Original Article

Comparison of Nasal Parameters between Bangladeshi and Indian Manipuri Medical Students

Maksuda Bina[1], Prof. Selina Anwar[2], Prof. Sultan Ahmed[3]

Abstract:
Background: Anthropometry is the study of human morphology. Physical variation between the people of different ethnic groups can be recorded by anthropometry. Measurements of craniofacial parameters have anatomical, clinical, forensic and anthropologic significance. In the present study comparisons of the nasal parameters between adult Bangladeshi and Indian Manipuri medical students of both sexes was done to determine the extent of racial and sexual dimorphism. **Objective:** To evaluate nasal parameters between Bangladeshi and Indian Manipuri medical students. **Methods:** This cross-sectional, analytical study was conducted at the Department of Anatomy of Rangpur Medical College from July 2018 to June 2019. 100 Bangladeshi and 100 Indian Manipuri medical students was the subject of the study from the date of approval. The Indian Manipuri students were collected from Prime Medical College, Rangpur and Rangpur Community Medical College, Rangpur. Nasal height and width and protrusion of nose was measured manually by using digital slide calipers. **Result:** Among the measurements, both nasal height and width was where in Manipuri than Bangladeshi in both sexes but reached a significant level for nasal height in male and nasal width in female. But protrusion of nasal tip was significantly higher in both sexes in Bangladeshi than Manipuri. **Conclusion:** From this study it could be concluded that there was significant difference on nasal variables studied among Bangladeshi and Indian Manipuri medical students of both sexes especially ethnic variation was more prominent in males than females.

Indexing words: Nasal length, Nasal width, Protrusion of nasal tip, Nasal index

Introduction:
Studying variations between and within populations in different morphological characters have been interest of anthropologists[1]. Craniofacial anthropometry includes measurements of head, face, nose, ear, orbital and orolabial regions. Craniofacial morphometry is the hallmark to study these variations and provides considerable information about physical conditions and development during growth. Facial characters are mostly influenced by factors such as race, ethnicity, age, sex, and culture, and their variation has been the subject of an investigation from ancient times[2,3].
Morphometric difference in facial characters are always present among various races in world geographic clusters[4]. Nasal anthropometry is the study concerned with the measurements of the proportion, size, and shape of the human nose. It has become an important tool used in genetic counseling, reconstructive surgery and forensic investigation[5,6,7]. The nose occupies the center of the face, and it is one of the most important factors characterizing the face[8]. The nose can be divided into two parts—the external and the internal parts, and the external part is the most studied part[9]. The shape of external nose varies from one to other considerably. It is pyramidal in structure located in the midline of the face and its skeletal framework is made up of bones and cartilages that maintain its shape. The shape of the external nose varies from one to another considerably. The external nose serves the cosmetic function by enhancing an individual's personality and beauty[10].
The knowledge of nasal anthropometry can provide important information to the rhinoplastic

1. Assistant Professor, Dept. of Anatomy, Rangpur Community Medical College,
2. Professor & Head, Dept. of Anatomy, Rangpur Medical College,
3. Professor, Dept. of Anatomy, Rangpur Medical College,

surgeon and help to take accurate preoperative planning. The normative data are also indispensable for precise determination of degree of congenital or posttraumatic facial deviations from normal[11].

Manipuri (Meitei) people are the majority ethnic group of Manipur, a northeastern state of India. They primarily settle in the central plain region of Manipur. A significant population of the Manipuri is also settled in domestic neighboring states such as Assam, Meghalaya, and Tripura. They also settled in Bangladesh and Myanmar. The Meitei people are made up of seven clans. The general feature of a Meitei looks like a mongoloid but ethnologist have observed that Meitei have great diversity and among them are found traces of Aryan race[12].

The aim of the present study was to measure the various dimensions of nose (length, width, and protrusion of nasal tip) of Bangladeshi and Manipuri medical students of both sexes and to compare these variables to find out any differences between these two races.

Methods:

The study was done in the Department of Anatomy, Rangpur Medical College, Rangpur from July 2018 to June 2019. 100 adult male and female Bangladeshi medical students of Rangpur Medical College, Rangpur and 100 adult male and female Indian Manipuri medical students of Rangpur Community Medical College and Prime Medical College, Rangpur who came from India as foreigner students in these medical colleges were the subjects of the study. Again among the Bangladeshi and Manipuri students, 50 were males and 50 were females in each group. Apparently healthy adult male and female medical students (19-25) years of age with no visible features of asymmetrical skull were selected for the study.

At first, for each subjects, soft tissue and bony landmarks was located through inspection and palpation and was marked on the cutaneous surface to increase accuracy using a black eye pencil. During landmark marking, the subject was asked to sit in a relaxed position suitable for correct identification of facial features. In the second step, all the measurement was taken with the subject sitting in the same relaxed position. The nasal measurements were taken at a fixed time between 8am to 2.30pm to eliminate the discrepancies due to diurnal variations[13]. All the physical measurements were taken by digital sliding caliper or spreading caliper and recorded in millimeter (mm).

Nose height: It is the linear vertical distance from the midpoint of the nasofrontal suture (nasion) to the junction between the lower border of the nasal septum and the cutaneous portion of the upper lip (subnasale) (Fig. 1).

Nose width: It is the linear transverse distance between the most lateral points (alares) on the nasal ala (Fig. 2).

Protrusion of nasal tip: It is the linear vertical distance from the junction between the lower border of the nasal septum and the cutaneous portion of the upper lip (subnasale) to the most protruded point of nasal tip (pronasale) (Fig. 3).



Figure 1: Procedure of measuring nasal height of Bangladeshi



Figure 2: Procedure of measuring nasal width of Bangladeshi



Figure 3: Procedure of measuring protrusion of nasal tip of Bangladeshi

Results:

Table I shows the mean ± SD of nasal height, width and protrusion of the nasal tip between Bangladeshi and Manipuri male and females. It was observed that nasal height was higher in Indian Manipuri male and female than Bangladeshi but reached a significantly higher level in male ($p<0.05$) only. Again mean ± SD of nasal width Indian Manipuri of both sexes was higher than Bangladeshi but reached a significant level in females only ($p>0.05$).

But protrusion of nasal tip was significantly higher in Bangladeshi than Indian Manipuri in both sexes. When comparison was done between male and female of Bangladeshi and Indian Manipuri groups for these three variables, it was observed that males had a significantly higher value than females in both these groups except for nasal height in Bangldeshi, where value was higher but did not vary significantly (Table II).

Table I: Comparison of height, width of nose and protrusion of nasal tip Between Bangladeshi and Indian Manipuri (n=50 in each group)

Variables	Sex	Bangladeshi	Indian Manipuri	p value
Nasal height(mm)	Male	47.72±3.45 (40.82-58.89)	49.83±3.75 (39.74-58.50)	0.004
	Female	47.10±3.05 (41.50-53.98)	47.90±3.40 (39.34-54.84)	0.219
Nasal width(mm)	Male	37.99 ±1.98 (34.30-44.72)	38.47±2.62 (30.08-45.22)	0.302
	Female	33.45±2.33 (29.29-38.95)	34.90±2.71 (28.62-44.00)	0.005
Protrusion of nasal tip (mm)	Male	16.35±2.22 (10.02-21.46)	14.79±1.93 (9.49-19.32)	0.000
	Female	14.90±1.81 (9.62-19.52)	13.98±1.97 (10.32-18.85)	0.018

Results are shown as range and mean±SDs

Comparison between Bangladeshi and Indian Manipuri was done by unpaired student's "t" test $p<0.05$ was considered as significant.

Table II: Comparison of height, width of nose and protrusion of nasal tip between male and female subjects of both group (n=50 in each group)

Variables	Name of subject	Male	Female	p value
Nasal height(mm)	Bangladeshi	47.72±3.45 (40.82-58.89)	47.10±3.05 (41.50-53.98)	0.346
	Indian Manipuri	49.83±3.75 (39.74-58.50)	47.90±3.40 (39.34-54.84)	0.009
Nasal width(mm)	Bangladeshi	37.99±1.98 (34.30-44.72)	33.45±2.33 (29.29-38.95)	0.000
	Indian Manipuri	38.47±2.62 (30.08-45.22)	34.90±2.71 (28.62-44.00)	0.000
Protrusion of nasal tip (mm)	Bangladeshi	16.35±2.22 (10.02-21.46)	14.90±1.81 (9.62-19.52)	0.001
	Indian Manipuri	14.79±1.93 (9.49-19.32)	13.98±1.97 (10.32-18.85)	0.040

Results are shown as range and mean ± SDs

Comparison between male and female of both groups was done by unpaired student's "t" test $p<0.05$ was considered as significant.

Discussion:

Anthropometric studies play an important role in distinguishing a pure race from the local mingling of races. The nose is widely acceptable as one of the best clue to racial origin. Difference in nose types is significant in categorization between races. Regional and environmental climatic conditions are useful in determining the dimensions of the nose which may vary across different races and environments.

The use of morphological facial features in personal identification still remained inconclusive. Facial identification with nasal morphometry is becoming more significant with the increase in crime rates, terrorist attacks.

Dimensions obtained in the present study about nasal parameters have a great potential to guide clinical decision, relevant in esthetic and reconstructive surgery, forensic investigation as well studying variation in humans.

Nasal height:

In present study, mean nasal height among Indian Manipuri male was significantly higher than Bangladeshi male and it was 49.83 and 47.72 mm respectively. On the other hand, mean nasal height of Indian Manipuri female was higher than Bangladeshi female and that was 47.90 and 47.10 mm respectively but these values did not vary significantly.

When comparison was done between Bangladeshi and Indian Manipuri of both sexes, mean value of nasal height of males was higher than females in both ethnic groups and reached in significant level in case of Manipuri only. Among all groups of present study, highest value of mean nasal height was found among Indian Manipuri male than others.

Nasal height of some different groups of people around the world was found during review of literature during present study by different authors are listed in Table III. It was observed that in case of male, highest value of nasal height among Iranian (62.6 mm) studied by Farkas et al[14] and lowest value among students (37.8 mm) of Uttar Pradesh, India studied by Ray et al[15]. In case of female, this value was highest among Iranian (58.5 mm) studied by Farkas et al[14] and lowest value among students (34.7 mm) of Uttar Pradesh, India studied by Ray et al[15].

Nasal width:

In present study, mean nasal width among Indian Manipuri male was higher than Bangladeshi male and it was 38.47 and 37.99 mm respectively. On the other hand, mean nasal width of Indian Manipuri female was higher than Bangladeshi female and that was 34.90 and 33.45 mm respectively.

When comparison was done between Bangladeshi and Indian Manipuri of both sexes, mean value of nasal width of males was significantly higher than females in both ethnic groups. Among all groups of present study, highest value of mean nasal width was found among Indian Manipuri male than others.

Nasal width of some different groups of people around the world was found during review of literature during present study by different authors are listed in Table III. It was observed that in case of male, highest value of nasal width among Angolan (46.3 mm) studied by Farkas et al[14] and lowest value among students (28.7 mm) of Uttar Pradesh, India studied by Ray et al[15]. In case of female, this value was highest among Angolan (40.8 mm) studied by Farkas et al[14] and lowest value among students (24.9 mm) of Uttar Pradesh, India studied by Ray et al[15].

Table III: Discussion on nasal height and width in different group of population of different part of the world

Author	Study population	No. of population	Nasal height (mm)		Nasal width (mm)	
			Male	Female	Male	Female
Farkas et al[14]	Iranian	60	62.6	58.5	35.3	32.1
Farkas et al[14]	Portuguese	60	59.5	57.8	36.6	31.9
Farkas et al[14]	Turkish	60	58.1	55.2	36.8	32.9
Farkas et al[14]	Japanese	60	56.9	53.3	38.2	37.1
Shinde et al[16]	Adult Indian	150	56.5	54.8	38.3	34.9

Author	Study population	No. of population	Nasal height (mm)		Nasal width (mm)	
			Male	Female	Male	Female
Choudhary and Chowdhary[17]	Jat, Rajasthan, India	100	56.42	-	38.42	-
Farkas et al[14]	Italian	60	56.2	52.1	32.1	29.5
Farkas et al[14]	Slovenian	60	56.2	52	35.9	33.1
Farkas et al[14]	Azerbaijan	60	55.9	52.3	35.7	33.8
Choudhary and Chowdhary[17]	Sindhi, Rajasthan, India	100	55.84	-	39.24	-
Farkas et al[14]	Greek	60	55.5	52.8	35.7	32.4
Staka et al [18]	Kosovo Albanian	204	55.26	52.01	36.90	33.12
Farkas et al[14]	Hungarian	60	55	52.5	37.3	33.5
Farkas et al[14]	Egyptian	60	54.6	47.4	32.4	29.3
Farkas et al[14]	Bulgarian	60	54	52.1	36	33
Farkas et al[14]	Czech	60	54	52.1	36.2	33.8
Shah et al[19]	Bangali, Bangladesh	100	54	-	35	-
Farkas et al[14]	Croatian	60	53.8	50	36.5	32.9
Farkas et al[14]	Singaporean Chinese	60	53.8	51.7	39.2	37.2
Farkas et al[14]	Polish	60	53.7	51.2	35.2	32.6
Farkas et al[14]	Slovak	60	53.5	49.4	33.6	30.6
Farkas et al[14]	North American White	60	53	48.9	34.7	31.4
Farkas et al[14]	Vietnamese	60	52.1	50.4	40.2	39.8
Farkas et al[14]	German	60	52	51.4	34	31
Farkas et al[14]	Afro-American	60	51.9	48.8	44.1	40.1
Farkas et al[14]	Russian	60	51.7	50.4	35.8	33.2
Ngeow and Aljunid[20]	Malay, Malaysia	100	51.6	54.1	41	37.5
Farkas et al[14]	Thai	60	51.5	49.5	40.8	40.2
Farkas et al[14]	Zulu	60	50.2	49.5	42	38
Farkas et al[14]	Angolan	60	49.8	46.6	46.3	40.8
Farkas et al[124]	Tonga	30	49.2	-	44	-
Jain et al[21]	Adult craia,India	300	48.7	46.1	26.2	24.7
Devi et al[22]	Meitei, Manipur,India	100	48.5	-	38.9	-
Chakraboty et al[23]	Bangali, Bangladesh	50	48.46	48.68	33.81	31.79
Shah et al[19]	Santhal, Bangladesh	100	48	-	38	-
Farkas et al[14]	Indian	60	47.2	43.7	37.9	33.8
Ukoha et al[24]	Students, Uli, Nigeria.	500	46.1	43	41.2	36.8
Singh and Purkait[25]	Dangi, India	200	45	43	35	33
Oladipo et al[26]	Yorubas, Nigeria	1000	42.6	44.7	38.3	37.4
Chakraboty et al[23]	Chakma, Bangladesh	50	41.34	40.57	34.70	33.15
Singh and Purkait[25]	Ahirwar, India	177	38	36	32	33
Ray et al[15]	Students, Uttar Pradesh, India	300	37.8	34.7	28.7	24.9
Mostafa et al[27]	Bangladeshi Buddhist Chakma female	100	-	43.2	-	34.8
Present study	Bangladeshi	100	47.72	47.10	37.99	33.45
	Indian Manipuri	100	49.83	47.90	38.47	34.90

Protrusion of nasal tip:

In present study, mean value of protrusion of nasal tip among Bangladeshi male was significantly higher than Indian Manipuri male and it was 16.35 and 14.79 mm respectively. On the other hand, mean value was significantly higher than Indian Manipuri female and that was 14.90 and 13.98 mm respectively.

When comparison was done between Bangladeshi and Indian Manipuri of both sexes, mean value of protrusion of nasal tip of males was significantly higher than females in both ethnic groups. Among all groups of present study, highest value of mean protrusion of nasal tip was found among Bangladeshi male than others.

Protrusion of nasal tip of some different groups of people around the world was found during review of literature during present study by different authors are listed in Table IV. It was observed that in case of male, highest value of protrusion of nasal tip among adult Indian (18.7 mm) studied by Shinde et al[16] and lowest value among Chakma of Bangladesh (14.48 mm) studied by Chakraboty et al[23]. In case of female, this value was highest among adult Indian (18.5 mm) studied by Shinde et al[16] and lowest value among Indian Manipuri (13.98 mm) in present study.

Table IV: Discussion on protrusion of nasal tip in different group of population of different part of the world

Author	Study population	No. of population	Protrusion of nasal tip (mm)	
			Male	Female
Shinde et al[16]	Adult Indian	150	18.7	18.5
Ukoha et al[24]	students, Uli, Nigeria	500	18.6	17.2
Ngeow and Aljunid[20]	Malay, Malaysia	100	18.1	17.5
Chakraboty et al[23]	Bangali, Bangladesh	50	16.77	16.58
Chakraboty et al[23]	Chakma, Bangladesh	50	14.48	14.38
Present study	Bangladeshi	100	16.35	14.90
	Indian Manipuri	100	14.79	13.98

The table is arranged according to the mean value of protrusion of nasal tip of male from different authors are arranged from higher to lower

Conclusion:

Among the nasal measurements, nasal height was significantly higher in Indian Manipuri males and nasal width was significantly higher in Indian Manipuri females. But protrusion of nasal tip was significantly higher in Bangladeshi than Indian Manipuri in both sexes. Again male values were significantly higher than females in both ethnic groups except nasal height in Bangladeshi did not vary significantly.

References:

1. Jahanshahi M, Golalipour MJ, Heidari K. 'The effect of ethinicity on facial anthropometry in Northern Iran', Singapore Med J, 2008; 49(11): 940-943.
2. Vegter F, Hage JJ. Clinical anthropometry and canons of the face in historical perspective. PlastReconstrSurg 2000; 106:1090-6.
3. Kanan UG, Achleshwar G, Apurva D. 'Morphometric variation I nose types of Gujrati population', Asian J Med Res, 2012; 1:118-20.
4. Rajakshmi CH, Singh MS, Devi HB, Chandmani SL. Cephalic index of fetuses of Manipuri populations- A baseline study. J AnatSoc India 2001; 50:119-120.
5. Oladipo GS, Olabiyi AO, Oremosu AA, Noronha CC. 'Nasal indices among major ethnic groups in Southern Nigeria', Sci Res Essays, 2007; 2: 20-2.
6. Krishan K. Estimation of stature from cephalo-facial anthropometry In north Indian population. Foren.Sci. Inter.2008; 181(1-3):52e1-52e6.
7. Olotu JE, Eroje A, Oladipo GS, Ezon-Ebidor E. Anthropometric study of facial and nasal length of adult Igbo ethnic group in Nigeria. The Inter. J Biol. Anthrol. 2009; 2(2).
8. Iida N, Ogwa T, Tsutsumi K, Tonegawa M, Yokaro K. An examination of external nose reconstruction methods used in our department. Jpn J PlastTeconstrSurg 2002; 45:35-42.
9. Hotchman B, Casticho HT, Ferreira LM. Photographic and morphometric standardization in the compeuterized photogrammetry of the nose. Acta Cir Bras 2002; 17:258-66.

10. Harzika P, Nayak DR, Balakrishna R. The Textbook for Ear, Nose, Throat and Head & Neck Surgery. 1st ed. Darya Ganj, New Delhi: CBS publishers and Distributors; 2007. p-249-50.
11. Abdelmonem AH. Anthropometric study of nasal index in Egyptia. International Journal of Anatomy and Research 2014; 2(4):761-767.
12. 'Meitei people'. Wikipedia, wiki article, viewed 6 March 2019.http:// en.m.wikipedia.org.
13. Mostofa A, Banu LA, Rahman F, Paul S. 'Craniofacial anthropometric profile of adult Bangladeshi Buddhist chakma female', Journal of Anthropology, 2013; 1-17.
14. Farkas LG, Katic MJ, Forrest CR. 'International anthropometric study of facial morphology in various ethnic groups/races', The Journal of Craniofacial Surgery, 2005; 16: 615-646.
15. Ray SK, Saha K, Kumar A, Banjare S. 'Anthropometric study of nasal index among the population of Western Uttar Pradesh region', International Journal Of Scientific Study, 2016; 4(2): 65-70.
16. Shinde SA, Sable RB, Patil AS. 'Craniofacial Anthropometric measurements of Adult Indians in Angles Class I Malocclusion', International Journal of orthodontic Rehabilitation, 2016; 7(4):130-4.
17. Choudhary A, Chowdhary DS. 'Comparative anthropometric study of nasal parameters between two ethnic groups of Rajasthan State', International Journal of Medical and Public Health, 2012; 2(2): 46-48.
18. Staka G, Dragidella F, Disha M. 'Anthropometric Study of Nasal Index of The Kosovo Albenian Population', Antrocom Online Journal of Anthropology, 2012; 8(2): 457-462.
19. Shah MRI, Anwar S, Mondal DK, Yesmin S, Ahmed S. 'Anthropometry of The Nose: a comparative Study between Adult Male Santhals and Bengalis in Bangladesh', Mediscope, 2015; 2(2):28-32.
20. Ngeow C, Aljunid ST. 'Craniofacial anthropometric norms of Malays', Singapore Med J, 2009; 50: 525-528.
21. Jain D, Jasuja OP, Nath S. 'An Assessment of Sex Using Craniofacial Measurement of Human Crania by Discriminant Function Analysis', Rom J Leg Med, 2016; 24: 294-299.
22. Devi TB, Singh SJ, Tamang BK, Singh TN. 'Inter-Generational variation of nasal morphology of Meitei males of Manipur, India', International Journal of Medical Research Professionals, 2017; 3 (3): 59-64.
23. Chakraboty R, Bhattacharjee PK, Mostafa A, hoque R, Biswas RSR, Begum M. 'Study of Nasal parameters Between Bengali and Chakma School Going Children of Bangladesh', ChattagramMaa-o-Shishu Hospital Medical College Journal,2017; 16: 33-36.
24. Ukoha U, Egwu OA, Ndukwe GU, Akudu LS, Umeasalugo KE. 'Anthropometric Study of the Nose in a Student Population', Annals of Bioanthropology, 2016; 4(1):8-11.
25. Singh P, Purkait R. 'A cephalometric study among sub caste groups Dangi and Ahirwar of Khurai Block of Madhya Pradesh', Anthropologist, 2006; 8(3):215-7.
26. Oladipo G, Fawehinmi H, Suleiman Y. 'The Study of Nasal Parameters (nasal Height, Nasal Width, Nasal Index) among The Yorubas of Nigeria', The International Journal of Biological Anthropology, 2008; 3(2):1-5.
27. Mostofa A, Banu LA, Rahman F, Paul S. 'Craniofacial anthropometric profile of adult Bangladeshi buddhist chakma female', Journal of Anthropology, 2013; 1-17.