Asian Journal of Medicine and Health

Volume 21, Issue 12, Page 67-75, 2023; Article no.AJMAH.109660
ISSN: 2456-8414

Facial Analysis of the Igbo Ethnic Group of Nigeria for the Evaluation of Sexual Dimorphism

Hakeem Babatunde Fewehinmi [a], Peter Done Okoh [a], Loveday Ese Oghenemavwe [a], Lekpa Kingdom David [a], Michael Anozie Amadi [b], Chile A. Oparaocha [c], Celestine Ebieto Ebieto [d], Khadija A. Bobbo [e] and Nicholas Asiwe [a*]

[a] Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Science, University of Port Harcourt, Port Harcourt, Nigeria.
[b] Department of Anatomy, Faculty of Basic Medical Science, Pamo University of Medical Sciences, Port Harcourt, Nigeria.
[c] Department of Fine Arts and Design, Faculty of Humanities, University of Port Harcourt, Port Harcourt, Nigeria.
[d] Department of Mechanical Engineering, Faculty of Engineering, University of Port Harcourt, Port Harcourt, Nigeria.
[e] Department of Anatomy, Faculty of Basic Medical Sciences, Gombe State University, Gombe, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJMAH/2023/v21i12961

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/109660

Original Research Article

Received: 28/09/2023
Accepted: 04/12/2023
Published: 20/12/2023

**Corresponding author: E-mail: asiwenicholas@gmail.com;*

ABSTRACT

Background: Facial analysis defines the measurement of soft tissue in the face used in forensics, anthropology, artistic design, and facial reconstruction. The study aims to evaluate the sexual differences in facial parameters among the Igbo ethnic group of Nigeria.
Methods: 400 (200 males and 200 females) subjects of Igbo origin volunteered for the study. Each subject's frontal view photographs were taken in the Natural Head Position (NHP) and analyzed using Pro-Image Facial Software Version 2 to evaluate the nasal width, nasal height, mouth width, facial width, facial height, inner canthal distance, and outer canthal distance. Data obtained were analyzed with IBM SPSS (version 23) and independent T-test as an inferential statistic.
Results: The result showed that NW was (M=5.16±0.65, F=5.34±0.53, t=-2.91, p=0.00), NH was (M=5.61±0.62, F=5.26±0.57, t=5.92, p=0.00), MW was (M=6.64±0.7, F=6.54±0.71, t=1.46, p=0.14), FW was (M=16.17±1.31, F=15.07±2.04, t=6.39, p=0.00), FH was (M=16.63±1.11, F=16.08±1.31, t=4.36, p=0.00), En was (M=4.62±0.46, F=4.31±0.47, t=6.75, p=0.00) and Ex was (M=12.23±0.86, F=12.16±1.01, t=0.82, p=0.41).
Conclusion: The nasal width and Height, facial width and height, and inner canthal distance show gender differences among the Igbo ethnic group of Nigeria. This study will have a practical application in Forensics, Anthropology, Artistic and Industrial design, and to medical professionals involved in facial reconstruction.

Keywords: Facial analysis; soft tissue; forensics; anthropology; Igbo; Nigeria.

1. INTRODUCTION

Facial analysis defines the measurement of soft tissue in the face used in various disciplines such as forensics, facial reconstruction, anthropology, and population studies [1]. The soft cutaneous tissue of the face such as mouth width, nasal height and width, canthal distances, and facial width and height has been a point of interest because the role of the hard tissue (skeletal structures) is an accepted fact that influences facial form but the soft tissue bears the covering which forms the external surface of the face that is made up of integument, adipose tissue, connective tissue, and muscles [2]. This constituent of the soft tissue does not always distribute itself in a uniform orderly manner in every individual and has led to greater variations in the amount and distribution. However, studies show that the predisposition of this constituent of the soft tissue and facial features in general is influenced by genetic, diet, and environmental factors which in turn has made it difficult to establish a defined difference in sex in a population [3].

In Forensics and anthropology, there is a need to establish the sexual differences in the facial parameters to aid in identification and classification when necessary [4]. However, reference data abound in our communities, but diet and environmental changes have been observed to alter the facial morphology of an individual [4,5] therefore, it is necessary to evaluate facial anthropometry continuously to remain current and have relevant data of the population. The need to establish sexual differences in facial parameters is not limited to Forensics and anthropology alone rather it will be valuable in artistic design such as face masks, nose braces [6], and so on, to pinpoint the areas of consideration also it will be value to all medical professionals involved in facial reconstruction. The importance of sexual differences in facial parameters in understanding ethnic diversity cannot be overemphasized [7].

Previous studies among Nigerian populations on nasal width, nasal height, mouth width, facial width, facial height inner and outer canthal distance have shown variations in their findings over time [8,9,10,11,12,13,14,15,16,17]. These variations have motivated the interest of this study to aim at evaluating the sexual differences in facial parameters among the Igbo ethnic group of Nigeria.

The Igbo ethnic group is one of the largest and most culturally diverse ethnic groups in Nigeria [18]. They primarily inhabit the southeastern region of Nigeria, which includes states such as Anambra, Enugu, Imo, Abia, and Ebonyi [19]. The Igbo people have a rich cultural heritage, with a language called Igbo (or Ibo) as their primary means of communication. Igbo society is known for its strong sense of community and family ties [20]. Their social structure is often organized around extended families and clans,

with a focus on communal values and traditional customs. The impacts of climate change in the region are diverse and can have far-reaching consequences for the environment, agriculture, and overall livelihoods of the Igbo people [21].

2. MATERIALS AND METHODS

2.1 Study Design

The study adopted a cross-sectional descriptive study design to generate values of the nasal width, nasal height, mouth width, facial width, facial height, inner canthal distance, and outer canthal distance of males and females of the Igbo ethnic group of Nigeria using anthropometric standards via photogrammetry. The study population comprised subjects drawn from Abia, Anambra, Enugu, Ebonyi, and Imo State of Nigeria, and Imo State University was used as the Study area.

2.2 Sample Techniques and Sample Size

A multistage random sampling technique was adopted in the study to ensure that every respondent has an equal chance of being selected and the sample size was calculated using the Taro Yamane formula of the descriptive survey.

2.3 Study Criteria

The study was limited to only subjects whose parents and grandparents are of Igbo origin and currently residing in Igbo land, Subjects who fit into the designed age interval of 18-41 years were selected and they must not have any facial deformity or have undergone any facial surgery. subjects who did not meet these stated criteria were excluded from the study.

2.4 Photographic Setup

A descriptive questionnaire was administered to all respondents to obtain their socio-demographic variables. For facial capture, a digital camera (Nikon COOLPIX S2800, 20.1 megapixels, x5 zoom) was mounted on a tripod platform 120cm distant from a graphic board. To guarantee that the head was in a natural head position (NHP), a mirror was placed opposite the graphic board where the tripod was in between. All respondents were photographed in a calm state with their heads in the natural head position (NHP), and the images were saved to a hard drive for picture analysis.

2.5 Photographic Analysis

The study made use of a digitalized photo analyzer, the WinImager developed by Oghenemavwe et al. [22] to measure the soft cutaneous points of the face and determine the value of various landmarks such as nasal width, nasal height, mouth width, facial width, facial height, inner canthal distance and outer canthal distance.

2.6 Statistical Analysis

The data were subjected to statistical analysis using the International Business Machines Statistical Package for Social Science (IBM SPSS version 23) for statistical analysis. Independent t-test was used as an inferential statistic to test for significance between sex. A probability less than 0.05 ($P<0.05$) was considered statistically significant.

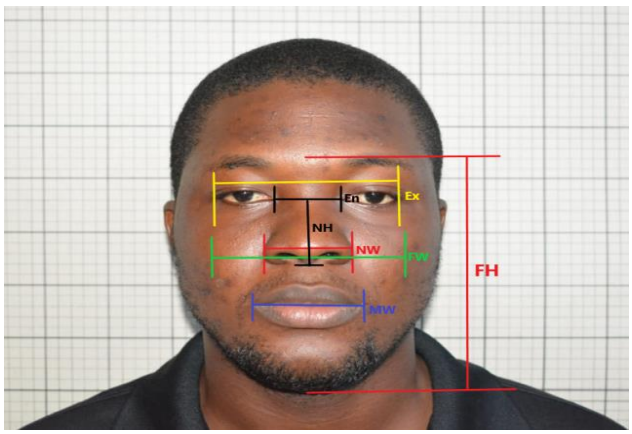

Fig. 1. Soft cutaneous landmarks

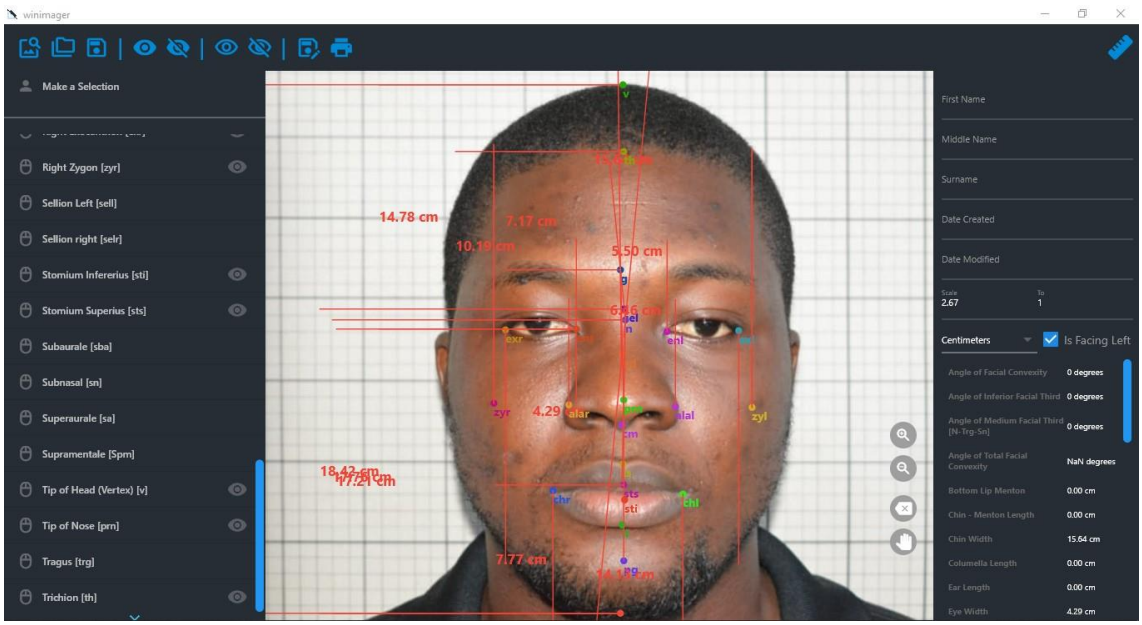

Fig. 2. Diagram showing photographic analysis

3. RESULTS

The study comprised four hundred respondents (200 males and 200 females) within the age interval of 18-40 years from the Igbo ethnic group of Nigeria (Fig. 1, 2).

Table 1, provides the descriptive statistics of the Igbo ethnic group of Nigeria, the mean± SD for the age was 25.72±3.26, nasal width was 5.25±0.59, nasal height was 5.44±0.62, mouth width was 6.59±0.71, facial width was 15.62±1.80, facial height was 16.62±1.24, inner canthal distance was 4.±0.49, and outer canthal distance was 12.19±0.93.

Sexual differences of some facial linear variables of the Igbo were presented in Table 2. The mean±SD of nasal width showed a significant differences (M=5.16±0.65, F=5.34±0.53, t=-2.91, p=0.00), nasal height was also significant with gender (M=5.61±0.62, F=5.26±0.57, t=5.92, p=0.00), mouth width (M=6.64±0.7, F=6.54±0.71, t=1.46, p=0.14) it shows no gender difference but facial width (M=16.17±1.31, F=15.07±2.04, t=6.39, p=0.00), facial height (M=16.63±1.11, F=16.08±1.31, t=4.36, p=0.00), both facial width and facial height was statistically significant with gender. The inner canthal distance was evaluated (M=4.62±0.46, F=4.31±0.47, t=6.75, p=0.00) and was also significant so as outer canthal distance (M=12.23±0.86, F=12.16±1.01, t=0.82, p=0.41) and was non-significant with gender.

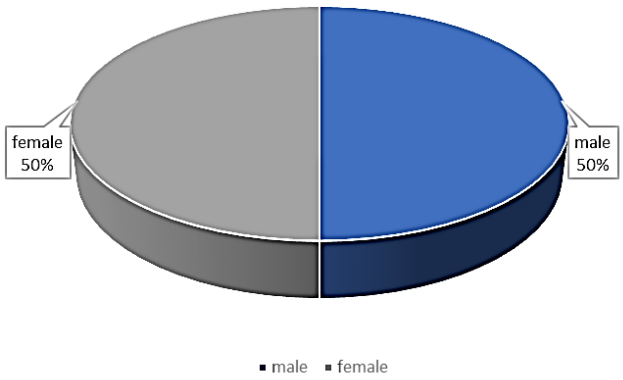

Fig. 3. Sex

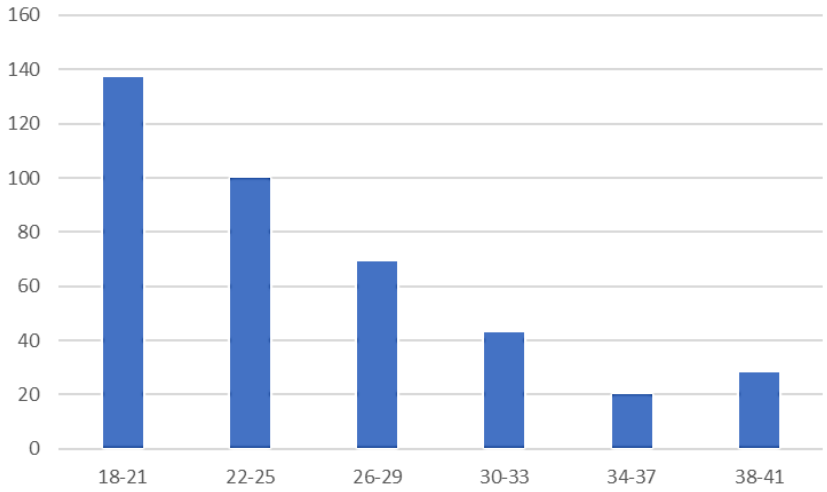

Fig. 4. The age interval

Table 1. Descriptive Statistics for Igbo

Parameters	N	min	max	Mean	SEM	Std. Deviation
age	400	18.00	40.00	25.72	0.16	3.26
NW (cm)	400	3.86	6.92	5.25	0.03	0.59
NH (cm)	400	3.54	7.68	5.44	0.03	0.62
MW (cm)	400	3.78	9.37	6.59	0.04	0.71
FW (cm)	400	10.38	21.40	15.62	0.09	1.80
FH (cm)	400	11.80	21.36	16.36	0.06	1.24
En (cm)	400	3.04	6.10	4.47	0.02	0.49
Ex (cm)	400	10.18	15.24	12.19	0.05	0.93

NW= nasal width, NH= nasal height, MW= mouth width, FW= facial width, FH= facial height, En= inner canthal distance, Ex= outer canthal distance,

Table 2. Compares the mean of Igbo facial linear measurements based on sex

Parameters	male	female	t-score	p-value	Inference
NW (cm)	5.16±0.65	5.34±0.53	-2.91	0.00	S
NH (cm)	5.61±0.62	5.26±0.57	5.92	0.00	S
MW (cm)	6.64±0.70	6.54±0.71	1.46	0.14	NS
FW (cm)	16.17±1.31	15.07±2.04	6.39	0.00	S
FH (cm)	16.63±1.11	16.08±1.31	4.56	0.00	S
En (cm)	4.62±0.46	4.31±0.47	6.75	0.00	S
Ex (cm)	12.23±0.86	12.16±1.01	0.82	0.41	NS

NW= nasal width, NH= nasal height, MW= mouth width, FW= facial width, FH= facial height, En= inner canthal distance, Ex= outer canthal distance, NS=*Non-significant, S= significant, p<0.05*

4. DISCUSSION

The present study evaluates the sexual differences of facial linear parameters among the Igbo ethnic group of Nigeria, where nasal width was 5.16±0.65 in males and females was 5.34±0.54. the nasal height in males was 5.61±0.62 and in females was 5.26±0.57. Our results have shown that males have a larger nasal height and a smaller nasal width compared to females, though it has been hypothesized that males have a larger nose because males tend to have more lean muscle mass than females which means males need more oxygen to encourage muscle growth and maintenance but in contrary, the size and shape of a nose vary among individuals and is influenced by various factors like; genetics, evolutionary and environmental factors. The hormonal factor is another key role that affects the size and shape of the human

body, especially for females. The present findings have shown that nasal width and height had sexual differences among the Igbo ethnic group of Nigeria which is consistent with Mohammed et al. [8] in their study of nasal index among the Hausa ethnic group of Nigeria, that there are sexual differences in nasal width and height. Oladipo et al. [23] study in southern Nigeria stated that nasal width and height showed significant gender differences. The study by Agburun et al. [24] among the Ikwerres of Rivers State, Nigeria, also reported that there are sexual differences in nasal width and height among the Ikwerres population though Esomonu et al., [9] study among the Bekwara ethnic group of Cross River State findings is inconsistent with the present study but our study has shown consistency with [25,26,27,28].

In orthodontics, assessing the width of the mouth is crucial for diagnosing and treating issues related to malocclusion [29]. The present study evaluates the mouth width of the Igbo ethnic group of Nigeria and the result showed that males had a mean of 6.64±0.70 while females had 6.54±0.71 and the comparison shows no gender difference among the Igbo of Nigeria. The finding of the study disagrees with Benowoke et al. [30], Uche et al. [10] among Nigerians of Delta State extraction, and Houlton et al. [31] among southern Africans, that there are significant gender differences. The lack of a statistically significant difference in mouth width between males and females within the Igbo ethnic group suggests that, based on the sample studied, this particular facial characteristic does not exhibit gender-based distinctions. It's also important to note that the absence of statistical differences does not imply that there are no individual variations but rather the study focuses on the Igbo ethnic group of Nigeria.

The present study evaluates the facial width and height. The results showed that males have a larger facial height and width compared to females and the comparison has shown that there is a sexual difference. The findings agree with the notion that that males have a higher facial height and width compared to females which first, the influenced by hormonal action that occurs during puberty. Males typically undergo a surge in testosterone during puberty which is possible to influence facial bone growth. On the other hand, genetic coding inherited from parents can also play a significant role and developmental factors such as nutrition, environment, and lifestyle attributes in facial growth. The present study agrees with Adelaja et al. [11] on the evaluation of facial index among the Igbo. In their report, they stated that there are sexual differences in facial width and height. Okwesili et al., [25] among the Igbo also reported sexual differences though Ese [13] among the Ika ethnic group of Delta State reported that there is no gender difference in facial height, she further stated that facial width had a significant gender difference. Human may vary in their measurement due to many factors that can alter the human morphology. Jeremic et al. [32] study in central Serbia, and Yesmin et al. [33] among the Malay population have also reported in their works that there are significant sexual differences in facial width and height. Even a study carried out among university students of Tehran University India by Dodangheh et al. [34] also reported that there are sexual differences in facial width and height.

The normative values of inner and outer canthal distance are very important for the successful reconstruction of the canthal area. The present study presents that the inner canthal distance of Igbo males was 4.62±0.46 and for females was 4.31±0.47 while the outer canthal distance for males was 12.23±0.86 and for females was 12.16±1.01. The study further showed that inner canthal distance had a significant gender difference among the Igbo but outer canthal distance showed no gender difference. males may have facial features that are perceived as more robust or larger compared to females due to hormonal and genetic factors. These differences can include a broader jaw, a more prominent brow ridge, and a larger nose The finding of this study agrees with Oladipo et al. [14] study on the canthal index among the Ibibios, they reported that inner canthal distance showed gender difference and outer canthal distance showed no gender difference. Jaja et al. [35] in their study also reported that inner canthal distance is significant while outer canthal distance showed no gender difference among young Nigerians. A study carried out in India also agrees with the present study that inner canthal distance showed significant gender difference and outer canthal was insignificant. Even a study among the Isoko in Delta State, Nigeria also agrees with the present study that inner canthal distance had a significant gender difference and outer canthal had no gender difference. Though the present disagrees with a study by Eboh et al. [15] among the Urhobos, Nigeria. They reported that outer canthal distance had a significant gender difference. Osunwoke et al. [16] among

Igbo also contradict the present study, they reported that inner canthal distance showed no gender difference, in 2012, Osunwoke et al. [36] study on inner and outer canthal distance among the Ijaws, their findings disagreed with the present study because they reported that outer canthal distance showed a significant gender difference. Oladipo et al. [17] also disagree with this study, they reported a significant gender difference among Ikwerre, Rivers State, Nigeria. The findings of this study further suggest that males have a higher inner canthal distance than females but there is no difference in outer canthal distance.

The above-discussed study has shown some similarities and differences in facial parameters among different ethnic groups and the difference could be attributed to ethnicity, race, methodology, and environmental factors.

5. CONCLUSION

The study has shown gender differences in nasal width and height, facial width and height, and inner canthal distances. The findings of the study will have a practical application in Forensics, Anthropology, Artistic and Industrial design, and to medical professionals involved in facial reconstruction.

CONSENT

A written consent was issued to every subject to declare their consent to participate in this study as per University Standards.

ETHICAL APPROVAL

The study was approved by the ethical research committee of the University of Port-Harcourt, Port-Harcourt, Nigeria.

ACKNOWLEDGEMENT

This study is part of the Anatomical Modeling Research Group of the University of Port Harcourt, sponsored by the Tertiary Education Trust Fund (TETFund 2020 NRF).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Stephan CN, Meikle B, Freudenstein N, Taylor R, Claes P. Facial soft tissue thicknesses in craniofacial identification: Data collection protocols and associated measurement errors. Forensic Science International. 2019 Nov 1;304:109965.
2. Shui W, Wu X, Zhou M. A computerized facial approximation method for Homo sapiens based on facial soft tissue thickness depths and geometric morphometrics. Journal of Anatomy; 2023 Nov.
3. Cao C, Xiao Z, Wu Y, Ge C. Diet, and skin aging—From the perspective of food nutrition. Nutrients. 2020 Mar 24;12(3): 870.
4. Bertsatos A, Chovalopoulou ME, Brůžek J, Bejdová Š. Advanced procedures for skull sex estimation using sexually dimorphic morphometric features. International Journal of Legal Medicine. 2020 Sep;134:1927-37.
5. Cheronet O, Finarelli JA, Pinhasi R. Morphological change in cranial shape following the transition to agriculture across western Eurasia. Scientific Reports. 2016 Sep 13;6(1):33316.
6. Gupta NS, Rohatgi R, Gupta S. Role of orthodontics in forensic facial reconstruction for human identification. Journal of Forensic Medicine and Toxicology. 2022;39(2):97-104.
7. Schmid I, Witkower Z, Götz FM, Stieger S. Registered report: Social face evaluation: ethnicity-specific differences in the judgment of trustworthiness of faces and facial parts. Scientific Reports. 2022 Oct 31;12(1):18311.
8. Mohammed I, Mokhtari T, Ijaz S, Omotosho AD, Ngaski AA, Milanifard M, Hassanzadeh G. Anthropometric study of the nasal index in Hausa ethnic population of northwestern Nigeria. Journal of Contemporary Medical Sciences. 2018 Jan 1;4(1).
9. Esomonu UG, Ude RA, Lukpata PU, Nandi EM. Anthropometric study of the nasal index of Bekwara ethnic group of cross river state, Nigeria. International Research Journal of Applied and Basic Sciences. 2013;5(10):1262-5.
10. Uche UL, Oluseun AO, Nwachuku MI, Babatunde LB, Ikpa JO. Anthropometric Study Of Inter-alar Width And Mouth Width Measurements Among

Nigerians Of Delta State Extraction. European Journal of Biomedical. 2020; 7(8):17-20.
11. Adelaja AA, Michael A, Busayo AO, Ibukun F, Rabiu J, Salihu AM. Sex and tribal differences in facial measurements of Nigerians of Yoruba, Hausa, and Igbo origin. Research Journal of Forensic Sciences. 2016;4(1):5-11.
12. Okwesili OR, Obikili EN, Achebe JU. Facial index among Igbo children and adolescents in Enugu. Biomed Res. 2019;30.
13. Ese A, Okiemute EM, Peace I, Charity O. Facial types and morphology: A study among Ika subjects in Delta State, Nigeria.
14. Oladipo GS, Akande PA, Osogba IG, Yorkum KL. Anthropometric studies of inner canthal distance, outer canthal distance, and canthal index of adult Ibibios. Asian J Med Sci. 2011 Feb 25; 3(1):14-6.
15. Eboh DE, Ogbor-Omorie EO, Dibie JO. Anthropometric study of canthal and circumference interorbital indices among young Urhobo adults in South-South Nigeria. Annals of Bioanthropology. 2015 Jul 1;3(2):42.
16. Osunwoke EA, Elekwa A, Bob-Manuel IF, Ojeka SO. A study on the normal values of inner canthal, outer canthal, canthal index, interpupillary distance, and head circumference of 23-42 years Igbos. Global Journal of Medical Sciences. 2010;9(1&2):43-8.
17. Oladipo Gabriel S, Yorkum Leyira K, Okoh Peter D. Measurements of head circumference, intercanthal distances, canthal index and circumference interorbital index of Ikwerre school children in Nigeria. Journal of Natural Sciences Research. 2013;3(4).
18. Onwubu C. Ethnic identity, political integration, and national development: the Igbo diaspora in Nigeria. The Journal of Modern African Studies. 1975 Sep;13(3):399-413.
19. Umo IS, Enwereuzor AI. The implications of spatial variations in geographic location, geology, and pedology on food security in Southeast Nigeria. Jour. Of Earth Sciences. 2021;10(3):83-9.
20. Aligwekwe PE. The continuity of traditional values in the African society: The Igbo of Nigeria. Xlibris Corporation; 2008 Jun 5.
21. Ikhuoso OA, Adegbeye MJ, Elghandour MM, Mellado M, Al-Dobaib SN, Salem AZ. Climate change and agriculture: The competition for limited resources amidst crop farmers-livestock herding conflict in Nigeria-A review. Journal of Cleaner Production. 2020 Nov 1;272:123104.
22. Oghenemavwe LE, Fawehinmi HB, Lekara DT. A software tool for facial analysis. Research Journal of Applied Sciences, Engineering and Technology. 2012 Mar 15;4(6):551-6.
23. Oladipo GS, Olabiyi AO, Oremosu AA, Noronha CC. Nasal indices among major ethnic groups in Southern Nigeria. Sci Res Essay. 2007 Jan 1;2(1):20-2.
24. Agburum GC, Horsfall AU, Victor PD, Ajie PC, Okpara PE, Reuben ER, Nkpurukwe CI, Otto BJ, George BO. Anthropometric Study of the Nasal Index of Adult Native of Ikwerre of Rivers State, Nigeria. International Journal of Biological Studies. 2023 Mar 30;3(1):17-27.
25. Li KZ, Guo S, Sun Q, Jin SF, Zhang X, Xiao M, Wang CC, Sun X, Lv MZ. Anthropometric nasal analysis of Han Chinese young adults. Journal of Cranio-Maxillofacial Surgery. 2014 Mar 1;42(2):153-8.
26. Staka G, Dragidella F, Disha M. Anthropometric study of nasal index of the Kosovo Albanian population. Antrocom Online Journal of Anthropology. 2012; 8(2):457-62.
27. Sharma S, Grover R, Joshi P. Comparative Evaluation of Nasal Index and its Role in Sexual Dimorphism in Central Indian Population: A Cross-sectional Study. Journal of Clinical and Diagnostic Research. 2023 Jan 1;17(1): YC06-10.
28. Gulzar S, Hussain A, Kumar IA, Itoo MS, Mir NS. Sexual dimorphism of the nasal index, nasal breadth, and nasal height among young Kashmiri population. International Journal of Research in Medical Sciences. 2022 Sep;10(9):1963.
29. Kapila SD, Nervina JM. CBCT in orthodontics: assessment of treatment outcomes and indications for its use. Dentomaxillofacial radiology. 2015 Jan; 44(1):20140282.
30. Benwoke WI, Amachree EP, Perebosigha SI, Bienonwu EO. Anthropometric Study of Canthal Distances and Mouth Width Among Adults of Kalabari. International

Journal of Health Sciences. 2023 Aug 24;6(5):1-7.
31. Houlton TM, Jooste N, Steyn M. Mouth width and Cupid's bow estimation in a southern African population. Journal of Forensic Sciences. 2020 Mar;65(2):372-9.
32. Jeremić D, Kocić S, Vulović M, Sazdanović M, Sazdanović P, Jovanović B, Jovanović J, Milanović Z, Đonović N, Simović A, Parezanović-Ilić K. Anthropometric study of the facial index in the population of central Serbia. Archives of Biological Sciences. 2013;65(3):1163-8.
33. Yesmin T, Thwin SS, Afrin Urmi S, Wai MM, Zaini PF, Azwan K. A study of facial index among Malay population. Journal of Anthropology. 2014;2014.
34. Dodangheh M, Mokhtari T, Mojaverrostami S, Nemati M, Zarbakhsh S, Arabkheradmand A, Gh H. Anthropometric study of the facial index in the population of medical students in Tehran University of Medical Sciences. GMJ. 2023;3(1).
35. Jaja BN, Fawehinmi HB, Jack JT. Craniofacial anthropometry in a young Nigerian population: the canthal distances. Int J Morphol. 2011 Sep 1; 29(3):914-7.
36. Osunwoke EA, Didia BC, Olotu EJ, Yerikema AH. A study on the normal values of inner canthal, outer canthal, interpupillary distance, and head circumference of 3-21 years Ijaws. Am J Sci Ind Res. 2012;3(6):441-5.

© 2023 Fewehinmi et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/109660