

Distribution of nose types among Igbos of South-East Nigeria

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Abstract

Background: The nose is an important aesthetic unit that is essential in defining the facial appearance of an individual and also helps in identifying a tribe or race. Understanding the distribution of nose types within the Igbo population is crucial for elucidating patterns of human diversity, population genetics, and evolutionary anthropology. The aims of this study were to determine some nasal parameters of Igbo adults, analyze the distribution of the types, check sexual dimorphism, and to correlate the parameters with age, height, weight and body mass index (BMI) respectively

Materials and Methods: This was a descriptive cross-sectional study of 312 Igbos in Enugu of Southeastern Nigeria using cluster sampling. The nasal dimensions were measured with digital Vernier's calipers and the nasal indices were calculated. Weight and height were also measured and BMI calculated. All data were collated and analyzed.

Results: The mean age was 37.05 (± 15.83). The age range was 20 to 69 years and they were grouped into 20 – 29 years group, 30 – 39, 40 – 49, 50 – 59 and 60 – 69 years groups. The range nasal height was 37.24 - 57.63mm for males, while range for females was 32.43 - 52.97mm. The range for nasal width was 37.04 - 51.29mm for males and 32.93 - 48.52mm for females. The mean nasal widths of males were significantly wider than those of females in all age groups respectively ($p < 0.01$). The mean nasal indices for males and females were 91.91 (platyrrhine) and 86.26 (platyrrhine) respectively. Majority of the sample population had platyrrhine nose (67%) while 32% of them had mesorrhine nose and only 1% of them had leptorrhine nose. There was a significant positive correlation between height of nose and width of nose of adult Igbos with their age, height and weight (p value < 0.01) and a significant negative correlation with body mass index ($p < 0.01$).

Conclusion: This study provides valuable insights into the distribution of nose types among the Igbo people of South-East Nigeria. We have characterized the prevalence of different nose types and explored potential associations with demographic and anthropometric factors. The major nose type of Igbos is platyrrhine, while the minor one is mesorrhine. Knowledge of nasal parameters are applied in forensic studies; and in surgeries involving the nose, and this ensures that individuals do not lose their identities even after extensive nasal surgeries.

Keywords: Nasal index; Anthropometry; Nose of Igbos; Platyrrhine and mesorrhine; Sexual dimorphism; Nasal height and nasal width

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1. Introduction

The nose is an important aesthetic unit that is essential in defining the facial appearance of an individual and also helps in identifying a tribe or race. Nasal index has been used in classifying the nose into leptorrhine, which is the long and narrow type (nasal index below 70), mesorrhine, the medium type (70.0 - 84.9) and platyrrhine (85.0 and above), the broad and flat nose type.^[1, 2] It has been reported that the shape of the nose is influenced by the geographical location and climate;^[3] with platyrrhine nose noted to be commoner among populations living in warm and humid areas while the narrow leptorrhine nose is prevalent in cold and dry climates.^[1, 4]

The predominant nose in a tribe or race is technically defined based on the average nasal index of the population in question.^[5] It is however rare to find a tribe or race bearing only one type of nose. Therefore, it is necessary to look at the pattern of distribution of nose types in a population. The distribution not only reveals the major type, but reveals other minor nose types. Factors like migration, intermarriages and cultural practices may influence the nose morphology/distribution within the Igbo population, or any other given tribe. This information would be useful in understanding the origin and ancestry of the tribe/race or the possibility of a relationship with another tribe/race. Nigeria is a heterogenous society with numerous ethnic groups, with the four major ethnic groups residing in different geopolitical zones.

There is a global surge in facial cosmetic surgery, and this is seen among both males and females, though higher in females.^[6] Knowledge of nasal parameters is useful to surgeons, especially plastic surgeons, maxillofacial surgeons, prosthodontists and orthodontists.^[4] The plastic surgeons apply the knowledge in rhinoplasty and reconstruction of extensive nasal defects.^[6, 7, 8] It is relevant in the preoperative assessment and postoperative evaluation of the surgical outcome of such surgeries. It is also useful in forensic studies in cases of missing people, identifying the dead and investigating criminals.^[3, 5] Knowledge of nasal parameters is important in designing nasal implants and designing facemasks.

Existing literature on the distribution of nose type of the Igbos is limited, with a few studies specifically addressing nose morphology among African populations, particularly the Igbo ethnic group. The lack of comprehensive data on nose types among the Igbo people presents a significant gap in anthropological research, hindering our understanding of intra-population variation and its implications for population genetics and health disparities. Additionally, cultural and societal perceptions of nose morphology may influence self-perception, identity formation, and social interactions within the Igbo community.

The primary aim of this study was to determine the distribution of nose types among the Igbo people living in Enugu, South-East Nigeria, and specifically access the nasal height, nasal width and nasal index, and also to explore any associations with age, sex, height, weight and body mass index (BMI).

2. Material and methods

This was a descriptive cross-sectional study of adult Igbos living in Enugu metropolis, a town in Southeastern Nigeria. Cluster sampling was used in selecting the subjects from two tertiary institutions, the staff and visitors of a state government ministry and a group of retirees. The total population of Enugu was 722,664^[9] and calculated sample size for the adults was 200 (being 50% of the whole population) using Bourley's formula. The subjects for the study were 312 with their ages between 20 and 69 years.

All the subjects used were those with normal body stature, whose parents and grandparents were Igbos. Subjects with facial anomaly or history of nasal/facial trauma were excluded. Ethical approval was obtained for the original proposal, "Craniofacial Dimensions in the Igbos of Enugu" from the University of Nigeria Teaching Hospital Health and Research Ethics Committee.

The height of the nose was measured as the vertical distance from the nasion (n) to the subnasale (sn) and the width was measured as the horizontal distance between the two alar nasi (al) using digital Vernier's calipers. In measuring the width, the limbs of the calipers were placed on the most lateral points of both alae. The height and weight of each subject were also measured using a mobile stadiometer. Nasal index for each nose was calculated using the formula nasal width (NW) divided by nasal height (NH) multiplied by hundred: Nasal index = $NW/NH \times 100$.^[2]

The collected data were analyzed using Statistical Package for Social Sciences (SPSS) software version 20. The data were subjected to statistical analysis for means and standard deviation. Pearson's correlation coefficient (r) was used to check

for any relationship between the nasal variables and age, height, weight, body mass index respectively. Mean values for the sexes were compared and p values of less than 0.05 considered statistically significant.

3. Results

Three hundred and twelve individuals were evaluated and measured, 126 males and 186 females, with a mean age of 37.05 (± 15.83). The age range was 20 to 69 years. Age distribution had 142 individuals in the 20 – 29 years group, 45 in 30 – 39 years group, 46 in 40 – 49 years group, 43 in 50 – 59 years group, and 36 persons in the 60 – 69 years group.

3.1. Nasal Height

The nasal height for males had a range of 37.24 - 57.63mm, while range for females was 32.43 - 52.97mm. Looking at the age groups, the mean nasal height of the Igbo men was found to be significantly longer than that of Igbo women ($p < 0.05$) in the 30-39yrs and 40-49yrs age groups (see Table 1), though it was not same for the elderly group (60-69yrs).

Table 1 Nasal heights of Igbo men

Age (yrs)	HEIGHT (mm)				
	Males		Females		p value
	Means	SD	Means	SD	
20-29	47.0	3.4	46.1	3.4	0.14
30-39	49.5	4.1	46.3	2.3	0.00**
40-49	48.4	3.5	45.7	2.8	0.01*
50-59	46.8	3.2	47.8	1.4	0.02*
60-69	48.8	3.8	46.9	2.7	0.11

**Significant at $p < 0.01$; *Significant at $p < 0.05$

3.2. Nasal Width

The nasal width for males had a range of 37.04 - 51.29mm while the range for females was 32.93 - 48.52mm. The mean nasal widths of Igbo men were significantly wider than those of the women in all age groups respectively ($p < 0.01$); see Table 2. This shows strong sexual dimorphism in nasal width of Igbos.

Table 2 Nasal widths of Igbo women

Age (yrs)	NASAL WIDTH (mm)				
	Males		Females		p value
	Means	SD	Means	SD	
20-29	43.2	2.6	39.0	2.6	0.00**
30-39	44.7	1.6	39.6	2.6	0.00**
40-49	44.0	2.4	41.3	3.3	0.00**
50-59	42.8	2.3	40.7	1.4	0.00**
60-69	44.8	2.6	41.8	2.1	0.00**

**Significant at $p < 0.01$; *Significant at $p < 0.05$

3.3. Nasal Index

Table 3 showed sexual dimorphism in the mean nasal indices of the Igbos in the 20-29 years, 30-39 years and 50-59 years group with statistically significant differences in both sexes. There were no statistically significant differences between males and females in the 40-49 years and 60-69 years age groups.

Table 3 Nasal indices of Igbo men and women

Age(yrs.)	MALES			FEMALES			p value
	No.	Mean	SD	No.	Mean	SD	
20-29	42	92.4	8.5	100	85.2	9.8	0.00**
30-39	15	90.9	7.9	30	85.7	6.6	0.02*
40-49	24	91.4	9.1	22	90.8	11.5	0.83
50-59	23	91.8	7.5	20	85.2	3.5	0.00**
60-69	22	92.4	9.7	14	89.3	4.2	0.27

**Significant at p < 0.01; *Significant at p < 0.05

For the whole population, the mean nasal indices were 91.91 (platyrrhine) for males and 86.26 (platyrrhine) for females (see Table 4) The range of nasal indices for males was 69.43 - 119.09, while the range for females was 67.53 - 133.40. The person with the broadest nose was a female with nasal index of 133. On the other hand, there was a man that had a leptorrhine nose, though two females also had nasal indices for leptorrhine nose.

Table 4 Mean Parameters for Males and Females

Means	Males	Females	p value
Mean Nasal Height	47.85	46.30	0.000
Mean Nasal Width	43.74	39.75	0.000
Mean Nasal Index	91.91	86.26	0.000

3.4. Distribution of Nose Types

Majority (67%) of the sample population had platyrrhine nose while 32% of them had mesorrhine nose. (see Figure 1) Only 1% of them had leptorrhine nose.

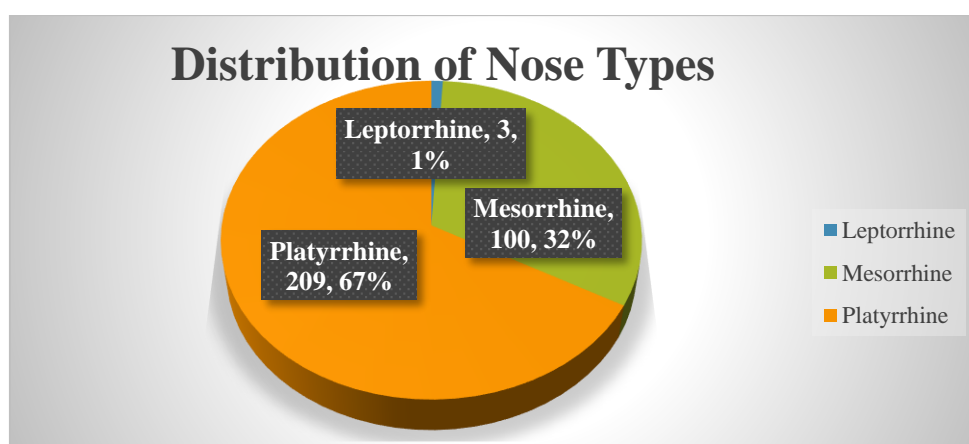


Figure 1 Distribution of the nose types in the study population based on their nasal indices

The proportion of those with platyrrhine noses that were males and females were 34% and 33% respectively (See Figure 2). On the other hand, among the 32% that had mesorrhine noses, majority of them (26%) were females, while only 6.1% of them were males. Platyrrhine nose was still the commonest type among females (33%), despite the significant proportion of them (26%) that had mesorrhine nose.

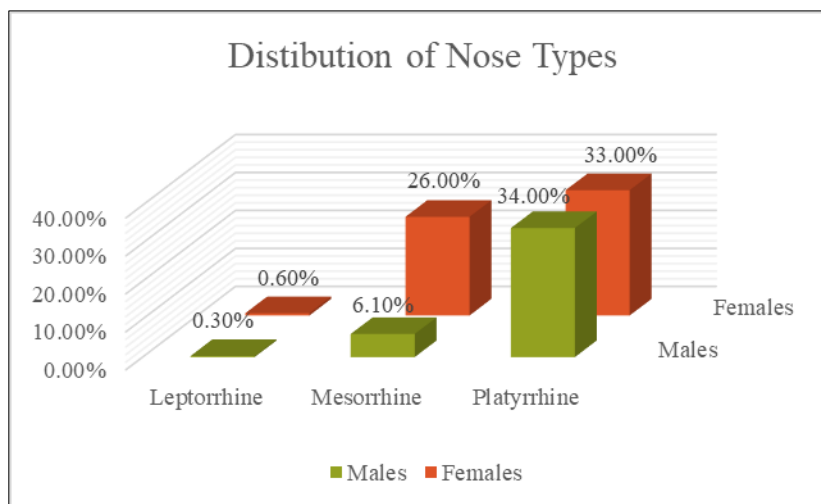


Figure 2 Pattern of distribution of the types of noses in adults by sex.

3.5. Correlations

The result in Table 5 shows that there was a significant positive correlation between height of nose and width of nose of adult Igbos with their age, height and weight (p value < 0.01).

Table 5 Pearson correlation coefficients of the variables with age, height, weight and body mass index

Variables	Age		Height		Weight		Body mass index	
	r	p value	r	p value	r	p value	r	P value
Height of Nose (mm)	.180	.00**	.244	.00**	.135	.02*	-.375	.00**
Width of Nose (mm)	.342	.00**	.375	.00**	.250	.00**	-.364	.00**
Nasal Index	.130	.02*	.127	.03*	.097	.09	-.004	.92

** Correlation significant at $p < 0.01$; * Correlation significant at $p < 0.05$

On the other hand, the height and width of the nose had a negative correlation with body mass index that was also significant ($p < 0.01$). On the contrary, nasal index had a significant positive correlation with only age and height ($p < 0.05$) but had no significant correlation with weight and body mass index.

4. Discussion

There is a type of nose that is of common occurrence in a tribe or race that contributes to their having a unique appearance. Nasal index makes it technically easier to define or identify this major nose type. This is frequently deduced from the mean nasal index of that population. Platyrrhine nose is generally predominant among indigenous Africans in the South of Sahara.^[1,10] In the present study, the mean nasal indices of Igbo men (91.91) and Igbo women (86.26) living in southeastern Nigeria were platyrrhine (i.e.85 and above), but the males had a higher nasal index and the difference between the indices of both sexes were strongly significant, with $p < 0.001$ (see Table 4) This is similar to the findings of Oladipo et al 2007 who got a nasal index of 95.9 as mean nasal index for Igbo men and 90.8 as that for Igbo women.^[11] Both studies showed that nose of Igbo men and women are platyrrhine but the nasal indices in this present study were lower for both sexes. This may be explained by the fact that the Igbos in the other study included individuals living in diverse places including states in the South-West and South-South of Nigeria. The same study also reported nasal indices of Ijaw men and women to be 98.6 and 92.4 respectively and those of Yoruba men and women were 90 and 88.1 respectively. In another study among Yorubas of Southwestern Nigeria that were 18yrs and above, the mean nasal indices of males and females were 98.92 and 92.94 respectively.^[12] These suggests that platyrrhine nose is common among tribes in Southern Nigeria since Igbos, Yorubas and Ijaw people are major tribes in Southern Nigeria.

In a study of four racial groups that was carried out in USA, African-Americans had the largest nasal index (95.82), Caucasians had the least (72.46), and a nasal index of 82.59 made Latinos the 2nd largest, while East Asians were third with a nasal index of 78.33.^[13] The study shows that African-Americans have platyrrhine nose like most Africans south

of the Sahara where most of the African-Americans have traced their ancestors to. Their nasal index is also similar to that of Igbos in the present study.

Platyrrhine nose was also seen in the highest percentage of sample population; it was seen in 67% of them. This was followed by mesorrhine nose with 32%, serving as the minor nose type. It is quite likely that most tribes/ethnic populations, if not all, usually have other types of noses that are in the minority. The present study showed that mesorrhine nose is common among Igbo women (26.0%) which is lower but close to the population of women with platyrrhine nose (33.0%). Only one percent of the population had leptorrhine nose, and this could be considered an incidental finding. The distribution of nose types in Northern Nigeria, majorly occupied by Hausas and Fulanis is different from the present study. In Northern Nigeria, mesorrhine nose (30.2%) was reported to be the predominant type, followed by leptorrhine that was seen in 18.8% and platyrrhine nose was seen in only 1.3%.^[5] In another study of only Hausa people in the Northwestern Nigeria, mesorrhine nose was also in the majority with 60% of Hausa people having it, followed by leptorrhine nose seen in 37.5% and the least being platyrrhine nose which was seen in only 4%.^[10] In the same study, two-thirds of those with leptorrhine nose were females while about two-thirds of those with mesorrhine nose (59%) were males, and only one female had platyrrhine nose. The distribution differs remarkably from that of Igbos seen in this present study

The distribution of nose types in any population is expected to change from one generation to another due to marriages between two tribes that bear different types of noses. In this study we eliminated those whose parents or grandparents were not Igbos but they could have had distant generation of ancestors that were not Igbos. With the advent of globalization and the rapidly increasing number of inter-tribal and inter-racial marriages, the distribution of nose types in a tribe or race is bound to keep changing. In spite of these anticipated changes, the study of nose is considered one of the means of understanding racial origin.^[14]

The nasal parameters exhibited diverse degrees of sexual dimorphism. This was quite strong for the mean nasal height, width and nasal index for males and females of the sample population. For the different age groups, though sexual dimorphism was still observed, the differences in both sexes were not consistently significant in all the age groups for nasal height and nasal index. However, nasal width showed a significant difference that was consistent in all the age groups. Results of previous studies also showed sexual dimorphism in nasal parameters.^[14,15]

The difference between the nasal parameters of males and females is utilized in forensic studies especially in the identification of gender.^[3] There were also strong correlations between nasal height and age, body stature, weight and body mass index (BMI) respectively and these would be useful in forensic studies. Correlations were established between nasal width and age, stature, weight and body mass index respectively. The patterns of these correlations could be applied in cases involving culprits that have aged and grown taller with time, or those that added weight to aid masking of their identities.

Knowledge of nasal anthropometry is utilized in surgical reconstruction, especially in rhinoplasty and reconstruction of extensive nasal defects following trauma or oncological resections. In the process of reconstructing the nose, it is important to remain within the limits of dimensions that retains the individual's racial or ethnic identity. However, there are cases where a patient for cosmetic surgery deliberately requests a change in identity, and plastic surgeons should still be guided by established dimensions and indices gotten from nasal anthropometry. From the findings in this present study, an Igbo man undergoing nasal reconstruction should have a platyrrhine nose, while an Igbo woman should have either a platyrrhine nose or a mesorrhine nose.

5. Conclusion

The major nose type of Igbos is platyrrhine while the minor one is mesorrhine. Nasal parameters are applied in surgeries involving the nose, and ensures that individuals do not lose their identity even after extensive nasal surgeries. Determining nasal parameters of Igbos is important in establishing their identity despite the changes that are expected with inter-tribal and inter-racial marriages. Knowledge of the existence of sexual dimorphism and the patterns of correlations of nasal parameters with age, sex, height, weight and body mass index are useful tools in forensic studies.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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