

Anthropometric study of the nose in a student population

ABSTRACT

Background: Human nose differs in its anatomy and morphology among different racial and ethnic groups. **Objective:** The objective of this study was to establish and compare the nasal parameters of male and female subjects in a student population. **Materials and Methods:** Five hundred (500) subjects were selected at random comprising 250 males and 250 females. The ages of the subject ranged from 18 years to 25 years. Nasal heights, breadths, and pronasal distances were measured using a Mitutoyo manual vernier caliper. The nasal indices were calculated. **Result:** The mean heights of the nose in males and females were 4.61 ± 0.58 cm and 4.30 ± 0.54 cm, respectively. The mean breadths of the nose in males and females were 4.12 ± 0.52 cm and 3.68 ± 0.46 cm, respectively. The mean pronasal distances of the nose in males and females were 1.86 ± 0.23 cm and 1.72 ± 0.22 cm, respectively. The mean nasal index of the nose in the males and females were 89.95 ± 11.26 and 85.71 ± 10.76 , respectively. The result showed sexual dimorphism, with significantly higher values of all the parameters in males compared to the females ($P < 0.05$). **Conclusion:** The result of the study showed that the mean nasal index of the subjects irrespective of their ethnic groups falls within the nose type platyrrhine.

Key words: Anthropometry, nasal parameters, nasal index, sexual dimorphism

Ukoha U. Ukoha, Ogugua A. Egwu¹,
Godwin U. Ndukwe²,
Lotanna S. Akudu³,
Kosisochukwu E. Umeasalugo

Departments of Anatomy, College of Health Sciences, Nnamdi Azikiwe University, Nnewi, Anambra, ¹Federal University, Ndufu-Alike Ikwo, Ebonyi, ²Departments of Human Anatomy, Abia State University, Uturu, Abia, ³Chukwuemeka Odumegwu Ojukwu University, Uli, Anambra, Nigeria

Address for correspondence:

Dr. Ukoha U. Ukoha,
Department of Anatomy, College of Health Sciences, Nnamdi Azikiwe University, P.M.B 5001, Nnewi, Anambra, Nigeria.
E-mail: drukohaukoha@yahoo.com

INTRODUCTION

While evaluating human face, one of the things that often call for attention is the set of three facial prominences that characterize the profile: The lips, nose, and chin.^[1] To a great extent, beauty and attractiveness of the face depend on the reciprocal proportion and aesthetic harmony, and the set of these three features constitute the aesthetic facial triads.^[2] The nose occupies the center of the face, and it is one of the most important factors characterising the face.^[3] The nose can be divided into two parts—the external and the internal parts, and the external part is the most studied part.^[4] The external nose is pyramidal in structure and its skeletal framework is made up of bones and cartilages that maintain its shape. The external nose serves the cosmetic function by enhancing an individual's personality and beauty.^[5]

Physical anthropology relies mainly on external measurements and descriptions of the human body.^[6] The nasal index measurement is one of the methods anthropologists have used to distinguish racial and ethnic differences^[7-11] and sexual differences,^[12] and it has become a useful tool in forensic science.^[13] Nasal index ratio (ratio of nasal width to nasal height multiplied by 100) has aided in the classification of nasal index into three different nose types:

NASAL INDEX

69.9 and below
70–84.9
85 and above

TYPE OF NOSE

Leptorrhine or long-nosed
Mesorrhine or medium-nosed
Platyrrhine or broad-nosed

Access this article online

Quick Response Code:



Website:

www.bioanthrojournal.org

DOI:

10.4103/2315-7992.190461

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Ukoha UU, Egwu OA, Ndukwe GU, Akudu LS, Umeasalugo KE. Anthropometric study of the nose in a student population. *Ann Bioanthropol* 2016;4:8-11.

The studies of nasal index have been carried out in various locations and in different races. Risley^[7] studied the nasal indices of Indo-Aryans and Indian Negroids, while Daniel^[14] reported nasal indices for various races as follows: Lebanon (63.30), Alawite (62.74), Damascus (63.26), Armenians (63.80), Greeks (68.49), and Arabic (74.48).

In Nigeria, Akpa *et al.*^[15] reported nasal parameters in Igbo of both sexes and classified them as platyrrhine. Oladipo *et al.*^[16] also reported the mean nasal index of Igbo, Ijaw, and Yoruba ethnic groups in Southern Nigeria as platyrrhine. Oladipo *et al.*^[17] also investigated the nasal parameters of Itsekiris and Okpes of Southern Nigeria. Significant difference was seen between the two ethnic groups, and sexual dimorphism was observed within these ethnic groups, with males having significantly higher nasal index values than females. Anibor *et al.*^[18] carried out a study on Isokos, while Eboh^[19] studied the Bini ethnicity, and both the studies classified their subjects as platyrrhine.

It has been stated that several reports exist in nasal indices of Caucasian populations with few on African populations and few on Nigerians; therefore, this study aimed to establish and compare the nasal parameters of male and female subjects in a Nigerian student population.

MATERIALS AND METHODS

A total of 500 subjects (250 males and 250 females) were studied. The subjects were students of Anambra State University, Uli, with ages ranging from 18 years to 25 years. The subjects were sampled using the random sampling technique. None of the subjects had previous plastic surgery or trauma to the face. Ethical approval was sought and obtained from the Ethical Committee of the Faculty of Basic Medical Sciences, Anambra State University, Uli.

Method of measurement

Informed consent was obtained from the subjects before the measurement. All the measurements were taken with the students sitting on a chair in a relaxed condition and the head in anatomical position. The muscles of the face were relaxed in order not to alter the size of the nose. The measurements of nasal height, nasal breadth, and pronasal distance were taken with a Mitutoyo manual vernier caliper (Japan; accuracy: 0.01 mm).

- Nasal height: This was measured from the nasion to the subnasion
- Nasal breadth (maximum breadth of the nose): This was measured from one ala to the other ala at right angle to the nasal height
- Pronasal distance: This was measured from the most prominent point of the nasal tip to the point of union of both alar curvatures
- Nasal index: This was calculated as the ratio of nasal breadth to the nasal height multiplied by 100.

Statistical analysis

The data were subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS) version 20.0 (SPSS-Inc., Chicago, IL). Mean and standard deviation were determined for the nasal parameters. Independent sample *t*-test was used to determine sexual dimorphism. The level of significance was set at $P < 0.05$.

RESULTS

Data are means and standard deviation of the nasal parameters of the subjects. Independent sample *t*-test indicated sexual dimorphism, with the male subjects having significantly higher nasal parameters than the females ($P < 0.05$).

DISCUSSION

The result of the present study [Table 1] showed that the mean nasal height of male and female subjects were 4.61 cm and 4.3 cm, respectively. This is in conformity with studies done in Nigeria^[18-21] and an Iranian study using Sistani women.^[22] However, the present study showed lower nasal height than some Nigerian studies^[15,23] and other studies in USA^[24] and Turkey.^[25] The present study reinforces the fact that anthropometric parameters vary between populations.

The mean nasal breadth of the present study [Table 1] was 4.12 cm in males and 3.68 cm in females. This is similar to various Nigerian studies.^[20,23,26] Heidari *et al.*^[22] reported the mean nasal width of the Sistani and Baluch aborigine women as 3.23 cm and 3.14 cm, respectively; these findings agree with the values of the females in the present study. Another study^[27] showed a lower nasal breadth for Chilean males, and a similar value for their females when compared to the present study.

The mean pronasal distance in this study [Table 1] was 1.86 cm and 1.72 cm for males and females, respectively. The results were slightly lower than the findings by Chukwuanukwu *et al.*^[28] and Omur *et al.*^[29] on Igbos and Turks, respectively. The present study was also lower than the values for Chileans^[27] that was reported to be 4.35 cm in males and 3.92 cm in females.

The present study showed the mean nasal indices of males and females to be 89.95 and 85.71, respectively, and

Table 1: Nasal parameters of male and female subjects

Parameters	Males (N=250)	Females (N=250)	P
Nasal height	4.61±0.58	4.3±0.54	0.025
Nasal breadth	4.12±0.52	3.68±0.46	0.016
Pronasal distance	1.86±0.23	1.72±0.22	0.015
Nasal index	89.95±11.26	85.71±10.76	0.034

conformed to the platyrrhine nose type, which is typical of the African population. The present study was in conformity with various Nigerian studies where nasal indices of male and female subjects were greater than 85.^[16,20,28,30] The result of the present study was however at variance with Nigerian studies on the Hausas and Andonis,^[23,31] and on Iranian^[22] and Turkish subjects^[29] which were all less than 85. In Table 2, the nasal indices were compared with other studies, and showed that the Nigerian nose type was platyrrhine (>85), followed by the Chinese and Egyptian males (mesorrhine), while the Egyptian females and the Caucasians had the leptorrhine nose type.

Sexual dimorphism was observed in the present study, with the males showing significantly higher values than the females [Table 1]. This is also in agreement with several studies.^[16,23,26,30] However, studies by Chukwuanukwu et al.^[28] on Igbo subjects and Oladipo et al.^[32] on Ikwerre subjects reported that the females had significantly higher nasal indices ($P < 0.05$) than their male counterparts. In another Nigerian study,^[31] the Okrika ethnic group showed no significant difference in nasal index between the males and females, and Eboh^[19] also concurred in his study on Bini adolescents that the difference in nasal indices between sexes was not statistically significant.

The factors responsible for the variation in size, shape, and length of the nose could include genetic factors,^[33] race, and environmental climate conditions.^[34] According to Hall,^[35] narrower noses are better favoured in cold and dry climates while broad noses are favoured in warm and moist environments. The present study reinforces this theory, given that the study was carried out in a tropical region and the overwhelming majority of the subjects had the platyrrhine (broad) nose type.

CONCLUSION

Our study showed that the external nose of the male and female student population in Anambra, irrespective

of their ethnic groups, falls within the African nasal classification known as platyrrhine (broad nose) that has a nasal index of ≥ 85.0 , and it also indicates sexual dimorphism.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Perez DA. Influence of facial prominence in the aesthetic appreciation of facial profile. Thesis for the title: Dentist University of Talca Chile 2004.
- Canut J. A Dentofacial Aesthetic Analysis. Rev Esp Ortod 1996; 26:13-30.
- Iida N, Ogwa T, Tsutsumi K, Tonegawa M, Yokaro K. An examination of the external nose reconstruction methods used in our department. Jpn J Plast Reconstr Surg 2002;45:35-42.
- Hochman B, Casticho HT, Ferreira LM. Photographic and morphometric standardization in the computerized photogrammetry of the nose. Acta Cir Bras 2002;17:258-66.
- Harzrika P, Nayak DR, Balakrishna R. The Textbook for Ear, Nose, Throat and Head and Neck Surgery. 1st ed. Dariya Ganj, New Delhi: CBS Publishers and Distributors; 2007. p. 249-50.
- Alex FR, Steven B, Timothy GL. Human Body Composition. 4th ed. Champaign, IL: Human Kinetics Publishers; 1996. p. 167-72.
- Risley HH. The People of India. 2nd ed. Crook W, editor. Delhi: Orient Books; 1969. p. 395-9.
- Williams P, Dyson M, Dussak JE, Bannister LH, Berry MM, Collins P, et al. Gray's Anatomy: Skeletal System. 3rd ed. Edinburgh: Churchill Livingstone; 1995. p. 609-12.
- Porter JP, Olson KL. Analysis of the African American female nose. Plast Reconstr Surg 2003;111:620-8.
- Franciscus RG, Long JC. Variation in human nasal height and breadth. Am J Phys Anthropol 1991;85:419-27.
- Aung SC, Foo CL, Lee ST. Three dimensional laser scan assessment of oriental nose with a new classification of oriental nasal types. Br J Plast Surg 2000;53:109-16.
- Zhang XT, Wang SK, Zhang W, Wang XF. Measurement and study of the nose and face and their correlations in the young adult of Han nationality. Plast Reconstr Surg 1990;85:532-6.
- Xu B, Wang Y, Ma J, Li M, Xu L. A computer-aid study on the craniofacial features of Archang race in Yunnan province of China. Hua Xi Kou Qiang Yi Xue Za Zhi 2001;19:394-6.
- Daniel B. Racial Anthropology and Genetics of the Lebanese. 2002. p. 1-2. Available from: <http://www.nasalindexoflibanese.com>. [Last accessed on 2015 Apr 07].
- Akpa AO, Ugwu C, Maliki AO, Maliki SO. Morphometric study of nasal parameters in Nigerian Igbos. J Exp Clin Anat 2003;2:24-5.
- Oladipo GS, Olabiyi AO, Oremosu AA, Noronha CC. Nasal Indices among major ethnic groups in Southern Nigeria. Sci Res Essay 2007;2:20-2.
- Oladipo GS, Coker T, Anugweje KC, Abidoye AO. Study of some anthropometric parameters of Itsekiri and Okpe ethnic groups of Delta State, South-South Nigeria. Int J Com Re 2013;2:77-80.
- Anibor E, Etetafia MO, Eboh DEO, Akpobasaha O. Anthropometric study of the nasal parameters of the Isokos in Delta State of Nigeria. Ann Biol Res 2011;2:408-13.

Table 2: Comparison of nasal indices between populations

Author	Year	Population-Ethnicity	Nasal index	
			Male	Female
Aung et al. ^[11]	2000	Chinese	79	81
Farkas et al. ^[36]	2005	Caucasian	65.5	64.2
Oladipo et al. ^[16]	2007	Nigeria-Igbo	95.9	90.8
		Nigeria-Yoruba	90	88.1
		Nigeria-Ijaw	98.6	94.2
Staka et al. ^[37]	2012	Kosovo-Albanian	67.07	63.87
Jovanovic et al. ^[38]	2014	Serbia	67.56	66.01
Hegazy ^[39]	2014	Egypt-East Delta	71.46	64.56
Current study	2015	Nigeria-Anambra State	89.95	85.71

19. Eboh DE. Nasal indices among Bini adolescents in Edo state, Nigeria. *Int J Morphol* 2011;29:1231-4.
20. Oladipo GS, Fawehinmi HB, Suleiman YA. The study of nasal parameters (nasal height, width and nasal index) among the Yorubas of Nigeria. *Int J Biol Anthropol* 2009b; 3:1-19.
21. Garandawa HI, Nwaorgu OG, Oluwatosin OM. Nose parameters in adult Nigerians. *BOMJ* 2005;2:5-9.
22. Heidari Z, Mahmoudzadeh-Sagheb H, Khammar T, Khammar M. Anthropometric measurements of the external nose in 18-25-year-old Sistani and Baluch aborigine women in the southeast of Iran. *Folia Morphol (Warsz)* 2009;68:88-92.
23. Anas YI, Saleh MS. Anthropometric comparison of nasal indices between Hausa and Yoruba ethnic groups in Nigeria. *J Sci Res Reports* 2014;3:437-44.
24. Wisth PJ, Bøe OE. The reliability of cephalometric soft tissue measurements. *Arch Oral Biol* 1975;20:595-9.
25. Ahmet U, Hayati A, Sait B, Mehmet E, Ozgur B, Bunyamin S, *et al.* The average values of nasal anthropometric measurements in 108 young Turks. *Auris Nasus Larynx* 2006;33:31-5.
26. Oladipo GS, Okoh PD, Hart JS. Anthropometric study of some craniofacial parameters: Head circumference, nasal height, nasal width and nasal index of adult Ijaws of Nigeria. *Asian J Med Sci* 2010;2:111-3.
27. Troncosco PJ, Suazo GIC, Cantin LM, Zawando MD. Sexual dimorphism in the nose morphotype in adult Chilean. *Int J Morphol* 2008;26:537-42.
28. Chukwuanukwu TO, Ukoha U, Chatjok JD. Morphometric study of nasal parameters in Igbos, South East Nigeria. *J Expt Clin Anat* 2012;11:65-9.
29. Ömür K, Burak G, Murat AK, Ferhan E, Ilter K. Morphometric facial analysis of Turkish adults. *Balikesis Saglik Bil Derg* 2012;1:7-11.
30. Oluwayinka P, Olatunji SY, Adelodun ST, Amlabu MG. An anthropometric study of some basic nasal parameters of three major ethnic groups in Kogi State, Nigeria. *Am J Clin Expt Med* 2015;3:62-7.
31. Oladipo GS, Eroje MA, Fahwehinmi HB. Anthropometric comparison of nasal indices between Andoni and Okrika tribes of rivers state, Nigeria. *Int J Med Med Sci* 2009;1:135-7.
32. Oladipo GS, Oyakhire MO, Ugboma HAA. Anthropometric Studies of Nasal Indices of the Ekpeye and Ikwerre Ethnic Groups in Nigeria. *Asian J Med Sci* 2010;2:167-9.
33. Farkas LG, Katić MJ, Forrest CR, Alt KW, Bagic I, Baltadjiev G. International Anthropometric Study of Facial Morphology in Various Ethnic Groups/Races. *The Journal of craniofacial surgery*. 2005;16:615-46.
34. Last RJ. *Anatomy – Applied and Regional*. 6th ed. Churchill Livingstone. 1981. p. 398-403.
35. Hall RL, Hall DA. Geographic variation of native people along the Pacific Coast. *Human Biology* 1995;67:407-26.
36. Farkas LG, Hreczkota, Deutsh CK. Objective assessment of the nostril type – A morphometric study. *Anatomy Plastic Surgery*, 1983;11:381-9.
37. Staka G, Dragicidella F, Disha M. Anthropometric studies of nasal index of the Kosovo Albanian population. *Antrocom Online Journal of Anthropology* 2012;8:457-62.
38. Jovanović J, Jeremić D, Jovanović B, Maja V, Sazdanović P, Maja S, *et al.* Nasal morphological characteristics of the Serbian population. *Archives of Biological Science* 2014;66:227-34.
39. Hegazy AA. Anthropometric study of nasal index of Egyptians. *Int J Anat Res* 2014;2:761-7.

