

Anthropometric study of the nasal index of bekwara ethnic group of cross river state, nigeria.

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ABSTRACT: Nasal anthropometry can be employed in identification of the race and sex of individuals whose identity cannot be ascertained since the normal nose morphology is dependent on ethnic, gender and environmental influences. This study is aimed at deriving normal standard values for the Nasal Index (NI) in adults of the Bekwara ethnic group in Cross River state of South- South Nigeria. One hundred (100) subjects (50 males and 50 females) aged 21-45 years were recruited for this study of which the nasal height, nasal length and nasal breadth were determined. Sexual dimorphism was noted ($P < 0.05$) as higher values were observed in males in Nose width and Nasal indices ($P < 0.05$). Applying the international Nose anthropometric methods to assess and compare Nasal morphological characteristics, both males and female have platyrrhine (broad and short) Nose type since their nasal index was revealed to be 94.65 and 90.33 respectively. This study clearly buttresses the African origin of the Bekwaras, it also confirms that anthropometric variation in the nose parameter employed in the calculation of the nasal index does exist. These measurements in healthy subjects are useful for dysmorphologist in the early identification of some dysmorphic syndromes like cleft lip associated with nose disorders, it will also be relevant in forensic medicine, rhinoplastic surgery and physical anthropology.

Keywords: Nose height, Nose length, Nose width, Nasal Index, Bekwara

INTRODUCTION

The knowledge of the nasal anthropometry is employed in forensic science and physical anthropology, as one of the tools used in identification of different races, ethnicity and the gender of an individual. This is because the nasal morphometry is one of the features of the body that has been reported to be ethnicity specific because it outlines the morphological peculiarities of the nose of a particular ethnic group (Heidari, et al., 2009; Olaidapo et al., 2009; Olotu et al., 2009; Oladiran et al., 2010), it is also gender specific (Zhang 1990). The nasal profile and morphology is therefore one of the defining features that characterize different races. Different anthropological findings have describe the nose as a signature indicating the ethnicity, race, age and sex of an individual (Ofodile and Bokhari, 1995; Ochi, 2002; Romo, 2003; Ferrario et al 1997; Oladipo et al., 2009; Olotu et al 2009). The morphological differences in nasal anatomy between genders cannot be over emphasized especially in cosmetic rhinoplasty because feminization of masculinization of the opposite sex nose might not give the desired aesthetic effect. The shape of the nose is believe to be a unique feature of the ethnic origin of an individual, as such the nasal anthropometric features when studied can provide useful information to the rhinoplastic surgeon especially when nasal reconstruction is sort for by an individual who desire to change his nasal morphology to that of other race. The data correlation of nose anthropometry of various ethnic groups is therefore very useful when planning such aesthetic nasal surgery and cosmetology.

There are three categories of nose on the basis of 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). Africans are reported to have platyrrhine type of nose. (Risely, 1915)

A large number of reports exist on the Nasal anthropometry of Nigerians. Oladipo et al., (2009) conducted an anthropometric assessment of Nasal parameters of Itsekiris and Urhobos ethnic group of Nigeria with the aim of comparing the nose type among the two ethnic groups. Their results showed that on the average, Urhobos had a mean Nasal index of 89.63% and the Itsekiris had a mean index of 90.74%. Sexual dimorphism was observed in the ethnic groups studied with males having significantly ($P < 0.05$) higher nasal values than the females. Therefore, their work shows that the two ethnic groups fall within the same nose type which is platyrrhine (broad and short) expected of an African population. Oludiran et al., (2010) further established that the Bini ethnic group of Nigeria

also have the platyrrhine nose type, with male having a nasal index of 91.17 ± 1.52 and females recording 89.14 ± 1.75 .

The nasal index of the Igbos, Yorubas and Ijaws were determined by Oladipo et al., (2006). Their results showed that on the average, the Igbos had a mean nasal index of 94.1 ± 0.37 , Yorubas 89.2 ± 0.30 and the Ijaws 96.37 ± 1.06 . Sexual dimorphism was also observed in all the ethnic groups studied with males having significantly higher ($p < 0.05$) nasal index than the females. However, the three ethnic groups still fall within the same nose type platyrrhine (short and broad nose) expected of an African population.

Shrestha et al., (2009), carried out a study on craniofacial measurement of parameters such as head length and width, nasal length and width among the Rai and Limbu community of Sunsari. This study included 444 healthy people aged 25-50 years belonging to pure race Rai and Limbu communities. Nasal parameters were measured and their result revealed that Limbu males and females had longer nasal length and nasal height. Similarly, nasal width of Limbu females were as in males, Rai had broader nose than that of the Limbu.

The present study therefore aims to establish standards for the following nasal anthropometric parameters: Nasal height, Nasal length, Nasal width and Nasal index and to study the distribution of basic nose types and shape of the Bekwara ethnic group of Cross River State so as to provide a baseline data of nasal anthropometry which could be vital in forensic and anthropological studies.

Cross River State is a coastal state in South-south Nigeria, named after the Cross River, which passes through the state. The Bekwara ethnic group is one of the major ethnic groups in Cross River State of Nigeria.

MATERIALS AND METHOD

A total number of one hundred (100) subjects were recruited for this research (50 males and 50 females) across the Bekwara Ethnic group in Cross River State. Subjects which were invited to participate in the measurement were within age 21 years through 45 years with normal nose configuration and both parents are indigenes of Bekwara 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 hours than in the afternoon (Montagu, 1960). The method applied for this research is the direct method using sliding caliper with the subject sitting on a chair with head in the anatomical position. (Shrestha et al., 2009). The measurements taken in this study include: NASAL HEIGHT, this is measured from the nasion and subnasale; NASAL LENGTH, this is measured between the nasion and the pronasale; NASAL WIDTH, measured at right angle to the nasal height from ala to ala. Nasal index was calculated as follows: $\text{nasal width NW} / \text{nasal length NH} \times 100 = \text{NW} / \text{NH} \times 100$ (Romo and Abraham, 2003) which determines if the nose is leptorrhine (fine nose) with value < 70 , mesorrhine if it is between 70-85 and platyrrhine (broad nose) if it is > 85 (Williams et al., 1995; Porter and Olson, 2003). The data were subjected to statistical analysis using student T-test.

RESULTS

The subjects for this research were recruited from the Bekwara ethnic group of Northern Cross River State. The mean of the nasal height for Bekwara ethnic group for male and female was found to be 4.24 ± 0.25 cm while in females it was 4.28 ± 0.27 cm. The difference was not significant ($P < 0.05$).

The mean nose width for male indigenes of Bekwara ethnic group was recorded as 4.01 ± 0.24 cm while that of females was 3.98 ± 0.21 cm. When the values for males were compared with the values for females, there was significant sexual dimorphism observed with male values being higher (table 1). The mean for nose length in males and females is 3.84 ± 0.29 cm, 3.91 ± 0.29 cm respectively (table 1). Unlike the nasal height, the nasal length is not statistically significantly ($p < 0.05$). The mean and standard deviation of nasal indices in males and females was determined and it was observed that the overall male values were 94.65 ± 6.4 while that of females was 90.33 ± 6.4 (table 4) which means that people of the Bekwara's from Cross River State shares the platyrrhine Nose type.

TABLE.1: Comparison of nose height, nose width, nose length and nasal index in male and female subjects in adults of Bekwara Ethnic group of Northern Cross River State.

NASAL PARAMETER	MALE (cm)	FEMALE (cm)	TOTAL
Nasal Height	4.24 ± 0.25	4.28 ± 0.27	4.24 ± 0.25
Nasal Breadth	4.01 ± 0.24^A	3.98 ± 0.21^A	3.95 ± 0.23
Nasal Length	3.84 ± 0.29	3.91 ± 0.29	3.87 ± 0.31
Nasal Index	94.65 ± 6.42^B	90.33 ± 6.45^B	92.49 ± 6.76

Values with similar superscript are significant at $P < 0.05$

DISCUSSION

Different anthropological findings have describe the nose as a signature indicating the ethnicity, race, age and sex of an individual (Ofodile and Bokhari, 1995; Ochi, 2002; Romo, 2003; Ferrario et al 1997; Oladipo et al., 2009; Olotu et al 2009). The morphological differences in nasal anatomy between genders cannot be over emphasized especially in cosmetic rhinoplasty in order to achieve the desired aesthetic effect.

In the present study sexual dimorphism was observed in the mean value of the nose width, and in the calculated nasal index. This study found the male nasal width to be $4.01 \pm .24$ cm and that of female was $3.98 \pm .21$ cm (table 1) with higher significant value noted in male than in female ($P < 0.05$). Akpa et al., (2005) also revealed that Igbo males have a higher mean nasal width than the Igbo females. Oladipo et al., (2009) reported in their study that the nasal width of the Itsekiris and Urhobos is $4.01 \pm .14$ cm and $3.99 \pm .40$ cm respectively. The value of the nasal width irrespective of sex which was found to be $3.95 \pm .23$ cm. this value can be compared to the nasal width of the Urhobos as revealed by Oladipo et al., (2009), but when compared to the work of Heidari et al., (2009), on Sistani and Baluch of Iran who recorded $3.23 \pm .13$ cm for Sistani and $3.14 \pm .15$ cm for Baluch the Bekwara value was higher. This shows that variation exist in the nasal width of different ethnic groups.

Olotu et al., (2009) revealed that the nasal height for Igbo male adult was found to be $4.87 \pm .84$ cm while the Igbo female recorded $4.40 \pm .76$ cm. The mean nasal height for the present work was found to be $4.24 \pm .25$ cm for males and $4.28 \pm .27$ cm for females. The Bekwara mean nasal width value which showed no sexual dimorphism, were lower than the reported values by Olotu et al.,(2009)

The classification of the nose into various types is a function of the nasal index and in anthropology it is used in distinguishing racial and ethnic differences (Franciscus and Long, 2001; Porter and Olson 2003). The nasal index also exhibits sexual dimorphism (Zhang, 1990) that is why it a relevant tool in Forensic Science towards gender differentiation (Xu *et al.*, 2001). The shape of the nose of an African just like those of other races are said to be influenced by the environmental climate condition (Last, 1981). The broader nose of the Africans could be as a result of a natural selection that favors their warm and moist environment (Hall and Hall, 1995). The present study revealed a Nasal index of 94.65 ± 6.4 for males and 90.33 ± 6.4 for females. The male value for the nasal index was significantly higher than that of female (table 1). This is in line with the works of Oladipo *et al.* (2007) who reported that the males from Igbo, Ijaw and Yoruba ethnic groups in Southern Nigeria have significantly higher nasal index than their female counterpart ($p < 0.05$). Oladipo et al., (2009) also observed sexual dimorphism in the nasal index of Itsekiris and Urhobos of Nigeria, with males having significantly higher nasal index values than females. The nasal index value reported for the Bekwara Ethnic group of Cross River State irrespective of sex was revealed as 92.49 ± 6.76 cm, this nasal index value place the Bekwara in to the Platyrrhine type of nose. This buttress their African origin because it has been reported that Africans mostly have the Platyrrhine nose type which is the broad nose with nasal index above 85 (Risely, 1915). Other Nigerian ethnic group that have platyrrhine nose type include the Igbos, Ijaws and Yoruba (Oladipo et al., 2007), the Okrikas (Oladipo et al., 2009), and Bini ethnic group (Oludiran et al., 2010). Findings of this study and the comparison of the nasal index with other works have shown that though anthropological difference exist in the values of the nasal index they still fall within the platyrrhine type of nose prevalent in the African continent.

CONCLUSION

In conclusion, this study has shown significant differences in Bekwara male and female nasal parameters. The Bekwara ethnic group falls under the platyrrhine (broad nose) which is the typical African nose type. This study was carried out using standard anthropometric method, hence this result is recommended to forensic experts especially with the recent interest in employing biometrics as a tool in national identification, and it can also be useful to the plastic surgeon who might want to create the Bekwara type of nose for his patient.

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