Anthropometric Study of NasofacialParameters of Adults of Bini Ethnic Group of Nigeria

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INTRODUCTION:

Anthropometric features of any parts of the body amongst different individuals and race are never the same.[1] Morphological differences in humans such as growth and development can be affected by a lot of factors such as geocological, biological, geographical, racial, gender, and age factors.[1][2][3] Proper understanding of human growth, population variation, and medicolegal identification in forensics as well as in the optimization of instruments such as respirators, gas and dust masks, and military helmets are dependent to a very large extent on the knowledge of the differences in the size and shape of the different parts of the human body.[4] The face plays the most important role in human identification and its functions comprises of beauty and recognition.[5]The human face and nose can be categorized into different shapes and sizes and ethnic influences can result in their different appearance.[6] Based on the facial index, face shape can be categorized into five types.[7] When the facial index is $\leq$ 79.9, the individual is said to have hypereuriprosopic (very broad) face shape and when it range from 80–84.9, it is euryprosopic (broad) face shape. Similarly, when the index is range from 85–89.9, it is mesoprosopic (round) face shape. Leptoprosopic (long) face is an index ranging from 90–94.9 and hyperleptoprosopic (very long) face is $\geq$ 95.[7] Also, based on nasal index, the nose shape can be categorized into Hyperleptorrhine (excessively tall and narrow) when nasal index is$\leq$54.9, Leptorrhine (tall and narrow) when nasal index range from 55.0–69.9, Mesorrhine (medium) when nasal index range from 70.0–84.9, Platyrrhine (broad and flat) when nasal index range from 85.0–99.9 and Hyperplatyrrhine (excessively broad and flat) when nasal index is$\geq$100.0.[1] This present study was carried out to study the nasofacial index of the Bini ethnic group of Benin City, Edo state. In medical specialties, such as orthognathic and plastic surgery, orthodontics, and dental prosthesis, where issues with nasofacial features are attended, there is a high need for clinicians working to know the standard of the nasofacial region of a specified ethnic group, which may then be a guide for the repair of affected areas in their patients. This present study would also be useful to anatomists, beauticians, forensic scientists, genetic counselors, and even physical anthropologists.

MATERIALS AND METHODS: This cross-sectional study was conducted with approval from the Ethical Committee of the College of Medical Sciences, University of Benin before the commencement of the study. It was conducted in Benin City, Edo State, Nigeria on adults of the Bini ethnicity who were selected randomly. Bini ethnicity was determined on the basis of the criterion that their parents and paternal and maternal grandparents were all of Bini origin. Three hundred and eight six (386) subjects in total between 18 years and 45 years of age, consisting of 181 males and 205 females, were included in this study. The selected sample consisted of Bini subjects, with fully developed adult facial features. Subjects with facial

malformation, trauma as in accidents and other forms of injuries or signs of craniofacial syndromes were excluded.Informed consent was obtained from each of the subjects.Subjects were made to sit with their head placed in the normal anatomical position. A sliding vernial caliper was used for the measurementof morphological face height, face width, nose height and nose width. Morphological face height was measured from nasion (n) to gnathion (gn), face width was measured from the left zygion (zy) to right zygion (zy),nose height was measured from nasion (n) to subnasale (sn) while nose width was measured from left alare (al) to right alare (al). Measurement was then taken with an accuracy of 0.01cm.

Facial and nasal indices were calculated as

Facical index = $\dfrac{\text{face height (n-gn)} * 100}{\text{face width (zy-zy)}}$

Nasal index = $\dfrac{\text{nose width (al-al)} * 100}{\text{nose height (n-sn)}}$

The facial indices were classified accordingly into hypereuriprosopic(when the facial index is ≤ 79.9), euryprosopic (when it ranged from 80–84.9), mesoprosopic(when the index ranged from 85–89.9), leptoprosopic (when face index ranged from 90–94.9) and hyperleptoprosopic (when face index is ≥ 95).

Also, nasal indices were classified into hyperleptorrhine (when nasal index is ≤54.9), leptorrhine (when nasal index ranged from 55.0–69.9), mesorrhine (when nasal index ranged from 70.0–84.9), platyrrhine (when nasal index ranged from 85.0–99.9) and Hyperplatyrrhine (when nasal index is ≥100.0).

RESULT: Descriptive statistical analysis including mean ± standard error and the results of the Student's *t*-test comparing male and female measurements is shown in Table 1.The morphological face height was significantly (p=0.007) higher in males (10.92 ± 0.79 cm) than females (10.68 ± 0.92 cm). There was no statistically significant difference (p=0.157) in face width between males (12.10 ± 0.56 cm) and females (12.02 ± 0.63 cm). There was also no statistically significant difference (p=0.121) in face index between males (90.43 ± 7.97 cm) and females (89.11 ± 8.61 cm). There was statistically significant difference in the facial index (p=0.121) between males and females.

There was no statistically significant difference in nose length (p=0.447) between males (4.55 ± 0.49 cm) and females (4.51 ± 0.53 cm). The nose width was significantly higher (p=0.000) in males (4.26 ± 0.49 cm) than females (4.07 ± 0.48 cm). Mores so. nasal index was significantly higher (p=0.000) in males (94.47 ± 13.12 cm) than females (90.91 ± 10.67 cm)**.**

From the facial index (table 2),when the sexes were combined, out of the 386 subjects studied,69 (17.9%) subjects had euriprosopic face type, 33 (8.5%) subjectshad hypereuriprosopic face type, 65 (16.8%) subjects hadmesoprosopic face type, 94 (24.4%) subjects had leptoprosopic face type and 125 (32.4%) subjects had hyperleptoprosopic face type being the most predominant.Out of the 181 males studied (table 2), 10 (5.5 %) subjects had hypereuriprosopic face, 31 (17.1%) subjects had euriprosopic face, 30 (16.6%) subjects had mesoprosopic face, 50 (27.6%) subjects had leptoprosopic face and 60 (33.1%) subjects had hyperleptoprosopic face. Out of the 205 females studied (table 2), 23 (11.2%) subjects had

hypereuriprosopicface, 38 (18.5%) subjects had euriprosopic face, 35 (17.1%) subjects had mesoprosopic face, 44 (21.5%) subjects had leptoprosopic face and 65 (31.7%) subjects had hyperleptoprosic face.

From the nasal index when the sexes were combined (table 3), out of the 386 subjects studied, only 1 (0.3%) subject hadhyperleptorrhinenose type, 6 (1.6%) subjects hadleptorrhinenose type, 96 (24.9%) subjectshad mesorrhinenose type, 175 (45.3%) subjectshad platyrrhinenose type and 108 (28%) subjectshad hyperplatyrrhinenose type.Out of the 181 males studied (table 3), only 1 (0.6%) subject had hyperleptorrhine nose, 3 (1.7%) subjects had leptorrhine nose, 40 (22.1%) subjects had mesorrhine nose, 70 (38.7%) subjects had platyrrhine nose and 67 (37%) subjects had hyperplatyrrhine nose.Out of the 205 females studied (table 3), no subject had hyperleptorrhine nose type, 3 (1.5%) subjects had leptorrhine nose, 56 (27.3%) subjects had mesorrhine nose, 105 (51.2%) subjects had platyrrhine nose and 41 (20%) subjects had hyperplatyrrhine nose.

Table 1: Descriptive statistical analysis of face height, face width, facial index, nose length, nose width andnasal index.

PARAMETERS	MEAN VALUES (cm)		P VALUES
	MALE	FEMALE	
Face Height	10.92±0.79	10.68±0.92	0.007
Face Width	12.10±0.56	12.02±0.63	0.157
Facial Index	90.43±7.97	89.11±8.61	0.121
Nose Length	4.55±0.49	4.51±0.53	0.447
Nose Width	4.26±0.49	4.07±0.48	0.000
Nasal Index	94.47±13.12	90.91±10.67	0.000

TABLE 2: Classification of Face type based on Face index

Face type	COMBINED (n=386)	MALES (n=181)	FEMALES (n=205
Hypereuryprosopic	8.5% (33/386)	5.5% (10/181)	11.2% (23/205)
Euryprosopic	17.9% (69/386)	17.1% (31/181)	18.5% (38/205)
Mesoprosopic	16.8% (65/386)	16.6% (30/181)	17.1% (35/205)
Leptoprosopic	24.4% (94/386)	27.6% (50/181)	21..5% (44/205)
Hyperleptoprosopic	32.4% (125/386)	33.1% (60/181)	31.7% (65/205)

TABLE 3: Classification of Face type based on Face index

Face type	COMBINED (n=386)	MALES (n=181)	FEMALES (n=205
Hyperleptorrhine	0.3% (1/386)	0.6% (1/181)	-
Leptorrhine	1.6% (6/386)	1.7% (3/181)	1.5% (3/205)
Mesorrhine	24.9% (96/386)	22.1% (40/181)	27.3% (56/205)
Platyrrhine	45.3% (175/386)	38.7% (70/181)	51.2% (105/205)
Hyperplatyrrhine	28.0% (108/386)	37.0% (67/181)	20.0% (41/205)

DISCUSSION: The hyperleptoprosopic face type was the most predominant face type amongst other face types found in the present study. The order of most predominance was from hypreleptoprosopic to

leptoprosopic to euriprosopic and to mesoprosopic before hypereuriprosopicwhich was the least predominantface type. The values of facial index obtained in this study (90.43±7.97 cm in males and 89.11±8.61 cm in females) were similar in comparison with those of found in Purana inhabitants (92±5.1 cm in males and 90±6.2 cm in females) by Chandimal*et al.*[8] It was lower than those found in Serbians (94.04±7.00 cm in males and 92.38±6.72 cm in females) by Jeremić*et al.*[9] and higher than those found inHaryanvi Indians (86.09±5.141 cm in males and 84.84±5.713 cm in females) by Kumar and Lone.[10] The study disagrees with Omotoso*et al.*[11] in the nasofacial anthropometry of adult Bini tribe in Nigeria where they categorized the Binisinto mesoprosopic face type by using the overall mean facial index(86.93cm)of the population instead of using the frequency distribution of individual indices.

Several literatures from the past have shown differences in nasal index amongst different populations from different race and ethnic groups.[12] The present study classifies the Bini nose type as platyrrhine (broad nose). Although, platyrrhine nose type was the most predominant, other nose types were also recorded. The order of most predominant was from platyrrhine to hyperplatyrrhine to mesoplatyrrhine and to leptorrhine before hyperleptorrhine which was the least predominant nose type. The values of nasal index obtain in this study (94.47±13.12 cm in males and 90.91±10.67 cm in females) were similar in comparison with those found in the Ibos (107.62±1.09 cmin males and 98.89±1.30 cm in females) by Eliakim-Ikechukwu*et al.*[13]It was higher than those found inOmuku adults (86.09±9.60 cm in males and 90.16±9.20 cm in females) byOladipo*et al.*[14] and those found in Itsekiris (91.01±5.98 cm in males and 90.55±4.73 cm in females) by Oladipo*et al.*[15] The nasal index of the males in the present study was higher than those found in Okpes (93.67±7.97 cm) but the nasal index of females in the present study was lesser than those found in the Okpes (92.58±9.87 cm) by Oladipo*et al.*[15] The present study disagrees with the findings in the nasofacial anthropometry of adult Bini tribe in Nigeriaby Omotoso*et al.*.[11]who also categorized the bini nose as platyrrhine by using the overall nasal index(97.32cm) of the population instead of using the frequency distribution of the different nose type found in the study.

CONCLUSION:

This study therefore categorizes the Bini face into thehyperleptoprosopic face type and the Bini nose into theplathyrhine nose type. Anthropometric data of the face and nose obtained would be useful in different fields such as in sex determination, forensics medicine, identifying nasofacialmalformation, and reconstructive facial and nasal surgeries. More studies are needed in various fields of anthropometry within the Bini population to meet the demand in the medical and surgical fields as well as aesthetic fields too.

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