

MORPHOMETRIC ANALYSIS OF THE NASAL SHAPES AND ANGLES IN YOUNG ADULT FEMALES IN OBIO/AKPOR LGA

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ABSTRACT

Background: The human nose plays a crucial role in respiration, olfaction, and facial aesthetics, with its morphology being influenced by genetic, environmental, and evolutionary factors. This study therefore aimed to perform a detailed morphometric analysis of nasal shapes and angles among adult females in Obio/Akpor LGA. **Materials:** A cross-sectional descriptive design was adopted. Three hundred (300) adult females aged 18–55 years, indigenes of Obio/Akpor LGA, were recruited through stratified random sampling. Direct anthropometric measurements were obtained using a digital vernier caliper to determine nasal length and width, while photographic images were analyzed via photogrammetric software to measure nasofrontal and nasolabial angles. The nasal index (NI) was calculated as (nasal width / nasal height) × 100. Descriptive statistics, one-sample t-test, analysis of variance (ANOVA), and Pearson's correlation were performed using SPSS version 25, with statistical significance set at $p < 0.05$. **Results:** Results revealed a mean nasal length of 4.07 ± 0.30 cm, nasal width of 3.62 ± 0.31 cm, and mean nasal index of 89.02 ± 7.36 , classifying the majority as platyrrhine (broad-nosed). The mean nasofrontal and nasolabial angles were $125.12^\circ \pm 3.36$ and $104.18^\circ \pm 5.06$ respectively. A one-sample t-test indicated a significant difference between the mean nasal index and the Nigerian national reference ($p = 0.020$), implying slightly broader noses among Obio/Akpor females. ANOVA showed significant age-related variations in nasal width and nasal index but not in nasal length or angular parameters. Correlation analysis revealed a weak positive relationship between nasal index and nasofrontal angles ($r = 0.119$, $p = 0.039$) and a moderate positive correlation between nasofrontal and nasolabial angles ($r = 0.293$, $p < 0.001$). **Conclusion:** The study concludes that adult females in Obio/Akpor LGA possess predominantly platyrrhine nasal morphology, consistent with southern Nigerian populations adapted to humid tropical environments. These findings provide valuable baseline data for clinical rhinoplasty, forensic identification, and anthropological comparison.

KEYWORDS: Nasal Morphometry, Nasal Index, Craniofacial Anthropometry, Nasal Angles, Obio/Akpor LGA.

INTRODUCTION

The human face is a complex anatomical structure composed of several features that contribute to identity, function, and aesthetics. Among these features, the nose occupies a central and prominent position and significantly influences facial harmony and symmetry. The nose performs essential physiological roles including respiration, olfaction, filtration, humidification, and thermoregulation of inspired air.^[1,2] Because of its anatomical and aesthetic importance, it has been widely

studied in anatomy, physical anthropology, forensic science, and plastic and reconstructive surgery.

Structurally, the human nose consists of both bony and cartilaginous components. The upper third is supported by the nasal bones and frontal processes of the maxilla, while the lower two-thirds are formed by septal and alar cartilages. Internally, the nasal cavity is divided by the nasal septum and contains turbinate that functions in warming and humidifying inhaled air.^[3] Variations in these structural components contribute to differences in

nasal shape and dimensions among individuals and populations.

Nasal morphology varies significantly across populations due to genetic inheritance, environmental influences, climatic adaptation, and sexual dimorphism.^[4,5] The climate adaptation theory proposes that populations living in colder and drier climates tend to have narrower and longer noses (leptorrhine type), which enhance air warming and humidification. In contrast, individuals in warmer and more humid climates often exhibit broader noses (platyrrhine type), which may facilitate airflow and heat dissipation.^[6] These variations demonstrate the evolutionary and adaptive significance of nasal morphology.

Anthropometry, defined as the scientific measurement of the human body and its parts, provides objective and reproducible methods for assessing craniofacial dimensions.^[7] Craniofacial anthropometry focuses specifically on facial structures, including nasal height, nasal width, nasal index, nasolabial angle, and nasofrontal angle. Morphometric analysis enables researchers to establish normative values and compare anatomical variations across populations.^[8]

The nasal index remains one of the most widely used parameters in classifying nasal types into leptorrhine, mesorrhine, platyrrhine, and hyperplatyrrhine categories.^[9] In addition to linear dimensions, angular measurements such as the nasolabial angle and nasofrontal angle are important indicators of nasal projection and facial aesthetics. These angular measurements are particularly relevant in rhinoplasty planning and forensic facial reconstruction.^[10]

Despite the growing body of literature on nasal morphometry globally, there remains limited localized anthropometric data among many African populations, particularly within Nigerian sub-populations.^[11] Studies conducted among different Nigerian ethnic groups have demonstrated variations in nasal index values, highlighting the need for region-specific data.^[12] Nigeria is characterized by significant ethnic diversity, suggesting possible intra-national differences in nasal morphology.

Obio/Akpor Local Government Area in Rivers State is predominantly inhabited by the Ikwerre ethnic group and other Niger Delta communities. Given the humid tropical climate of the Niger Delta region, nasal morphology in this population may reflect platyrrhine characteristics, consistent with climatic adaptation theory.^[6] However, limited published data exist specifically for young adult females in this locality.

Young adults are ideal for anthropometric studies because craniofacial growth is complete and age-related degenerative changes are minimal.^[13] Furthermore, sexual dimorphism has been reported in nasal

dimensions, with males generally presenting larger nasal measurements compared to females.^[14] Therefore, establishing female-specific normative values is essential for clinical, forensic, and anthropological applications.

The absence of population-specific nasal morphometric data presents challenges in clinical rhinoplasty, forensic identification, anatomical education, and prosthetic design. This study therefore aims to establish normative morphometric data for nasal shapes and angles among young adult females in Obio/Akpor Local Government Area, Rivers State.

MATERIALS AND METHODS

This study was a descriptive cross-sectional study designed to determine the morphometric characteristics of nasal shapes and angles among young adult females in Obio/Akpor Local Government Area (LGA), Rivers State, Nigeria. The study population comprised of young adult females aged 18–35 years who are indigenes of Obio/Akpor LGA. A stratified random sampling technique was employed to ensure adequate representation across different communities. Eligible participants were selected proportionately from the identified strata.

Determination of Sample Size

To determine the sample size for this study on morphometric analysis of the nasal shape and angles in adult females in Obio/Akpor LGA, we will use Taro Yamene's^[15] formula for the sample size calculations.

Calculation

$$n = Z^2 \times p \times (1 - p) / e^2$$

Where:

n = required sample size

Z = Z-score (1.96 for 95% confidence level)

p = estimated prevalence of a particular nasal type in the population (If unknown use 0.5 for maximum variability)

e = margin of error (typically 5% or 0.05)

Calculations

Substituting the values:

$$n = \frac{(1.96)^2 \times 0.5 \times (1 - 0.5)}{(0.05)^2}$$

$$n = 384.16$$

The calculated sample size is approximately 384 participants. Based on projected population of Obio/Akpor LGA in 2022 was 665,000.

To determine the appropriate sample size for this study on Morphometric analysis of nasal shapes and angles, using the finite population correction formula:

$$n = \frac{n_0}{1 + (n_0 - 1/N)}$$

Where:

- n = adjusted sample size
- n₀ = initial sample size (384)
- N = total population (665,000)

Substituting these values:

$$n = \frac{384}{1 + (384/665000)}$$

$$n = 384/1+0.0057$$

$$n = 384/1.00057$$

$$n = 383.7$$

$$n_{(\text{adjusted})} = 383 \times 0.785 = 300$$

The sample size was adjusted to account for missing measurements, data errors and non-response.

Inclusion Criteria

Females aged 18–55 Years, Indigenous residents of Obio/Akpor, Individuals without previous nasal surgery or deformities, Individuals willing to participate and provide informed consent.

Exclusion Criteria

Individuals with congenital or acquired nasal deformities, Participants with a history of trauma

affecting nasal morphology, Individuals with respiratory diseases affecting nasal structure, Unwilling participants.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of Rivers State University. Written informed consent was obtained, confidentiality of participants was maintained and participation was voluntary.

Data Collections and Measurement Techniques

- **Digital Vernier Caliper:** For linear measurements of nasal height and width. The caliper blades were cleaned with 70% alcohol in-between subjects to minimize transfer of skin contaminants.

- **Phone camera:** For taking nasal pictures to measure nasofrontal angles and nasolabial angles.

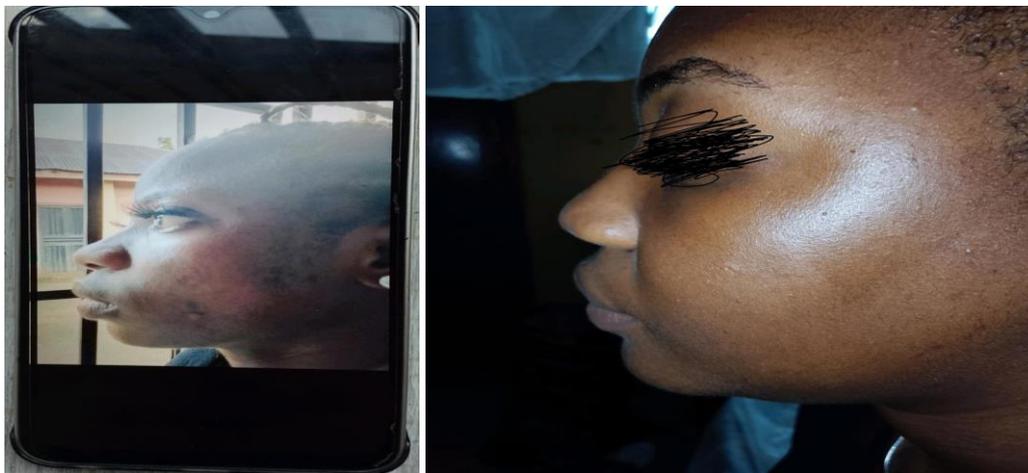


Fig. 1: Showing the diagram of a phone camera used for taking nasal pictures.

The following parameters were then measured and recorded using the digital vernier caliper:

- **Nasal Height:** This is the distance from the nasion to the subnasal. This is measured using the vernier caliper.

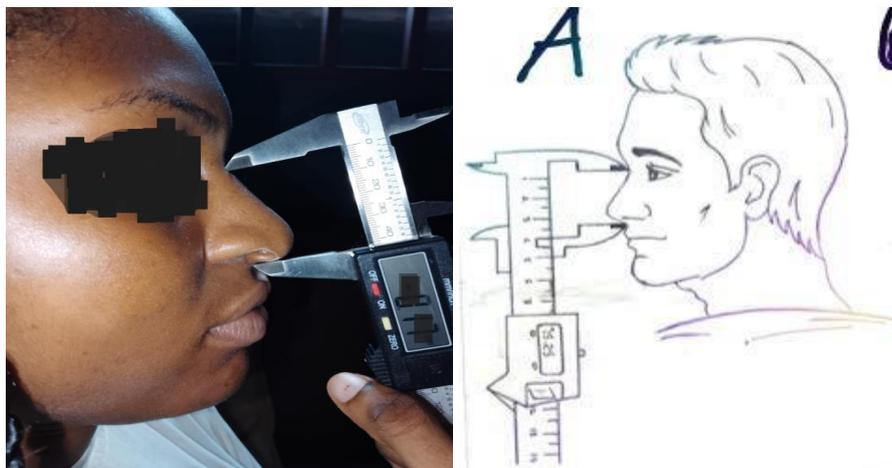


Fig. 2: Picture of the nasal height taken from a participant using a digital vernier caliper (Adapted from Asian Journal of Medicine and Health Sciences (2018)).

- **Nasal Width:** This is the distance between the left and right alare. This measurement was taken using a digital

vernier caliper.

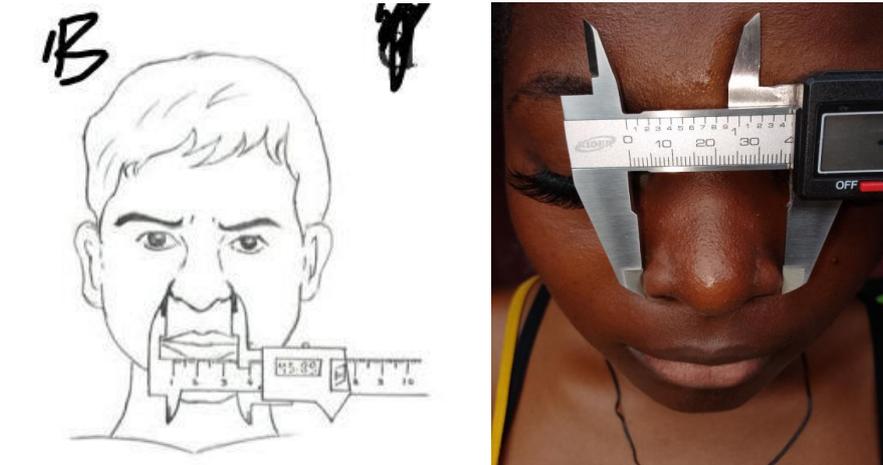


Fig. 3: Pictures of the nasal width taken from participants.

- **Nasal Index:** This is computed as $(\text{nasal width}/\text{nasal height}) \times 100$.

- **Nasolabial Angle:** This is the angle between the columella and the upper lip. This Angle is gotten using a photogrammetry software.

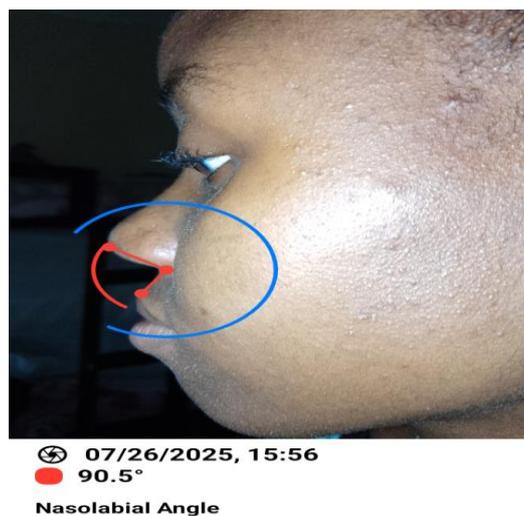


Fig. 4: Picture of the nasolabial angle taken from a participant using photogrammetry.

- **Nasofrontal Angle:** this is the angle formed at the intersection of the forehead and nasal dorsum. This angle is gotten using photogrammetry software.



🕒 07/23/2025, 12:05
 ● 128.8°

Nasofrontal angel

Fig. 5: Picture of the nasofrontal angle taken from a participant using photogrammetry.

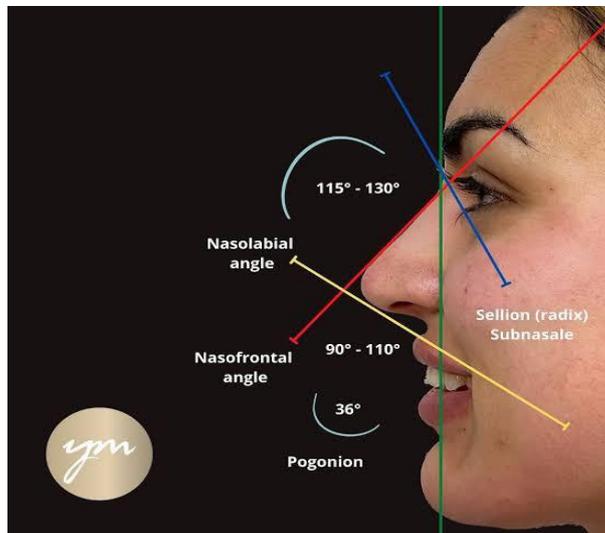


Fig. 6: Image showing the angles of the nose. (Researchgate.com).

Measurements were taken using a Vernier caliper to ensure precision. Each measurement was repeated thrice or more, and the average was recorded to avoid and minimize errors.

Statistical Analysis

Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 25.0. Descriptive

statistics including mean and standard deviation were computed. Inferential statistics such as one-way Analysis of Variance (ANOVA) and Pearson’s correlation coefficient were used where appropriate. Statistical significance was set at $p < 0.05$.

RESULTS

Table 1: Descriptive Statistics of the Total Sample (N = 300).

Variable	N	Mean	S.E.M	Minimum	Maximum
Nasal length (cm)	300	4.07	0.02	3.0	4.9
Nasal width (cm)	300	3.62	0.02	3.0	4.7
Nasal index	300	89.02	0.43	74.11	121.50
Nasofrontal angle (°)	300	125.12	0.19	115	146
Nasolabial angle (°)	300	104.18	0.29	88	114

Note: S.E.M= Standard error of mean, (cm)= Centimeter

Table 2: One-sample T-Test.

Variable	Test Value	T	Df	Sig. (2-tailed)	Mean difference	95% CI of Difference
Nasal Index	88.2	2.33	300	0.020	1.00	[1.16, 1.83]

Table 3: ANOVA of Multiple Comparisons of Nasal Measurements Across Age Groups.

Measured parameters	Age	N	Mean \pm S.E.M	Significant difference (P>0.05)
Nasal Length (cm)	18–25	132	4.12 \pm 0.03	0.085
	26–32	49	4.00 \pm 0.03	
	33–39	61	4.05 \pm 0.02	
	40–46	48	4.07 \pm 0.03	
Nasal Width (cm)	18–25	132	3.79 \pm 0.03	0.000
	26–32	49	3.45 \pm 0.03	
	33–39	61	3.50 \pm 0.02	
	40–46	48	3.35 \pm 0.04	
Nasal Index (NI)	18–25	132	91.88 \pm 0.81	0.000
	26–32	49	86.31 \pm 0.61	
	33–39	61	86.47 \pm 0.61	
	40–46	48	87.31 \pm 0.70	
Nasofrontal Angle ($^{\circ}$)	18–25	132	125.38 \pm 0.36	0.378
	26–32	49	125.41 \pm 0.39	
	33–39	61	125.02 \pm 0.35	
	40–46	48	124.44 \pm 0.38	
Nasolabial Angle ($^{\circ}$)	18–25	132	104.79 \pm 0.48	0.135
	26–32	49	104.83 \pm 0.69	
	33–39	61	103.65 \pm 0.57	
	40–46	48	103.05 \pm 0.70	

Table 4: Pearson Correlation Matrix.

Variables	Nasal Index	Nasofrontal Angle	Nasolabial Angle
Nasal index	1	.119	-0.024
Nasofrontal angle	.119	1	0.293
Nasolabial angle	-0.024	0.293	1

RESULT/DISCUSSION

In table 1, the mean nasal length was 4.07 ± 0.30 cm, with values ranging from 3.0 to 4.9cm. The mean nasal width was 3.62 ± 0.31 cm, with a minimum of 3.0 cm and a maximum of 4.7cm. The nasal index had a mean of 89.02 ± 7.36 , ranging from 74.11 to 121.50. The nasofrontal angle averaged $125.12^{\circ} \pm 3.36$, with a range of 115° to 146° . The nasolabial angle had a mean value of $104.18^{\circ} \pm 5.06$, ranging from 88° to 114° .

In table 2, a one-sample t-test was conducted to determine whether the mean nasal index in the present sample ($M = 89.02 \pm 7.36$) differed significantly from the reference Nigerian mean ($M = 88.02$).^[26]

The result indicated a statistically significant difference, $t(300) = 2.34$, $p = 0.020$, with the current sample exhibiting a slightly higher nasal index by approximately 1.0 unit (95% CI [0.16, 1.83]). This suggests that, although both groups fall within the platyrrhine (broad nose) category, the females in Obio/Akpor have a slightly broader nose (Platyrrhine) than the general Nigerian female population.

In table 3, a one-way ANOVA tested for differences in nasal parameters across age groups was analyzed. The

results suggest that nasal width and nasal index are the most age-sensitive anthropometric parameters in this population, showing significant differences between younger adults (18–25 years) and older groups. In contrast, nasal length, nasofrontal angle, and nasolabial angle remain relatively stable across age categories.

The ANOVA test reveals significant variation in nasal width and nasal index across age groups ($p < 0.05$), with younger participants (18–25 years) showing higher mean values compared to older groups. No statistically significant differences were observed for nasal length, nasofrontal angle, and nasolabial angle, indicating relative stability of these parameters with increasing age.

These findings are consistent with anthropological literature, which indicates that certain nasal parameters (especially nasal breadth and proportional indices) are more variable with age, while angular measurements tend to remain constant.^{[16],[11]}

Pearson's correlation was used to examine relationships between nasal index, nasofrontal angle, and nasolabial angle. Results are shown in Table 3. A weak but significant positive correlation was found between nasal index and nasofrontal angle ($r = 0.119$, $p = 0.039$). A

moderate positive correlation existed between nasofrontal angle and nasolabial angle ($r = 0.293$, $p < .001$). No significant correlation was observed between nasal index and nasolabial angle ($r = -0.024$, $p = 0.673$).

This study focused on the morphometric analysis of nasal shapes and nasal angles among adult females in Obio/Akpor Local Government Area (LGA) of Rivers State. The research provided essential baseline data for understanding regional variations in nasal morphology and their anthropological, clinical, and forensic implications.

The present study recorded a mean of height of $4.07\text{cm} \pm 0.30$ (Table 1) among adult females in Obio/Akpor Local Government Area. When compared with other Nigerians and international populations, this value falls between the lower range of female nasal heights reported across various ethnic groups.

Oladipo *et al.*,^[17] reported a higher nasal height of $4.36 \pm 0.41\text{cm}$ among adult females in Omoku, Rivers State, Oladipo *et al.*,^[18] found a slightly shorter mean of $3.89 \pm 0.43\text{cm}$ among the Ijaw females of Bayelsa. The mean nasal height of $4.10 \pm 0.45\text{cm}$ observed among the Igbo ethnic group by^[19] and $4.25 \pm 0.37\text{cm}$ reported among the Yoruba by^[20] also show close similarity to the present findings. However, studies from the northern region have demonstrated slightly higher nasal lengths. Adelaja *et al.*,^[21] recorded a mean of 4.50 ± 0.28 among the Hausa females, while international studies by^[22] on Turkish females (4.47 ± 0.33) and^[23] on North Indian females (4.30 ± 0.30) also showed comparatively higher nasal lengths. This pattern reflects the north-south gradient in nasal morphology, where individuals in hot, humid southern regions tend to exhibit shorter nasal bridges, while those in arid or temperate climates show longer and narrower nasal forms.^[5] The slightly reduced nasal length observed among Obio/Akpor females may therefore represent an adaptive response to humid climatic conditions as well as genetic admixture associated with urban settlement diversity. Overall, the nasal length mean of Obio/Akpor females aligns with the expected West African morphometric profile, characterized by moderate nasal length and broad nasal aperture consistent with platyrrhine morphology.

The mean nasal width obtained in this study was 3.62 ± 0.31 cm among adult females in Obio/Akpor Local Government Area. This measurement represents the transverse dimension of the external nose and plays an important role in determining overall nasal shape and classification.

When compared with related studies across Nigeria and other regions, the mean nasal width observed in Obio/Akpor females is moderately broad, consistent with previously reported patterns among southern Nigerian populations.^[19] found a mean nasal width of 3.93 ± 0.35 cm among Omoku indigenes in Rivers State, while^[18]

reported a slightly higher mean of 3.79 ± 0.33 cm among the Ijaw of Bayelsa State. Similarly,^[19] observed a mean width of 3.87 ± 0.29 cm in adult Igbo females, and^[20] reported 3.85 ± 0.27 cm among Yoruba women. In contrast, northern Nigerian populations typically exhibit narrower noses,^[21] reported 3.52 ± 0.28 cm among Hausa females, indicating a mesorrhine to leptorrhine tendency.

Internationally, narrower nasal widths have been documented among temperate and arid-climate populations. Uzun *et al.*,^[22] recorded 3.41 ± 0.25 cm for Turkish females, while^[23] found 3.48 ± 0.30 cm in North Indian females. Among Sudanese women,^[24] reported 3.58 ± 0.34 cm, and Egyptian females had a mean nasal width of 3.55 ± 0.29 cm.^[25] Even narrower averages have been recorded in European females (3.32 ± 0.26 cm) and Brazilian females (3.46 ± 0.28 cm).^[26,17]

This shows that the Obio/Akpor females possess a nasal width narrower than the Ijaw and Omoku populations but broader than that of Hausa and Turkish females. The observed pattern reflects the climatic and genetic adaptation principle, where populations in hot, humid coastal areas evolve broader nasal apertures to facilitate air exchange and humidification, whereas those in arid climates develop narrower noses to conserve moisture.^[5]

Furthermore, the slightly reduced mean nasal width in Obio/Akpor compared with neighboring Niger-Delta populations may be attributed to ethnic admixture and urban migration, as the area hosts residents from multiple ethnic backgrounds. Despite this, the dominant morphometric profile remains platyrrhine, consistent with other West African female populations.

In table 1 the present study recorded a mean nasal index (NI) of 89.02 ± 7.36 among adult females in Obio/Akpor Local Government Area, classifying most participants as platyrrhine according to standard anthropometric categories. This nasal type is characterized by a broad nasal aperture relative to nasal height and is typically associated with populations inhabiting warm, humid tropical environments.

This finding agrees with^[11], who reported a mean nasal index of 89.2 ± 0.30 among Yoruba females, and^[27], who found 88.1 ± 6.4 among Igbo females. It is also similar to^[30] whose nationwide average for Nigerian females was 88.2, all within platyrrhine range. However, the present value is slightly lower than the Bini (91.2 ± 6.9) and Ijaw (90.4 ± 7.1) values reported by^[29] and^[30] respectively. This similarity confirms that females in Obio/Akpor display characteristic broad nose (Platyrrhine) typical of southern Nigerian population. However, when compared with other population globally, the present study shows a much higher mean nasal index than Indian females 76.83 ± 3.87 ,^[31] Turkish females 70.00 ± 4.08 ^[22], and European females 68.4 ± 5.1 ^[16], all fall into the mesorrhine or leptorrhine nasal types. The broader nasal feature observed in the present

research reflects climatic and racial adaptation, supporting the view that warmer, humid regions favor wider nasal apertures for better air conditioning.

In Table 2, the one-sample t-test revealed a significant difference between the mean nasal index of the present study (89.02 ± 7.36) and the Nigerian national average (88.02 ± 6.4).^[28] When compared internationally, Obio/Akpor mean nasal index is considerably higher than Indian mean of 77.27 ± 5.30 ^[32] and Turkish mean of 7 .^[22] These differences confirm regional and racial variation in nasal morphology, with African populations generally exhibiting broader nasal indices than Asian and European.

The analysis of variance (ANOVA) revealed significant differences in nasal width and nasal index across age groups, with younger females showing slightly higher mean values than older participants. This observation is similar to the report by^[33] who found significant variability in nasal indices across Nigerian ethnic groups, ranging from 89.2 in Yoruba to 96.4 in Ijaw populations. The trend observed in the present study also supports^[16], who noted that nasal breadth tends to decrease slightly with age due to soft tissue changes. The lack of significant age differences in nasal length and angular measurements agrees with^[29], who observed stability of nasal parameters among adult females in the southeastern region. Internationally, studies such as Farkas^[16] and^[31] reported little or no significant age-related differences in nasal dimensions among adults, suggesting that nasal parameters stabilize after facial maturity. The finding in the present research is that nasal width tends to reduce slightly with age therefore supports the influence of soft-tissue elasticity and environmental factors unique to tropical populations.

The correlation analysis showed a weak but significant positive relationship between nasal index and nasofrontal angle ($r = 0.119$, $p = 0.039$), as well as a moderate positive relationship between nasofrontal and nasolabial angles ($r = 0.293$, $p < 0.001$). These results suggest a proportional interplay between the vertical and angular components of nasal structure. The absence of correlation between nasal index and nasolabial angle, however, indicates that nasal width and upper lip inclination are influenced by independent anatomical factors, as similarly observed by^[34] in their photogrammetric assessment of nasal morphology. While^[16] documented stronger correlations among nasal parameters in European samples, possibly due to narrower nasal morphology and lower soft-tissue variability. Although few international studies have directly compared angular nasal relationships, the proportional harmony observed in the present research is consistent with global findings that craniofacial dimensions tend to maintain internal balance regardless of population differences.

The Obio/Akpor females (mean NI = 89.02) exhibit a nasal breadth slightly narrower than those of Bini, Ijaw, and Igbo females, yet broader than the Hausa and many northern Nigerian samples.

This pattern is consistent with established climatic and genetic gradients in nasal morphology in southern and coastal populations (hot, humid environments) show broader noses, while northern and high-altitude groups (hot but dry environments) tend toward narrower nasal forms.^[5]

Thus, although the Obio/Akpor mean Nasal Index places this population within the platyrrhine range, it is relatively moderate compared with other Niger Delta populations. This suggests micro-regional variation even within the same ecological zone. It is possibly influenced by ethnic admixture, urban migration, and gene flow common in metropolitan areas like Obio/Akpor. The moderately lower mean Nasal Index observed in this study suggests that local variation exists even within similar climatic zones.

In terms of angular parameters, the mean nasofrontal angle (NFA $\approx 125.12^\circ$) and nasolabial angle (NLA $\approx 104.18^\circ$) in the present study also align with typical West African female values, remaining within the aesthetic norm range.^{[17],[24]}

These angular values complement the linear indices by confirming a harmonious nasal profile typical of African facial morphology.

The mean nasofrontal angle obtained among Obio/Akpor adult females in this study ($125.12^\circ \pm 3.35^\circ$) lies within the typical range (115° – 135°) reported for African females. This angle represents the degree of inclination between the forehead (glabella) and the nasal dorsum, serving as an indicator of facial convexity and nasal bridge projection.

Similar findings were reported by^[18] among Ijaw females (mean $125.6^\circ \pm 5.9^\circ$) and^[27] among Bini females (mean $127.2^\circ \pm 6.1^\circ$), confirming the consistency of the facial-nasal transition angle among southern Nigerian women.

However, studies from northern Nigeria and temperate regions tend to show slightly narrower nasofrontal angles.^[21] reported $122.4^\circ \pm 5.5^\circ$ among Hausa females, while Uzun et al.^[22] observed a mean NFA of $120.5^\circ \pm 4.8^\circ$ among Turkish females. Even smaller means, such as $118.2^\circ \pm 6.0^\circ$, have been reported among European females^[16], reflecting sharper nasal bridges and higher nasal dorsum prominence.

Conversely, broader angles ($\geq 130^\circ$) have been noted among Sudanese ($130.4^\circ \pm 5.7^\circ$) and Egyptian females ($131.2^\circ \pm 6.3^\circ$)^{[24],[25]}, consistent with flatter nasal bridges characteristic of North African populations.

The nasofrontal angle of Obio/Akpor females, therefore, represents a moderate facial profile flatter than European or Turkish counterparts but not as flat as North African types. This suggests a transitional adaptation between humid tropical and arid African morphologies, influenced by both genetic and climatic factors.

The mean nasolabial angle among Obio/Akpor females was $107.4^\circ \pm 5.8^\circ$, which falls within the ideal aesthetic range (95° – 115°) for females.^[16] This angle measures the relationship between the columella (base of the nose) and the upper lip, serving as a key determinant of nasal tip orientation and facial harmony. This value closely aligns with those of other Nigerian female populations:

Ijaw females – $108.3^\circ \pm 6.2^\circ$ ^[18], Igbo females – $106.5^\circ \pm 5.5^\circ$ ^[19], Yoruba females – $109.1^\circ \pm 4.9^\circ$.^[20] Slightly lower means have been reported among Hausa females ($103.2^\circ \pm 6.0^\circ$)^[21], indicating a more acute nasolabial angle due to a relatively longer columella and less elevated nasal tip.

Comparatively, Turkish females ($102.5^\circ \pm 5.0^\circ$)^[22], Indian females ($104.8^\circ \pm 5.4^\circ$)^[23], and European females ($100.6^\circ \pm 4.9^\circ$)^[16] show narrower nasolabial angles reflecting sharper nasal bases and more projected nasal tips.

Wider nasolabial angles, as seen in Sudanese ($111.2^\circ \pm 5.8^\circ$) and Egyptian females ($112.3^\circ \pm 6.1^\circ$)^{[24],[25]}, correspond to broader, less projected noses, typical of African morphologies.

Hence, the nasolabial angle observed among Obio/Akpor females represents a balanced and aesthetically moderate nasal profile, consistent with the African platyrrhine nose type but slightly narrower than those of northern African groups.

Overall, these findings affirm that female nasal morphology in Obio/Akpor aligns with West African morphometric characteristics. The broad nasal index, coupled with moderately obtuse nasofrontal and nasolabial angles, reflects both climatic adaptation and genetic inheritance. Furthermore, the results support the need for population-specific reference data rather than reliance on imported Caucasian or Asian standards during clinical, forensic, and aesthetic facial assessments.

CONCLUSION

This study established normative data for nasal height, nasal width, nasal index, and selected nasal angles among young adult females in Obio/Akpor LGA, Rivers State. The findings provide valuable population-specific anthropometric reference values that may be useful in clinical practice, forensic identification, and anthropological research. The study underscores the need for localized craniofacial data to enhance accuracy in medical and scientific applications.

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