

Nasal anthropometry of children and young adults of the Efik ethnic group of Cross River State, Nigeria

ABSTRACT

Introduction: Nasal anthropometry is crucial for its diverse applications. In order to assess sexual dimorphism and classify the nose type of children and young adults of the Efik ethnic group of Cross River State, this study was designed to determine the standard values for some nasal anthropometric parameters like nasal height (NH), nasal width (NW), nasal length (NL), and nasal index (NI). **Materials and Methods:** The study sample consisted of 600 subjects (300 males and 300 females) aged 6-20 years, who were drawn randomly from the Efik ethnic group of Cross River State, Nigeria; they were divided into three age subgroups (6-10 years, 11-15 years, and 16-20 years) to observe the gender difference within the groups and the variations of each parameter with advancing age. **Results:** Sexual dimorphism was noted ($P < 0.05$) only in the age group of 11-15 years as higher values were observed in females in NH and NL ($P < 0.05$). The age-related changes were not significant. The mean value of NI in males and females in general was determined and it was observed that the overall value of males was 90.36 ± 9.4 , while that of females was 89.76 ± 11 . **Conclusion:** This, therefore, implies that the indigenes of the Efik ethnic group of Cross River State have platyrrhine (broad and short) nose type since they have an $NI > 85$. The result from the present study will be useful in aesthetic and reconstruction surgery involving the nose, and also for the physical anthropologist and forensic scientist in the area of ethnic and racial identification.

Key words: Cross River State, nasal index, nasal height, nasal length, nasal width

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INTRODUCTION

The nose is a special facial structure, the external appearance of which varies considerably based on the race, ethnicity, and gender of an individual, and it is also important in identification.^[1-3]

Nasal anthropometry involves the measurements of the external features of the nose in order to determine its size as well as usage of the nasal index (NI) to classify the nose into three main categories, which include the following: Leptorrhine with an NI of 69.90 or less, mesorrhine with

an NI between 70 and 84.90, and platyrrhine (broad nose) with an NI of 85 and above.^[4,5]

The data correlation of nose anthropometry of various ethnic groups is important in planning aesthetic nasal surgery, as this surgery aims to improve facial aesthetics by maintaining the dimensions and proportions of the nose specific for a particular race or ethnic group.^[6]

The importance of the nose in facial recognition, especially with the recent advances in biometrics in the decade, cannot be over emphasized. Moreover, several authors have revealed that nasal anthropometry is specific to different ethnic groups because it outlines the morphological similarities of the nose of a particular ethnic group.^[7-10]

The literature is inchoate with reports on the nasal anthropometry of Nigerians. Anthropometric evaluation of nasal parameters of the Itsekiris and the Urhobos ethnic groups of Nigeria was carried out by Oladipo *et al.* in 2009, with the aim of comparing the nose types among these two

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DOI:

10.4103/2315-7992.173991

ethnic groups.^[8] Their results showed that on an average, Urhobos had a mean NI of 89.63% and the Itsekiris had a mean NI of 90.74%.^[8] Sexual dimorphism was observed in the ethnic groups studied, with the males having significantly higher nasal values than the females ($P < 0.05$).^[8] Thus, their work showed that the two ethnic groups have the same nose type, platyrrhine (broad and short) that is expected of an African population. Furthermore, in 2009, Olotu *et al.* discovered that the nasal height (NH) for adult Igbo males was $4.87 \pm .08$ cm and $4.40 \pm .76$ cm for the adult Igbo females,^[9] whereas the Bini ethnic group of Nigeria also has the platyrrhine nose type, with the males having an NI of 91.17 ± 1.52 and the females recording 89.14 ± 1.75 .^[10]

The present study aims to establish the standards for the following nasal anthropometric parameters: NH, nasal length (NL), nasal width (NW), and NI, and to study the distribution of the basic nose types and shapes in children and young adults of the Efik ethnic group of Cross River State so as to provide a baseline data of nasal anthropometry that could be vital in anthropological and forensic studies.

The Efik ethnic group of Cross River State is the major ethnic group in Cross River State. They are found mostly in Southern Senatorial District of Cross River State. The state is within the south zone of Nigeria.

MATERIALS AND METHODS

A total number of 600 subjects were recruited for this research (300 males and 300 females) across the Efik ethnic group of Cross River State. The subjects were aged 6-20 years with normal nose configuration, and with both their parents from the Efik ethnic group of Cross River State.

All the measurements used for this research were taken in the morning hours; this is because individuals are presumed to be more relaxed in the morning than in the

afternoon.^[11] The method applied for this research was the direct method, with the subject sitting on a chair with his/her head in the anatomical position [Figure 1].^[12] The measurements taken in this study included the following: NH, measured from the nasion to the subnasale; NL, measured between the nasion and the pronasale; and NW, measured at right angle to the NH from the ala to ala. NI was calculated as follows: NW divided by NH multiplied by 100, i.e., $NW/NH \times 100$.^[13] This determines if the nose is leptorrhine (fine nose) with value <70 , mesorrhine if the value is between 70-85, or platyrrhine (broad nose) if the value is >85 .^[9,10] The data were subjected to statistical analysis using Student's *t*-test.

RESULTS

In this cross-sectional extensive study, a total number of 600 subjects were measured (male: 300 and female: 300). Student's *t*-test was carried out, and the mean and standard deviation (SD) for the values of NH, NW, NL, and NI for the male and female subjects of the Efik ethnic group of Cross River State were noted. The nose measurements were compared between males and females [Table 1]. All the measurements are given in centimeters. Most of the variables had equivalent proportions between the age, but some appeared to be sexually dimorphic ($P < 0.05$), i.e., relative to the sex. Statistical analysis was carried out using SPSS for Windows, Version 16.0. Chicago, SPSS Inc.

Results of the NH and NL showed that no significant differences were observed between the males and females, for age groups 6-10 years and 16-20 years, but there were significant differences ($P < 0.05$) between males and females in the age group of 11-15 years for both the parameters [Table 1]. The group, therefore, revealed that the mean NH and NL were sexually dimorphic in the age group 11-15 years, with higher values noted in females than in males. It was also observed that there were no significant

Table 1: Comparisons of the nasal anthropometric measurements between male and female indigenes of the Efik ethnic group of Cross River State

Age (years)	Sex	NH (in cm)	NW (in cm)	NL (in cm)	NI
6-10	Male	3.72±.37	3.21±.40	3.23±.40	86.69±7.2
	Female	3.62±.28	3.16±.30	3.09±.31	87.60±8.2
	Total	3.67±.33	3.18±.35	3.16±.36	87.14±7.7
11-15	Male	3.86±.29*	3.60±.35	3.30±.43*	93.68±9.8
	Female	4.04±.37*	3.63±.34	3.55±.42*	90.14±9.2
	Total	3.95±.34	3.61±.34	3.42±.44	91.94±9.2
16-20	Male	4.07±.37	3.668±.37	3.42±.45	90.48±9.7
	Female	4.05±.53	3.660±.44	3.45±.44	91.36±14
	Total	4.07±.45	3.664±.40	3.43±.44	90.92±12
Total	Male	3.89±.37	3.502±.42	3.32±.43	90.35±9.4
	Female	3.91±.45	3.490±.43	3.37±.44	89.75±11
	Total	3.89±.41	3.496±.42	3.34±.42	90.05±10

*Values are mean ± SD of data the obtained. Values with similar superscript are significantly different at $P < 0.05$, using Student's *t*-test

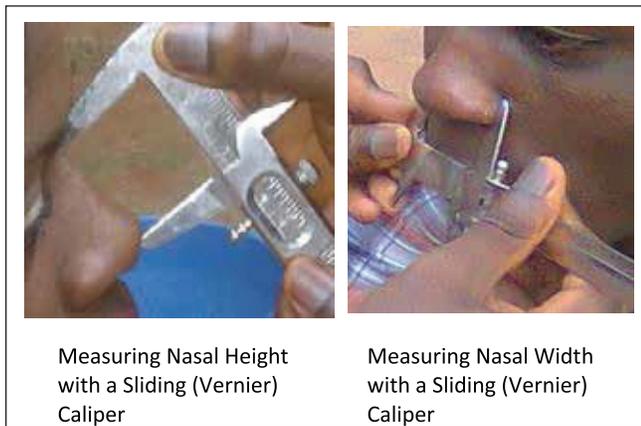


Figure 1: Picture plates showing measuring procedures

differences in the values of the NW and NI for all the age groups ($P < 0.05$).

The mean and SD of NIs in males and females in general was determined, and it was observed that the overall value for males was 90.36 ± 9.4 while that for females was 89.76 ± 11 . From this result, it is observed that the studied population, irrespective of sex and age, has an NI value that places them in the platyrrhine class of nose.

DISCUSSION

The nose has been described by most researchers as one of the distinguishing features of the face that depicts the ethnicity, race, age, and sex of an individual.^[1,3,8,9,11,14,15] The morphological differences in nasal anatomy between genders cannot be overemphasized, especially in cosmetic rhinoplasty, in order to achieve the desired aesthetic effect.^[6] The present study shows that the predominant nose shape is platyrrhine (broad nose), as seen in the mean NIs of 90.36 and 89.76 for males and females, respectively. No significant increase was observed in any of the measured parameters as a result of age advancement, but sexual dimorphism was observed with the female values being higher than the male values in NH and NL in the age group of 11-15 years.

The mean NW for the present work, irrespective of age difference, was found to be $3.50 \pm .42$ cm for males and $3.49 \pm .43$ cm for females. There was no significant difference in the NW between the males and females in all the age groups. This trend was also observed by Anas and Saleh in 2013 as they revealed that among the Hausa and Yoruba ethnic groups of Nigeria, there were no significant differences in the NW of males and females,^[12] but Akpa *et al.* discovered that Igbo males have a higher mean NW than Igbo females.^[15] Moreover, the NW of the Itsekiris and the Urhobos were $4.01 \pm .14$ cm and $3.99 \pm .40$ cm, respectively,^[8] if compared to that of the indigenes of the Efik ethnic group of Cross River State, it is apparent that the studied group

has a lower NW for both males and females. However, when this result was compared with that conducted on the Sistanis and the Balochs of Iran, it was found that the Sistanis recorded $3.23 \pm .13$ cm and the Balochs recorded $3.14 \pm .15$ cm,^[4] the NW of the studied population was higher. This proves the existence of differences in the NW of different ethnic groups. It has been revealed that the broader nose of the Africans could be as a result of a natural selection that favors their warm and moist environment.^[16]

The shape of the nose is a function of the NI and it is used in differentiating racial and ethnic differences in anthropology.^[5,17] The NI also exhibits sexual dimorphism that made it a viable tool in forensic science toward gender differentiation,^[3,12,16,18] but this might only be in adults because in the present study, the NI is not sexually dimorphic in all the age groups that represent the children and young adults of the Efik ethnic group of Cross River State. In the present study, the NI value reported for the studied population, irrespective of sex, was 90.05 ± 10 cm; this value does support their African origin because it has been reported that Africans mostly have the platyrrhine nose type, that is, a broad nose with an NI >85 .^[13] Other Nigerian ethnic groups in Cross River State who have platyrrhine nose type include the Bekwarras^[18] and the Ejaghams.^[3] Other ethnic groups of Nigeria that have been reported to have platyrrhine type of nose include the Igbos, Ijaws, Yoruba,^[19] Okrikas,^[8] and the Bini ethnic group.^[10] Although cases of nose type different from the platyrrhine nose type have been reported among Nigerian subjects, this is seen among the Andonis,^[8] the Ikweres,^[20] and the Hausas^[13] who fall within the mesorrhine nose type.

The findings of this study and the comparison of the NI with other works have shown that though anthropological difference exists in the values of the NI, they still fall within the platyrrhine type of nose prevalent in the African continent.

CONCLUSION

This study shows sexual dimorphism in NH and NL of the 11-15-year-old indigenes of the Efik ethnic group of Cross River State; all the other parameters measured were not sexually dimorphic. However, all the age groups fell under the platyrrhine (broad nose) that is the typical African nose type. Standard anthropometric methods were employed in carrying out this study; hence, this result is recommended to Rhinoplasty surgeons who may need the nasal profile of children and young adults of the Efik ethnic group of Cross River State during surgery. Furthermore, with the recent advances in biometrics, it could come in handy for forensic experts in the identification of individuals of this particular ethnic group. Moreover, the relevance of this study to the physical anthropologist cannot be overemphasized.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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How to cite this article: Esomonu UG, Sunday R, Biose JI, Nandi EM. Nasal anthropometry of children and young adults of the Efik ethnic group of Cross River State, Nigeria. *Ann Bioanthropol* 2015;3:59-62.

Source of Support: Nil, **Conflict of Interest:** None declared.