Original Research Article

"Geography of the Nose an Anthropometry Study"

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Abstract

Background: The nasal index determination is one of the most commonly used anthropometric parameters in classifying human races. *Aim:* The objective of this study was to determine the normal parameters of the external nose (Nasal height, width and nasal index) in the south Indian population. *Subjects and Methods*: The study was conducted randomly on healthy subjects of both sexes. Nasal height and width were measured using a vernier caliper. Then, the nasal index was determined for each subject. The obtained data were subjected to statistical analysis (SPSS Version 21). *Results*: A total of 143 subjects, 73 males and 70 females, aged 18-23 years, were enrolled in the study. The study showed the existence of sexual dimorphism in nasal morphology, appearing after the age of 20 years. The mean nasal index in the investigated adults was 42.1 ± 8.4 in males, and females were 31.7 ± 3.8, respectively. The dominant nasal type was Leptorrhine in male 46.5% (n=34) and female was Mesorrhine 41.4 % (n=29) respectively. *Conclusion:* This study can help in understanding the need for those who want a more "shapely" nose. Forensic medicine, Genetic counseling, Anthropological research, Cosmetic, reconstructive surgery, Orthodontics, and specific manufacturing industries, benefit from age- and gender-based data of the study.
Keywords: Anthropometry, Anatomy, Nasal breadth, Nasal height, Nasal index, Sexual dimorphism, Nasal type.

INTRODUCTION

Beauty is the harmony and proportion of elements. A proportionate and beautiful nose adds to the beauty of the face. The nose, with its central position in the front, outlined by the sharp contours of the forehead, cheeks, and jaws, is widely believed to influence the observer's visual impression of the face decisively [1].

When people get older, the nasal skin will become thinner, and the cartilage framework can be seen; also, the tip of the nose relatively drops [2].

The nose is one of the essential structures in the face that has both bones and cartilages and performs major functions [3].The nose is the most prominent feature on the face, giving it exaggerated importance than other facial features [4].

Many people have some complaints about the shapes of their noses. There is an increasing interest in cosmetic Rhinoplasty in recent times, but reports of anthropometric measurements of the Indian population are limited [5].

There are various categories of the nose based on nasal height, nasal breadth, and nasal index. The nasal index is an ethnicity sensitive anthropometric index. It is for suggesting the race and sex of an individual whose identity is unknown. It also exhibits sexual differences. The importance of nasal morphometric parameters recognized in Forensic Science, Dentistry, Surgical, and Medical management [6, 7].

Anthropometry is the inexpensive and non-invasive hallmark technique that deals with the study of body proportion and absolute dimensions that vary widely with age and sex within and between racial groups [8].

This study aimed to provide baseline data of the nasal index of the south Indian population and to classify their nose type and the comparison of the data with other studies.

SUBJECTS AND METHODS
Objective
To evaluate the nasal shapes in both sexes and to provide data for anthropometry

Study Design
The study was descriptive and cross-sectional with some analytical components.

Subjects
The study group consisted of 143 dental students, 73 Males, and 70 Females within the age group of 18–25.

The main reason for the selection of adults as the study group was because the morphology of the human body is not stable during the earlier years of life and gets stable overtime only during adulthood.

Based on the study of Mehta N. *et al*. sample size was calculated using a formula; [9]

$$n = Z^2 x SD^2 / e^2$$
$$= (1.96)^2 x (0.3)^2 / (0.05)^2$$
$$= 138.29$$
Where,
n = required sample size
Z = 1.96 at 95 % confidence interval
SD = standard deviation (0.3)
e = margin of error (5%)

Standard deviation mentioned was 0.3 according to educated guess following which sample size derived was 138.29. Altogether, 143 students were enrolled in the study by convenient sampling method.

Inclusive criteria
a. No craniofacial abnormalities.

Exclusive criteria
a. History of any congenital abnormalities of face or nose.
b. Craniofacial a previous surgery.
c. Trauma of the nose.

The anthropometric landmarks were identified on the subjects with careful inspection and then marked on the face with black liquid eyeliner.

Land Marks. (table.1)
a. Midline landmarks: n, nasion; sn, subnasale.
b. Paired landmark: al, alare.

Position of the subjects
Subjects asked to sit in an upright relaxed position "natural and normal" erect posture of the head (Frankfurt's Plane) and shoulders, with both arms hanging free beside the trunk for the linear measurements of the face [10]. The measurements were done up to 0.5 degrees and 0.5 mm accuracy on the subjects with maximum care and comfort.

The instrument used in the study was a Digital Vernier Caliper (manual) following the standard method described by Martin and Saller with accuracy of 0.01 mm by using Neiko 01407A stainless steel digital caliper with extra-large LCD (liquid crystal display) screen and instant SAE-metric (Society of Automotive Engineers) conversion, New York, USA.

The measurements taken were in millimeters. Following three relevant nasal surface landmarks were identified on the subjects with careful inspection and then marked on the nose with a black marker.

Every measurement was obtained thrice by the same observer. A third reading was taken if the initial two analyses showed a large discrepancy, and the two closer readings were used.

Digital vernier caliper was as chosen as they were economical and convenient. The principal investigator took all the measurements.

Nose linear distances (unit: mm) (Table.1)
a. Nasal width (al–al).
b. Height of the nose (n–sn).

Nose ratios (unit: mm) (Table.1)
a. The ratio of vertical to horizontal measurement.
b. Nasal index (al-al/n-sn).

Consent of the volunteers was taken after explaining them the process of measurement.

STATISTICAL ANALYSIS
The data obtained were analyzed statistically. Basic descriptive statistics and was done to find the mean and standard deviation of nasal width, nasal height, and nasal index within the study participants.

An independent sample t-test was carried out by computerized statistical analysis software— Statistical Package for Social Sciences (SPSS-21) and Microsoft Excel Windows 2007. The P-value of less than 0.05 was considered statistically significant.

OBSERVATIONS AND RESULTS
The results consisting of the statistical analysis concerning the measurement of nasal variables such as nasal width, nasal heights as well as NI (Nasal Index) of males and females are shown in Tables 2–5.

In this study, 73 males (48.6 %) and 70 females (46.6 %) were evaluated for the NI. The descriptive analysis of the data was shown in Table 2.

There was a significant difference in the nasal width (P = 0.0001), height (P = 0.0001) and NI (P = 0.0001) of sex groups as shown in Table 3. The mean age of 17-23 years (21.7 ± 2.1) (Table 2)

The mean nasal height and nasal width for all the subjects were found to be 42.1 ± 8.4 mm in males and 31.7 ± 3.8 mm in females(Table 3).

Mean nasal height observed in males and females groups was 49.7 ± 2.6 mm and 48.1 ± 3.4 mm, respectively (Table 3). Mean Nasal width observed was 34.1 ± 5.3 mm in males and 31.7 ± 3.8 mm in females (Table 3).

The commonest nasal type in male group was Leptorrhine 46.5 %(n=34) followed by mesorrhine (n=26) 18.1% (Table 4). The most characteristic nasal type in the female group was Mesorrhine 41.4 %(n=29), followed by Leptorrhine 25.7% (n=18) (Table 4).

The unpaired t-test value was 9.4 at CI 95% with P<0.0001 showing a highly significant difference in nasal indices of male and female (Table 5).
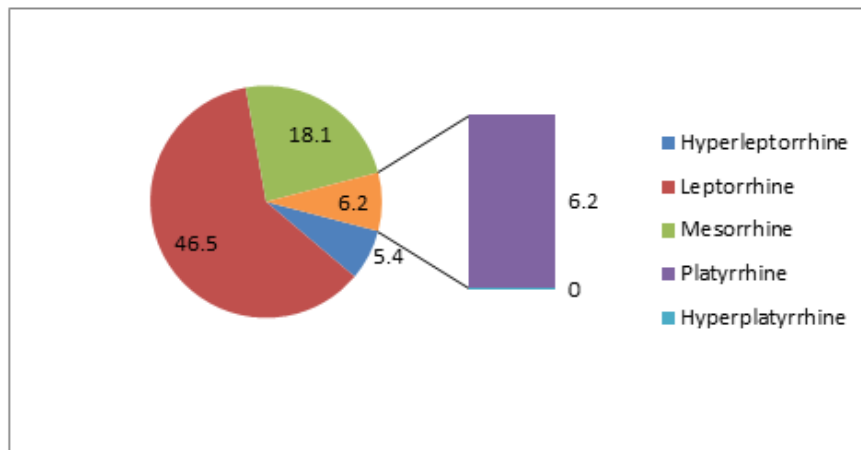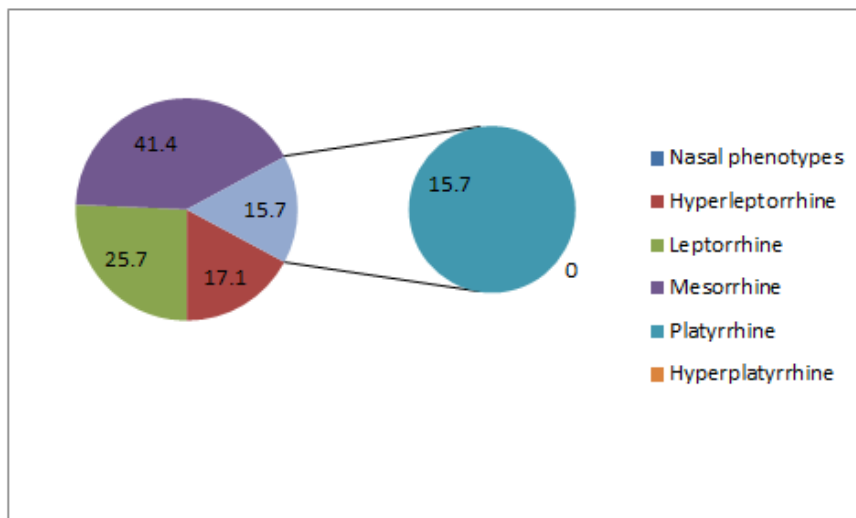

Fig-1: Nasal phenotypes of males

Fig-2: Nasal phenotypes of females

DISCUSSION

The frontonasal prominences, nasal prominences, and maxillary and mandibular prominences play a vital role in the development of face and nose [11].

The human nose is an essential component of the facial complex. It plays a vital role in facial aesthetics by enhancing the personality of the individual [11].

The nasal cavity filters and conditions the inspired air. It is also an organ for smell perception [12]. Various methods have been reported to study the nose, such as by morphometric analysis, cephalometry, and photography. In addition to these, 3D scans and digitizers have also been used to study the nose [13].

As seen in the western countries, in contemporary Indian society, aesthetic is becoming a matter of concern at all ages and probably in all social strata. Among all parts of the body, primary attention is given to the face [14].

Staka G *et al.* [15]. Study done on 204 subjects (101 males and 103 females) aged between 18-25yrs of Kosovo Albanian population and Showed nasal index of 67.07 ± 6.67 in males and 63.87 ± 5.56 in females. The study showed Leptorrhine (76.96%) as a dominant nasal type among the Kosovo Albanian population. The results were in par with the present study.

Anthropometric study of the nasal index of Egyptians done by Hegazy AA *et al.,* [16] on 290 subjects showed the mean nasal index of 68.01 in the adults, whereas in males and females was 71.46 and 64.56 respectively. According to the study, the dominant nasal type in Egyptians was considered to be between Mesorrhine and Leptorrhine. The results were in par with the present study.

Patil GV *et al.,* [17] did the study on nasal index of South Indian population comprised 250 subjects who were in the age group of 18-32yrs showed mean nasal index in males as 84.91 and female as 67.75 which indicates the dominant nasal form in males as Mesorrhine and Females were Leptorrhine The results were not in favour of the present study.

Heidari *et al.,* [18] in southeast Iran, conducted an anthropometric study of the external nose on individuals aged 18 – 25 years and noted that the most frequent type of nose was Leptorrhine (elegant nose), with 55.5% and 98.5% in the Sistani and Baluch groups, respectively. The rarest type was Platyrrhine (broad nose), with 0% in both groups. The results of our study are at variance with this study.

On analyzing the nose in the present study, it was observed that the mean nasal index was more significant in males than in females. Similar to our research, Ozdemir *et al.*, [11] have shown the nasal parameters of males to be higher than females, suggesting that the sex of an individual could be estimated from morphometric measurements of nose. In the present study, analysis of nasal parameters among the undergraduate dental students was performed.

CONCLUSIONS

The result from this study shows that the nasal index of males (Leptorrhine) was significantly higher than females (Mesorrhine), which confirmed the existence of sexual difference in nasal parameters possibly due to genetic, hormonal, nutrition and other related factors.

LIMITATIONS OF THE STUDY

The study was conducted only among the dental students; therefore, the results thus obtained cannot be generalized. Hence the authors suggest that further elaborated research is desirable.

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