OPEN ACCESS
Scholars Bulletin
Abbreviated Key Title: Sch Bull
ISSN 2412-9771 (Print) |ISSN 2412-897X (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Subject Category: Anatomy

Sexual Dimorphism in Facial, Nasal, Mandibular, Maxillary and Orofacial Heights of the Ikwerre People in Rivers State

Sonny Clement Okoseimiema[1], Kenneth Amadi[1], John Nwolim Paul[1,2*]

[1]Department of Anatomy, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria
[2]School of Public Health, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria

DOI: 10.36348/sb.2021.v07i05.002 | **Received:** 29.03.2021 | **Accepted:** 06.05.2021 | **Published:** 11.05.2021

***Corresponding author:** John Nwolim Paul

Abstract

Background: An attractive face, no doubt is pleasing to behold, however the definition of an attractive face is subject to factors such as personality, culture, age, ethnic background as well as personal preferences. Beauty, ugliness and handsomeness are subjective attributes ascribed to the facial appearance of individual. Though the determination of each is personal subjective, it is obvious that the human face is the most beautiful and attractive of all the mammals. Hence, this study was aimed at determining whether there is sexual dimorphism in the facial height, nasal height, mandibular height, maxillary height and orofacial height of the Ikwerre people in Rivers State. ***Materials and Methods***: The study was cross-sectional that included males and females of the Ikwerre ethnicity of Rivers state of Nigeria. A total of 1,038 subjects comprising males (585) and females (453) aged between 5 – 45years were used for this study. The parents and grandparents were all from Ikwerre ethnic group. Each subject sat on a comfortable sitting position and then their facial measurements were taken including; facial height, nasal height, mandibular height, maxillary height and orofacial height. ***Results and Discussions*:** Results & Discussion: F.H. for males in the age grade 25yrs and above was 106.81±11.58, while for the females 101.24±6.98; N.H. for the males: 37.991±6.126, while for the females 38.344±6.255, Man. H. males: 47.511±8.016, females: 41.975±7.018; Max. H males: 22.08±21.16, females: 20.107±3.667, and O.H. males: 69.59±22.76, while females had 62.083±8.013. The result of the study showed that across the age categories the males consistently had higher values of the facial parameters investigated. ***Conclusion***: The result of the study showed that there was sexual dimorphism with the male values of all the facial dimensions measured were significantly higher than female values (P<0.05).

Keywords: Sexual dimorphism, Facial, Nasal, Maxillary, Height, Ikwerre people.

Copyright © 2021 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

The face provides our identity as an individual human and the basic shape of the face is determined by the underlying bones. The face also plays an important role in communication. Our interactions with others take place largely via the face, including the ears [1]. An attractive face, no doubt is pleasing to behold, however the definition of an attractive face is subject to factors such as personality, culture, age, ethnic background as well as personal preferences. Beauty, ugliness and handsomeness are subjective attributes ascribed to the facial appearance of individual. Though the determination of each is personal subjective, it is obvious that the human face is the most beautiful and attractive of all the mammals [2]. Facial parameters such as facial, nasal, maxillary, mandibular and oro-facial change with age and are dependent on variations in the dimensions of the skeleton, development of muscles, sex and fat content and distribution in the body which are under the influence of climate, diet, health etc. these factors are important determinants of growth and development [3]. Ethnicity is a variable that affects craniofacial dimensions [4].

This study was aimed at determining whether there is sexual dimorphism in the facial height, nasal height, mandibular height, maxillary height and orofacial height of the Ikwerre people in Rivers State. There are researchers who have done similar studies with findings on other ethnic groups [4-10].

MATERIALS AND METHODS

The study was cross-sectional that included males and females of the Ikwerre ethnicity of Rivers

state of Nigeria. The communities sampled where Omuanwa town and Isiokpo town in Ikwerre local government area. Rumuchida community in Rumueme, Obioakpor local government area. The University of Portharcourt, Olobo premier college, Choba. Our lady of Lourdes, Ozuoba. Community secondary school, Aluu. State Primary School and Alakahia. A total of 1,038 subjects comprising males (585) and females (453) aged between 5 – 45years were used for this study. Subjects with facial problems such as those that have undergone facial surgery or those whose faces are deformed due to accident (accident victims) were excluded. The parents and grandparents were all from Ikwerre ethnic group. Each subject sat on a comfortable sitting position and then their facial measurements were taken including; facial height, nasal height, mandibular height, maxillary height and orofacial height. The volunteers were made to sit upright with the head unsupported, relaxed and breathing quietly facing forward to the researcher.

Sample Size Determination

The sloven's formula or Taro Yamane was used to calculate the minimum sample size of subjects in the research.

$N = N/1+N(e)^2$

n = sample size (minimum); N = population size; e = significant level (0.05)

N = Population size of Ikwerre ethnic group [Ikwerre(188,930) + Obio/Akpor(462,350) + Emohua (201,057) + Port Harcourt city(538,558)]

National Population Commission (2010)

That is N = 1,390,895

$N = 1390895/1 + 1390895(0.05)^2 \approx 399.88$

Using the digital caliper, facial dimensions or parameters were taken;

Facial Height

This was measured as the distance between the nasion of the nose and the menton of the mandible also called the gnathion (A+B+C).

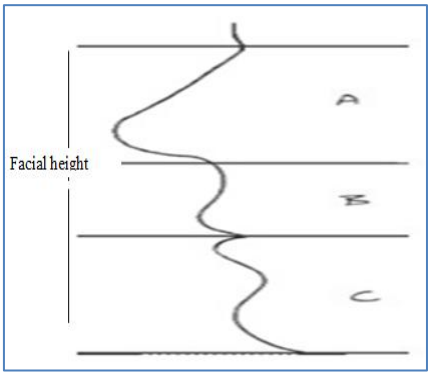

Fig-1: Measurement of facial parameters (Didia and Dapper, 2005).

Nasal Height

This was measured as the distance between the nasion and anterior nasal spine (A).

Fig-2: Measurement of nasal height

Maxillary Height

This was measured as the distance between the anterior nasal spine and the junction between the upper and lower lips (B).

Mandibular Height

Was measured as the distance between the junction of the upper and lower lips and the menton (C)

Oro-Facial Height

This was determined by measuring the distance between the anterior nasal spine and the menton. This is also gotten as the sum of maxillary and mandibular heights (B+C).

Nasal Height	A
Maxillary Height	B
Mandibular Height	C
Oro-facial Height	B + C
Facial Height	A + B + C

Precaution

We ensured that the instrument used for the measurement was not in bad shape, that is rusted, bent, and broken or has a dead battery in order to avoid wrong results or readings, errors due to parallax was avoided while taking the readings from the digital caliper, new measurement were taken while the caliper was set back to its zero (0) point, and the external jaw of the vernier caliper was cleaned with wool damped with methylated spirit to keep it sterile, prior to next measurement.

Verbal informed consent was sort from subjects before measurements were taken. Subjects were comfortably positioned, sitting upright with the head unsupported during measurements, the subject face was cleaned or dried from sweat or water when necessary to avoid slipping of the digital caliper from the right position before and during reading and made

© 2021 |Published by Scholars Middle East Publishers, Dubai, United Arab Emirates

sure the subject in question was not chewing or eating when measuring. All linear measurements were in millimeters for each parameter. The data on the measured parameters were analyzed using the z-test to determine the sex differences and ($P < 0.05$) was taken as being statistically significant. The actual ranges for the male and female sexes were found out.

STATISTICAL ANALYSIS

A descriptive statistic was used to determine the mean values of the parameters investigated for both gender using SPSS version 25.

RESULTS

Table-1: Comparison of facial parameters for age grade 5-14years between Ikwerre males and females

Variables	Male	Female
	Mean ± SD (mm), N=289	Mean ± SD (mm), N=192
F.H	97.770±6.581	95.876±5.728
N.H	35.96±18.10	35.398±3.829
MAN. H	42.698±6.798	40.591±3.983
MAX. H	19.870±2.999	18.912±2.546
O.H	62.498±7.712	59.504±5.562

(P<0.05), Data are mean ± SD. N, number of subjects, F.H, facial height, N.H, nasal height, MAN. H, mandibular height, MAX.H, maxillary height, O.H, orofacial height

Table-2: Comparison of facial parameters for age grade 15-24 years between Ikwerre males and females.

Variables	Male	Female
	Mean ± SD (mm), N=243	Mean ± SD (mm), N=238
F.H	104.76±11.22	99.129±7.006
N.H	37.568±5.628	36.665±3.662
MAN. H	46.831±7.483	42.322±6.035
MAX. H	21.86±19.83	19.852±3.378
O.H	68.69±21.45	62.174±6.937

(P<0.05) Data are mean ± SD. N, number of subjects, F.H, facial height, N.H, nasal height, MAN. H, mandibular height, MAX.H, maxillary height, O.H, orofacial height

Table-3: Comparison of facial parameters for age grade 25years and above between Ikwerre males and females

	25yrs and above	Female 25yrs and above
	Mean ± SD (mm), N=214	Mean ± SD (mm), N=176
F.H	106.81±11.58	101.24±6.98
N.H	37.991±6.126	38.344±6.255
MAN. H	47.511±8.016	41.975±7.018
MAX. H	22.08±21.16	20.107±3.667
O.H	69.59±22.76	62.083±8.013

(P<0.05), Data are mean ± SD. N, number of subjects, F.H, facial height, N.H, nasal height, MAN. H, mandibular height, MAX.H, maxillary height, O.H, orofacial height

DISCUSSIONS

The present study investigated the facial height, nasal height, mandibular height, maxillary height and orofacial height of Ikwerre ethnicity (5-45 years). The male values of all the facial dimensions measured were significantly higher than female values (P<0.05), hence parameters were sexually dimorphic (Tables 1-3). These differences or dimorphism that has been seen to exist between the sexes have been reported by some authors to be as a result of genetic make-up and inheritance which appear as sexual dimorphism [5-7]. The male hormone testosterone could also be a possible reason for the observed sexual dimorphism as it brings about direct increase in the size and mass of muscles and bones and thus, changes in the shape of the face between the two sexes [8]. These values of higher facial parameters for males than females in the present study agrees with the reports of the previous based on similar findings was following the same trend when compared to the previous works of adult Ibibios of Nigeria [9, 10].

A research on the nasal parameters in the population of central Serbia [11] revealed that the mean nasal height for Serbian females was higher than their males; this contradicts the findings of this current study on nasal heights, where the male values were much higher than the females, although it showed dimorphism as well.

Conversely, on Anthropometric Comparison of Nasal Indices between Hausa and Yoruba Ethnic Groups in Nigeria, Anas and sale [12] reported a higher mean nasal height for Hausa males than females and this was not in accordance with the present study. In the same vein they recorded that the Yoruba males had a lower mean nasal height than their females. This is not in line with the result of the present study.

Furthermore, Akpa et al. [13] study on the nasal parameters of Nigerian Igbos showed in centimeters that the male Igbos had significantly higher nasal height than their females. In order to compare their results with the present study, they were converted to millimeters. The resultant was in conformity with the present study. Another research on anthropometric study of the nasal index of bekwara ethnic group of cross river state, Nigeria [14]. Their mean nasal height values in centimeters were changed to their millimeter equivalent for comparison with the present study. Their values of mean nasal height for both sexes showed no significant difference and were not corresponding with the mean nasal height of Ikwerre males and females where sexual difference was recorded. Hence, it's possible that the difference in the results emanated from difference in the ethnic groups.

CONCLUSION

The present study investigated the facial height, nasal height, mandibular height, maxillary height and orofacial height of Ikwerre ethnicity (5-45 years) and the result showed that the male values of all the facial dimensions measured were significantly higher than female values ($P<0.05$), hence parameters were sexually dimorphic. These differences or dimorphism that has been seen to exist between the sexes have been reported by some authors to be as a result of genetic make-up and inheritance which appear as sexual dimorphism.

RECOMMENDATIONS

We recommend that the findings from this study be used as reference in for other studies.

Acknowledgements

We appreciate the participants and the research assistants who took part in the study.

Conflict of Interest

We write to state that there is no conflict of interest.

REFERENCES

1. Moore, K. L., & Dalley, A. F. (2018). Clinically oriented anatomy. Wolters kluwer india Pvt Ltd.
2. Didia, B. C., & Dapper, D. V. (2005). Facial, nasal, maxillary, mandibular, and oro-facial heights of adult Nigerians. Orient Journal of medicine, 17(1), 1-8.
3. Quinn, F. B. (2004). Preoperative evaluation of the aesthetic patient. Grand Rounds Presentation.
4. Rajlakshmi, C. H., Shyamo, S. M., Bidhumukhi, T. H., & Chandramani, S. L. (2001). Cephalic index of foetuses of manipuri population—A Baseline study. J Anat Soc India, 50(1), 8-10.
5. Daniel, B. (2002). Racial anthropology and genetics of the Lebanese. www. Nasalindexo lebanese.com, 1-2.
6. Oladipo, G. S., Olotu, J. E., & Didia, B. C. (2007). Anthropometric study of nasal parameters of the Ogonis in Nigeria. Sci Afr, 6(1), 69-71.
7. Osunwoke, E. A., Amah-Tariah, F. S., Obia, O., Ekere, I. M., & Ede, O. (2011). Sexual dimorphism in facial dimensions of the Bini's of South-Southern Nigeria. Asian Journal of Medical Sciences, 3(2), 71-73.
8. Oladipo, G. S., Isong, E. E., & Okoh, P. D. (2010). Facial, nasal, maxillary, mandibular and oro-facial heights of adult Ibibios of Nigeria. Aust J Basic Appl Sci, 4(12), 6306-11.
9. Babel, H., & Gangrade, P. (2012). Anthropometric study of craniofacial parameters of adult population of tribals of Mewar region in Southern Rajasthan. Journal of Forensic Medicine and Toxicology, 29(1), 48-50.
10. Ebeye, O., Emore, E., Ebite, E., & Ijeh, N. (2009). Facial dimensions in Urhobos of Nigeria. The internet Journal of Biological anthropology, 4(1).
11. Jovanović, J., Jeremić, D., Jovanović, B., Vulović, M., Sazdanović, P., Sazdanović, M., & Živanović-Mačužić, I. (2014). Nasal morphological characteristics of the Serbian population. Archives of Biological Sciences, 66(1), 227-232.
12. Anas, I. Y., & Saleh, M. S. (2014). Anthropometric comparison of nasal indices between Hausa and Yoruba ethnic groups in Nigeria. Journal of scientific research and reports, 437-444.
13. Akpa, A. O. C., Ugwu, C., Maliki, A. O., & Maliki, S. O. (2003). Morphometric study of the nasal parameters in Nigerian Igbos. Journal of Experimental and clinical anatomy, 2(2), 24-25.
14. Esomonu, U. G., Ude, R. A., Lukpata, P. U., & Nandi, E. M. (2013). Anthropometric study of the nasal index of Bekwara ethnic group of cross river state, Nigeria. International Research Journal of Applied and Basic Sciences, 5(10), 1262-1265.

© 2021 |Published by Scholars Middle East Publishers, Dubai, United Arab Emirates