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The Hausa face: an ethnic study from Nigeria

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ABSTRACT

Introduction: Over the years, physical anthropologists have used the metric variables obtained from the skull in the determination of an individual's sex, race as well as his/ her ethnicity to help provide a detailed and accurate description of the individual. The study objective was aimed at investigating the various face types, facial length, facial width, prosopic index and also the influence of gender on face type distribution. Material and Methods: In this study, a total of 100 participants consisting of 50 Hausa male and 50 hausa females were involved in the study, with the use of the manual caliper as well as pencil in the process of data collection. T-test as statistical tool was used to comparing the means of the test variable between male and female as well as the chi-square test in establishing the association between gender and face types Results: Findings from this study showed hyperleptoprosopic face type been the most dominant with an incidence of 50/100 with mesoproscopic been the least prevalent (20%). As regards the mesoproscopic and leptoproscopic face type they were predominant in males than females. Statistical significance was observed when comparing the facial width and prosopic index between male and female in the studied population with p-value of 0.005 & 0.037 respectively. Conclusion: The most predominant face type among the Hausa's was the hyperleptoprosopic face type with an incidence level of 50/100. It was observed that the dominant face type in males was leptoproscopic while that of the females was the hyperleptoprosopic face type.

Keywords: Facial Length, Facial Width, Prosopic Index, Hausa.

INTRODUCTION

The Human face the best and widely recognized feature used in the identification of an individual, with its development occurring in the fourth – eighth week of gestation and it's anatomical layout after its embryonic development extends from the chin to the hairline vertical, with its transverse layout runs from one ear to the other [1]. Its anterior surface consists of the forehead, eyes, nose, mouth and chin [2]. The face is an undeniably the best anthropometric feature in identification of an individual's sex, ethnicity and race [3]. Over the years physical anthropologists have been able to study the variation in humans with the aid of qualitative and quantitative measurement of feature of the human body such features include the face structure, face type, skull size etc, of which these feature vary among ethnic groups, race as well as gender [2].

In respect to the use of the face as an anthropometric tool in establishing variations in humans both the qualitative and quantitative methods were adopted [4]. Qualitative methods involves the shape of the face which in most case is used in distinguishing various sex, the shape of the jaw line which also is used in differentiating between male and females, studies have shown male to have a squared jaw line compared to female who possess round jaw line [5]. Also, the zygomatic arch is another qualitative feature in the distinguishing between the various sexes with the males having a prominence of the arches compared to females [5].

The quantitative method is one which involves measurement of certain features of the face

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such metric variables include the facial length, facial width and proscopic index, among others [6].

The facial length is a metric variable obtained by measuring from the nasion (intersection of the nasofrontal suture on the mid-sagittal plane) to the gnathion (the lowest point of the mandible border on the mid-sagittal plane), facial width is obtained by measuring the Bizygomatic breath (farthest point of the zygomatic arches) [7]. The Prosopic index, also known as the facial index, is obtained mathematically from the product of the ratio of the facial length to facial width by 100 [8].

According to Williams et al., 1995 the facial index has been classified on the basics of international description with a set range of facial index belonging to a face type. The classification is as follows hypereuriprosopic face (very broad face, range :< 79.9), Euriprosopic face (broad face, range: 80-84.9), mesoproscopic face (round face, range: 85-89.9), leptoproscopic face (long face, range: 90-94.9) and hyperleptoprosopic face (very long face, range: >95) [1]. As regards these metric variables they have a correlation with the age and gender of the individual [9]. These methods and discoveries have been in the world of anthropology in terms of forensics, also in the world of plastic surgery for reconstructive surgery and also in the identification of abnormalities of the face such as malocclusion [10].

Studies have shown that the variation of face type and facial parameters can be associated to factors such as race, sex, age and gender. In a study conducted by Hossain et al. (2011), it was discovered that the proscopic index of adult Japanese female students changed over two decades which supported the influence of age on prosopic index [11]. Research has shown the predominance of leptoproscopic face type among adult Africans, it was also observed in a study conducted by Eliakim et al., (2012), it was reported that the Igbo's and Yoruba's had a predominance of leptoproscopic and hypereuriprosopic face type respectively [12,13]. In a study conducted by Babatunde et al., (2019), among children of the southern part of Nigerian it was observed there was a predilection of mesoproscopic face type [14]. In other countries such as Colombia it was observed among the children that there was a predominance of both the mesoproscopic and leptoproscopic face type, among the Malaysian's there were also reported to have a predominance of hypereuriprosopic face type [10].

With these above mentioned studies it could be observed the effect of race as well as ethnicity in the distribution of face types. The aim of this study was to investigate the most predominant face type among Hausa residents in Abraka, Delta state, Nigeria.

MATERIAL AND METHODS

This study adopted a cross-sectional study design as well as a simple random sampling technique comprising of 100 consented participants who were Hausa residents in Abraka, Delta State, Nigeria. These participants consisted of a total of 50 males and 50 female participants respectively. Prior to the onset of data collection, ethical approval for this study was sought from the Delta State University Research and Ethic Committee.

The data were obtained using a manual spreading calipers and pencil, with the facial length obtained by measuring from the nasion to the gnathion of the face. The facial width was obtained by measuring from the farthest point of the left zygomatic arch to the farthest point of the right zygomatic arch. As regards the Proscopic Index it was obtained mathematically by simply dividing the facial length by the facial width and multiplying it by 100.

The various face types were determined on the basis of the international description which showed hypereuriprosopic < 79, Euriprosopic 80 – 84.9, Mesoprosopic 85 – 89.9, Leptoprosopic 90 – 94.9, Hyperleptoprosopic >95, according with Williams et al. (1995) [1]. The data were analyzed using Statistical package for social science software version 20, which were then presented in graphs and tables. Significance was accepted at $p \leq 0.05$.

RESULTS

Table 1 shows the mean facial length, mean facial width as well as the mean Proscopic index in the studied population.

Table 2 depicts the descriptive statistics of the male and female participants in the study as well as its test of significance between the test variables, which showed no significant difference between male and female as regards the mean facial length (p-value= 0.721) but showed a statistical difference between male and female with respect to the mean facial width as well as the mean proscopic index which had p-values of 0.005 & 0.037 respectively.

Table 3 shows the test of association between gender and face type which showed no statistical difference with the p-value > 0.05.

Figure 1 displays the distribution of face types in the studied population, with the Hyperleptoprosopic face type being the most prevalent with a frequency of 50% with mesoproscopic face type being the least in the studied population with an incidence of 20/100.

Figure 2 shows a comparative distribution of face types between male and females in the studied sample which presented males having a higher prevalence of mesoproscopic (12%, 8%) and leptoproscopic (19%, 11%) face type than the females but also showing females having a higher incidence level of hyperleptoprosopic (19%, 31%) face type than the males.

Table 1. Measurement and Proscopic Index in the studied sample.

Face Length (mean±std)	Face Width (mean±std)	Proscopic Index (mean±std)
113.76±6.21	117.08±6.44	97.53±8.56

DISCUSSION

Research has shown the face to be the best feature in the identification of an individual [14]. Physical anthropologists have over the years developed several methods in the identification of an individual that includes the anthropometric technique. These involves the measurement of certain features of the human body such as the facial width, facial length and others. With the development of these techniques, anthropologists have now been able to stipulate the identification of individuals based on gender, race as well as ethnic groups [4].

From this study, it was observed that the Hyperleptoprosopic face type a proportion of 50% which was in concordance with results obtained from studies conducted by Rexhepi et al., (2008) [16] among Kosava subjects which showed the Hyerleptoprosopic face type as the predominant face type with a prevalence of 31.6%, despite its similarity with these works it was in disagreement to works conducted by Kumar et al. (2013) [17] among Haryanvian adults which showed the mesoproscopic face type (42.5%) been the predominant, also a study conducted by Shetti et al. (2011) [10] were mesoproscopic face type was the most prevalent among the Indians.

It was also obtained from this study that there was statistical significance in the prosopic index between male and female this was in similarity with the results of studies conducted by Twisha et al. (2015) [19], but results of studies conducted by Sharma et al. (2014) [18], among Nepalese students showed disparity with no statistical difference (p=0.553). It was observed in this study that the females had a higher prosopic index then the males which were akin to results obtained from the study conducted by Twisha et al., (2015) [19] among Non-Gujarati, which showed the females possessing a mean prosopic index of 76.95 which was higher than those of their male counterpart (74.28), this is also in accordance with studies conducted by Shetti et al., (2011) conducted among Malaysians [10], Rexhepi et al. (2008) among Kosova subjects (male, female: 83.59:84.79) [16].

However, these findings were different from those obtained when a prosopic index study survey was conducted among Gujarat population were it was observed the males (75.35) had a higher mean prosopic index than the females (74.73) in the population [19], also different from studies conducted by Kumar et al. (2013) among Haryanvian adults (male, female:86.09,84.84), among patients of Yazd by Tabatabaei et al. (2010) (male, female:108.39:106.98), and Shetti et al. (2011) among the indian population (male, female:87.19:86.75).

Table 2. Descriptive Statistics of the Hausa sample.

Test Variable	Sex	N	Minimum	Maximum	Mean	STD	STDE	t	Sig. (2-tailed)
Facial Length	Male	50	99.91	125.14	113.5362	6.54623	.92578	-.358	.721
	Female	50	103.92	124.53	113.9822	5.90339	.83487	-.358	.721
Facial Width	Male	50	108.84	135.09	118.8826	5.67568	.80266	2.905	.005
	Female	50	103.76	128.17	115.2736	6.70429	.94813	2.905	.005
Proscopic Index	Male	50	85.68	114.63	95.7496	7.79913	1.10296	-2.118	.037
	Female	50	85.43	114.42	99.3126	8.97998	1.26996	-2.118	.037

*p-value ≤ 0.05. STD = standard error deviation; STDE = standard error mean.

Table 2. Chi-square test of association between gender and face type

Gender	Face Type			Chi-square	P-value
	Mesoprosopic	Leptoprosopic	Hyperleptoprosopic		
Male	12(%)	19(%)	19(%)	5.813	0.055
Female	8(%)	11(%)	31(%)		
Total	20(%)	30(%)	50(%)		

*p-value ≤ 0.05.

Figure 1. Distribution of various face types in the studied sample.

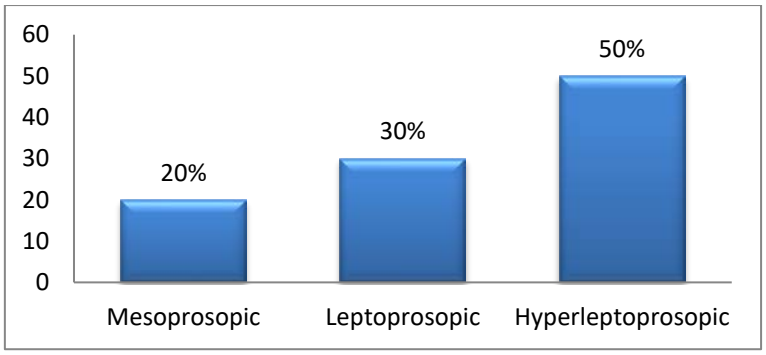
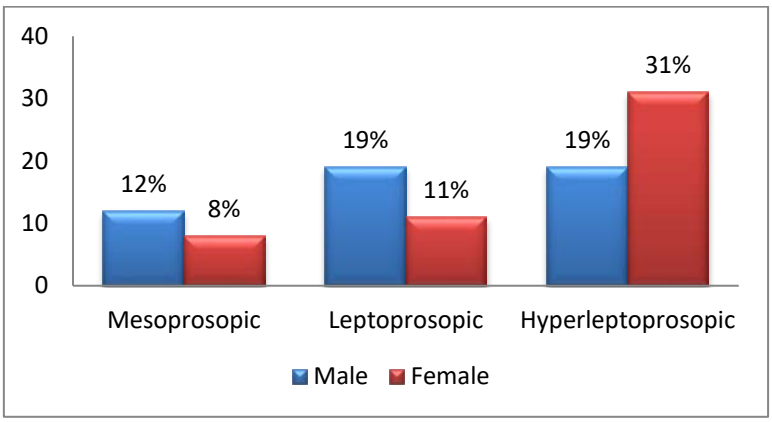


Figure 2. Distribution of various face types among the males and females in the studied sample.



CONCLUSIONS

The general facial morphological types did not show any significant association with gender.

Hyperleptoprosopic facial type (50.0%) was most common in majority of the subjects followed by Leptoprosopic (30.0%) and the least common was Mesoprosopic (20.0%) in a sample from Hausa.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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RESUMO

O rosto dos Hauçás: um estudo étnico da Nigéria

Introdução: Ao longo dos anos, os antropólogos físicos usaram as variáveis métricas obtidas do crânio na determinação do sexo, da raça e da etnia de um indivíduo para ajudar a fornecer uma descrição detalhada e precisa do indivíduo. O objetivo do estudo foi investigar os vários tipos de rosto, comprimento facial, largura facial, índice prosópico e também a influência do gênero na distribuição do tipo de rosto. Material e Métodos: Neste estudo, um total de 100 participantes, composto por 50 homens hausa e 50 mulheres hausa, esteve envolvido no estudo, com o uso de paquímetro manual e lápis no processo de coleta de dados. O teste T como ferramenta estatística foi utilizado para comparar as médias da variável de teste entre homens e mulheres, bem como o teste do qui-quadrado para estabelecer a associação entre gênero e tipos de face. Resultados: Os achados deste estudo mostraram que o tipo de face hiperleptoproscópico foi o mais dominante com incidência de 50/100 com mesoproscopia foi a menos prevalente (20%). Quanto ao tipo de face mesoproscópica e leptoproscópica, predominaram no sexo masculino e feminino. Observou-se significância estatística ao comparar a largura facial e o índice prosópico entre homens e mulheres na população estudada com valor de p de 0,005 e 0,037, respectivamente. Conclusão: O tipo de rosto mais predominante entre os Hausa foi o tipo de rosto hiperleptoprosópico, com um nível de incidência de 50/100. Observou-se que o tipo de face dominante nos homens era leptoproscópico, enquanto o das mulheres era o tipo de face hiperleptoproscópico.

Palavras-chave: Comprimento Facial, Largura Facial, Índice Prosópico, Hausa.