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Analysis of Nasofrontal and Nasal Tip Angles between Bengali and Manipuri Adult Males of Bangladesh: A Photo-Anthropometric Study

Md. Azmal Khan Pathan[1*] Pankaj Paul[2] Najnin Akhter[3] Sudipta Choudhury[4]
Marufa Najmin[5] Abul Hasan[6] Ferdaucy Chowdhury[7]

ABSTRACT

Background: Photo anthropometry is a scientific method that involves using photographs to analyze the proportions of various body parts and to obtain measurements, which can vary significantly across different racial groups. This study aimed to explore photo-anthropometric variations by evaluating the nasofrontal and nasal tip angles of the external nose in Bengali and Manipuri adult males residing in Bangladesh.

Materials and methods: This cross-sectional analytical study was carried out in the Department of Anatomy at Sylhet MAG Osmani Medical College, Sylhet, between January 2022 and December 2022. Fifty (50) Bengali and fifty (50) Manipuri adult males, aged 25 to 59 years, were chosen through convenient sampling. Photo-anthropometric methods were used to collect data from the Sylhet region. The results were presented as mean ± standard deviation, and the two-sample mean "Z" test was employed to compare findings between the groups.

Results: The angular measurements of the external nose, the nasofrontal and nasal tip angles, were significantly higher in Manipuri adult males compared to Bengali adult males ($p \leq 0.05$).

Conclusion: The findings of this study will be valuable in the fields of Anatomy, Plastic Surgery, Forensic Medicine, Genetics, and Anthropology for purposes such as identification, planning corrective surgical procedures, and designing nasal models for different ethnic groups.

KEY WORDS

External nose; Nasofrontal angle; Nasal tip angle; Photo-anthropometry.

INTRODUCTION

The term 'Anthropometry' executed from the Greek word Anthropos: A man and Metron: Collective measurement synonymized as measurement of the human. Anthropometry is gold standard technique that trades with the study of body proportion and absolute dimensions that differ widely among racial groups.[1] Nasal anthropometry refers to the study of the size, shape, and proportions of the human nose across various populations.[2] Nasal measurements also play a key role in assessing and diagnosing craniofacial abnormalities.[3] Nasal parameters are considered as one of the most important variables to racial and ethnic origin among the different parameters of cephalometry.[1] Anthropometry based on photographs is called photo-anthropometry which is a new field developing in Bangladesh. The midline of the midface features includes the pyramidal-shaped external nose.[4] The dimensions of the nose vary from person to person, depending on its size, shape and the proportion of the face it occupies. Nose offers a visual cue about their personality, ethnicity and other racial identity.[5]External nose shapes differ significantly between individuals. The morphometric analysis of the external nose provides a foundation for identifying racial and ethnic differences. The external nose is one of the anatomical structure that provide a look to an persons face.[6] The knowledge of the nasal anthropometry is essential for the rhino plastic surgeon forproper preoperative decision making.[1] Photo-Anthropometry is not difficult to conduct and is not invasive and inexpensive. As a result, photo-anthropometry of the craniofacial region

1. Assistant Professor of Anatomy
Brahmanbaria Medical College, Brahmanbaria.
2. Professor of Anatomy
Sylhet MAG Osmani Medical College, Sylhet.
3. Associate Professor of Anatomy
Brahmanbaria Medical College, Brahmanbaria.
4. Associate Professor of Anatomy
Sylhet MAG Osmani Medical College, Sylhet.
5. Assistant Professor of Anatomy
Parkview Medical College, Sylhet.
6. Assistant Professor of Anatomy
Gazi Medical College, Khulna.
7. Medical Officer of Anatomy
Sylhet MAG Osmani Medical College, Sylhet.
*Correspondence : Dr. Md. Azmal Khan Pathan
Email: azmalkhan866@gmail.com
Cell : +88 01638 80 70 20

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can be used to get various angular and linear measurements of the nose.[7] The shape of the external nose and its relationship with the face are quite different among races in both anatomically and morphologically. Various types of nasal surgery are performed recently on the basis of nasal anthropometry for aesthetic refinement and reconstruction in patients of different nationalities.[8] Though Bangladesh is a relatively small country, people of different ethnic groups live here and these different groups have differences in their physical characteristics. There are some major tribe in Bangladesh, Manipuri community is one of them. The people from the Manipuri tribe have different physical characteristics from those of the Bengali population.[9] So the main objective of the study to founded the Photo-anthropometry of external nose between Bengali and Manipuri adult males of Bangladesh.

MATERIALS AND METHODS

This cross-sectional analytic study was done in the Department of Anatomy, Sylhet MAG Osmani Medical College, Sylhet from January 2022 to December 2022 after getting written clearance from the Ethical committee to avoid any medicolegal questions during collection of digital photograph of face from the subjects. About fifty (50) Bengali and fifty (50) Manipuri adult males (Age 25 to 59 years) were selected by convenient sampling technique. However any congenital facial abnormalities, nasal surgery or trauma subjects are excluded from inclusion criteria. A pre-designed data collection sheet used to collect data.

Data was collected fom Sylhet zone and Photo-anthropometric methods were used for collecting data. Moreover, an informed written consent was taken from the subjects.The ossification process of all facial bones is completed by the age of twenty five years and that was the basis of selecting of sample.[10] For data collection digital camera, computer programmed with MB ruler were used. The procedure of the work was narrated to the participants. With the help of a questionnaire information was collected from all the participants. Age of the participant was filed from birth certificate and/or national identity card. Digital photography of face–lateral view was taken. This procedure was an alternative of manual anthropometry provided that the images was captured in a standardized fashion.[11] Participant was guided to follow the instruction that was neutral, relaxed facial expression and all facial jewelry was removed from the subject if present. The participants were seated comfortably on a chair looking straight forward.[11] The camera was set up on a stand. Lateral facial photographs was taken with a digital camera, using flash mode from a fixed distance (4 feet) using zoom function.[11] The participants head was at the same level as the camera for providing a good image of face and also kept the distortion of face to a minimum. The lateral facial photographs was captured at a fixed time between 9 AM and 2 PM to avoid diurnal variations. All the photographic measurements of the subjects was taken by same researcher in a computer programme named Adobe Photoshop.[11] The "nose height" was measured from nasion to subnasale by slide caliper before taking lateral facial photograph of each subject. Then the "nose height" of individual photograph was transformed into physically measured value by using the transform option of Adobe Photoshop. Then MB ruler software was used to measure the variables from the photograph.[12] A line was drawn from the glabella to nasion line and another line was drawn from nasion to tip line for measuring nasofrontal angle and to get the nasal tip angle, a line was drawn from nasion to pronasale and another line from pronasale to subnasale.[13,14] Then this angles were measured by using the 'MB Ruler' software and was recorded on data sheet.[15]

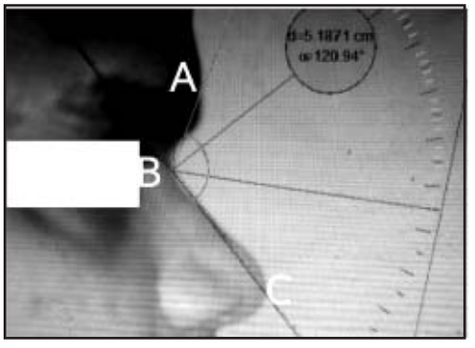

Image 1 Right lateral view of face with head in standardized position showing nasofrontal angle (ABC). A-glabella, B-nasion, C-pronasale

Image 2 Right lateral view of face with head in standard position showing nasal tip angle (ABC). A-nasion, B-pronasale. (B-C)-line from pronasale to subnasale

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Values of the study were measured as mean ± standard deviation. Two sample mean "Z" test was used for comparison the results of this two groups.

RESULTS

Nasofrontal angle in Bengali adult male, the mean ± SD was 121.06° ± 4.04. The nasofrontal angle ranged from 111.00° to 129.43°. In Manipuri adult male, the mean ± SD of nasofrontal angle was 131.22° ± 6.10. The nasofrontal angle ranged from 115.47° to 145.70°. From Table I it is evident that the mean nasofrontal angle was significantly higher ($p < 0.001$) in the Manipuri adult male than in the Bengali adult male (Fig 1).

Table I Nasofrontal angle in Bengali and Manipuri adult male

Variables	Adult male (n = 100)		p-Value
	Bengali (n = 50)	Manipuri (n = 50)	
Nasofrontal angle (°) (Mean ± SD)	121.06 ± 4.04 (111.00-129.43)	131.22 ± 6.10 (115.47 - 145.70)	<0.001**

Figure in parentheses indicate range, Comparison between Bengali and Manipuri adult male was done by two sample Z-test. * = Significant at $p < 0.05$ (2 tailed) ** = Significant at $p < 0.01$ (2 tailed) n = Total number of sample, n = Sample size, SD = Standard Deviation.

Nasal tip angle in Bengali adult male, the mean ± SD of was 83.57° ± 2.12. The nasal tip angle ranged from 80.00° to 89.00°. In Manipuri adult male, the mean ± SD of nasal tip angle was 91.08° ± 2.88. The nasal tip angle ranged from 82.90° to 98.90°. From Table II, it is evident that the mean nasal tip angle was significantly higher ($p < 0.001$) in the Manipuri adult male than in the Bengali adult male (Fig 1).

Table II Nasofacial angle in Bengali and Manipuri adult male

Variables	Adult male (n = 100)		p-Value
	Bengali (n = 50)	Manipuri (n = 50)	
Nasofacial angle (°) (Mean ± SD)	83.57 ± 2.12 (80.00 - 89.00)	91.08 ± 2.88 (82.90 - 98.90)	< 0.001**

Figure in parentheses indicate range, Comparison between Bengali and Manipuri adult male was done by two sample Z-test. * = Significant at $p < 0.05$ (2 tailed) ** = Significant at $p < 0.01$ (2 tailed) n = Total number of sample, n = Sample size, SD = Standard Deviation.

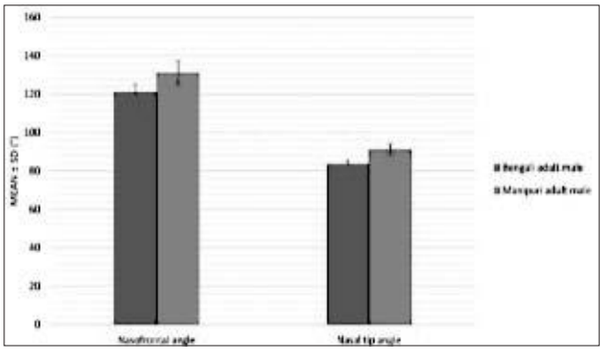

Figure 1 Bar diagram showing nasofrontal angle (°) and nasal tip angle (°) in Bengali and Manipuri adult male

DISCUSSION

Nose is the most protruding part of the face of human. Morphometry of nose is identical and differs from person to person, tribe to tribe and also different in various environmental region. Nasomental angle and nasal tip angle were measured in this study from digital photograph of face in lateral view. Results of different photographic variables of this study and the photographic variables of other studies of Bangladesh and different countries like India, Nigeria, Iran, Turkey, Nepal, China, Brazil were discussed.

In the present study, we have shown that the mean nasofrontal angle of Bengali adult was 121.06° and Manipuri adult male was 131.22°. The mean nasofacial angle of this present study was statistically significant and it was greater in Manipuri adult male compared with Bengali adult male. The mean nasal tio angle of Bengali adult male was 83.57° and Manipuri adult male was 91.08° of this present study. The mean nasal tip angle was statistically significant and it is also higher in Manipuri adult male compared with Bengali adult male of this present study. A study on nasofrontal angle measurement conducted by Uzan et al. in adult males of Turkey where the mean nasofrontal angle was 134.96°.[16] Another study by Ferdousi et al. in Garo people of Bangladesh where mean value of nasomental angle was 129.56°.[7] Study on nasomental angle find that study conducted by Uzan et al. on Turkish adult male where the mean value of nasomental angle was greater than Bengali and Manipuri adult male of present study. In the another study conducted by Ferdousi et al. 2013 on Garo adult male of Bangladesh where the mean value of nasomental angle was greater than Bengali adult male of present study but the mean value of nasomental angle was lesser than Manipuri adult male of present study.[7] There have also observed a study on nasal tip angle measurement by Akter T. in adult males of medical students of Dhaka city where

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the mean nasal tip angle was 81.09°.[12] Akter T. found the mean value of nasal tip anglein medical students of Dhaka city was lower than the Manipuri and Bengali adult male of present study.[12]

LIMITATIONS

i) The sample size was not very large (Some study subjects were unable to be cognized and to include as participants for the study and some of them didn't permit to give facial photographs).

ii) Study subjects were chosen from the Sylhet area which may not illustrate the accurate scenario of the Bengali and Manipuri adult males of Bangladesh.

iii) During selecting of study subjects, the assessment of exclusion criteria were based totally on information gathered through verbal enquiry and on visual impression.

CONCLUSION

Results of this present study showed that nasofrontal angle measurements was significantly higher in Manipuri adult males than in Bengali adult males and nasal tip angle measurement was also significantly higher in Manipuri adult males than Bengali adult males of Bangladesh.

RECOMMENDATION

Study subjects should be selected from different region of Bangladesh for further studies and also from different sets of people to represent the actual information of the country. More research is needed to get more precise data on different anthropometric measurements of external nose and use of more sample size to investigate the variations on morphometry of external nose. Research should be done on others tribal population to find out morphological differentiation. Studies can be done on different age groups to find out age related changes on anthropometry of nose. There are further scopes for studying variables that were not included in this study.

DISCLOSURE

All of the authors declared no competing interests.

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