Sexual Dimorphism in Facial Dimensions of the Bini’s of South-Southern Nigeria

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Abstract: A study on sexual dimorphism of facial dimensions was carried out to measure structures relating to the face and how it differs between the two sexes in adult Bini’s of south-southern Nigeria. A total of one thousand (1000) subjects comprising 500 males and 500 females (18-45 years) were randomly selected from Benin City in Edo State. Measurements were taken using a digital vernier caliper. The mean Menton-Nasion distance in males was 113.62±9.44 mm and 109.05±6.58 mm in females. Zygoma-Zygoma 124.63±5.78 mm in males and 122.28±6.39 mm in females, Subnasal-Nasion 43.05±3.83 mm in males and 39.93±3.96 mm in females, Ala-Ala 41.14±3.30 mm in males and 37.34±3.50 mm in females, Bigonial breadth 114.39±9.64 mm in males and 110.68±6.88 mm in males and 25.59±3.03 mm in females, Menton-Subnasal 65.97±5.91 mm in males and 60.35±5.71 mm in females. Bini males had significantly higher values than Bini females in all the facial parameters measured (p<0.05). The most prominent significant difference was observed in Ala-Ala (nose breadth) 90.8% and the least was observed in Zygoma-Zygoma (face breadth) 98.1%. This study has revealed that sexual dimorphism exist between the Bini adults of south-southern Nigeria.

Key words: Binis, facial dimensions, sexual dimorphism

INTRODUCTION

Sexual dimorphism is the existence of physical differences between the sexes other than differences in sex organ (Gluksmann, 1981). Facial dimension is the measurement of length, width and height relating to the face (Stedman, 2006). For evaluation of variations in craniofacial morphology, standards of anthropometric measurements should be established for a particular population (Bascifetel et al., 2004). In addition to variation in facial morphology during development which differs amongst different races and ethnic groups, differences have also been observed to exist between more closely related people.

In a study to assess for significant difference between males and females in face dimensions for the population of Zenica in Bosnia and Herzegovina, it was reported that men had larger face dimensions than women (p<0.01) and dimensions of the face length did not exceed ±6% between gender while dimensions of face width did not exceed ±5% between men and women (Ibrahimagic-sieper et al., 2006). Didia and Dapper (2005), studied the values of facial, nasal, maxillary, mandibular and oro-facial heights on 200 (110 male and 90 female) adult Nigerians with normal facial morphology. They established that for males, facial height is 12.28±3.39 cm; nasal height 4.50±1.23 cm; maxillary height 2.44±0.66 cm; mandibular height 4.49±1.23 cm and oro-facial height 6.90±1.89 cm. The figures obtained for the female subjects were, facial height 11.77±3.53 cm; nasal height 4.48±1.37 cm, maxillary height 2.30±0.69 cm, mandibular height 4.20±1.26 cm and oro-facial height 6.32±1.91 cm. The values obtained for males were found to be significantly higher than the corresponding female values thereby establishing sexual dimorphism among Nigerians. Oladipo et al. (2007) reported the nasal height of Ogonis (in Nigeria) males and females as 3.99 and 3.91 cm, respectively; and Akpa et al. (2003) reported nasal height of Igbos (in Nigeria) as 6.31 and 6.04 cm for males and females, respectively.

Jorge (2003) stated that nasal height is related to maxillary height as 1.000:0.618; the sum of the nasal height and maxillary heights are related to mandibular height as 1.618:1.000; the mandibular height is related to the maxillary height as 1:0.618 and the oro-facial height is related to the nasal height as 1.618: 1.000. Each ratio differs by 1.618 in line with the rule of golden proportion. Garba et al. (2008) in his study on craniofacial classification of normal newborns in Maiduguri studied a total of 120 newborns within 12-24 h of birth among Kanuri and Babur/Bura newborns and reported face length among Kanuri males and females as 6.14±0.13 and 5.89±0.08, respectively and that for Bura/Bura males and females as 5.87±0.09 and 5.81±0.07, respectively. He
Table 1: Table showing Mean facial dimensions and age distribution of Bini males and females

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<thead>
<tr>
<th>Age Groups</th>
<th>Sample size</th>
<th>Me-Na (mm)</th>
<th>Zy-Zy (mm)</th>
<th>SuN-Na (mm)</th>
<th>Ala-Ala (mm)</th>
<th>Bg Breadth (mm)</th>
<th>Lip width (mm)</th>
<th>Me-SuN (mm)</th>
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Me-Na = Menton-Nasion, Zy-Zy=Zygoma-Zygoma, SuN-Na=Subnasal-Nasion, Ala-Ala=Ala-Ala, Bg Breadth=Bigonial breadth, Me-SuN=Menton-Subnasal

also reported a prosopic index (facial index) of 83.77 and 82.84% respectively among Kanuri males and females and 80.84 and 81.03%, respectively for Babur/Bura males and females. On description of the shape of the face however, he reported that both the Kanuri and Babur/Bura newborns have the hypereuryprosopic type of face shape which is characterized by very low and wide face. In a similar study for sexual dimorphism in facial dimensions of adult Ijaws by Oladipo et al. (2008). One thousand (1000) students (500 males and 500 females) were used for facial parameters such as facial, nasal, maxillary, mandibular and oro-facial heights and it was reported that Ijaw males had a mean facial height of 11.87±1.59, nasal height 4.71±0.63 cm, maxillary height 2.49±0.33 cm, mandibular height 4.60±0.61 cm and oro-facial height 7.12±0.9 cm while mean facial dimensions for female Ijaws were facial height 10.71±1.43 cm, nasal height 4.43±0.59 cm, maxillary height 2.39±0.32 cm, mandibular height 4.28±0.57 cm and oro-facial height 6.50±0.87 cm. This study is aimed at showing variations of facial parameters in normal Bini males and females.

MATERIALS AND METHODS

A total number of one thousand (1000) Bini adults from Benin city in Nigeria comprising 500 males and 500 females (ages 18-45) who are Binis by both parents and grand parents, showing no form of facial deformities or scars and have not been involved in any form of plastic or reconstructive surgery were randomly selected for this study (this study was carried out in 2009). Subjects were recruited from secondary schools, market places and streets of Benin City. Measurements were taken with the use of a digital vernier caliper. Seven facial dimensions were measured and these include the following:

- **Menton-Nasion length (face length):** Measured from Nasion (root) of nose to the gnathion under the tip of the chin.
- **Bizygomatic breath (Face width):** Between the two most lateral points of the zygomatic arches.
- **Subnasal-Nasion (nose length):** Base of nose to root of nose (nasion)
- **Nose Width:** Between the most lateral points on the wings (ala) of the nasal cartilage.
- **Bigonal Breath:** Between the two lateral ends of the mandible.
- **Lip width**
- **Menton-Subnasal Length:** Base of nose to tip of the chin.

Each parameter was measured with the subject sitting and the head placed in anatomical position with facial muscles relaxed. The data obtained was analyzed using student’s z-test.

RESULTS AND DISCUSSION

The result of the study is presented in the following tables. Table 1 showing the mean facial dimensions and age distribution of adult Bini males and females. Table 2 showing the mean of variables measured on the face for both males and females and their standard deviation.

This study was directed mainly towards determining if facial differences exists between both sexes of Bini adults, show the variations in facial dimensions and establish values for the facial measurements of Bini Adults. The age range of this study (18-45 years) is significant since as opposed to the periods between 5-17 years, facial growth changes are minimal (Bishara and Ortho, 2000; Didia and Dapper, 2005). All facial dimensions measured were significantly different between both sexes (p<0.05). These differences that have 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 manifest as sexual dimorphism (Oladipo et al., 2006; Oladipo et al., 2007; Daniel, 2002).
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. The most prominent difference among the facial dimensions measured between the sexes from the percentage difference calculated was found in the Ala-ala (90.8%) followed by Menton-Subnasal (91.5%) while the least prominent difference was found in Zygoma-Zygoma (98.1%). In comparison with the study of the facial dimensions of adult Ijaws by Oladipo et al. (2008), the Ijaw males had Menton-Nasion of 120.60 and Menton-Subnasal of 71.20; female values were Menton-Nasion of 109.60 and Menton-Subnasal of 65.00. These values were significantly higher than those obtained for adult Bini people (P<0.05). Thus, Bini adults can be said to have a smaller Menton-Nasion and Menton-Subnasal when compared with the Ijaws only.

CONCLUSION

This study has been able to establish mean facial values for facial dimensions of adult Bini people of south-southern Nigeria and also revealed that sexual dimorphism exist in facial dimensions of adults Bini people. This study is important in medical applications such as cosmetology. Therefore orthodontist, plastic surgeons and anesthesiologist should utilize this knowledge during facial reconstructive surgery.

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REFERENCES


