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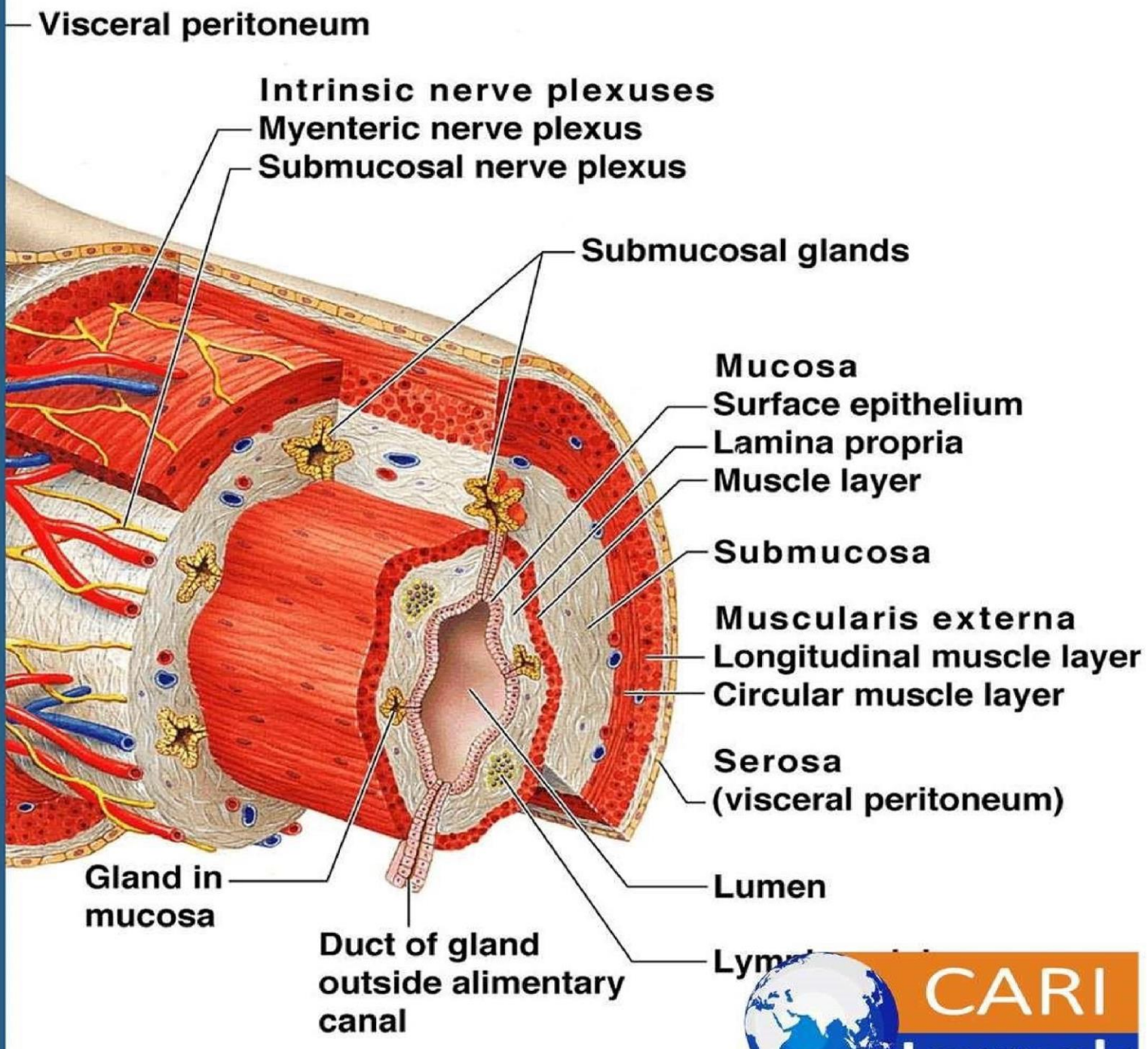

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Anthropometric Study of the Nasal Index of Adult Native of Ikwerre of Rivers State, Nigeria.

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Abstract

Background: The human nose differs in its anatomy and morphology among different ethnic groups. The nasal index is a vital measurement for classifying the ethnic groups and sex of an individual. The study aims at determine the nasal index of adult male and female Ikwerre natives in relation to age and to show its interest in forensic anthropology.

Materials and methods: Three hundred and thirty subjects (160 males and 170 females) aged 20–59 years were recruited for this study. Nasal height and width were measured using a digital Vernier caliper. The nasal index was calculated as nasal width/nasal height ×100.

Results: The mean nasal index of females aged 20-29, 30-39, 40-49, and 50-59 years were 87.45±0.85, 94.69±1.30, 93.90±1.71, and 93.94±1.39 respectively. The mean nasal index of males aged 20-29, 30-39, 40-49, and 50-59 years were 94.22±0.8, 90.46±1.45, 90.24±1.10, and 99.46±1.68 respectively. The nasal index of overall males and females was 77.22±2.11 and 94.23±0.90 respectively. The higher nasal index was observed in males within the age groups 20–29 and 50–59 years, as compared to the females, who had a higher nasal index within the age groups 30-39 and 40–49 years. The result revealed sexual dimorphism.

Conclusion: This study showed that males in the Ikwerre ethnicity fall within the Mesorrhine nose type while females have the Platyrrhine nose type.

Keywords: *Platyrrhine nose, Mesorrhine nose, Ikwerre natives*

INTRODUCTION

Anthropometry is a standard scientific technique for measuring the human body due to variations in physical characteristics. The human nose is one of the important anthropometric parameters for the identification of the sex and ethnicity of an individual of unknown identity (Shrestha et al., 2009). A vital tool in forensic investigation, reconstructive surgery, and genetic counseling is facial anthropometry (Oladipo, 2007; Krishan, 2008; Olotu et al., 2009). The nose is the uppermost part of the respiratory tract and the organ for the smell. The external nose is part of the human nose that protrudes forwards from the face and the typical nose morphology depends on ethnic, gender, and environmental variables (Sinnatamby, 2006; Esomonu 2013).

Nasal anthropometry can be used to identify the ethnicity and sex of individuals whose identities cannot be determined (Esomonu 2013). Nasal index is an ethnic sensitive anthropometric index for classifying the ethnic groups and sex of an individual (Oladipo et al., 2010). It is a vital measurement in performing rhinoplasty as well as the diagnosis of craniofacial deformities (Shrestha et al., 2019). Vast knowledge of the variation in nasal index for any particular ethnic group is beneficial to plastic surgeons especially in cosmetic surgery (Zolbin et al., 2015).

Nasal index is expressed as the percentage of the width in relation to the height of the nose (Oluwayinka et al., 2015). Nasal width (NW) is measured as a straight distance at right angle to the nasal height from ala to ala. The nasal height (NH) is measured as the distance between the nasion and subnasale (Oluwayinka et al., 2015). Based on nasal index the nose can be classified into Leptorrhine (Long and fine nose), Mesorhhine (medium nose), Platyrrhine (Broad nose) nose types with nasal index of <69.9,70-84.9 and >85 (Porter et al., 2003). The Platyrrhine nose type has a very prominent ala lobule with a rounded nasal tip. The mesorhhine nose type has a less prominent lobule and a more defined nasal tip while the Leptorrhine nose type has the least prominent ala lobule with a well-defined nasal tip (Jimoh et al., 2011).

Geographically, the Ikwerre people are a homogeneous group who inhabit a substantial part of the northern half of Rivers State, Nigeria (Nduka 1993). They now live in four local government areas which are Emohua, Ikwerre, Obio/Akpor, and Port Harcourt (Achinewhu 1994). Several studies on nasal anthropometry in Nigerians reported sexual dimorphism amongst different ethnic groups which was significantly higher in males and fall within the same nose type which is platyrrhine (broad and short) as expected of Africans (Fawehinmi et al., 2008, Oladipo et al., 2009, Esomonu et al., 2013). There are several studies on nasal index among ethnic groups in Nigeria. However, there are very few available anthropometric studies on the nasal index, and its relationship with the age and gender of the adult Ikwerre ethnic group. Hence, the need for this study.

MATERIALS AND METHOD

Three hundred and thirty (100) subjects were recruited for this research (160 males and 170 females) aged 20-59 years were recruited for this study across the Ikwerre ethnic group in River State, Nigeria. Subjects who were invited to participate in the measurement were male and female

Ikwerre indigenes who fall within 20-59 years of age and whose parents and grandparents are Ikwerre Indigenes. Pregnant women, Ikwerre indigenes whose mothers are from other tribes or whose grandmothers are from other tribes, and Ikwerre indigenes with trauma of the nose, septorhinoplasty, facial trauma, and other congenital facial malformations were excluded.

All the measurements used for this research were taken in the morning hours; this is because individuals are presumed to be more relaxed in the morning hours than in the afternoon (Montagu, 1960). The method applied for this research is the direct method using a sliding caliper with the subject sitting on a chair with their head in the anatomical position (Shretha et al., 2009). The data was obtained by using a sliding Vernier caliper in centimeters at a precision level of 0.1 mm. The nasal height was measured from nasion to nasospinale. The inter-alar distance was calculated as the nasal width. The measurements were taken in the Frankfurt plane with the subject sitting comfortably on the chair. After obtaining the nasal width and nasal height, the nasal index was calculated by the following formula: Nasal Index = Nasal Width (cm)/Nasal Height (cm) × 100(Romo and Abraham, 2003). which determines if the nose is leptorrhine (fine nose) with value <70, mesorrhine between 70-85, and platyrrhine (broad nose) >85 (Williams et al., 1995; Porter and Olson, 2003).

Figure 1: Rivers State Showing Local Government Areas and Headquarters

(Source: Abah et al., 2018).

STATISTICAL ANALYSIS

Data was expressed as Mean ± SD. Mean difference was tested using one-way Analysis of variance. Values were considered statistically significant when $P \leq 0.05$. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 25.

RESULTS

In the present study, statistically significant difference was observed between Nasal index and Age among males and females of Ikwerre native. Also, between Nasal width and age (Table I and 2).

Comparison between the Nasal indices and age groups revealed that a statistically significant difference within 50-59 (Table 4), 20-29 and 30-39 (Table 3).

From Table 5, statistical significance differences were observed when Nasal indices for Males and females Irrespective of Age were compared. This shows the presence of sexual dimorphism.

Table 1: Comparison of Nasal indices of Males Between Age Groups

Age	**NH**	**NW**	**NI**
20-29	44.71±0.63	41.67±0.51	94.22±2.08
30-39	44.99±0.48	40.67±0.70	90.46±1.45
40-49	44.32±0.52	39.83±0.35	90.24±1.10
50-59	44.68±0.39	44.18±0.47	99.46±1.68
F	0.64	9.04	7.64
P-Value	>0.05	<0.05	<0.05

Table 2: Comparison of Nasal indices of Females Between Age Groups

Age	NH	NW	NI
20-29	41.88±0.42	36.52±0.32	87.45±0.85
30-39	41.51±0.52	39.13±0.43	94.69±1.30
40-49	41.73±0.51	39.11±0.73	93.90±1.71
50-59	42.42±0.51	39.67±0.56	93.94±1.39
F	0.24	16.26	6.90
P-Value	>0.05	<0.05	<0.05

Age (Years)	Nasal Indices	Sex	N	Mean±SEM	F	P-Value	Inference
20-29	NH	F	50	41.88±0.42	14.67	<0.05	S
		M	43	44.71±0.63			
	NW	F	50	36.52±0.32	77.73	<0.05	S
		M	43	41.67±0.51			
	NI	F	50	87.45±0.85	10.08	<0.05	S
		M	43	94.22±2.08			
30-39	NH	F	40	41.51±0.52	21.40	<0.05	S
		M	26	44.99±0.48			
	NW	F	40	39.13±0.43	3.93	<0.05	NS
		M	26	40.67±0.70			
	NI	F	40	94.69±1.30	4.51	>0.05	S
		M	26	90.46±1.45			

Table 3: Comparison of Nasal Indices of Age Groups Between Males and Females (age 20-39)

NH= Nasal Height, NW= Nasal Width, NI= Nasal Index, S= Significant, NS= Not significant, F= Female, M= Male

Table 4: Comparison of Nasal Indices of Age Groups Between Males and Females

Age (Years)	Nasal Indices	Sex	N	Mean±SEM	F	P-Value	Inference
40-49	NH	F	30	41.73±0.51	11.97	<0.05	S
		M	41	44.32±0.52			
	NW	F	30	39.11±0.73	0.93	>0.05	NS
		M	41	39.83±0.35			
	NI	F	30	93.90±1.71	3.56	>0.05	S
		M	41	90.24±1.10			
50-59	NH	F	50	42.42±0.51	12.51	<0.05	S
		M	50	44.68±0.39			
	NW	F	50	39.67±0.56	37.98	<0.05	S
		M	50	44.18±0.47			
	NI	F	50	93.94±1.39	6.43	<0.05	S
		M	50	99.46±1.68			

NH= Nasal Height, NW= Nasal Width, NI= Nasal Index, S= Significant, NS= Not significant, F= Female, M= Male

Table 5: Comparison of Nasal Indices for Males and Females Irrespective of Age

Parameter	N	Sex	Mean±SEM	F	P-Value	Inference

NH	170	F	37.11±0.86	67.0	<0.05	S
	160	M	44.65±0.26			
NW	170	F	40.09±0.28	19.23	<0.05	S
	160	M	41.82±0.28			
NI	170	F	77.22±2.11	52.87	<0.05	S
	160	M	94.23±0.90			

Analysis was done using One-Analysis of Variance, in SPSS version 26.0, p-value is considered significant if ≤0.05

DISCUSSION

The facial skeleton's prominent and significant component is the nose. The bones and cartilages in the nose make it up. Nasal anthropometry is a crucial method for detecting sexual diversity and dimorphism among various tribes and ethnic groups. The strongest predictor of tribe identification is nasal anatomy (Madson, 2004, Nazim et al., 2021). One of the indices that are influenced by the climate is the nasal index; usually, a hot and humid climate is linked to a broad nose, whilst a cool and dry climate is linked to a narrow nose (Nazim et al., 2021).

In this study, the mean nasal width was 41.82 ± 0.28 for males and 40.09 ± 0.28 for females and the mean nasal height was 44.65 ± 0.26 for males and 37.11 ± 0.86 for females implying that males recorded significantly higher values, indicating sexual dimorphism in both width and height. This is consistent with findings from Oladipo et al. (2011) that males in Omoku, Rivers State, had wider mean nasal widths.

The mean nasal index for males was 94.23 ± 0.90 and 77.22 ± 2.11 for females. The males had significantly higher nasal index when compared to females implying that the Ikwerre men had broader noses than their women. This nose type conforms to the platyrrhine nose type, which is typical of the African population. This is in agreement with Oladipo et al., (2007) who reported that the males from Igbo, Ijaw and Yoruba ethnic groups in Nigeria have significantly higher nasal indices than their female counterparts. Oladipo et al., (2009) also observed sexual dimorphism in the nasal index of Itsekiris and Urhobos of Nigeria, with males having significantly higher values than females. The Igbo, Ijaw and Yoruba ethnic groups in Nigeria, a country in African.

These morphological differences in Nose Anatomy will be useful in Cosmetic rhinoplasty (Esomonu and Nnadi, 2013).

This study showed that the nasal width continued to significantly increase slightly with age in females, however in males, there was no significant difference with age. The mean nasal height for males and females was fairly constant across the age groups. This study also showed that the nasal width and nasal index slightly increased with age for females but after age 39 there was no further significant difference. This study showed a significant difference in nasal height, nasal width, and nasal indices between males and females of Ikwerre ethnic.

Results obtained in this study reveal that the Ikwerre ethnic group falls within the platyrrhine nose type. The platyrrhine nose type is in agreement with Oluwayinka et al., (2015) who reported that the Okun, Igala, and Ebira in Kogi State have Platyrrhine nose type. This type of nose observed could be a result of environmental, genetic, and climatic factors. This agrees with Farkas et al. (2005) and Last (1981). Ordu et al.,(2016), stated that in hot, humid conditions a low, broad nose serves to dissipate heat which affects the shape of the nose, however, It has been shown that irrespective of the child's descent (African or caucasian) or environment (climate hot and humid chilly climate), they retain their size and shape of the nose. It means that an environmental factor plays a smaller role in determining the nasal index of an individual.

This study is in contrast with Oladipo et al., (2010) who reported that the Ikwerre males fall within the mesorrhine nose type. Ikwerre females had higher Nasal index values than the males. This study revealed that the Ikwerre natives of Rivers State has platyrrhine / broad nose type, which is the typical African nose type. This difference may be due to the age range used for the study. Oladipo et al., (2010) used the age range of 18-32 years while the age range of 20-59 years was used for the present study. This data will be useful in differentiating the Ikwerre population, forensic investigations, clinical practice, and plastic surgery.

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