

The Study Of Nasal Parameters (Nasal Height, Nasal Width, Nasal Index) Amongst The Yorubas Of Nigeria

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Abstract

This study was carried out to determine and compare the nasal parameters of male and female Yorubas for any existing differences or similarities. The study was carried out using a sample size of five hundred (500) male and five hundred (500) female Yoruba subjects. They were randomly selected from Shaki polytechnic in Oyo State. The ages of subjects ranged from 18 – 45 years. Nasal widths and Nasal heights were obtained with the aid of a sliding caliper, and nasal indices were calculated as: Nasal width/Nasal height x 100. The results were analyzed using discrete statistics while z-test was used for test of significance. Males had mean nasal width, height and index of 3.83cm, 4.26cm and 90.02 respectively while those of females were 3.73cm, 4.47cm and 83.58 respectively. The mean nasal index of male Yorubas was significantly higher than that of female Yorubas ($p < .05$). The results of this study have shown that the mean nasal index of the Yorubas still falls within the nose type called platyrrhines (< 85.0). This data will be of importance in forensic science, clinical practice (plastic surgery) and anthropological studies. The data is therefore recommended to forensic experts, surgeons and anthropologists.

INTRODUCTION

Facial anthropometry has become an important tool used in genetic counseling, reconstructive surgery and forensic investigation^{1,2,3,4}. The nose is considered as one of the best clues to racial origin⁵. Its proportion is determined on the same principles as those of the skull, the importance of the nose is so great that one might label it “Nasal science”⁶. The nose can be categorized on the basis of Nasal parameters (Nasal height, Nasal width and nasal index); these three categories are commonly accepted^{7,8}. Nasal analysis is the first step a surgeon takes before performing rhinoplasty (plastic surgery) to change the shape of the nose^{9,10,11}.

The nose is part of the respiratory tract superior to the hard palate which contains the peripheral organ of smell^{12,13}. There are certain variables that determine the shape of the nose, these variables include: race, tribes and environmental climatic conditions¹⁴ with narrower nose being favored in cold weather and dry climate and broader nose in warmer climate¹⁵. This is to say that nasal elongation is influenced by adaptation to environment¹⁶.

The nose has been classified into three major groups based on the nasal parameters—Leptorrhine or fine nose (69.9 or less), Mesorrhine or medium nose (70.0 – 84.9), Platyrrhine or broad nose (≥ 85.0)⁷.

Nasal index which is a physical characteristic of a race is said to be related to climatic conditions¹⁷. It is obtained by division of the width of the nose by its height and multiplying the resultant factor by 100¹⁸.

There are several races which hold different anthropometric views these include: Africa, Europe, Asia, Australia and the Pacific Indo-Africans etc. All races have their peculiarities and these vary considerably when referring to various anthropometric parameters¹⁹.

A study was carried out and produced three categories for physiological classification; Afro-caucasians, Africans and Afro-Indians. The subjects of study were assigned to one of the three categories with the majority classified as Afro-caucasians (52%), Africans (24%) and Afro-Indians (22%)^{20,21}. Researchers found similarities within these categories. Similar anthropometric study was carried out to compare the nasal indices of Igbo and Yorubas for any existing differences or similarities. The report showed that the Igbo males and females had a mean nasal indices of 95.8 ± 0.44 and 90.8 ± 0.61 respectively while the Yoruba males and females had mean nasal indices of 90.0 ± 0.38 and 88.1 ± 0.47 respectively. The mean nasal indices of Igbo males and females were significantly higher than those of Yoruba males and females. However the Yorubas and Igbo still fall

within the same nose type called platyrrhines ²² .

Another study was also carried out on nasal indices of major ethnic groups in Southern Nigeria, these ethnic groups are: the Yoruba ethnic group, Ijaw ethnic group and Igbo ethnic groups. The result showed that on the average, the Igbo had a mean nasal index of 94.1 ± 0.37 , Yoruba 89.2 ± 0.30 and Ijaws 96.37 ± 1.06 . Thus the Ijaws had a significantly higher nasal index ($p < 0.05$) than either the Igbos or Yorubas ¹⁹ . Sexual dimorphism was also observed in all ethnic groups with males having significantly higher ($p < 0.05$) nasal index than females ¹⁹ . Studies on the nasal indices of Ogonis showed that the Ogoni males and females had mean nasal widths of 3.98cm and 3.64cm respectively; the mean nasal heights for both males and females were 3.99cm and 3.91cm respectively while their nasal indices were 106.1 and 90.9 respectively. The parameters in males were significantly higher than those of Ogoni, thus were sexually dimorphic amongst the Ogonis ²⁴ . Reports on the nasal indices of Aryans and Sudroids (Indian Negroids) Shows that the Sudroids which include the Dravidian people with nasal index of 89.8 fall within the class platyrrhines, verdict shudros (Aryanise and enslaved blacks) with nasal index of 83.0 fall under the platyrrhine class ²⁵ .

A study carried out on the Onges, reported the nasal length for males and females as 3.90-4.60, 3.40-4.50 respectively while the nasal widths in males and females were 3.30-4.50, 3.90-3.50 respectively. Mean nasal indices of 72.3-97.7 and 70.5-97.4 were also reported for male and female Onges respectively.

In 1980, a study carried out showed that most Western Europeans were leptorrhines having a long and narrow nose with a nasal index of 69.9 or less while the Bantus and Bushmen of African as well as the indigenous Australians were platyrrhine having broad nose with a nasal index of 85.0 and above ²⁶ . A previous study has shown that the German nasal index is similar to that of the general Western Europeans average of nasal index of 71.0 and below leptorrhines ²⁷ . Although nasal index of Yorubas has been investigated previously using smaller sample size, the study was however not comprehensive enough as other nasal parameters: nasal height and nasal width as well as age groups of subjects were not included in previous studies. Thus this present comprehensive study was aimed at documenting , using larger sample size, the nasal parameters on Yorubas and also comparing data of male s and females for sexual dimorphism.

MATERIALS AND METHODS

One thousand subjects of Yoruba tribe with age ranging from 18 to 45 years were used in the study. These were made up of 500 females, 500 males whose parents (both parents) and grand parents were Yorubas. The subjects were selected at random from the staff and students of Ibadan Polytechnic, Shaki Campus, Oyo State of Nigeria.

The subjects comprises of individuals with normal and craniofacial configuration. Subjects with trauma of the nose and congenital abnormalities were excluded.

Sliding vernier caliper (12.5cm with accuracy of 0.01cm) was used in measurement of nasal height and width. Nasal height was measured by placing the upper fixed divider arm of the vernier caliper with accuracy of 0.01cm on the nasion of the nose superiorly and then the lower and moveable divider arm on the subnasale then the reading was read on the vernier scale and then recorded. Nasal Width was measured as the distance between the external surface of one ala to the other ala at right angle to the nasal height from ala to ala ²⁸ .

The measurements were taken with subjects sitting on a chair in a relaxed mood. The ratio of nasal width to the nasal height of the nasal multiplied by 100 gave the nasal index ²⁹ . Thus Nasal index is mathematically expressed as follows:
Nasal Index=Nasal width/Nasal height x 100.

RESULTS

The results of the study were presented in tabular forms (Table1-4). The dimensions of the nasal parameters obtained in the study together with the statistically analyzed values for both males and females are shown in Table 1- 3. A comparison between the nasal parameters of males and females is given in Table 3. Table 4 shows the comparison of nasal indices obtained in the study with other populations previously studied.

From table 1, the highest mean nasal index in males was observed amongst the age group 42-45 years while the least was observed amongst age group 26-29 years. On the other hand in females (Table 2), the highest mean nasal index was observed in age group 42-45 years while the least was observed in age group 22-25 years. In table 3, the mean nasal widths, heights and indices in males were 3.83cm,4.26cm and 90.02 respectively while those of females were 3.74cm, 4.47cm and 83.58 respectively. The mean nasal index of male subjects was significantly higher than that of female subject when compared statistically

(p<0.05).

Table 4 clearly shows that ethnicity significantly affects nasal parameters as differences exist amongst different races/ tribes and ethnic groups as shown in the table.

Figure 1

Table 1: Mean Nasal Parameters and standard deviation (S. D) of Male subjects

Age Group (years)	Nasal width (cm)	Nasal height (cm)	Nasal Index	No. of subject
18-21	3.74±0.44	4.10±0.47	90.96±6.69	160
22-25	3.80±0.49	4.29±0.64	88.76±7.74	84
26-29	3.79±0.64	4.38±0.76	87.47±7.25	64
30-33	3.74±0.65	4.18±0.87	90.40±6.13	49
34-37	3.92±0.77	4.46±0.95	87.66±8.79	38
38 - 41	3.99±0.68	4.38±0.81	91.18±6.75	55
42 - 45	4.09±0.83	4.41±0.81	92.55±5.56	50
				500

SD (Standard Deviation), sample size= 500

Figure 2

Table 2: Mean Nasal Parameters and standard deviation(SD) of Female Subjects

Age Group (years)	Nasal width (cm) ±SD	Nasal height (cm) ±SD	Nasal Index ±SD	No. of subject
18-21	3.61±0.34	4.30±0.42	84.47±6.41	154
22-25	3.58±0.52	4.47±0.68	79.94±7.54	93
26-29	3.83±0.62	4.54±0.83	84.80±7.79	65
30-33	3.67±0.49	4.46±0.61	82.80±8.72	41
34-37	3.91±0.57	4.72±0.89	83.75±9.27	38
38 - 41	3.81±0.73	4.54±0.81	83.90±7.93	53
42 - 45	4.00±0.53	4.66±0.81	85.94±7.12	56
				500

SD (Standard Deviation), sample size= 500

Figure 3

Table 3: Nasal Parameters of Male and Female Yorubas

Nasal Parameters	Males, n=500	Females, n=500
	Mean ± S.D	Mean ± S.D
Nasal Width(cm)	3.83 ± 0.118	3.74±0.147
Nasal height(cm)	4.26±0.133	4.47±0.137
Nasal index	90.02±1.616	83.58±1.896

P < 0.05

Figure 4

Table 4: Comparative table of nasal indices among various populations

RACE/POPULATION	NASAL INDEX	AUTHOR(S)/YEAR
Sudroid	89.8	Franciscus&Long 1991
Aryans	83.0	Franciscus&Long 1991
Male onges	72.3-97.7	Franciscus&Long 1991
Female onges	70.5-97.4	Franciscus&Long 1991
Western Europeans	69.9	Heirmaux&Hartono 1980
Bantus	85.0	Heirmaux&Hartono 1980
German	71.0	Nichang, 2004
Igbo male	95.8	Oladipo <i>et al.</i> , 2006
Igbo female	90.8	Oladipo <i>et al.</i> , 2006
Yoruba male	90.0	Oladipo <i>et al.</i> , 2006
Yoruba female	88.1	Oladipo <i>et al.</i> , 2006
Ogoni male	106.1	Oladipo <i>et al.</i> , 2007(a)
Ogoni female	90.9	Oladipo <i>et al.</i> , 2007(a)
Ijaws	96.37	Oladipo <i>et al.</i> , 2007(b)
Yorubas	89.2	Oladipo <i>et al.</i> , 2007(b)
Igbos	94.1	Oladipo <i>et al.</i> , 2007(b)
Yoruba male	90.02	Present study
Yoruba female	83.58	Present study

DISCUSSION

The nose, which has earlier been defined, is a facial structure consisting of bones and cartilages₂ has also been classified into three groups based on nasal anthropometric parameters as: Leptorrhine or fine nose (69.9 or less), Mesorrhine or medium nose (70.0 – 84.9) and platyrrhine or broad nose (≥85.0)₃₀.

The nasal index has been studied by several authors, these studies indicated racial and ethnic difference in nasal index amongst different populations₂₂. Most Caucasians are leptorrhine having long and narrow nose with nasal index of 69.9 or less or they could be mesorrhine with an index between 70.0 and 84.9 on the other hand, the Bantu speaking Negroids as well as Australoids are platyrrhine with broad nose and nasal index of 85 or more₂₅.

Nasal analysis is the first step a surgeon takes prior performing rhinoplasty (plastic surgery of the nose) to change the shape or size of the nose. Thus appreciating the details of nasal analysis for any particular ethnic group will enable the surgeon to offer a better cosmetic result without compromising the patients desire to maintain his or her cosmetic ethos. Most nasal indices analysis shows that sexual dimorphism exist between tribes. Nasal index which is a physical characteristics of a race appears to bear a marked relation to climate, broad nose being associated with hot moist climate and narrow noses with cool dry conditions

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The results of the present study conform to earlier reports on African population with nasal index of 90-100. It also agrees with other authors on sexual dimorphism of nasal parameters.

This study has shown that the male Yorubas have a significantly higher mean nasal index ($p < 0.05$) than the females. Similarly, the Yorubas fall within the African nasal classification (platyrrhine or broad nose).

CONCLUSION

This study has been carried out using standard anthropometric methods, hence the result is recommended to forensic experts, plastic surgeons and anthropologists.

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