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ORIGINAL ARTICLE

Morphometric Analysis and Degree of Satisfaction of Nasal Profiles in Young Medical Students in Northern India

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ABSTRACT

Background: The nose is the most prominent feature on the face, giving it an exaggerated importance than other facial features. Many people have some complaints about the shapes of their noses. There is increasing interest in cosmetic rhinoplasty in recent times, but reports of anthropometric measurements of the Indian population are limited.

Aims: The objective of this survey was to provide anthropometric data for reconstructive and cosmetic surgery, and medical esthetics.

Materials and methods: A random sample of medical students of both the sexes between the ages of 18 and 25 years from our medical college was obtained for this study. We measured the nasal height, nasal width, and anatomical nasal index. We also inquired about the degree of satisfaction and, in case of dissatisfaction, what an individual wants with his/her nose. The data were analyzed statistically.

Results: Nasal indices were leptorrhine type and showed sexual dimorphism (female *vs* male: 60.44 *vs* 67.79). Most of the individuals were satisfied with their nose. Those unsatisfied had larger nasal indices and wanted smaller noses.

Conclusion: This study can help in understanding the need of those who want a more "shapely" nose and can contribute to satisfactory results of cosmetic and reconstructive nasal surgery, anthropology, and forensic medicine.

Keywords: Anthropometry, Leptorrhine, Nasal shapes.

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INTRODUCTION

The nose is the most prominent feature on the face, giving it an exaggerated prominence and thus greater importance than any other facial features. More people have some complaints about the shape of their nose. Some feel like their nose are too big, too wide, or too flat, or have distractingly pronounced bump on the bridge. The proportions of the so-called ideal nasal shapes and the operations designed to achieve this have been the subjects of numerous studies. The size, shape, and proportion of the measurement of the nose provide a visual basis suggesting the character of a person.[1,2] In recent times, as there is increased awareness about a person's looks, cosmetic rhinoplasty has become a field of interest, and research is ongoing to redefine beauty.[3] Being aware of the morphologic differences in the nasal anatomy between men and women during the cosmetic rhinoplasty is essential because feminization of a male nose is not a very rare complication. Although there is no difference in the techniques of male and female rhinoplasty, the anthropometric differences should be considered.

Anthropometry is the study of the measurements of the human body. By tradition, this has been carried by taking measurements from body surface landmarks, such as circumference, length, and breadth, using simple instruments.[2,3] Anthropologists developed racial classification based on skull shape and other observable craniofacial skeletal differences, such as the breadth of nasal aperture, nasal root height, head shape, sagittal crest appearance, jaw thickness, brow ridge size, forehead slope, etc. In a holistic anthropological approach, other observable physical characteristics that can be used include nasal shape, eye color, skin color, lip shape, and hair type.

Ochi and Ohashi[4] found nasal index to be useful clinically in nasal surgery and medical management. Daniel[5] postulated that the measurement of nose can also help reveal the course of evolution leading to the modern varieties of human beings. Fransiscus and Long[6] found nasal index to be useful in determining the race and sex of an individual or a group with unknown identity. The shape of the nose is influenced by environmental climatic conditions.[7] Narrower noses are favored in cold and dry climates, whereas broader noses in warmer, moister ones as a consequences of natural selection of human evolution.[8]

To simplify the statistical analyses, numerical classification has been given to the categories of each of the

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nose features (metrical and morphological). The classification of nasal index in general use is as follows[9]:

- Leptorrhine (fine nose) – If the nasal index is less than 70,
- Mesorrhine – If it is between 70 to 85, and
- Platyrrhine (broad nose) – If it is more than 85.

Another classification of nasal index is as follows[10]:

- Narrow – When nasal index is less than 54.9,
- Intermediate – When nasal index is between 55 and 99.9, and
- Wide – When it is more than 100.

However, studies on nasal anthropometry have been less extensively carried out in India, and there is no nasal anthropometric data from the northern region. In this study, we measured anthropometric parameters of the external nose and classified shapes of the nose. These data can provide useful insights for the fields of cosmetic and reconstructive nasal surgery, anthropology, and forensic medicine.[3]

MATERIALS AND METHODS

The objective of this morphometric study was to evaluate the nasal shapes in both sexes and to provide data for anthropometry and forensic medicine, medical esthetics, and cosmetology. This study could provide credible and objective reference material to the surgeon for the external nasal soft tissue evaluation and planning of the cosmetic nasal surgery and preoperative and postoperative evaluations of secondary rhinoplasty in nasal deformity associated with cleft lip and palate.[11] A random sample of medical students between the ages of 18 and 25 years from SRMS Institute of Medical Sciences, Bareilly was obtained for this study. Anthropometric data were obtained using standard anthropometric methods with a digital sliding Vernier's calliper at a precision level of 0.1 mm. The measurements were taken under the guidelines given by Farkas et al.[12]

The landmarks of the measurement points were as follows:

- Nasion (n), the point in the midline of both the nasal root and the nasofrontal suture;
- Subnasale (sn), the midpoint of the columella base;
- Pronasale (prn), the most prominent point on the nasal tip; and
- Alar curvature (ac), the most lateral point in the curved baseline of each ala.

In the investigation presented here, the following parameters were measured and noted:

- Nasal height (n-sn): From soft tissue nasion to subnasale (Fig. 1).
- Nasal width (acr-acr): From right to left nasal alae (Fig. 2).
- Anatomical nasal index (acr-acr/n-sn): The ratio of nose width to nose height multiplied by 100.

Subjects were told to sit upright in relaxed mood with the head in anatomical position to maintain Frankfurt horizontal line (line joining the infraorbital margin to the external acoustic meatus) while taking measurements. Surface landmarks were noted on the face before taking standard anthropometric measurements. The digital sliding Vernier's calliper was used in the measurement of nasal height and width. Nasal height was measured by placing the upper fixed divider arm of the Vernier's calliper on the nasion of the nose superiorly and then the lower moveable divider arm on the subnasale. The readings were recorded from the digital screen of the callipers. The nasal breadth was measured at right angle to the nasal height from ala to ala. The measuring techniques followed internationally accepted standards in anthropometry and were taken to the nearest 0.01 cm. The nasal index was calculated as the ratio of nasal width

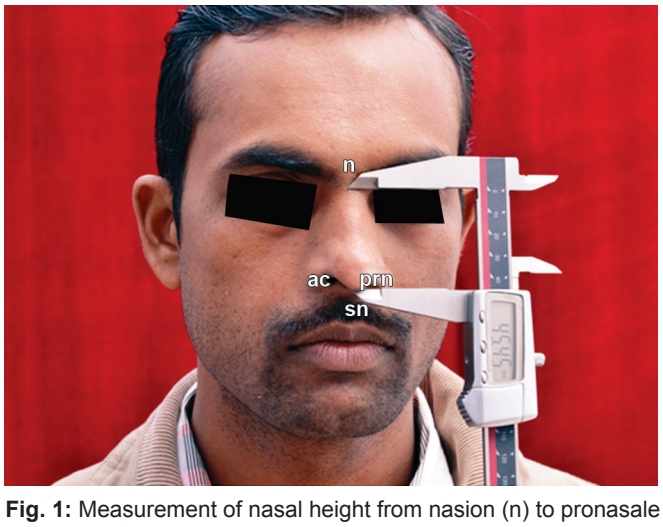

Fig. 1: Measurement of nasal height from nasion (n) to pronasale (sn); prn: Prominent point on nasal tip; ac: Alar curvature

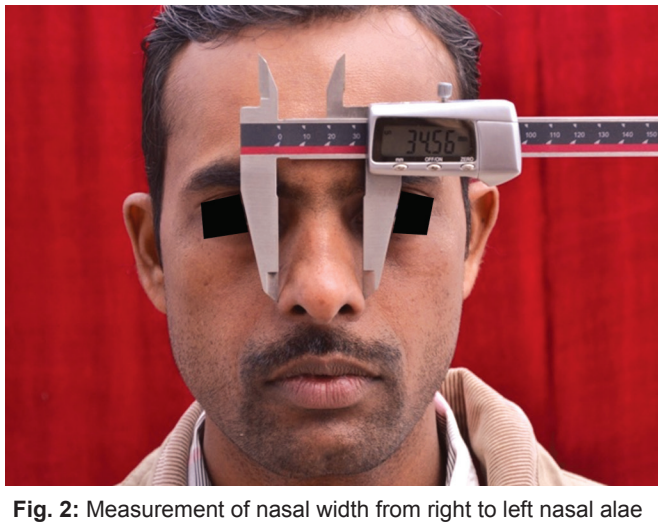

Fig. 2: Measurement of nasal width from right to left nasal alae

to nasal height multiplied by 100. It was ensured that the calliper was placed properly and accurate readings were taken. It was also ensured that each subject did not smile or change facial expression while taking measurements in order to get accurate value. Nasal indices of males and females as well as their level of satisfaction were compared.

The data obtained were subjected to statistical analysis. Values were expressed as mean T standard deviation. A p-value less than 0.05 was considered significant.

RESULTS

In our study, we included 100 medical students aged between 18 and 25 years. There were 46 males and 54 females. They all belonged to affluent social class.

The mean nasal height was 47.95 mm (24.07–68.21). The mean nasal width was 30.59 mm (24.13–43.57). The mean nasal index was 63.82 (44.631–88.31). The most common type of nose in the studied population was leptorrhine (fine nose) (n = 77). Only one person had platyrrhine (broad) nose (Table 1).

The mean nasal height of male medical students was 48.86 mm (33.0–68.21) while the mean nasal width of male medical students was 33.01 mm (25.2–43.57). The mean nasal height of females was 47.17 mm (24.07–58.38) and the mean nasal width was 30.59 mm (24.13–34.65). Most students fell under the category of leptorrhine (fine nose). Male medical students had higher mean nasal index than females; thus, nasal indices showed significant sexual dimorphism (female *vs* male, 60.44 *vs* 67.79; p = 0.0004).

Most of the individuals were satisfied with their noses. Those unsatisfied had significantly larger nasal indices (71.21 *vs* 63.82; p < 0.0001) and wanted smaller noses (Table 2).

Thus, the study sample had leptorrhine nose type and also showed sexual dimorphism. Males had a higher nasal index than the females in all ethnic groups. Morphometric parameters were dependent on age, race, and sex, so leptorrhine nose could be typical to Indians. A parameter value for each ethnic group is needed for the purpose of clinical practice.

DISCUSSION

The study population comprised of 100 students of a medical college of Uttar Pradesh, and these students were from the northern part of India, i.e., from a particular geographical region. The present study was done to measure various parameters of nose and indices to provide reference data for anthropometry and cosmetic surgery.

In the present study, the mean nasal length was 47.95 ± 6.36 mm. Heidari et al[3] reported that the mean nasal length in the Sistani and Baluch group of Iran was 46.5 ± 1.8 and 53.0 ± 1.3 mm respectively. In the Sistani group, the mean nose length was similar to that in our study. The mean nose lengths in Chinese, Caucasian, Afro-American, Northern Italian, and Afro-Indian were 53.50, 53.00, 52.4, 54.33, and 54.7 mm respectively.[3-13] Thus, the nose in our study was shorter than in the above-mentioned ethnic groups but longer than that of the Jingpo of China.[3]

The mean nose width in our study was 30.59 ± 5.61 mm, and it was similar to the findings of Khanderar et al[14] (30.5 ± 0.8 mm). These values are less than those of Sistani and Baluch groups (32.3 ± 1.3 and 31.4 ± 1.5 mm), and Canadian-Caucasian (35.0 mm), white northern Italians (35.31 ± 2.57 mm), but greater than Turkish (23.14 mm).[3]

The nasal index of the studied population was 63.82; therefore, the type of nose in the studied population was leptorrhine. Ngeow and Aljunid[15] reported that Malaysian Indian females have a nose that is narrow or leptorrhine similar to our findings. Heidari et al[3] reported that the nasal index in Sistani and Baluch groups of Iran were 69.7 ± 3.5 and 59.2 ± 3.3 respectively. The nasal indices are lower than that of the Jingpo people of China (74.93), Afro-American (83.8 ± 11.9), Sudroid (100), and Caucasian (65.8) and higher than that of young Turkish (59.40 ± 6.44).[3]

The mean nasal length of males was 48.86 ± 5.49 mm and the mean nasal width was 33.01 ± 4.65 mm. The mean nasal length of females was 47.17 ± 6.97 mm and the mean nasal width was 28.54 ± 5.57 mm. Therefore, males have high nasal index as compared with females (67.79 ± 9.02 *vs* 60.44 ± 11.09; p = 0.0004). The most common type of nose in both males and females is leptorrhine. Khanderar et al[14] reported that nasal width is more among Indian males compared to Indian females in all the age groups, which is similar to our findings. Singh and Purkait[16] found that in males and females of the Dangis subcaste in Madhya Pradesh, the nasal height and width are 46 and 35 mm and 43 and 33 mm respectively, and in males and females of the Ahirwar subcaste, the nasal height and width are 43 and 34 mm and 41 and 34 mm respectively. This also matches our finding that in females, measurement is less as compared with males. Ngeow and Aljunid[15] found that males in general have a significantly higher measurement than females. Therefore, nasal indices show sexual dimorphism (p = 0.0004). Singh and Purkait[16] found that in Dangis population, the nasal index is 76.5 in both males and females and 81 in males and 82.4 in females of the Ahirwar population of Madhya Pradesh. Therefore, Ahirwar population shows sexual dimorphism.

Most of the individuals (n = 67) were satisfied with their nose. Those persons (n = 33) who were unsatisfied with their nose have significantly high nasal width (35 *vs* 28.43 mm) and high nasal indices (71.21 *vs* 63.82) and want smaller noses (p = 0.0001).

Table 1: Nasal height, nasal width, and nasal indices of male and female medical students

Parameters	*Male (n = 46)*	*Female (n = 54)*	*Total (n = 100)*
Nasal height (mm)	Mean – 48.86	47.17	47.95
	Range – 33.0–68.21	24.07–58.38	24.07–68.21
	(SD = 5.49)	(SD = 6.98)	(SD = 6.36)
Nasal width (mm)	33.01	28.54	30.59
	25.2–43.57	24.13–34.65	24.13–43.57
	(SD = 4.66)	(SD = 5.57)	(SD = 5.61)
Nasal index	67.79	60.44	63.82
	45.405–88.31	44.631–81.00	44.631–81.00
	(SD = 9.03)	(SD = 11.09)	(SD = 10.79)

SD: Standard deviation

Table 2: Nasal height, nasal width, and nasal index according to satisfaction with the nose

Parameters	*Satisfied (n = 67)*	*Unsatisfied (n = 33)*	*Total (n = 100)*
Nasal height (mm)	47.17	49.54	47.95
	(SD = 6.59)	(SD = 5.64)	(SD = 6.36)
Nasal width (mm)	28.43	35.00	30.59
	(SD = 5.32)	(SD = 3.06)	(SD = 5.61)
Nasal index	60.18	71.21	63.82
	(SD = 10.24)	(SD = 7.76)	(SD = 10.79)

SD: Standard deviation

A few students who were suffering from obvious nasal deformities (n = 3) or who underwent nasal surgery recently (n = 2) were excluded from the study.

Our study population comprised young and educated medical students belonging to affluent class; they were more conscious about their appearance and those unsatisfied with their nose may opt for corrective surgeries. This study could provide credible and objective reference materials for surgeons for external nasal soft tissue evaluation and planning of cosmetic nasal surgery. Besides, these results could be a useful guidance for preoperative and postoperative evaluations of secondary rhinoplasty in nasal deformity associated with cleft lip and palate.[11]

CONCLUSION

We conclude from our study that nasal indices show sexual dimorphism because the averages for males are larger than the averages for females. Most of the individuals were satisfied with their nose. Those persons who were unsatisfied with their nose had high nasal indices and wanted smaller noses. This study could provide credible and objective reference material for ear, nose and throat, plastic, and maxillofacial surgeons for external nasal soft tissue evaluation and planning of the cosmetic nasal or nasofacial surgery.

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