Bangladesh Journal of Anatomy January 2019, Vol. 17, No. 1, pp. 25-29

Photoanthropometric Study of Nasal Angles in Adult Bangladeshi Population

Tahmina Akter[1], Humaira Naushaba[2], Uttam Kumar Paul [3], AHM Mazharul Islam[4], Afroj Zahan[5], Sk. Amin Mohi Uddin[6],Tamanna Mahmud Urmi[7]

Abstract

Context : Photo-anthropometric measurement of nasal angles are used to determine sexual dimorphism. These angles are necessary to perform optimum correction of shape of nose in both sexes during rhinoplasty. Any surgeon who performs rhinoplasty should be keenly aware of the sex and racial/ethnic differences in nasal anatomy. So far it is known, there is no published article on this topic in Bangladesh. So this study was done to determine the nasal angles and to compare the angles of the nose between male and female in adult Bangladeshi population.

Materials and Methods: *The standard digital photographic images were taken in right lateral view from 200 consented medical students (100 male and 100 female) of Sir Salimullah Medical College, Mugda Medical College and Green Life Medical College, Dhaka, Bangladesh aged between 20 to 25 years without any history of facial deformities and injuries. These images were transferred to a computer and from these images nasofrontal angle, nasal tip angle and nasolabial angle were measured by MB ruler software.*

Results: The mean±SD of the nasofrontal angle, nasal tip angle and nasolabial angle were 123.27±4.18° , 81.09±3.49° and 94.94±4.12° respectively in male and 131.83±5.51°, 82.85±3.58° and 97.43±4.41 respectively in female. All three angles were significantly higher in female than in male (P < 0.001).

Keywords: *Anthropometry, nasofrontal angle, nasal tip angle and nasolabial angle.*

Introduction

The beauty of the face is the result of the relationship of the facial region and symmetry of its components. The importance of facial proportions indices, which would bear some relation to the clinical appearance of the nose, has been declared by several surgeons. More people have some complaints about the shape of their nose. The size, shape and proportion of measurement of nose provides a visual basis suggesting the character of a person. In recent times as there is increased awareness about a person's look, cosmetic rhinoplasty has become a field of interest and research is ongoing to redefine beauty.[1] Craniofacial anthropometry began when anthropologists measured human skull to categorize and classify them into races.[2] Photo-anthropometric measurement of nose is used to determine sexual dimorphism.

Photoanthropometry was chosen to measure the angular measurements of nose because it was proven to be reliable in studies which included facial landmarks, compared with direct measurements and showed that sharp facial profile contours could eliminate the differences between the direct and the indirect measurements of the nose.[3,4]

The nasolabial angle is clinically relevant in orthodontic diagnosis and treatment planning because it is related to the antero-posterior position and inclination of maxillary anterior teeth and its dimension can be changed by orthodontics surgery.[5]

[1]Lecturer, Department of Anatomy, Popular Medical College, Dhanmondi, Dhaka
[2]Professor, Department of Anatomy, Dhaka Medical College, Dhaka
[3]Professor & Head, Department of Anatomy, Sir Salimullah Medical College, Dhaka
[4]Assistant Professor, Department of Anatomy, Sheikh Hasina National Institute of Burn & Plastic Surgery, Dhaka
[5]Assistant Professor, Department of Anatomy, Gazi Medical College, Khulna
[6]Assistant Professor, Department of Anatomy, Ad-din Sakina Women's Medical College, Jashore
[7]Senior Lecturer, Department of Anatomy, Bashundhara Ad-din Medical College, Dhaka
Correspondence: Dr. Tahmina Akter
Email: drtahminaanatomy@gmail.com

Anthropometric methods and surgical practice intersect at a point to treat congenital or post traumatic facial and nasal disfigurements in various racial/ethnic groups successfully.

Rhinoplasty surgeons require access to facial and nasal databases based on accurate anthropometric measurements to perform optimum correction in both sexes. Any surgeon who performs rhinoplasty should be keenly aware of the sex and racial/ethnic differences in nasal anatomy because feminization of a man's nose will create a disharmonious face, and a disproportionate face and nose. The normative data are useful for determination of degree of congenital or post traumatic facial deviations from the normal.[6]

Forensic anthropologists may be largely benefitted from various nasal dimensions. Facial identification with nasal morphometry is becoming more significant with the increase in crime rates and terrorist attacks.[7]

So far it is known, there is no published article on this topic in Bangladesh. So this study was done to determine the normal values and to compare the nasofrontal angle, nasal tip angle and nasolabial angle of the nose between male and female in adult Bangladeshi population.

Materials and Methods

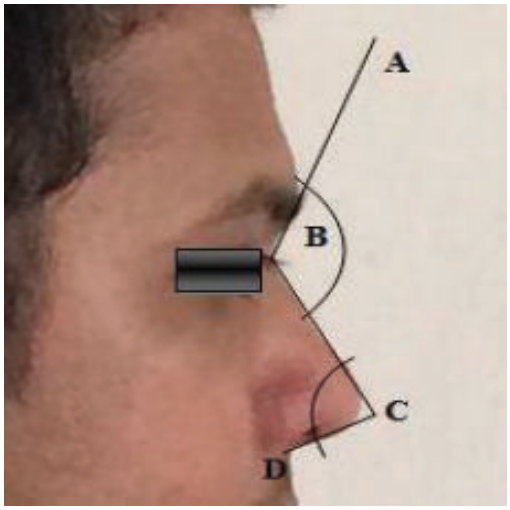
This cross-sectional study with some analytical components was carried out from July 2017 to June 2018 at the Department of Anatomy, Sir Salimullah Medical College, Dhaka. The study was carried out on 200 medical students (100 male and 100 female). Their age ranged from 20 to 25 years.

At first the nature of the work was explained to the study subjects. A written informed consent was taken from each study subject. Information was collected from each study subject with the help of a questionnaire. Age of the study subject was recorded from birth certificate or from national identity card. Subject who had trauma or surgery of the face or nose, history of cleft lip or palate were excluded from the study.

The standard digital photographic image were taken in right lateral view by usuing standard anthropometric measurement methods in the Anatomy department of Sir Salimullah Medical College, Mugda Medical College, and Green Life Medical College, Dhaka. These images were transferred to a computer and from these images nasofrontal angle, nasal tip angle and nasolabial angle were measured by MB ruler software.

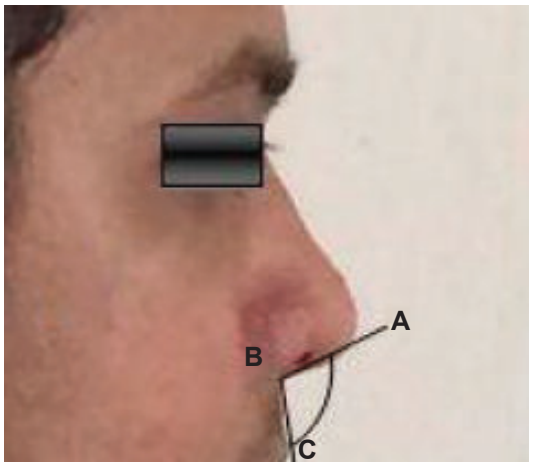
Procedure of measuring nasofrontal angle: It is the angle between the dorsum of the nose and the glabella (glabella to nasion line intersecting with nasion to tip line).[6] To get the nasofrontal angle, a line was drawn from the glabella to nasion line and another line was drawn from nasion to tip line. Then the angle between the two lines was measured (Figure1).

Procedure of measuring nasal tip angle: It is the angle between the nasal bridge and line connecting from nasal tip to subnasale.[6] To get the nasal tip angle, a line was drawn from nasion to pronasale and another line from pronasale to subnasale. The angle between two lines was measured (Photograph 1).



Photograph 1: *Digital photograph of right lateral view of face with head in standardized position showing nasofrontal angle (ABC) and nasal tip angle (BCD)*

Procedure of measuring nasolabial angle: It is the angle where the upper lip and the base of the columella meet.[6] To get the nasolabial angle, a line was drawn from subnasale to nasal tip and another line was drawn from subnasale to upper lip. The angle between the two lines was measured (Photograph 2).



Photograph 2: *Digital photograph of right lateral view of face with head in standardized position showing nasolabial angle (ABC).*

Ethical clearance

The study was approved by the Ethical Review Committee of Sir Salimullah Medical College, Dhaka.

Results

In male the mean±SD of the nasofrontal angle was 123.27±4.18° (range 114.33°- 134.23°), nasal tip angle was 81.09±3.49° (range 73.42° - 90.03°) and nasolabial angle was 94.94±4.12° (range 90.25° - 110.12°) (Table I).

In female the mean±SD of the nasofrontal angle was 131.83±5.51° (range 118.59° - 147.45°), nasal tip angle was 82.85±3.58° (range 73.54° - 92.55°) and nasolabial angle was 97.43±4.41(ranged 90.78° - 110.12°) (Table I).

Table I

Descriptive statistics of the measured dimensions

Dimensions	Mean±SD		P
	Male (n= 100)	Female (n= 100)	value
Nasofrontal angle(°)	123.27±4.18 (114.33-134.23)	131.83±5.51 (118.59-147.45)	0.000**
Nasal tip angle (°)	81.09±3.49 (73.42-90.03)	82.85±3.58 (73.54-92.55)	0.001**
Nasolabial angle (°)	94.94±4.12 (90.25-110.12)	97.43±4.41 (90.78-110.12)	0.000**

Figure in parenthesis indicate range. Comparison between sex was done by unpaired Student's 't' test. ** = Significant at P < 0.01(2 tailed), n= sample size.

Fig-1 and 2 show that all the three angles were significantly higher in female than in male (P < 0.001).

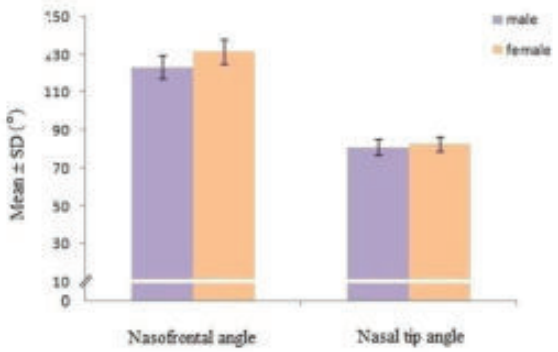


Fig-1: *Bar diagram showing nasofrontal angle (°) and nasal tip angle (°) in male and female*

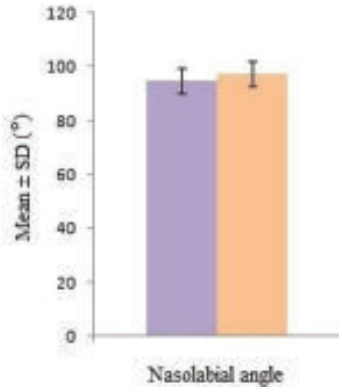


Fig-2: *Bar diagram showing nasolabial angle (°) in male and female*

Discussion

The mean nasofrontal angle of the present study was almost similar with that of Turkish[8] but was higher than that of Urhobos[9] and was lower than that of Southern Brazillian populations.[2] In agreement with the present study, nasofrontal angle was also found higher in female than in male in Turkish[8] Urhobos[9] and Southern Brazillian population.[2]

The mean nasal tip angle of the present study was almost similar with that of Persian adults[10] but was lower in male and higher in female than that of Turkish population.[8] Like the present study, nasal tip angle was significantly higher in female than in male in Persian adults.[10] But in contrary to the present study the mean nasal tip angle was significantly higher in male than in female in Turkish population.[8]

The mean nasolabial angle of the present study was almost similar with that of Romanian[11] but was lower in Southern Brazillian[2] and Persian[10] population. In agreement with the present study, the nasolabial angle was significantly higher in female than in male of Romanian population.[11]

In this study, in a lateral view, men had a heavier brow with the forehead appearing more prominent than those of women because of the more acute nasofrontal angle seen in men. Powell and Humphrey ssuggested that the ideal nasofrontal angle should be from 115 to 130 degrees.[12] This range was narrower than the results of our study. The nose appeared more upturned as indicated by the more obtuse nasal tip angle in the women. The nasolabial angle appeared to be more acute in men because of the greater forward angulation of the upper lip.[13,14,15,16] The appropriate proportion indices contributed to facial harmony and balance.[16] The proportion indices could be useful in the objective quantification of facial attractiveness.[17]

Acknowledgement

It is my pleasure to thank all those students of Sir Salimullah Medical College, Mugda Medical College and Green Life medical college who made themselves available as study subjects with their time, patience and cooperation.

References

1. Etöz A. Anthropometric Analysis of the Nose. Aesthetic, Plastic and Reconstructive Surgery. 2012: 1-10.
2. Ballin AC, Carvalho B, Dolci JEL, Becker R, Berger C and mocellin. Anthropometric Study of the Caucasion nose in the city of Curitiva: relevance of population evaluation. Brazil Journal of Otorhinolaryngology. 2017;4: 1-8.
3. Farkas LG, Bryson W, Klots J. Is photogrammetry of the face reliable?Plast Reconstr Surg1980;66:346Y35534.
4. Nechala P, Mahoney J, Farkas LG. Digital two-dimensionalphotogrammetry: a comparison of three techniques of obtaining digitalphotographs.Plast Reconstr Surg1999; 103:1819Y1825.
5. Wamalwa P, Amisi S. K. and Chen S. Angular photogrammetric comparison of the soft-tissue facial profile of Kenyans and Chinese. The Journal of Craniofacial Surgery. 2011; 3, 1064-1072.
6. He Z, Jian X, Wu X, Gao X, Zhou S and Zhong X. Anthropometric Measurement and Analysis of The External Nasal Soft Tissue In 119 Young Han Chinese Adults. The Journal Of Craniofacial Surgery. 2009;20(5): 1347-1351.
7. Ritz-Timme S, Gabriel P, Obertovà Z, Boguslawski M, Mayer F and Drabik A. A new atlas for the evaluation of facial features: Advantages, limits, and applicability. Int J Legal Med 2011;125:301-6.
8. Uzun A, Ozdemir F. Morphometric analysis of nasal shapes And angles in young adults. Braz J Otorhinolaryngol.2014; 80:397-402.
9. Oghenemavwe E L, Osunwoke A E, Ordu S K and Omovigho O. Photometric Analysis of Soft Tissue Facial Profile of Adult Urhobos. *Asian journal of Medical science*, 2010; 2(6), pp.248-252.
10. Jamilian A, Darnahal A, Hamedi R, Kamaly Z and Toopchi S. Photogrammetric analysis of facial profile in Persian adults. Journal of General Dentistry. 2016;64(2): 1-11.

11. Manuela C, Anamaria J, Maria BS, Cristina MM and Mariana P. Facial Profile Characteristics Evaluation in a Population of Central Romania Region. Acta Medica Marisiensis. 2014;60(2): 53-56.

12. Powell N, Humphreys B. Proportions of the Esthetic Face. New York, NY: Thieme-Stratten 1984:7

13. Farkas LG.Anthropometry of the Head and Face. 2nd ed. New York,NY: Raven Press 19942.

14. Farkas LG, Kolar JC and Munro IR. Geography of the nose: a morphometricstudy. Aesthetic Plast Surg1986;10:191Y223

15. Choe KS, Yalamanchili HR and Litner JA. The Korean Americanwoman's nose: an in-depth nasal photogrammatic analysis.Arch Facial Plast Surg2006;8:

16. Tessier P, Farkas LG and Munro IR. Anthropometric FacialProportions in Medicine. Springfield, IL: Charles C Thomas 198737.

17. Edler R, Agarwal P and Wertheim D. The use of anthropometric proportionindices in the measurement of facial attractiveness.Eur J Orthod 2006;28:274Y281.