cm respectively whereas, their mean facial length was 11.71±0.83cm and 11.36± 0.88cm respectively. The facial index that was calculated for both male and female subjects was 96.94 ± 0.80cm and 95.00 ± 0.87cm respectively (Table 2). Statistical analysis revealed that the difference in the face length was significant ($p<0.05$) whereas the face width and facial index didn't show any statistically significant difference (Table 2).The result also shows that the Idoma ethnic group has a Platyrrhine type of nose

Table 1: Descriptive statistics of Nasal parameters studied for Male and Female Idoma subjects

Parameter	Male	Female
Nasal Width (cm)	4.21 ± 0.16^{A}	4.09 ± 0.12^{A}
Nasal Height (cm)	4.87 ± 0.18^{B}	4.76 ± 0.11^{B}
Nasal Index	85.60 ± 1.15^{C}	84.62 ± 0.73^{C}

Values with similar alphabetical superscripts are statistically significant at $p<0.05$

Table 2: Descriptive statistics of Facial parameters studied for Male and Female Idoma subjects

Parameter	Male	Female
Face Width (cm)	12.11 ± 0.80	11.99 ± 0.84
Face Length (cm)	11.71 ± 0.83[D]	11.36 ± 0.88[D]
Face Index	96.94 ± 0.80	95.00 ± 0.87

Values with similar alphabetical superscripts are statistically significant at $p<0.05$

Table 3: Overall mean of Nasal and Facial Indices for the Idoma ethnic group

Parameter	Idoma	Classification
Nasal Index	85.11 ± 1.70	Platyrrhine
Facial Index	95.97 ± 1.83	Hyperleptoprosopic

Discussion

Facial and nasal indices are useful anthropometric parameters utilized in the determination of racial variation; and also used to determine sexual differences especially in individuals whose identity are unknown (Shah and Jadhav, 2004). Facial anthropometry plays a major role in the diagnosis of several dysmorphic syndromes (Guyot et al., 2003; Zankl and Molinari, 2003). The nasal index is very useful in anthropology as it is one of the clinical anthropometric parameter recognized in nasal surgical and medical management (Hansen and Mygind, 2002; Zankl et al., 2002).

The present study shows that Idoma ethnic group falls under platyrrhine nose type. Our result agrees with the findings of Oladipo et al (2009) on Okirika tribe who who were also classified under platyrrhine nose type and the claim of Risely (1915) that Africans basically have platyrrhine nose type. The result of the present study is congruent with reports from other studies about Nigerian ethnic groups having platyrrine nose type like Igbo, Ijaw and Yoruba (Oladipo et l., 2007) Ejagham and Bekwarra ethnic groups in cross river state (Ugochukwu et al., 2014, Esomonu et al., 2013) and Bini (Omotosho et al., 2011). Platyrrhine nose type may be typical of the Idoma people of Benue state because morphometric parameters are dependent upon age, race and sex (Oladipo et al., 2009). However, findings from the present study disagrees withsome other studies which showed that some tribes possess mesorrhine nose type like the Andonis (Oladipo et al., 2009)and Hausa (Anas and Saleh, 2014) which showed that tribe have mesorrhine nose type.

The present study also revealed that the predominant face type of Idoma people is hyperleptoprosopic. This is in agreement with the report of Mani (2013) who reported hyperleptoprosopic face type as the predominant face type in Rajput people of India. Similarly, hyperleptoprosopic face type was also reportedby Ojieh et al (2017) on Ukwanis of Delta state in Nigeria and Raji et al (2010) in North eastern Nigerian population which is in line with the result of the present study. However, our result revealed some degree of variation from studies of other ethnic groups who reported different facial forms like mesoprosopic face type in Bini tribe in Nigeria (Omotosho et al., 2011), Malaysians (Shetti et al., 2011).

Our study also revealed significant sexual dimorphism in the nasal parameters studied with males subjects having higher values than their female counterparts. This finding is similar to the results of other studies that reported sexual dimorphism with male having significantly higher nasal index than their female counterparts (Oladipo et al., 2007; Omotosho et al., 2011; Anaibor et al., 2011) but disagree with studies by oladipo et al. (2009) who on the contrary reported that female subjects had higher values of nasal dimensions than males. On the other hand, although our study revealed hyperleptoprosopic face type for the Idoma ethnic group, no sexual dimorphism was found in the facial parameters studied apart from facial length. This finding suggests that nasal or facial dimensions can be higher in any sex depending on the uniqueness of the population under study.

Conclusion

The present study has provided normative data ofthe Idoma ethnic people of Benue state in

Nigerian which has previously not been investigated. The Idoma ethnic group can be classified under platyrrhine nose type and hyperleptoprosopic face type. This finding suggests that genetics, and ethnicity can greatly influence account nasal and facial characteristics between and within populations. This study will be useful to the bioanthropologist, forensic scientist, plastic surgeons and other clinicians.

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