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Anthropometric Comparison of Nasal Indices between Ham and Adara Tribes of Kaduna State, Nigeria

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Abstract: *A comparative study on Nasal index was carried out on subjects from Ham and Adara tribes of Kaduna State, Nigeria. A total of two hundred and thirty-five (235) apparently healthy subjects within the age range of 15 - 65 years were employed for this study; Ham (n=120) and Adara (n=115) of Kaduna State. Subjects were indigenes of Ham or Adara whose great grandparents are also from Ham or Adara respectively. Nasal breadth (NB) and Nasal height (NH) were measured using the vernier caliper. Nasal indices (NI) were calculated using the formula (NI=NB/NH*100) proposed by Williams et al. (1995). Data were analyzed using sigmastat® statistical package, and Student's t-test was used to test for the mean difference between ethnic groups and sexes. Analysis revealed that, Mean Nasal Indices were 93.70±3.30 (platyrrhine nose type) and 102.10±7.10 (hyperplatyrrhine nose type) for Ham and Adara people respectively, and the difference was statistically significant ($p<0.01$). Remarkable ($p<0.05$) sexual dimorphism was observed in the Nasal Index of individuals from Ham ethnic group.*

Keywords: *Adara, Ham, Nasal Indices, Platyrrhine, Hyperplatyrrhine.*

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I. Introduction

The Adara ethnic group is found in the southern part of Kaduna, eastern part of Minna and northern part of Abuja, and consists predominantly of farmers and hunters. The Ham ethnic group also found in the southern part of Kaduna, traces their origin to the southern part of Egypt, and consists predominantly of farmers and craftsmen. Anthropometric parameters show peculiarity in different living races (Risley, 1915) and analysis of nose has aided in the classification of nasal index into three different nose types (Williams *et al*., 1995; Porter and Olson, 2003). Ethnicity is a factor that affects craniofacial dimension (Rajakshmi *et al*., 2001). Nasal index is a very useful tool in distinguishing racial and ethnic differences (Porter and Olson, 2003), and sexual dimorphism (Zhang *et al*., 1990).The nose is one of the main components of facial aesthetics, and its study is of great importance in plastic surgery (costal *et al.,* 2005), and forensic facial reconstruction (Rodriguez, 2004). The shape of the nose can be determined by environmental climatic conditions (Last, 1981). The narrower noses are favored in cold and dry climates whereas broader noses in warmer, moister ones as a consequence of natural selection in human evolution (Hall and Hall, 1995). There are three categories of nose on the basis of nasal index; these are Leptorrhine with a Nasal Index of 69.90 or less, Mesorrhine with a Nasal index between 70 and 84.90 and Platyrrhine (broad nose) with a nasal index of 85 and above (Williams *et al.,* 1995; Porter and Olson, 2003). Carleton (1989) showed that the Negroid race mainly of African descent have the Platyrrhine nose type. In Nigeria, Akpa *et al.* (2003) did a study on the nasal parameters in Nigerian Igbos and classified them as Platyrrhine. Oladipo et al. (2007) also conducted a study on the morphemetric analysis of the nasal parameters of Igbo, Ijaw and Yoruba ethnic groups in southern Nigeria. Their findings showed a mean nasal index >85.0 in the three Nigerian ethnic groups studied. The Ijaws had the highest nasal index (96.4) followed by Igbos (94.1) while the lowest value was observed in Yorubas (89.2). Males had a higher nasal index than the females in all the ethnic groups. The differences observed were statistically significant ($p<0.05$).

II. Material And Methods

The study population consists of 235 subjects (Ham, n=120 and Adara, n=115, with ages ranging from 15-65 years). Volunteers were of non-mixed direct and grand parentage, none was with sign of nose trauma. The Nasal height (NH) was measured with the help of sliding caliper, from nasion to nasospinale. The Nasal breadth (maximum breadth of the nose) was measured at right angle to the nasal height from ala to ala. All the measurements were taken with the subject sitting in chair in a relaxed condition and head in the anatomical position. The measurement was done by one observer to prevent inter-observer error. Nasal index was

calculated as follows: Nasal index = (Nasal breadth / Nasal height*100) (Oladipo *et al*., 2006). The data were subjected to statistical analyses of mean and standard deviation using student t-test.

III. Results And Discussion

In the present study, the Nasal Indices of Ham males and females were 95.7 ± 3.2 and 92.0 ± 5.2 respectively, while that of Adara males and females were 101.1 ± 7.0 and 102.9 ± 7.5 respectively (Table 1). Sexual dimorphism was recognized in Ham ethnic group with males having a significantly higher value than females with $p<0.05$. However, in the Adara ethnic group, there was no significant difference in Nasal Indices between males and females. The mean Nasal Index of the Adara tribe (102 ± 7.1) was significantly higher than Ham tribe (93.3 ± 4.7) with $p< 0.05$ (Table 2). The result also shows that the Ham tribe has a Platyrrhine type of nose while the Adara tribe has a Hyperplatyrrhine type of nose.

Table 1. Mean and Standard deviation (S.D) of Nasal Index of Ham and Adara tribes in Kaduna State, Nigeria

	HAM	HAM	ADARA	ADARA
	MALE	FEMALE	MALE	FEMALE
Mean	95.7	92.0	101.1	102.9
SD	3.2	5.2	7.0	7.5
N	60	60	55	60

$p<0.05$, SD = standard deviation, N= number of subjects.

Table 2. Overall Mean and Standard deviation (S.D) of Nasal Index of Ham and Adara tribes in Kaduna State, Nigeria

Groups	Ham	Adara
Overall Mean	93.9	102
Sd	4.7	7.1
N	120	115

$p<0.05$, SD = standard deviation, N= number of subjects

This study was carried out to compare the Nasal Indices of Ham and Adara tribes of Kaduna State and to provide a baseline data of Nasal Index which could be vital in forensic and anthropological studies.

The present study indicated that the predominant nose shape is platyrrhine (broad nose) based on the mean nasal indices of 93.9 and 102 for Ham and Adara respectively. Literature has it that the platyrrhine type of nose is typically African (Risely, 1915) and is associated with hot moist climate (Thompson & Buxton, 1923). The present study is a confirmation of the literature. Oladipo *et al.* (2007) conducted a study on nasal indices among the Igbo, Yoruba and Ijaw ethnic groups in Nigeria. They observed the Nasal SIndices to be distributed as follows: Igbos = 94.1 with males (95.9) and females (90.8); Yorubas = 89.2 with males (90.0) and females (88.1); and Ijaws = 96.4 with males (98.6) and females (94.2). These three Southern Nigerian ethnic groups have platyrrhine type of nose based on their nasal indices. The differences in Nasal Indices between males and females in the respective ethnic groups are statistically significant.

IV. Conclusion

The present study also showed a statistically significant difference between males and females of the Ham tribe only, indicating sexual dimorphism. In conclusion, this study should be subjected to further investigation because of its relevance to forensic science and clinical anthropometry.

4. 1Authors Have Declared That No Competing Interests Exist.

Authors' Contributions

Kogi G.M. designed the study, performed the statistical analyses, wrote the protocol, and wrote the first draft of the manuscript and all authors read and approved the final manuscript**.**

4.2 Consent

4.3 Ethical approval

All Authors Hereby Declare That All Human Studies Have Been Examined And Approved By The Appropriate Ethics Committee And Have Therefore Been Performed In Accordance With The Ethical Standards Laid Down In The 1964 Declaration Of Helsinki.

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