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FACIAL INDEX OF GAS FLARING AND NON – GAS FLARING POPULATION IN SOUTHERN IJAW LOCAL GOVERNMENT AREA OF BAYELSA STATE, NIGERIA

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ABSTRACT

Human beauty and handsomeness is more characterized by facial architecture. This study is aimed at specifying and contrasting face type of amongst people residence in Gas flaring and Non-gas flaring areas in Southern Ijaw Local Government Area of Bayelsa State, Nigeria. A cross-section of 1000 adult volunteered subjects (550 male and 450 females) within the ages of 18-45 years were considered. Measurements such as Total Facial Height [This is the measured distance from nasion to gnathion], Facial Breadth [The measured distance between the right and left zygion [bizygomatic breadth] and Facial Index [facial height divided by facial breadth multiplied by 100] were done from five [5] gas flaring communities such as Oporoma, Tebidaba, Ogboinbiri, Peremabiri and Koluama and five [5] Non-Gas flaring communities such as Ekowe, Nangi-Ama, Anyama, Oweikorogha and Amassoma. Results showed male and female mean facial height of the Gas flaring communities as 191.69±0.90 and 181.74±1.33. There was statistically significant difference between the two sexes ($P<0.05$). Their facial breadth was 128.67±1.09 for male and 125.97±1.23 for female, but no significant difference was recorded ($P>0.05$). While the facial Index for males and females from the Gas flaring communities are 148.97±1.16 and 146.27±1.52. The difference in their mean was significant ($P>0.05$). The facial height for male and female from the Non- Gas flaring communities are 188.61±1.32 and 185.79±1.04. There was exist statistically significant difference amongst their mean ($P>0.05$). Their facial breadth is 134.02±0.97 for male and 129.51±1.04 for females and was also significant ($P<0.05$). The facial index for male and female is 141.69±1.44 and 144.32±1.33 and no significant difference was recorded in their mean ($P>0.05$). The study has shown 100% of both the males and females from the Gas flaring communities possessess Hyperlepstosprosopia [Long face]. For the Non-gas flaring communities, 0.8% of the males possess Euryprosopia [Broad face]. while 99.2 % the males have Hyperleptoprosopia. On the other hand, 100% of the females population from the Non-gas flaring communities also possess Hyperleptoprosopia [Long face].This study is useful in esthetic and prosthodontic treatment.

KEYWORD: Facial index, Euryprosopia, Hyperleptoprosopia, Gas Flaring.

INTRODUCTION

One of the anthropological characteristics used in anthropometry—the ratio of the height of the upper face, that is, without the lower jaw (1), or of the entire skull, with the lower jaw (2), to the bizygomatic expressed in percent.[1] Facial index can be grouped into leptoprosop (narrow-faced), mesoprosop (medium- to wide-faced) and euryprosop (wide-faced). Vertical facial height and proportions of face among Hausa-Fulani children differ from those of other ethnic groups and should be used in orthodontic diagnosis and treatment planning in Hausa-Fulani children.[2]

A study was carried out to compare anterior and posterior facial heights in young white and black Brazilian subjects with normal occlusion and to verify sexual dimorphism. The white subjects had significantly greater upper anterior facial height (UAFH) and proportion of UAFH to total anterior facial height (TAFH), and significantly smaller proportion of lower anterior facial height (LAFH) to TAFH than the black subjects. Black boys had significantly greater total posterior face height (TPFH) and UAFH and upper posterior face height (UPFH) and UPFH/TPFH proportion than black girls. Black girls had significantly greater LPFH/TPFH proportion than boys. White boys

had significantly greater UPFH and UPFH/TPFH proportion than white girls. White girls had significantly greater LPFH/TPFH and facial height index values than boys. White subjects had larger UAFH, whereas black subjects had proportionally larger LAFH. Boys have a greater tendency for a vertical pattern than girls.[3] Although beauty may be in the eye of the beholder, there appears to be an achievable balance of facial proportions that creates a pleasing appearance.[4] The study of the face and the ability to alter its form have fascinated mankind for thousands of years. The clinical ability to alter dentofacial form, whether through orthodontics, facial growth modification, or surgery, requires an understanding of facial beauty, including the evaluation of facial esthetics, proportions, and symmetry.[5] The earliest recorded facial proportional analysis is in the Greek neoclassical canons (c. 450 b.c.). In contemporary times, there has not yet been a study that describes the relative differences in facial proportions among the world's different ethnic groups.[6] The greatest interethnic variability in facial proportions exists in the height of the forehead. More pronounced differences among the ethnic groups are also present in the measurements of the eyes, nose, and mouth. There is no significant difference between sexes in the neoclassical facial proportions.[6] Facial height has a profound effect on attractiveness. Occlusal vertical dimension (OVD) determines facial proportion at maximum intercuspation and influences facial dimension at rest. Deficient facial height visibly compromises optimal facial beauty.[7] Anthropologists have shown that the external covering made up of integument, adipose tissue, connective tissue, and muscle does not always distribute itself in a uniform, orderly manner. There are great variations in the amount and distribution of these soft-tissue elements. Therefore, a facial profile analysis that is limited to measurements on the hard skeletal structure would not appear to conform to the standards of accuracy if an assessment of the soft-tissue profile were required.[8] A careful clinical examination of the face is an essential part of the orthodontic diagnosis. By visual examination of the face important diagnostic determinations can be made regarding the patients profile, dental and skeletal relationships and 'facial animation.[9] Separating size from shape is useful for investigating therapeutically and growth-related morphological changes.[10] Traditional methods of model and cephalometric examination are often unreliable for diagnosis and treatment planning.[11] Successful esthetic and prosthodontic treatment are inseparable. In esthetic treatment, the goal is an enhanced but natural-looking appearance in which all prosthodontic principles have been taken into account. By the same token, prosthodontic treatment is as much about esthetics as mechanical and biologic requirements. Using all disciplines of dentistry to create a functional and pleasing esthetic impression creates the most successful outcomes.[12] Many scientific and artistic principles considered collectively are useful in creating a beautiful smile. The evaluation and analysis of the face, lips, gingival tissues and teeth are all considered in this process. Recognizing the ideal as a goal provides a direction for diagnosis and treatment planning for smile rejuvenation.[13] A study by,[14] to establish an evidence-based evaluation of the esthetic region of the mouth, by reviewing normal values for the face, the smile line, and the teeth and concluded that, clinicians will be able to document a standard set of data that will reveal skeletal and dental dysmorphia, which can then follow a well-organized sequence of treatment to re-establish facial and dental harmony. Surgical-orthodontic treatment planning for facial skeletal surgery begins with analysis of the morphologic form of the face, the soft-tissue envelope, and the underlying facial skeleton integrated with the dentition.[15] A study was conducted to determine the craniofacial parameters in the population of the central part of Serbia on 700 persons (360 males and 340 females), aged 18-65 years, selected randomly. The measured parameters were morphological facial height and breadth. There were significant differences in the facial parameters of male compared to female subjects in all observed parameters. The mean value of the morphological facial height in the study population was 116.8 mm ± 7.28, maximum facial breadth 124.12 mm ± 8.44, while the mean value of the total facial index was 93.68 ± 6.86.[16] Facial analysis is anthropologically useful to identify the racial, ethnical, and sexual differences. The study was done to see the sex difference and variation of facial index among Malaysian population. Cross-sectional descriptive type of study was done in Anatomy Department in UniKL RCMP which was performed on 81 Malay people (40 males, 41 females) aged 19–30 years. To measure the morphological parameters (facial height, facial width, and facial index), digital slide calliper and scale were used. There were significant differences found in all facial parameters of males compared with the females. The mean morphological facial height was 111.9 ± 8.4 and morphological facial width was 127.3 ± 8.0. The range of facial index was 67.44–106.90 for males and 75.21–97.99 for females.[17] A descriptive, observational, and cross-sectional study was designed to establish the baseline measurements of the craniofacial anthropometrical parameters and indices of 100 adult Bangladeshi Buddhist Chakma females aged between 25 and 45 years, residing at different locations of Chittagong and Rangamati cities was done. A total of ten craniofacial variables were measured using physical and photographic procedures. Craniofacial indices were calculated from those craniofacial variables. The craniofacial indices showed that Chakma females are mostly hyperbrachycephalic, hypereuryprosopic, and mesorrhine, with intermediate eyes and long narrow ears.[18] Most of the Chakma females (68%) examined have hypereuryprosopic or very broad face. The next most common type (25%) was euryprosopic. No hyperleptoprosopic female was found. 45% of the facial indices ranged from 75 to 80. In another 19% of the cases, the facial index ranged from 80 to 85.[18] Assessment of facial types have always been of great interest because they are used in forensic medicine,

plastic surgery, Orofacial surgery, pediatrics, dentistry, and for diagnostic comparisons between patients and normal populations.[19] Their study was to evaluate the facial type of Kurdish population in Sulaimani City, Kurdistan region-Iraq by using facial index. Methodology: The study was conducted in the school of Dentistry, University of Sulaimani on 200 adults comprising of 105 females and 95 males aged 18-24 years. The measured parameters were morphological facial height and breadth. The standard spreading caliper with scale was used for the measurement of facial parameters. Results: The mean morphological facial height for both genders was 105.255 ± 8.9 and mean morphological facial width was 116.8±8.7. The mean facial index was 90.6 ±9.65 for both genders. The dominant facial phenotype was leptoprosopic (50.5%) followed by mesoprosopic (19%), hypereuryprosopic (15.5%), euryprosopic (13.5%) and hyperleptoprosopic (1.5%) in both genders. They concluded that the dominant facial type in the Kurdish population of Sulaimani is leptoprosopic in both genders, however in males mesoprosopic and euryprosopic types were more common than in females and in females leptoprosopic and hypereuryprosopic were more common than in males.[19]

There was another study in China, done by Kurnia et al. (2012) who found that the mean facial index was 89.02±4.92for males and 88.52±4.89 for females and the dominant type of face was mesoprosopic (40% males and 30.30% females).[20]

MATERIALS AND METHODS

Materials used includes sliding digital caliper, camera, notebooks, pen.

Study Type

This is a cross-sectional study of 1000 adult volunteered subjects (550 male and 450 females) within the ages of 18-45 years using convenient sampling technique.

Study Location / Duration

This research was conducted in specific areas and communities in Southern Ijaw Local Government Area of Bayelsa State of Nigeria. Five [5] gas flaring communities viz; Oporoma [Town hall], Tebidaba [Open groun], Ogboinbiri [Town hall], Peremabiri [Town hall], Koluama [Open ground] and Five [5] Non-Gas flaring communities such as Ekowe [UAC playground], Nangi-Ama [Town hall], Anyama [School field], Oweikorogha [Town hall] and Amassoma [Town hall]. The study lasted from 20TH March, 2022 to 10th of June, 2022.

Method

TOTAL FACIAL HEIGHT: This is the measured distance from nasion to gnathion.
FACIAL BREADTH: The measured distance between the right and left zygion [bizygomatic breadth]
FACIAL INDEX: facial height divided by facial breadth multiplied by 100

Inclusion Criteria

1. All subjects/participants were indigenes of these aforementioned communities in Southern Ijaw Local Government Area.
2. Subjects were free from facial deformities

Exclusion criteria

1. Deformed subjects were excluded
2. Non- indigenes from these communities were excluded

Ethical Measures

Permission to conduct this research was obtained from the authorities [Paramount Rules, Youth Leaders]of these communities before commencement. The participants were enlightened on the purpose of the research.

In addition, verbal informed consent was sought from the volunteered subjects before the commencement of measurement procedures.

Statisttical Analysis

The obtained data was computed and analyzed using Statistical Package for Social Sciences [SPSS] version 20.0 software. The statistical tools such as Mean, Standard Deviation, Standard Error, Z- Test were used to analyze data. P- value less than (0.05) was considered as significant.

RESULTS

Table 1: Mean Values Of Facial Parameters.

S/N	SEX	TOTAL FACIAL HEIGHT [mm]	FACIAL BREADTH [mm]	FACIAL INDEX [%]
GAS FLARING COMMUNITIES	M	191.69±0.90	128.67±1.09	148.97±1.16
	F	181.74±1.33	125.97±1.23	146.27±1.52
NON-GAS FLARING COMMUNITIES	M	188.61±1.32	134.02±0.97	141.69±1.44
	F	185.79±1.04	129.51±1.04	144.32±1.33

Keys: All values are in Mean ±SEM.

Table 2: Z-Test for Significance Difference Between Males and Females of Non-Gas Flaring Communities.

S/N	PARAMETER	CALCULATED "Z"	TABULATED "Z"	INFERENCE
1	TOTAL FACIAL HEIGHT	1.670401067	1.96	P>0.05
2	FACIAL WIDTH	3.175839194	1.96	P<0.05**
3	FACIAL INDEX	-1.336919723	1.96	P>0.05

Key: **= Statistically Significant

Table 3: Z-Test for Significance Difference Between Males and Females of Gas Flaring Communities.

S/N	PARAMETER	CALCULATED "Z"	TABULATED "Z"	INFERENCE
1	TOTAL FACIAL HEIGHT	6.198118614	1.96	P<0.05**
2	FACIAL WIDTH	1.643401685	1.96	P>0.05
3	FACIAL INDEX	1.493661948	1.96	P>0.05

Key: **= Statistically Significant

Table 4: Z -Test for Significance Difference Between Males of Non-Gas Flaring and Gas Flaring Communities.

S/N	PARAMETER	CALCULATED "Z"	TABULATED "Z"	INFERENCE
1	TOTAL FACIAL HEIGHT	-1.92487639	1.96	P>0.05
2	FACIAL WIDTH	3.667095509	1.96	P<0.05**
3	FACIAL INDEX	-3.938737363	1.96	P<0.05**

Key: **= Statistically Significant

Table 5: Z -Test for Significance Difference Between Females of Non-Gas Flaring and Gas Flaring Communities.

S/N	PARAMETER	CALCULATED "Z"	TABULATED "Z"	INFERENCE
1	TOTAL FACIAL HEIGHT	2.46084268	1.96	P<0.05**
2	FACIAL WIDTH	2.197481599	1.96	P<0.05**
3	FACIAL INDEX	-0.966487942	1.96	P>0.05

Key: **= Statistically Significant

Table 6: Banister's Classification of Facial Types.

Face Shape	Range of Prosopic Index
(1) Hypereuryprosopic (very broad face)	<79.
(2) Euryprosopic (broad face)	80–84.9
(3)Mesoprosopic (round face)	85–89.9
(4) Leptoprosopic (long face)	90–94.9
(5) Hyperleptoprosopic (very long face)	>95

Table 6: Face Types And Percentages Of Present Study Using Baniter's Classification.

Gas Flaring Communities	Euryprosopia	Mesoprosopia	Leptoprosopia	Hyperleptoprosopia
Male	Nil	Nil	Nil	100%
FEMALE	Nil	Nil	Nil	100%

Table 7: Face Types And Percentages Of Present Study Using Baniter's Classification.

Non-Gas Flaring Communities	Euryprosopia	Mesoprosopia	Leptoprosopia	Hyperleptoprosopia
Male	0.8%	Nil	Nil	99.2%
Female	NIL	NIL	Nil	100%

Table 8: Mean values of Facial Parameters of Present and Previous Studies.

Parameter	Sex	Present study [2022] Southern Ijaw, Bayelsa, Nigeria	Osunwoke et al.[2011] Bini South-South, Nigeria	ANWAR et al. [2016] Kurdistan region-Iraq	Tahamida et al. [2014] Malay	Jeremi et al. [2013] Central Serbia
Total Facial Height	M=Gas	**191.69±0.90**	113.62±9.44	105.25 ± 8.9	98.54–130.8	116.8 ± 7.28
	M=Non-gas	**188.61±1.32**				
	F= Gas	**181.74±1.33**	105.04±6.58		94.6–120.9	
	F=Non-gas	**185.79±1.04**				
Facial Breadth	M=Gas	**128.67±1.09**	124.63±5.78	116.8±8.7	112.7–140.66	124.12± 8.44
	M=Non-gas	**134.02±0.97**				
	F=Gas	**125.97±1.23**	122.28±6.39		115.6–149.2	
	F=Non-gas	**129.51±1.04**				
Facial Index	M=Gas	**148.97±1.16**	91.17±7.57	90.6 ±9.65	67.44–106.90	93.68 ± 6.86
	M=Non-gas	**141.69±1.44**				
	F=Gas	**146.27±1.52**	85.90±6.49		75.21–97.99	
	F=Non-gas	**144.32±1.33**				

NOTE
F=Gas : Gas Flaring Communities
F=Non-gas: Non- Gas Flaring Communities

DISCUSSION

The results of the present study showed male and female mean facial height of the Gas flaring communities as 191.69±0.90 and 181.74±1.33. There was statistically significant difference between the two sexes (P<0.05). Their facial breadth was 128.67±1.09 for male and 125.97±1.23 for female, but no significant difference was recorded (P>0.05). While the facial Index for males and females from the Gas flaring communities are 148.97±1.16 and 146.27±1.52. The difference in their mean was significant (P>0.05). The facial height for male and female from the Non- Gas flaring communities are 188.61±1.32 and 185.79±1.04. There was exist statistically significant difference amongst their mean (P>0.05). Their facial breadth is 134.02±0.97 for male and 129.51±1.04 for females and was also significant (P<0.05). The facial index for male and female is 141.69±1.44 and 144.32±1.33 and no significant difference was recorded in their mean (P>0.05).

In the present results, the males from the Gas flaring communities possess higher total facial height than the males from the Non-gas flaring communities. While their female have shorter total facial height. On the average [summation of both Gas flaring and Non-gas flaring of the Southern Ijaw population] the males have a more total facial height [190.15±1.11] than their female counterparts [193.77 ±1.19]. This findings is in tandem with the results of,[17] on Malaysian population and,[22] of the Bini's, South-South, Nigerians . More so, from this results, both the males and females from the Gas flaring communities have shorter facial breadth than the males and females counterparts from the Non-gas flaring communities (P<0.05). On the average the Southern Ijaw males have a wider facial breadth than the females. This findings corroborates,[22] study on the Bini's , South-South, Nigerians contrary to the results of,[17] on Malaysian population. Population. The result of the present study showed Gas Flaring man have significantly higher facial index than the Non-gas flaring males (P<0.05). The females from the Gas flaring communities have higher facial index than the Non- gas flaring females. On the averages, the Facial index for males and females with values [145.33±1.30 and 145.30± 1.43] of Southern Ijaw population showed no significant variation. This findings is in contrast with the results of,[17] on Malaysian population and,[22] of the Bini's , South-South, Nigerians . The study has shown 100% of both the males and females of the Gas communities possess Hyperlepstosprosopia [Long face]. For the Non-gas flaring communities, 0.8% of the males possess Euryprosopia [Broad face]. while 99.2 % the males possess Hyperleptoprosopia. On the other hand, 100% of the females population from the Non-gas flaring communities also possess Hyperleptoprosopia [Long face].

CONCLUSION

From this study, normative values of the facial characteristic has been ascertained. This study has revealed sexual dimorphism amongst the Population of the Gas flaring and the Non-gas flaring Communities in Southern Local Government area, Bayelsa state, Nigeria. It is also evident in this study, that. there is ethnic and racial variations in the facial parameters. Sex and racial specificity should be maintained when dealing with these craniofacial dimensions in responds to forensic inquest, ergonomics and anthropological measurements.

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