

STUDY OF NASAL INDEX AMONG STUDENTS OF TERTIARY MEDICAL CARE INSTITUTE IN SOUTHERN INDIA

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ABSTRACT

Background: India is an ancient country having a diverse population group of various races, ethnic groups and tribes living in different climatic conditions. Nasal index is an ethnic sensitive anthropometric index which is used to classify race and sex of an individual.

Aim: To study the Nasal index by using nasal parameters like Nasal height and Nasal width among students of South India and North India.

Materials and Method: The study was done on medical students (male and female) aged between 18-23yrs of age after obtaining the necessary consent. Nasal height and nasal width were measured with the aid of sliding caliper. On the basis of nasal height and nasal width, nasal index was calculated and the data was analyzed statistically.

Results: The present study revealed that majority of the Indian population (both South India and North India) belong to mesorrhinae type of nasal form followed by platyrrhinae and leptorrhinae.

Conclusion: The majority of the Indian population belongs to mesorrhinae type of nasal form. The particular data will be of importance in forensic science, anthropology and rhinoplasty.

KEY WORDS: Anthropometry, Nasal Index, South India, North India.

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INTRODUCTION

Anthropometry comes from a greek word "Anthropos" which means human and "metron" which means measure. It is a non-invasive technique to measure the dimensions of the human body and skeleton. Anthropologists have devised a number of measurements for

describing the morphology of man. These measurements are defined on the basis of anatomical landmarks and have been in use for hundreds of years. They are useful in comparing various kinds of people living in different geographical regions. Racial comparisons are also made on their basis.

India is an ancient country having a diverse population group of various races, ethnic groups and tribes living in different climatic conditions [1]. The nasal morphology is mainly determined genetically but it also gets affected by environmental factors. The nose is considered as one of the best clues to racial origin [2]. There was a great interest in the 19th and early 20th century in classifying human races as Caucasians, Asian African etc., according to nasal shape and size. The nasal index was the most commonly used measurement to differentiate races [3].

The different shapes of the nose are mainly determined through the environmental factors and climatic conditions [4]. The narrower noses are favoured in cold and dry climates whereas broad and wide noses are seen in warm and moist regions indicating the climatic influence on the shapes of the nose [5]. The nose can be categorized on the basis of nasal index. Nasal analysis is the first step a surgeon takes before performing rhinoplasty to change the shape of the nose which is at present a very important branch of cosmetology.

Nasal index is an ethnic sensitive anthropometric index which is used to classify race and sex of an individual [6]. Nasal index is best classified into following types

1. Hyperleptorhinae : $X - 54.9$
2. Leptorhinae : $55.0 - 69.9$
3. Mesorhinae : $70.0 - 84.9$
4. Platyrrhinae : $85.0 - 99.9$
5. Hyperplatyrrhinae : $100 - X$

The present study was carried out to determine and compare the Nasal index among South and North Indian medical students. This data will be of importance in forensic medicine to identify the people of different racial origin, for rhinoplastic surgeons during reconstructive surgeries of the face and nose and anthropological studies. The proportions of the face and nose both from norma frontalis and norma lateralis are of enormous significance to the rhinoplastic surgeons. The shape of the external nose varies considerably between individuals. It is a pyramidal structure located in the midline of the face and attached to the facial skeleton. It has got root which is continuous with forehead and tip which forms the apex projecting

anteriorly. Its base contains two external nares or nostrils which open onto its internal surface, separated by the nasal septum and columella. The overall shape of the external nares is very variable. The variations of skin and soft tissue covering the dorsum of the nose affect the final nasal contour and profile after nasal augmentation [7].

Objectives:

- To compare the Nasal index among South and North Indian medical students.
- To compare the Nasal index among males and females

MATERIALS AND METHODS

The study was carried out on 132 medical students (male and female) aged between 18-23yrs after approval from Ethical committee of the institute. The necessary consent was obtained from the subject. Subjects who had history of trauma or surgery of the face and nose were excluded from the study. Subjects with developmental anomalies of face and nose such as cleft lip, cleft palate were also excluded. Nasal height and nasal breadth were measured with the aid of sliding caliper. Nasal height (NH) measure the straight distance between nasion (n) and subnasale (sn) and nasal breadth (NB) measure the straight distance between the two alaria (al) ie the most laterally placed points on the nasal wings (all the measurements were taken with the subject in sitting position and head in anatomical position). On the basis of NH and NB, Nasal index was calculated.

Nasal Index = $\frac{\text{Nasal Breadth}}{\text{Nasal Height}} \times 100$

The Data was entered in Microsoft excel and analyzed. Suitable statistical tests were applied in comparing the results obtained (independent t test was applied in comparing the mean scores and p value is expressed).

RESULTS

Fig. 1: Distribution of Study subjects based on their origin.

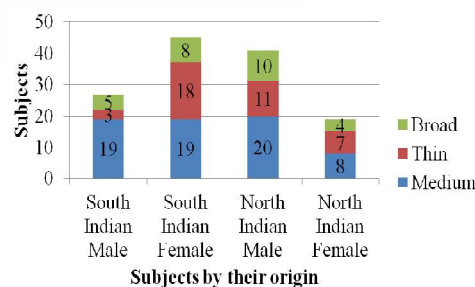


Fig. 2: Distribution of Study subjects based on the type of nose.

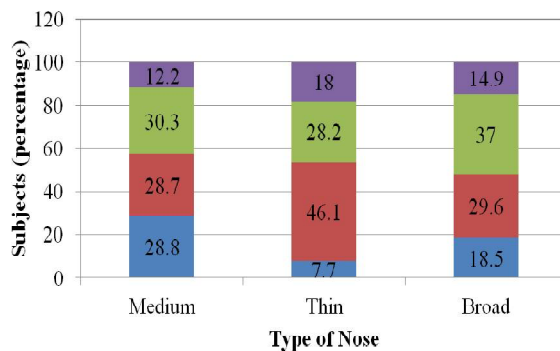


Table 1: Distribution of Nasal index parameters among male and female students (Thin Nose).

Thin	Male Mean \pm SD	Female Mean \pm SD	P-value
TNH	5.18 \pm 0.13	4.94 \pm 0.31	0.0091
TNW	3.45 \pm 0.11	3.24 \pm 0.18	0.0003
TNI	66.86 \pm 1.73	65.75 \pm 2.73	0.1787

Table 2: Distribution of Nasal index parameters among male and female students (Medium Nose).

Medium	Male Mean \pm SD	Female Mean \pm SD	P-value
MNH	4.76 \pm 0.20	4.72 \pm 0.19	0.418
MNW	3.60 \pm 0.14	3.47 \pm 0.13	0.0003
MNI	75.80 \pm 3.23	73.60 \pm 3.21	0.0082

Table 3: Distribution of Nasal index parameters among male and female students (Broad Nose).

Broad	Male Mean \pm SD	Female Mean \pm SD	P-value
BNH	4.67 \pm 0.09	4.58 \pm 0.24	0.19
BNW	4.05 \pm 0.05	3.72 \pm 0.49	0.015
BNI	86.7 \pm 1.45	81.43 \pm 12.87	0.1264

Table 4: Distribution of Nasal index parameters among south Indians and North Indians (Thin Nose).

Thin	SI Mean \pm SD	NI Mean \pm SD	P-value
TNH	5.05 \pm 0.28	3.31 \pm 0.21	0.3795
TNW	3.31 \pm 0.21	3.32 \pm 0.17	0.8725
TNI	65.49 \pm 2.85	66.92 \pm 1.65	0.0688

Table 5: Distribution of Nasal index parameters among south Indians and North Indians (Medium Nose).

Medium	SI Mean \pm SD	NI Mean \pm SD	P-value
MNH	4.73 \pm 0.23	4.77 \pm 0.14	0.4182
MNW	3.54 \pm 0.16	3.56 \pm 0.14	0.5988
MNI	74.98 \pm 3.85	74.80 \pm 2.68	0.8326

Table 6: Distribution of Nasal index parameters among south Indians and North Indians (Thin Nose).

Broad	SI Mean \pm SD	NI Mean \pm SD	P-value
BNH	4.61 \pm 0.24	4.65 \pm 0.08	0.5604
BNW	3.75 \pm 0.49	4.04 \pm 0.05	0.0368
BNI	81.75 \pm 12.38	86.77 \pm 1.48	0.1441

DISCUSSION

The nose is the most defining feature of the face; a slight change can greatly improve one's appearance. With the substantial increase in the number of cosmetic surgeries performed, it has become a great responsibility for surgeon to maintain core ethnic features while achieving cosmetic enhancement [8]. Nasal height and width are the most important measurements which are very useful in forensic medicine and anthropology [9].

A study done by Gandrade PR and Babel H on Bheel Meena tribe of southern rajasthan showed the mean nasal index of 81.36 which belongs to Mesorrhine type of nasal form [6].

Anthropometric study of nasal index of egyptians done by Hegazy AA 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 [10].

The nasal morphology in the endogamous group of Punjab such as Brahmin Majhabi Sikh and Muslims showed statistically significant differences. The nasal index of Brahmins was 70.02 \pm 9.13 for male and 69.89 \pm 6.04 for female, whereas nasal index of Majhabi Sikhs was 76.51 \pm 8.98 for male and 68.95 \pm 6.22 for female and also nasal index of Muslims was 67.04 \pm 8.87 for male and 69.38 \pm 8.09 for female [8].

According to Kalambelkar RR, the nasal index of male was 66.46 \pm 2.69 and female was 67.76 \pm 3.19 in Southern India and the nasal index of male was 63.29 \pm 4.10 and female was 61.04 \pm 5.64 in Northern India. The study showed statistically significant differences between the two regions which might have racial, ethnic and climatic influences [1]. The study done on 204 subjects (101 males and 103 females) aged between 18-25yrs of Kosovo Albanian population by Staka G showed men nasal index of 67.07 \pm 6.67 in males and 63.87 \pm 5.56 in females. The study showed leptorrhine(76.96%) as dominant nasal type among Kosovo Albanian population [11].

The study done by Patil GV 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 in

female as 67.75 which indicates the dominant nasal form in males as mesorrhine and females was leptorrhine [12].

A study was done to determine the nasal index of Manipuri fetuses which have striking ethnic influences on the nasal form. The nose of the fetuses of Manipuri population at birth is found to be Platyrrhine (round and wide) [13].

The authors Wai MM et al have studied the nasofacial index among university students of three races in Malaysia. According to the study, the nasal index in Malay subjects was 81.00 ± 7.48 (mesorrhine type), in Chinese the nasal index was 79.56 ± 8.62 and in Indian students nasal index was 76.27 ± 7.39 . All the three races showed the mesorrhine type of nasal form. The study was statistically significant which showed that there was sexual dimorphism of nasal parameters and nasal indices amongst the three Malaysian race groups [14].

The study of nasal parameters was conducted by Anibor E, et al on Isokos in Delta state of Nigeria which comprised of 210 males and 200 female subjects aged between 18-35yrs. Males had mean nasal width, height and index of 4.22cm, 4.60cm and 92.35 respectively, while those of females were 3.87cm, 4.35cm and 89.51 respectively. The result of the study showed that Isokos have Platyrrhine type of nasal form [15].

A cross sectional survey done by Jimoh RO et al among Nigerians aged between 18-70yrs showed significant association between the sex of an individual and type of nose. The mean nasal index was 90.7 in males and 88.2 in females [16]. Oladipo GS et al worked out nasal indices in subjects of Igbo, Yoruba and Ijaw ethnic groups. The study showed that the Igbos had a mean nasal index of 94.1 ± 0.37 , Yorubas had mean nasal index of 89.2 ± 0.30 and the Ijaws 96.37 ± 1.06 . The Ijaws had a significantly higher nasal index compared to Igbos and Yorubas. All the three ethnic groups have Platyrrhine (short and broad nose) type of nasal form [17].

The present study clearly revealed that Indian population (both South Indians & North Indians) belongs to Mesorrhinae in 50%, then Leptorrhinae in 29.54% & Platyrrhinae in 20.45% of the subjects. The study also highlighted the total absence of Hyperleptorrhinae & Hyperplat-

yrhinae. The statistically significant differences were found between male and female students in medium type of nose.

The nose which is the initial part of the respiratory tract is responsible for humidifying, warming and also filtering the inspired air. Very important is it lodges the olfactory epithelium which contains the olfactory receptor neurons responsible for detecting the sense of smell. The anatomy of the paired nasal valves in the nasal cavities appears to be important in regulating the nasal airflow and resistance. The airflow dynamics are proved as playing a principle role in conditioning the inspired air. Furthermore these dynamics are not satisfactorily understood. Probably the nasal index and its parameters can be correlated with the airflow dynamics and further research work in this area is commendable.

CONCLUSION

The majority of the Indian population belongs to mesorrhinae type of nasal form. The congruency of the nasal septum to the philtrum, the height and the width of the nose bears great significance in nasal reconstruction. Therefore establishing baseline nasal parameters for specific race and ethnicity has become valuable in rhinoplasty. The particular data will be of importance in forensic science, anthropology and rhinoplasty.

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Conflicts of Interests: None

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