

Morphological Assessment of Face and Nose Shapes among the Ukwuanis of Delta State, Nigeria.

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ABSTRACT

The individuality of the face also results primarily from anatomical variations in the shape and relative prominence of the features of the underlying facial bone. The purpose of this study was to determine the facial and nasal indices to classify the morphological face and nose shapes in children ages 12-15 years in Ukwuani ethnic group in Delta State, South-South of Nigeria. This may be useful in forensic medicine, oral/maxillofacial and plastic surgery, orthodontics and paediatrics. The study adopted the descriptive cross-sectional survey method and the multi-stage and purposive sampling techniques. The study population comprised 240 children (120 males and 120 females), between the ages of 12 and 15 years and who were apparently healthy and whose parents belong to the Ukwuani ethnic group. The face length, face width, nasal height and nasal width were measured and the prosopic and nasal indices determined. Descriptive statistics and unpaired t-test were used for the data analysis. Results showed the predominant face shape was hypereuryprosopic and the predominant nose shape was platyrrhine.

KEY WORDS: Face and Nose shapes; Ukwuani; Hypereuryprosopic; Platyrrhine.

The face is the anterior aspect of the head from one ear to the other and from the chin to the hairline or where it ought to be (Sinnatamby 2006). The individuality of the face also results primarily from anatomical variations in the shape and relative prominence of the features of the underlying facial bone (Moore and Keith, 2006). The face plays an important role in communication and our interactions with others take place mainly via the face. Furthermore, the shape and features of the face provide our identity (Moore & Keith, 2006).

Indices provide a system for metrical recording of sizes and proportions of cranio-facial features within known numerical limits instead of subjective impressions (Soamnes, 1995). Cranio-facial-metric methods are useful in forensic identification when cranial remains can be compared with existing photographic and radiographic records (Soamnes, 1995), in attempts to reconstruct appearance in life of individuals represented only by skeletal remains (Soamnes 1995, Stewart 1954). Cephalometry has also been applied in plastic and oral surgery concerned with craniofacial deformity. A standardized record of this kind will enable diagnostic comparison between patients and the normal population (Soamnes 1995, Rabey 1971).

Various studies have been conducted on morphological assessment of face and nose shapes across the globe (Golalipour et al 2003, Jahanshahi et al 2008, Arslan et al 2008, Garba et al 2008,

Heidari et al 2009, Raji et al 2010, Oladipo et al 2007, 2009, 2010). It has been shown that the dimensions of the human body are affected by ecological, biological, geographical, racial, gender and age factors (Jahanshahi et al 2008). Though Anthropometric assessment of face morphologies have been carried out in newborns across the globe including Nigeria, the literature is lacking as no such studies, either in newborns or in older age has been documented in this population. This study intends to fill the gap in the literature. This will provide a normative data for facial and nasal dimensions that will possibly be useful in anthropology, forensic medicine, plastic surgery, oral surgery, paediatric medicine and dentistry as well as diagnostic comparison between patients and the normal population (Soamnes 1995, Rabey 1971). Therefore, the purpose of the present study is to determine the prosopic and nasal indices for the morphological classification of face and nose shapes in children age 12-15 years in Ukwuani ethnic group in Delta State, South-South of Nigeria.

MATERIALS AND METHODS

The study adopted the descriptive cross-sectional survey method of the quantitative design. The study population comprised 240 children (120 males and 120 females), between the ages of 12 and 15 years and who are apparently healthy whose parents belong to the Ukwuani ethnic group. The

multi-stage and purposive sampling techniques were used in this study. The three Local Government Areas (Ukwuani, Ndokwa East and Ndokwa West) that constitute the Ukwuani ethnic group of Delta State were covered. Three secondary schools from each of the local government areas were sampled. At the respective school the subjects were sorted into males and females in the age group of 12 to 15 years old. The study subjects were sampled on the basis of the first few ones who presented for the study. Only subjects whose parents hail from Ukwuani ethnic group with no history of plastic surgery or trauma of the face and no history of clinical features of endocrinal, metabolic and developmental disorders were included in the study.

Prior to the commencement of the study, letters were sent to the respective principals of the schools stating the purpose of the study. Prior to measurement, the subjects were told the nature and purpose of the study and only those who showed willing cooperation participated. Accordingly, the Research and Ethics Committee of the College of Health Sciences, Delta State University, approved the procedure employed in the study.

The following measurements were taken: Facial length (FH) was measured in a straight line as the distance from the nasion to the gnathion; Facial length (FW) was measured in a straight line as the distance from the right zygion to the left zygion; Nasal height (NH) was measured in a straight line as the distance from the nasion to the subnasale; Nasal width (NW) was measured in a straight line from ala to ala of the nose. All measurements were taken to the nearest 1mm, digital vernier calliper (Mitutoyo Japan), except facial width that was taken to the nearest 1cm and converted to mm, using spreading calliper (ORION, Japan). The subjects were asked to sit on a chair in relaxed manner with their heads (face) in anatomical position and the measurements were taken using a sliding digital calliper for the facial width using standard anatomical landmarks according to (Lobo et al 2005).

Depending on the indices, the type of face and nose shapes were classified according to international standard (Raji et al 2010, Heidari et al

2009). The following indices were calculated using standard formulae (Soamnes 1995).

Prosopic Index (PI) = Face length/Face width x 100

Nasal Index (NI) = Nasal width/Nasal height x 100

In order to assess error of the measurements, twenty subjects were randomly selected and measurements of each parameter undertaken twice by one observer on two separate occasions with an interval of two weeks. Intra-observer error were assessed as recommended by Dahlberg (1940). The mean errors calculated ranged from 0.052 mm for face width and 0.352 mm for face length; for nasal height and nasal width it ranged from 0.148 mm and 0.166 mm respectively. Pearson *r* between respective first and second measurements ranged from 0.991 to 0.998; correlation is significant at the 0.01 level. The findings indicate that the errors are unlikely to bias the results as they were minimal.

The data obtained from the study were subjected to statistical analysis and mean, standard deviation, and independent sample t-test were determined. P-value of less than 0.05 was considered statistically significant.

RESULTS

The mean, standard deviation, and range of parameters measured for males and females are as presented below (Table 1). The t-test showed mean total height and width of the face were significantly higher in males than in females ($P < 0.05$). The prosopic index in the Ukwuani ethnic group was statistically not significant between male and female ($P > 0.05$) (Table 2). The most common type of face shape in this population was hypereuryprosopic with 227 (94.6%) and the rarest face shapes were mesoprosopic and leptoprosopic with 0 (0%) (Table 3).

The mean total height of the nose was significantly higher in males than in females ($P < 0.05$) but there was no significant difference in mean width of the nose between males and females. There was no statistically significant difference in the nasal index between male (97.48) and female (98.07) (Table 2). The commonest type of nose in this studied population was platyrrhine (broad nose) with 212 (88.3%) and the rarest type of nose

Table 1: Descriptive statistics of parameters measured among the Ukwuanis

Parameters measured/ indices	Total: Mean(mm) ±SD (N=240)	Range (mm)	Male: Mean(mm) ±SD (N=120)	Female: Mean(mm) ±SD (N=120)
FH (mm)	91.28 ± 5.66	58.09-105.78	92.12 ± 6.65	90.44 ± 4.33
FW (mm)	126.23 ± 6.26	114.00-185.00	127.16 ± 7.47	125.29 ± 4.58
PI (%)	72.72 ± 4.99	47.61-99.00	73.14 ± 5.59	72.29 ± 3.93
NH (mm)	39.08 ± 2.73	31.27-47.89	39.50 ± 2.86	38.66 ± 2.55
NW (mm)	38.06 ± 3.64	30.94-68.49	38.34 ± 4.40	37.77 ± 2.23
NI (%)	97.77 ± 10.84	75.58-168.91	97.47 ± 12.88	98.07 ± 8.37

Table 2: t-test of parameters measured between male and female Ukwuanis.

Parameters measured/ indices	Gender	Observation	Mean (mm)	df	T-stat	t-critical value	P-value	Significance
FH (mm)	Male	120	92.12	238	2.32	1.97	0.02	Significant
	Female	120	90.44					
FW (mm)	Male	120	127.16	238	2.34	1.97	0.02	Significant
	Female	120	125.29					
PI (%)	Male	120	73.18	238	1.33	1.97	0.18	Not significant
	Female	120	72.29					
NH (mm)	Male	120	39.51	238	2.4	1.97	0.02	Significant
	Female	120	38.66					
NW (mm)	Male	120	38.35	238	1.21	1.97	0.23	Not significant
	Female	120	37.76					
NI (%)	Male	120	97.47	238	0.43	1.97	0.67	Not significant
	Female	120	98.07					

Table 3: Frequency and percentage of morphological face and nose shapes among Ukwuanis.

Face Shape	Frequency (%)		
	Total	Male	Female
Hypereuryprosopic	227 (94.6)	111 (46.3)	116 (48.3)
Euryprosopic	11 (4.6)	7 (2.9)	4 (1.7)
Mesoprosopic	0(0)	0 (0)	0 (0)
Leptoprosopic	0(0)	0 (0)	0 (0)
Hyperleptoprosopic	2 (0.8)	2 (0.8)	0 (0)
Nose shape	-	-	-
Leptorrhine	0 (0)	0 (0)	0 (0)
Mesorrhine	28 (11.7)	17 (7.1)	11 (4.6)
Platyrrhine	212 (88.3)	103 (42.9)	109 (45.4)

DISCUSSION

In this study, mean facial height was 92.14mm in males and 89.94mm in females, the difference being statistically significant. The mean facial width was 127.16mm in male and 125.16mm in females, the difference being statistically significant. The most common type of face in this population was hypereuryprosopic and the rarest face shapes were mesoprosopic and leptoprosopic with 0(0%). This study is at variance with Heidari et al (2009) who carried out an anthropometric study of the face in southeast of Iran and observed that the commonest type of face was leptoprosopic. The result of our study also differs from Arstan et al., (2008) who observed the pattern of face shapes among Turkish young adults to be leptoprosopic (37.6%) euryprosopic (34.1%) and mesoprosopic (28.3%). Our study differ from Heidari et al., (2006) euryprosopic face type as the dominant phenotype in both Fars (50.8%) and Balouch (37%) women; and the rarest face type was hyperleptoprosopic in Fars (0.5%) and Balouch (2.5%). The result of our study is similar to Golalipour et al (2003) in the sense that the dominant face type was hypereuryprosopic (34.6%) for Turkman race and (71.9%) for Fars. The study was carried in normal male newborns in South-East of Caspian sea.

In another study carried out by Jahanshahi et al., (2008) in Northern Iran among young males and females (17-20 years old), the dominant type of face shape in both native Fars and Turkman males was mesoprosopic (44% and 38.4% respectively). The rare type of face shape was hyperleptoprosopic (5.8%) in the native Fars females and leptoprosopic (3%) in Turkman females. The rare type of face shape in the native Fars males was hyperleptoprosopic and hypereuryprosopic (4% each) and in Turkman males it was hypereuryprosopic (8.6%). Raji et al (2010) in a study in North-Eastern Nigerian population, observed that prosopic indices indicated that the dominant face shape is hyperleptoprosopic in both males (70%) and females (57.3%); and the rarest type of face shape is hypereuryprosopic in males (1.0%) and female (2.1%). Garba et al (2008) in a study in Maiduguri, Nigeria, on classification of Normal Newborns observed that the dominant face type was hypereuryprosopic in Kanuri males (46.7%), Babur/Bura males (43%) and Babur/Bura females (40%).

Heidari et al (2009) in an anthropometric study of external nose in 18-25 years in southeast Iran, noted that the commonest type of nose was leptorrhine (fine nose), with 55.5% and 98.5% in the Sistani and Baluch groups, respectively. The rarest type was platyrrhine (broad nose) with 0% in both groups. The results of our study is opposite of the aforementioned. Oladipo

et al, (2007) in a study on nasal indices among the Igbos, Yorubas and Ijaws, in Southern Nigeria, observed nasal indices as follows: Igbo = 94.1 with male (95.9) and female (90.8); Yoruba = 89.2 with male (90.0) and female (88.1); and Ijaws = 96.4 with male (96.6) and females (94.2). These three Nigerian ethnic groups are therefore expected to have platyrrhine type of nose. They also observed statistically significant differences between males and females. Our study therefore confirms platyrrhine type of nose in the Nigerian population; although the result shows a higher nasal index. In addition, our study differs as there was no statistically significant difference between males and females. In a related study (Oladipo et al 2009), nasal indices of 86.38 (platyrrhine) and 81.86 (mesorrhine) were observed among the Okrikas and Andonis respectively of Rivers State, Nigeria. In another study, Oladipo et al (2010) observed mean nasal index for males and females were 99.83 and 97.79 respectively for the adult Ijaws of Nigeria.

In general, this study involved anthropometry of the face and nose to determine the prosopic and nasal indices of the Ukwuani ethnic group. The most common type of face shape in this population was hypereuryprosopic and the rarest face shapes were mesoprosopic and leptoprosopic. The commonest type of nose in this studied population was platyrrhine (broad nose) and the rarest type of nose was leptorrhine (fine nose). This affirms the existence of ethnic differences among races or ethnic groups across the globe.

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