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Original Research Article

ANTHROPOMETRIC EVALUATION OF NASAL HEIGHT, NASAL BREADTH AND NASAL INDEX AMONG BINI CHILDREN IN SOUTHERN NIGERIA

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ABSTRACT

Background and Objective: The nasal dimensions are important cephalometric parameters used in physical anthropometry to distinguish different gender and groups of human population. It also used to categorize the human nasal morphology into five different morphological categories which include hyperleptorrhine, leptorrhine, mesorrhine, platyrrhine and hyperplatyrrhine. In this anthropometric study, the nasal morphological characteristics of the Bini children in Nigeria were evaluated and the prevalent nasal morphology of the study population determined.

Methodology: This study involved randomly selected 500 Bini children (comprising 250 males and 250 females) between ages 5-12 years. The nasal dimensions of each subject were measured between relevant anatomical landmarks. These include the nasal height measured as distance between nasion and subnasale and the nasal breadth measured as distance between the most lateral points of right and left ala of the nose using a sliding caliper. The nasal index for each subject was calculated as nasal breadth divided by nasal height and expressed as percentage.

Results: The mean nasal height for male and female Bini children was 4.58± 0.11 and 4.33 ± 0.10 while the mean nasal breadth was 4.05 ± 0.12 and 3.88 ± 0.11 respectively. The mean nasal index for male subjects (90.25 ± 1.33) was also higher than for female subjects (88.65 ± 1.50). The morphological classification showed the platyrrhine nose type as the most prevalent among the male (70.0%) and female (68.0%) Bini children.

Conclusion: The nasal dimensions and nasal index demonstrated prominent sexual dimorphism and the dominance of platyrrhine nose type is the current trend in the nasal morphology of Bini children.

KEY WORDS: Nasal dimensions, Nasal Index, Bini children, Nigeria.

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INTRODUCTION

The nasal dimensions and index are important cephalometric parameters used in physical anthropometry to distinguish different human populations and to categorize the human nasal morphology. Generally, cephalometric parameters including the nasal index are useful in identification of different ethnic groups and categorization of different races [1,2]. Other applications of cephalometric measurements include human identification, forensic science, orthodontics, plastic and reconstructive surgery, distinction between clinical patients and normal population as well as in physical or industrial ergonomics [3-6]. Based on the general shape, three types of human nose have been described which include– leptorrhine (long and narrow or Caucasian), mesorrhine (medium or Asian) and platyrrhine (broad and flat or African) [7]. Furthermore, based on the nasal index, five morphological categories of the human nose have been described which include– hyperleptorrhine, leptorrhine, mesorrhine, platyrrhine and hyperplatyrrhine (Table 1) [8,9].

Table 1: Morphological Classification of Human Nose based on the Nasal Index.

Categories	Nasal shape	Nasal index
Hyperleptorrhine	Very Narrow	40 – 54.9
Leptorrhine,	Long and Narrow	55 – 69.9
Mesorrhine	Moderate shape	70 – 84.9
Platyrrhine	Broad and Short	85 – 99.9
Hyperplatyrrhine	Very broad/Wide	≥ 100

Human body dimensions including the shape and size of the nose are influenced by age, gender, ethnic background, environmental and geographical conditions. For instance, wide-sized noses are prominent among individuals in warmer tropics while narrow-sized noses are most common among people in temperate regions [10-12].

There is therefore a continuous need for anthropometric study of human populations across gender, in different age groups, tribes and geographical locations. This study was therefore carried out to evaluate nasal morphometrics of children in Southern part of Nigeria, to determine possible sexual dimorphism and to describe their morphological classification.

MATERIALS AND METHODS

The subjects for this study were 500 randomly selected children of Bini ethnic origin and resident in Benin City, Edo State of Nigeria. The study population comprised 250 males and 250 females children between ages 5–12 years old. For each subject, the nasal height was measured and recorded as distance between nasion and subnasale while the nasal breadth was measured and recorded as distance between the most lateral points of right and left ala of the nose using a sliding caliper. All measurements were taken with the subjects in sitting and relaxed positions and their head in an anatomical position. Prospective subjects with facial abnormalities ornasal deformities were excluded from this study. The nasal index was calculated using the following equation [13].

$$\text{Nasal Index} = \frac{\text{Nasal Breadth}}{\text{Nasal Height}} \times 100$$

All measured and calculated values were analyzed using IBM-SPSS (version 20) software for windows. Statistical results obtained were presented as mean ± SEM and compared using *T*-test. ($P < 0.05$ was considered as statistically significant level).

RESULTS

From the results obtained in this study, the mean nasal height for Bini male children (4.58 ± 0.15) was significantly higher ($P < 0.05$) than values (4.33 ± 0.10) for Bini female children (Figure 1). Similarly, the mean nasal breadth for Bini male children (4.05 ± 0.18) was significantly higher ($P < 0.05$) than values (3.88 ± 0.16) for Bini female children (Figure 2). The mean nasal index also showed similar sexual variation with the values for male Bini children (90.25 ± 1.33) higher than those in female Bini children (88.65 ± 1.50) (Figure 3).

Fig. 1: The mean nasal height values among Bini male and female children.

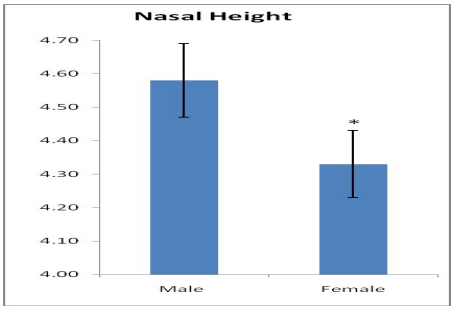


Fig. 2: The mean nasal breadth values among Bini male and female children.

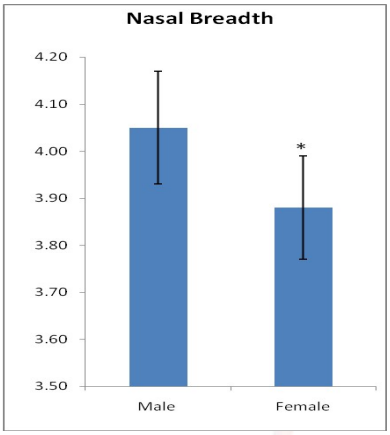
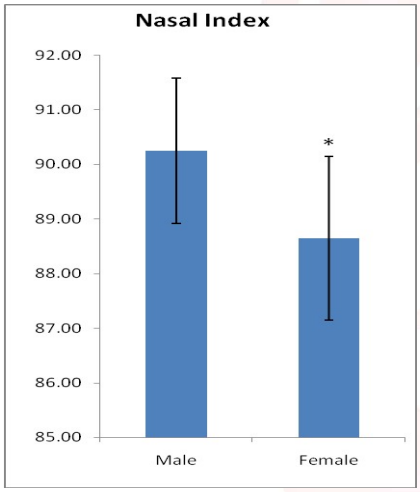


Fig. 3: The mean nasal index values among Bini male and female children.



The percentage distribution of the nose types represented in Figures 4 and 5 showed the prevalence of the platyrrhine nose type among both Bini male children (70.0%) and Bini female children (68.0%).

Fig. 4: Chart showing morphological classification of Nasal Index among Bini male children.

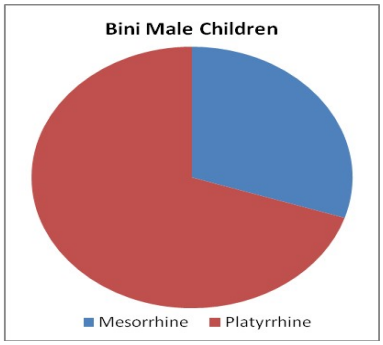


Fig. 5: Chart showing morphological classification of Nasal Index among Bini female children.

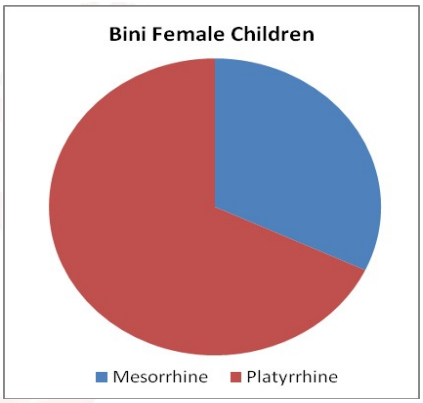


Table 2: Mean and standard deviation of nasal parameters of the Bini male and female children.

Variables	Nasal Height		Nasal Breadth		Nasal Index	
	Male	Female	Male	Female	Male	Female
Mean±S.E.M	4.58 ± 0.11	4.33 ± 0.10	4.05 ± 0.12	3.88 ± 0.11	90.25 ± 1.33	88.65 ± 1.50
S. D.	0.66	0.55	0.83	0.7	2.55	2.77

Table 3: Morphological classification and percentage distribution of nose types among Bini male and female children.

Classes	Range	Males (250)		Females (250)	
		Frequency	%	Frequency	%
Hyperleptorrhine	40 – 54.9	–	0	–	0
Leptorrhine	55 – 69.9	–	0	–	0
Mesorrhine	70 – 84.9	75	30.00%	80	32.00%
Platyrrhine	85 – 99.9	175	70.00%	170	68.00%
Hyperplatyrrhine	≥ 100	–	0	–	0

DISCUSSION

The nose is one of the characteristic features of the human face which is useful in the determination of sex, age, ethnicity and race of a person [14,15]. The result of this study showed significantly higher ($P < 0.05$) values for nasal height (figure 1) and nasal breadth (figure 2) among Bini male children than Bini female children (Table 2). Also, there is a significant ($p < 0.05$) sexual variation in the nasal index among the Bini male and female subjects with the males having higher values than the females

(Figure 3, Table 2). The result of this study showed correlation with findings from previous study among the adult Bini population [16]. Another study similarly reported significant sexual differences in the nasal indices of three major Southern Nigerian tribes– Igbo, Yoruba and Ijaw as well as the Andoni and Okrika tribes of Rivers State, Nigeria in which the male subjects have significantly higher values than their female counterparts [12,17].

According to the result of a study among the Bekwara ethnic group in Cross River state of Nigeria, the nasal index also demonstrated prominent sexual variation with the males having higher values (94.65) than the females (90.33) and there is reported prevalence of the platyrrhine (broad and short) nose type [18].

The result of a study done among the Urhobo and Itsekiri tribes of Southern Nigeria also showed significant sexual variation in the nasal dimensions [19]. Also, the craniofacial parameters (which include nasal height, width) obtained among Omoku indigenes of Nigeria similarly revealed significantly higher values of all parameters among males than in females [20]. Furthermore, the result of this study showed prevalence of the platyrrhine nose type among the Bini male children (figure 4) and Bini female children (figure 5) while mesorrhine was the next and least prevalent as there were no other nose types observed within the study population (Table 3). Comparatively, similar findings of platyrrhine prevalence were reported among the Efik children and young adult as well as the Urhobo and Itsekiri tribes in Southern Nigeria [15,19]; the Okrika tribe was prevalently platyrrhine while the Andoni tribe was prevalently mesorrhine [12]. Previous Studies [20,21] reported the prevalence of the platyrrhine nose type among the male and female Ekpeye tribe (93.72 ± 0.57 and 88.99 ± 0.61); female Ikwerre tribe (93.17 ± 0.51); male Ikwerre tribe was prevalently mesorrhine (84.81 ± 0.51) and among the male and female Omoku indigenes, platyrrhine nose type was also the most prevalent. The study of nasal index among Egyptian population reported significantly lower nasal index values among the male (71.46) and female (64.56) and prevalence of mesorrhine and leptorrhine nose types among the male and female Egyptians respectively [7].

Among the Turkish population, the leptorrhine (narrow nose type) is the most prevalent among both male (70%) and female (78%) [11]. Among the Iranian population, the mean nasal index for male and females were 68.91 and 66.05 respectively which confers the leptorrhine nose type as the most prevalent among both Iranian males and females [22]. Another study among the male and female of Gwalior region in India reported a significantly lower nasal index values (80.59 and 77.29 respectively) and mesorrhine nose types was the most prevalent [9] and mean nasal index value of 73.96 ± 1.9 and the prevalence of mesorrhine nose type was reported among the people of Western Uttar Pradesh region in India [23]. Another study among the Jats and Sindhis ethnic groups in India reported nasal index values of 68.09 and 70.72 respectively thereby implying the dominance of leptorrhine and mesorrhine nose types in the Jats and Sindhis ethnic groups respectively [24]. Based on the result of this study, there is a significant intra-tribal sexual variation but no significant inter-racial diversity in the nasal morphology of the Binis relative to other tribes in Southern Nigeria. However, prominent variation exists when compared with other distant tribes and populations.

CONCLUSION

The nasal dimensions and nasal index demonstrated prominent sexual dimorphism and can be used as a tool for description of sexual differences in human population. Also, the dominance of platyrrhine nose type is the current trend in the nasal morphology of Bini tribe like most other tribes in the Southern Nigeria.

Conflicts of Interests: **None**

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