

# Anthropometric Study of Nasal Parameters in Iranian University Students

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## ABSTRACT

**Introduction:** Nose morphology depends on gender, ethnicity, and environmental conditions. It can be used in identification of the race and sex of persons whose identity is unknown. Nasal index is a useful tool in anthropometry.

**Methods:** In this study, nasal parameters of Iranian males and females students were measured (nasal height, nasal width, and nasal index). This study was conducted on 200 medical students of Tehran University, Tehran, Iran. Subjects were 100 males and 100 females, aged 18-30 years. The nasal height and width were measured by a sliding vernier calliper and the nasal index was accordingly calculated.

**Results:** Our data showed that the mean nasal index for males and females were  $68.91 \pm 8.11$  and  $66.05 \pm 7.53$ , respectively. So, nose of Iranian people is leptorrhine type. The mean nasal index in males was significantly ( $P \leq 0.05$ ) higher than that in females.

**Conclusion:** The result of this study could be employed in the detection of gender in forensic medicine and rhinoplasty surgery.

## Key Words:

Nose, Anthropometry, Iran

## 1. Introduction

**T**here are physical differences in humans based on sex, race and place of residence. Many studies have emphasized the importance of anthropometric measurements

to assess variations in human populations, analysis and classification of fossil remains, and crime detection in forensic science. In the 20th century, the anthropometric methods were replaced by more sophisticated techniques for evaluating racial differences [1]. Nasal anthropom-

etry is a useful tool in anthropometry.

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etry is the study of the proportion, size, and shape of the human nose [2].

The shape of the external nose is variable and is determined by ethmoid bone and nasal septum, which is mostly of cartilage structure and separates the nose openings [3]. Based on morphology, the human nose can be classified into 6 types: Roman or aquiline nose (convex in shape, like a hook), the Greek or straight nose (with no curves), the Nubian nose (wide nostrils, a little narrow at the top, thick and broad at the middle and wide at the end), the hawk nose (very convex, very thin, and sharp), the snub nose (quite short in length and is not sharp) and the celestial or turn up nose (runs continuously from the eyes towards the tip) [4].

Nasal index is one of the important anthropometric parameters for evaluation of the race and sex of a person whose identity is unknown [5-7]. Several studies of the nasal index have been done among diverse groups in different countries. According to these studies, persons from different ethnic groups who share the same environment have the same nose type. Researchers believe on the influence climate on the variety of noses [8].

The nasal index is correlated with average temperature and humidity in different regions and nasal size with oxygen utilization [9]. The narrower noses are seen in cold and dry climates while broader noses in warmer, moister ones that is expressed as a consequence of natural selection in human evolution [10].

In a living person, the height is measured from nasion (where the internasal suture reaches to the frontal bone) to subnasal (where the nasal septum reaches to the upper lip) and the width of the nose is the highest distance between the 2 alae or nasal wings in anatomical condition. Nasal index is expressed as a percentage of the width in relation to the height of the nose [11]. Based on nasal index, the human nose can be classified into 3 types: leptorrhine (long and narrow nose), mesorrhine (medium), and platyrrhine (broad nose) nose [12, 13].

The purpose of this study was to determine the nasal parameters (nasal width, height, and index) and to classify the nose type in Iranian population. In the present study, nasal index was used to compare Iranian men and women. The result of this study could be useful in forensic medicine and rhinoplasty surgery.

## 2. Materials and Methods

This study was conducted on 200 subjects (100 male and 100 female). The participants were selected by ran-

dom sampling from medical students of Tehran University, Tehran, Iran. The ages of them were between 18 and 30 years. People who had nasal trauma, cleft palate, or cleft lip as well as those who had a history of plastic surgery of the nose, were excluded from the study. Participants completed a questionnaire that included their age, gender, ethnicity, and other relevant personal information.

In this study, the direct method described by Anas and Sale, was used [8]. In this method, a person sits on a chair in a relaxed condition with his or her head placed in anatomical position (directed anteriorly) to measure his or her parameters. A manual type of sliding vernier caliper was used for measurements which were done by an observer to prevent mistakes. Nasal height was measured from the nasion to the subnasal. Nasal width was measured from ala to ala at an angle perpendicular to the nasal height. The nasal index was calculated by the following formula:

$$\text{Nasal index} = \text{nasal width} / \text{nasal height} \times 100$$

The study results were analyzed by SPSS (SPSS, Inc, v21, 2012 USA), and descriptive statistics of obtained data were presented by mean and standard deviation (SD). Values of  $P \leq 0.05$  were considered statistically significant.

## 3. Results

The results showed that the average nasal height in Iranian men and women were  $54.22 \pm 3.97$  and  $49.4 \pm 3.17$  mm, respectively. There was significant difference ( $P \leq 0.05$ ) between 2 groups (Table 1).

After measuring the nasal width in 200 Iranian men and women and doing statistical analyses, the results showed that the mean nasal widths in Iranian men and women were  $37.16 \pm 3.44$  and  $32.49 \pm 2.9$  mm, respectively, that was significantly different ( $P \leq 0.05$ ) between 2 groups (Table 2).

After measuring the nasal width and height, the nasal index was calculated. The obtained results showed that means of the nasal indexes in Iranian men and women were  $68.91 \pm 8.11$  and  $66.05 \pm 7.53$  mm, respectively, so nose of Iranian people is leptorrhine type. There was significant difference ( $P \leq 0.05$ ) between two groups in his regard (Table 3).

## 4. Discussion

Researchers believed that there is a relationship between the nose shape and its function. Weather conditions and living environment have an important effect in

**Table 1.** Comparison of the nasal height in Iranian males and females.

Groups	n	Nose height, Mean±SD (mm)	SE
Male	100	54.22±3.97	0.39
Female	100	49.4±3.17	0.31

SD: Standard deviation; SE: Standard error; n: number of samples.

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**Table 2.** Comparison of the nasal width between Iranian males and females.

Groups	n	Nose width, Mean±SD (mm)	SE
Male	100	37.16±3.44	0.34
Female	100	32.49±2.9	0.29

SD: Standard deviation; SE: Standard error; n: number of samples.

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**Table 3.** Comparison of the nasal index in Iranian males and females.

Groups	n	Nasal index, Mean±SD (mm)	SE
Male	100	68.91±8.11	0.81
Female	100	66.05±7.53	0.75

S.D: Standard deviation; S.E: Standard error; n: number of samples.

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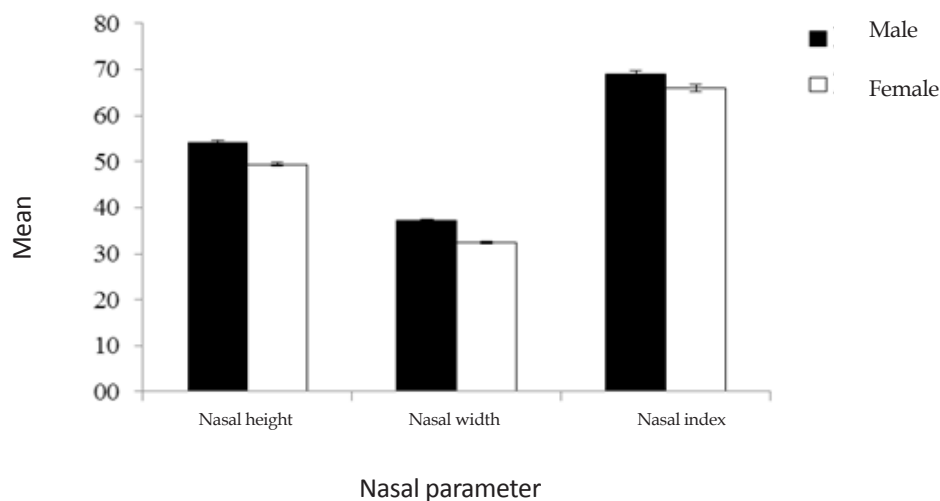
the structure of the nose. Nasal width, height, and index determine the nose shape which is different among people. In this study, these parameters were measured and evaluated in Iranian population. Based on nasal index, the human nose can be classified into 3 types:

1) Leptorrhine or fine nose (nasal index of 69.9 or less) characterized by least prominent ala lobule with a well-defined nasal tip.

2) Mesorrhine or medium nose (nasal index of 70.0-84.9) characterized by a less prominent lobule and a more defined nasal tip.

3) Platyrrhine or broad nose (nasal index of 85 and above) characterized by a very prominent ala lobule with a rounded nasal tip [14].

In this study and according to obtained nasal index, nose of Iranian men and women was leptorrhine type that corresponds to the findings of previous studies. Staka reported that the mean nasal index of the Kosovo



**Figure 1.** Differences between Iranian males and females regarding their nasal height, width and index.

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Albanian population was  $65.46 \pm 6.32$  irrespective of sex so their nose was a leptorrhine type. This result shows that a racial variation was observed in nasal index of different populations [15]. Hall reported that broader noses (platyrrhine type) are suitable in warm climates whereas narrower noses are fit in cold climates. This organization is explained as a consequence of natural selection [10]. Males nasal height, width, and index compared to females were significantly ( $P < 0.05$ ) higher than indicated sexual dimorphism. This result also conforms to previous studies that sexual dimorphism existed. Eboh reported that there is no sign of sexual dimorphism in the study of the nasal indexes among Benin adolescents in Edo State Nigeria [4]. The sexual dimorphism may be due to various etiological factors such as genetics and hormones in different populations [16].

Therefore, there are many reasons for existing variations in the nasal parameters of different groups and races. The reason for the similarities in the nasal parameters in groups can be linked to postulations made by Farkas that the nasal index could be related to sexual, regional, and climatic differences. Therefore, it is expected that ethnic groups in the same climatic regions regardless of sexual dimorphism should have similarities in their nasal indexes [17].

At the end of this study, we showed that the dominant nasal type in Iranian males and females is fine nose; this type of nose is related to climate. The present study confirmed that sexual dimorphism is very important in nasal morphology. The data obtained in this study may be useful in anthropological studies, forensic science, and surgery.

Finally, based on the results of this study, nose of Iranian men and women was the leptorrhine type. The results showed that nasal parameters (nasal width, height, and index) according to gender was different, so that these parameters in men were significantly higher than those in women. Our study results suggest that the nose can be a useful anthropometrical tool in determination of gender in forensic science and classification of fossil remains.

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