

Study of Nasal Parameters Between Bengali and Chakma School Going Children of Bangladesh

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Abstract

Background : Anthropometry is the study of human morphology. Physical variation between the people of different ethnic groups can be recorded by anthropometry. This study was done to establish the anthropometric difference by measuring the nasal parameters among Bengali and Chakma School Going Children. The data of nasal parameters provide important information in plastic surgery, aesthetics and, nationality study and medical jurisprudence. **Methods :** It was an observational and cross sectional study, convenient sampling was done to select the 50 Bengali and 50 Chakma School Going Children, age ranging from 5-16 yrs old. Data were collected by using standard anthropometric methods with a sliding caliper. Values were expressed as mean \pm Standard Deviation (SD). Student T test was used to compare the results. **Results :** In both sex, among the two ethnic groups, the mean total length and protrusion of nose in the Bengali group was significantly (<0.001) higher than the Chakma ethnicity (48.46 ± 6.75 vs 41.34 ± 4.17 , 16.77 ± 2.85 vs 14.48 ± 2.22). The mean anatomic width of the nose was higher in Chakma ethnic group. The mean nasal index in the Bengali ethnic group was 67.60 and in the Chakma was 83.38 which shows that the mean nasal index of most Bengali (68%) falls within the Leptorrhine (Narrow nose) type and the most Chakma ethnicity (54%) in the mesorrhine (Broad nose) type. **Conclusion :** This result represent that the nasal parameters and index play an important role in the ethnicity difference.

Key words : Nasal Index (NI); Leptorrhine; Mesorrhine; Platyrrhine.

INTRODUCTION

The term 'Anthropology' derived from the Greek word, 'anthrop' which means 'human' and 'logy' means study. So Anthropology is the study of human morphology. It is a long time practice to measure human individuals for the purpose of understanding human physical variations¹. Anthropometry is the hallmark technique that deals with the study of body proportion and absolute dimensions that vary widely with age and sex within and between racial groups². From the past, anthropologists have long been an interest in studying intra-and inter population variations in different morphological characters³.

The effect of environmental conditions on development, including growth, maturation and the fulfillment of genetic potential, can be identified through the study of the variations among different ethnic groups in the same population or in the comparison of ethnic groups from distinct countries. The important branch of anthropology is cephalometry through which a human being can easily distinguish between male and female face without much difficulty and also play a great role to find out the difference between different ethnic groups⁴. Among the different parameters of cephalometry, nasal parameters are considered as one of the most important clues to racial and ethnic origin.

The nose is the upper most part of the respiratory tract and the organ for smell. Its shape including the the nasal bridge, slope of the tip, septum and nares differs from race to race, tribe to tribe and from one environmental region to the other¹. It is believed that the shape of the nose is a signature indicating the ethnicity, race, age and sex⁵.

The knowledge of the nasal anthropometry can provide important information to the rhino plastic surgeon and help to take in accurate preoperative planning. The normative data are also indispensable for precise determination of degree of congenital or post traumatic facial deviations from the normal⁶. Nasal index is the ratio of nasal width to nasal height multiplied by 100. The nose has been classified into five groups based on the nasal index: Hyperleptorrhine (NI of 54.9) Leptorrhine or fine nose (Nasal index of 69.9 or less) Mesorrhine or medium (Nasal index of 70.0-84.9) Platyrrhine or broad nose (Nasal index of 85.0 or more) Hyperplatyrrhine (Nasal index of 100.0-or above)¹.

METHODS AND MATERIALS

The study was descriptive and cross-sectional in nature with some analytical components. Convenient sampling was done to select 50 Bengali and 50 Chakma School Going Children, age ranging from 5 to 16 years. Each participant was Bangladeshi by nationality, Bengali and Chakma by ethnicity, Muslim and Buddhist by religion, Middle class by economic status. After taking history and physical examinations, some expected participants were screened out from the study due to presence of some exclusion criteria such as mixed origin, history of any congenital craniofacial anomaly, having common genetic, endocrine or neurological disorders that might affect the measurements such as, Down's syndrome, Acromegaly, Myxedema, Hyperthyroidism, Facial palsy. Data were collected in standard anthropometric methods with a sliding caliper.

According to Kolar and Salter, for taking physical measurements four anthropometric landmarks were used in this study namely Nasion, the sagittal midline point of the nasal root at the nasofrontal suture, Sub-nasale (sn) the junction between the lower border of the nasal septum (The partition which divides the nostrils) and the cutaneous portion of the upper lip in the midline, Pronasale (prn) the most protruded point of the nasal tip, Alare (al) the most lateral point on the nasal ala on each side of the nose, and three nasal variables were taken using these landmarks such as Nose height (n-Sn) Nose width (al-al) Nasal tip protrusion (Sn-Prn) and the nasal index were calculated using these variables².

RESULTS

Table 1 and 2 showed that in both sex among two ethnic groups, Bengali ethnicity had larger nose height and higher protrusion of nose while Chakma ethnicity had broader nasal width only.

Another comparison from table 1, 2 described that in both sex all the nasal parameters except nasal width had highly significant differences among the two ethnic groups.

The mean and Standard Deviation (SD) of NI of Bengali and Chakma population were determined and showed in the table 3(a) and 3(b). According to the nasal index, most common type of nose in Bengali ethnic group was Leptorrhine (Fine nose) with 68.0% and Chakma ethnic group was Mesorrhine with 54.0% (Table 4).

Table 1 : Measurements of various nasal parameters within ethnic groups among the males (With independent samples t – test significance).

	Variable	n	Mean (mm)	± SD	Significance of difference
Nose Height	Bengali	25	48.46	6.75	t = 4.489
	Chakma	25	41.34	4.17	p = 0.000
	Total	50	44.90	6.61	Highly significant
Nose Width	Bengali	25	33.81	10.16	t = 0.418
	Chakma	25	34.70	3.12	p = 0.678
	Total	50	34.26	7.45	Not significant
Protrusion of Nose	Bengali	25	16.77	2.85	t = 3.171
	Chakma	25	14.48	2.22	p = 0.003
	Total	50	15.62	2.78	Highly significant

Table 2 : Statistics of various nasal dimensions within ethnic groups among the females (With independent samples t – test significance).

	Cranio-facial Dimensions	n	Mean	± SD	Sign.
Nose Height	Bengali	25	48.68	4.69	t = 6.386
	Chakma	25	40.57	4.29	p = 0.000
	Total	50	44.63	6.04	Highly significant
Nose Width	Bengali	25	31.79	4.19	t = 1.257
	Chakma	25	33.15	3.41	p = 0.215
	Total	50	32.47	3.84	Not significant
Protrusion of Nose	Bengali	25	16.58	1.70	t = 3.745
	Chakma	25	14.38	2.39	p = 0.001
	Total	50	15.48	2.33	Highly significant

Table 3(a): Determination of frequency and type of nose.

Index		Ethnicity		Total Bengali
		Bengali	Chakma	
Hyperleptorrhine	Count	2	0	2
	% within Ethnicity	4.0%	.0%	2.0%
Leptorrhine	Count	34	1	35
	% within Ethnicity	68.0%	2.0%	35.0%
Mesorrhine	Count	13	27	40
	% within Ethnicity	26.0%	54.0%	40.0%
Platyrrhine	Count	0	20	20
	% within Ethnicity	.0%	40.0%	20.0%
Hyperplatirrhine	Count	1	2	3
	% within Ethnicity	2.0%	4.0%	3.0%
Total	Count	50	50	100
	% within Ethnicity	100.0%	100.0%	100.0%

Table 3(b): Determination of nasal index.

	Ethnicity	n	Mean	Std Deviation	p value
Index	Bengali	50	67.6003	13.97725	0.001
	Chakma	50	83.3840	9.42590	

Table 4 : Comparative data on nasal indices (NI) of various population.

Country or region	Authors & Dates	Nasal Index
Lebanon	Daniel (2002)	63.30
Arabic	Daniel (2002)	74.48
Indo- Aryans	Risely (1915)	73.25
Africans-Americans	Porter <i>et al</i> (2001)	79.70
Rajputs	Mulchand (2004)	71.60
Nigerian Ogonis	Oladipo <i>et al</i> (2007)	98.00

DISCUSSION

To characterize the different races and ethnic groups the nasal profile and nasal morphology play very important role. The function of Nasal index is to classify the various types of nose. It is very useful in anthropology as it is one of the clinical anthropometric parameter recognized in nasal surgery and medical management⁹. The nasal index has been found to modify between childhood, adolescence and young adulthood and after young adulthood into the sixth decade of life⁷. Nasal index also can differ due to regional and climatic differences¹⁰. The above studies have indicated racial and ethnic differences amongst different populations. Oladipo et al and Porter et al reported that African population have platyrrhine type of nose and Daniel, Mulchand Risely and G.V.Patel studied that Asian population have mesorrhine type of nose in morphometric analysis of nasal parameters¹¹⁻¹⁵. But the present study didn't concurs with the above authors on the mesorrhine type of nose of Asian ethnic groups, though the both groups belong to Asian

racess and have mongoloid face, most of the Bengali population fall within the Leptorrhine type of nose and the Chakma population fall within the Mesorrhine type of nose, as lower age group (5-16yrs) and population from different habitat were selected.

Study of facial morphology plays an important role in distinguishing a pure race from the local mingling of races¹⁶. Farkas et al have published an international anthropometric study of the facial morphology of 26 ethnic groups/races throughout the world, which include five Asian ethnic groups⁷. For discussion of the facial morphology in case of male, the data of the present study compared with the mongoloid face from Farkas study showed that the mean values of nose height and nose width in Indian it was 47.2mm, 37.9mm, in Singaporean Chinese it was 53.8mm and 39.2mm, in Thai it was 51.5mm and 40.8mm, which showed differences with the values of Bengali it was 48.46mm and 33.81mm and Chakma it was 41.34mm and 34.70mm⁷.

When compared with Caucasian Azerbaijan the mean values of nose height and nose width was 55.9mm and 35.7mm and Negroid Angolan it was 49.8mm and 46.3mm, ethnic differences also established. For protrusion of nose, data was compared with Malay study was 18.1 mm while in the present study Bengali had 16.77mm and Chakma had 14.48mm that showed remarkable ethnical difference⁸.

In case of Female, When compared with Mongoloid face mean values of corresponding variables in Indian was 43.7mm and 33.8mm, in Singaporean Chinese 51.7mm and 37.2mm, in Thai it was 49.5mm and 40.2mm which showed considerable difference with our present study where Bengali it was 48.68mm and 31.79mm, in Chakma it was 40.57mm and 33.15mm. When compared with Caucasian Azerbaijan was 52.3mm and 33.8mm and Negroid Angolan was 46.6mm and 40.8mm, also observed ethnical differences.

For protrusion of nose, comparison was done with Malay study it was 17.5mm while Bengali had 16.58mm and Chakma had 14.38mm. There were also different values observed in different ethnic groups⁸.

CONCLUSION

The result of this study revealed a clear ethnic difference in nasal parameters. The mean nasal index of Bengali and Chakma has been determined. The Bengali ethnic group falls within Leptorrhine nose type and Chakma ethnic group falls within the Mesorrhine nose type. These two groups that are studied though belongs to same race (Mongoloid) showed significant variation in nasal parameters as well as in nasal index. This may be due to different etiological factors i.e environment ,genetic factors, geography , nutrition and selection of lower age group.

This study provided data on nasal parameters but the actual scientific reasons for these sexual and ethnic variations are still not clear. Therefore, it needs further studies to establish the scientific reasons for variation in measurements among this ethnic study population of Bangladesh.

DISCLOSURE

All the authors declared no competing interest.

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