

Role of Nasal parameters in gender determination among medical students

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ABSTRACT

Introduction: Anthropometric measurement of the nose has a great importance to differentiate gender, race, and ethnicity. Nasal index is an important parameter in forensic sciences and rhinoplasty surgery. Our aim is to compare the nasal index of both males and females and its role to identify gender differences among medical students. **Methods:** First and second year medical students were chosen and height, breadth and nasal index were calculated. The height and width of the nose was measured using a vernier caliper. The nasal index of both males and females were calculated and compared and based on this, the nasal shape was also determined. **Results:** Among 184 total participants, 114 (61.9%) were Nepalese and 70 (38.1%) were Indian. In the Nepalese cohort, mean nasal height for male students was 4.58 ± 0.37 cm which was higher than females (4.39 ± 0.34 cm). The mean nasal index was higher among males in students of both the countries. The mesorrhine was most common type of morphology found among all students. **Conclusions:** Nasal index of male medical students was significantly higher than females. Mesorrhine nose was the commonest type of nose in our study. This information may be used to estimate gender differences.

Keywords: Mesorrhine, nasal breadth, nasal height, nasal index.

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INTRODUCTION

The nose is a piriform aperture on the face having roots and a tip or base.¹ Root is continuous above with the forehead. The dorsum of nose is the part between the root and the tip. Ala of the nose is the lower flared part on the side of nose. It is one of the most prominent parts of the face which comprises of bony and cartilaginous portions. The bony part is formed by nasal bone, frontal bone and maxilla. The cartilaginous part is mainly formed by septal, major alar, lateral cartilage, and a few minor cartilages.²

Different parameters are measurable in the nose like nasal height, breadth, nasofrontal angle, nasofacial angle, nasolabial angle, etc. These parameters vary with respect to gender, race, ethnicity and environmental factors. The nasal index is a regional and racial-sensitive anthropometric index.³ Facial anthropometry plays an important role in forensic investigation, especially in the examination of facial skeleton.⁴ On the basis of nasal index, the nose can be categorized into three types: leptorrhine (long and narrow nose), mesorrhine (medium), and platyrrhine (broad nose).^{5,6}

Nasal parameters are also important for aesthetic and reconstructive surgery and genetic counseling in different sexes. Such study is crucial not only for identifying gender but also for facial cosmetics or rhinoplasty surgeons.⁷ This study aims to measure and compare

the nasal index and shape of nose among male and female medical students of Manipal College of Medical Sciences (MCOMS), Pokhara, Nepal.

METHODS

The study was conducted at Manipal College of Medical Science, Pokhara, Nepal from January 2020 to July 2021. This study was approved by the Institutional ethical committee (Ref No.: MEMG/IRC/298/GA). First and second year students of the Bachelor of Medicine and Bachelor of Surgery (MBBS) program at MCOMS with normal noses without any visible deformity were included in this study. The sample size was calculated by $n = Z\alpha^2\sigma^2 / e^2$ [Z= 1.96 which is the value at 95% confidence interval, e = 0.5 (absolute error), $\sigma = 3.24$ (standard deviation), n= size of the sample which came to be 162, and keeping a non-response rate of 10%, the final sample size was 178]. Students who didn't want to take part in the study and those who had undergone any reconstructive surgery were excluded. Out of a total of 200 students, 184 students' nasal height and width were measured. Informed consent was taken from each student.

Nasal height and width were measured by vernier caliper. The distance of the widest extension of the nose from one side of ala to the other side was taken as the nasal breadth. The nasal height was measured from the root of nose to the subnasale (nasolabial junction) at the lower border of the nasal bone anterior to the nasal spine, perpendicular to the nasal width. The nasal index was calculated by dividing nasal width and nasal height, multiplied by 100. Based on the nasal index, the nose shape was classified into following five types:

1. Hyperleptorrhine (≤ 54.9): very long and narrow nose
2. Leptorrhine (55 to 69.9): long and narrow nose
3. Mesorrhine (70 to 84.9): moderate nose
4. Plastyrrhine (85 to 99.9): broad nose
5. Hyperplatyrrhine (>100): very broad nose

All data was entered in excel sheet and analyzed using Statistical Package for Social Sciences version 26.0. Mean and standard deviation was calculated using frequency statistics. The difference in the mean of the nasal height, nasal breadth, and nasal index in gender was analyzed by using Z-test and was considered significant at P value < 0.05.

RESULTS

Out of total 184 students, 61.9% (n=114) were Nepalese

and 38.1% (n=70) were Indian. The mean age of Nepalese male and female students were 18.4 ± 0.78 and 18.34 ± 0.86 years respectively. The mean nasal height for Nepalese male students was 4.58 ± 0.37 cm which was significantly higher than Nepalese female students (P= 0.007). Overall, the mean nasal index was higher among males as compared to female students (Table 1). The most common type of nose was mesorrhine among both males and females followed by platyrrhine (Table 2).

Table 1: Nasal parameters of medical students

Variable	No. of students	Mean \pm SD	P value
Age in years	Male (Nepalese)	65	18.4 \pm 0.78
	Female (Nepalese)	49	18.34 \pm 0.86
	Male (Indian)	21	18.19 \pm 0.74
	Female (Indian)	49	18.3 \pm 0.81
Nasal height(cm)	Male (Nepalese)	65	4.58 \pm 0.37
	Female (Nepalese)	49	4.39 \pm 0.34
	Male (Indian)	21	4.57 \pm 0.35
	Female (Indian)	49	4.38 \pm 0.4
Nasal breadth (cm)	Male (Nepalese)	65	3.71 \pm 0.22
	Female (Nepalese)	49	3.32 \pm 0.22
	Male (Indian)	21	3.65 \pm 0.27
	Female (Indian)	49	3.31 \pm 0.28
Nasal index	Male (Nepalese)	65	81.54 \pm 8.55
	Female (Nepalese)	49	75.95 \pm 7.89
	Male (Indian)	21	80.3 \pm 8.24
	Female (Indian)	49	76.32 \pm 9.74

Table 2: Morphological classification of nasal index among the study participants

Variables	Type of Morphology					Total
	Hyperleptorrhine (40-54.5)	Leptorrhine (55-69.9)	Mesorrhine (70-84.9)	Platyrrhine (85-99)	Hyperplatyrrhine (>100)	
Indian male	0	3 (14.28%)	11 (52.3%)	7 (33.3%)	0	21
Indian female	1 (2.1%)	11 (22.4%)	30 (61.2%)	7 (14.2%)	0	49
Nepalese male	0	3 (4.61%)	44 (67.65%)	15 (23%)	3 (4.61%)	65
Nepalese female	0	11 (22.4%)	31 (63.2%)	7 (14.2%)	0	49
Total	1	28	116	36	3	184

DISCUSSION

The shape of nose is one of the beauties of human face. It helps not only in the determination of age and sex but also ethnicity and race of a population.⁸ This anthropometric measurement is helpful in plastic and reconstructive surgery, forensic anthropology, and scientific research. The result of this study showed a higher nasal height and breadth among males compared to female Nepalese and Indian medical students.

The nasal index in our study was found to be 81.54 ± 8.55 and 75.95 ± 7.89 in Nepalese male and female medical

students respectively. It was comparable among students from both Nepal and India. However, male had higher nasal index compared to females. In the study by Omotoso et al,⁶ it was 90.25 ± 2.55 in males and 88.64 ± 2.77 female in the Nigerian population which is comparatively higher than in our study and shows significant differences among sexes. The nasal index in the Egyptian population had a significantly lower nasal index compared to our study which was 71.46 in the male and 64.56 in the female.⁹ The nasal index of males and females of the Gwalior region in India was 80.59 and 77.29 respectively, which is comparable to our study.¹⁰ It is important to know that each race has its own nasal index, which usually is higher among males compared to females. Nigerian population have more nasal breadth- 4.25 cm in males and 3.88 cm in females which is higher compared to our medical students.⁵ It shows that Nigerians have boarder noses compared to our study population.

We found that the mesorrhine type of nose was most common in males 44 (67.6%) and female 31 (63.2%) Nepalese students. This was followed by platyrrhine in males (23%) and leptorrhine in females (22.4%). Our Indian students had similar findings. Sadhvi et al.³ found that the most common type of nose was platyrrhine (65.85%) in males and mesorrhine (51%) followed by platyrrhine (46.1%) in females. Chaudary et al.¹¹ studied among 100 each of Jats and Sindhis group of male and found that leptorrhine type of nose was common among Jats and mesorrhine type of nose among Sindhis population. The study from Nigeria showed that platyrrhine was the commonest type in both sexes.¹² However, Gujaratis have mesorrhine nose with mean nasal index of males and females being 81 and 79 respectively.¹³ The Iranian university students had leptorrhine nose as the commonest type with reported nasal indices in men and women 68.9 ± 8.1 and 66.05 ± 7.5 respectively and there was a statistically significant difference between two sexes.¹⁴ The limitation of our study was that only medical students were enrolled in this study. It is suggested that further studies compare nasal index among the different ethnic groups with larger sample sizes.

CONCLUSIONS

From our observation, the nasal index of males was comparatively higher than in females among Nepalese and Indian medical students. Mesorrhine type of nose was commonest among both sexes.

CONFLICT OF INTEREST: None declared.

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