

## Anthropometric Study of Nasal Index Among the Youth of Madheshis Community of Nepal

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### Abstract

#### Introduction

The nose is one of the important

component of the face which is considered as the major clue for the ethnic origin. The proportion of the nose is determined on the same principal as that of the skull. The external nose extends the nasal cavities onto the front of the face and positions the nares so that they point downwards. The shape of the nose is pyramidal with its apex anterior in position. The upper angle of the nose between the openings of the orbits is continuous with the forehead.

### Materials and Methods

This study was carried out among residents of Ramnagar Gaupalika-7, Sarlahi, Nepal, one of the core region of Madhesh Nepal dated Jan 2021 to April 2021. The cohort consists of independent adults of age group 17-45 and consenting adults from the metropolis. Ethical approval was sought prior to conducting the study from the supervising ethical committee of the Nobel Medical College Teaching Hospital, Biratnagar, Nepal. Written consents were taken from the subjects for the recruitment in the study.

## Results

The present study involved 100 subjects of equal males and females subjects of age groups 17-45 years from Madheshis community of Nepal. The tables below shows the values obtained for different parameters for males and females. The mean value of nasal height for male and female is  $52.59 \pm 1.89$  and  $50.27 \pm 2.16$  mm and the nasal width for male and female is  $37.64 \pm 1.72$  mm and  $35.42 \pm 2.04$  mm and the value of mean nasal index for both the sexes are  $71.59 \pm 2.31$  and  $70.58 \pm 3.04$  respectively. The dominant type of the nasal morphology in both the sexes are the mesorrhine type and the leptorrhine type as well.

## Conclusion

The human nose is a dominant feature in facial region which differs in anatomy and morphology among racial groups and of the most characteristic differences during the analysis of ethnic and racial differences. The dominant type of the nasal index is the mesorrhine type in both the male and female of the Madheshis community. Hence the data obtained here will be useful for the differentiation of different ethnic groups of Nepal as well as in the field of forensic science and rhinoplastic surgery.

## Introduction

The nose is one of the important parts of the face and is considered to be the main clue of race. The ratio of the nose is the same as the ratio of the skull.<sup>1</sup> The outer nose extends the nasal cavity to the front of the face and positions the nostrils so that they point downward. The shape of the nose is tapered, with its apex at the front. The upper corner of the nose between the orbital openings is connected to the forehead.<sup>2</sup>

The nose is one of the important structures of the face. It is composed of bones and cartilage and performs the main functions of breathing and smell.<sup>3</sup> The research and comparison of nasal index formed the basis of racial and ethnic differences in nasal index between different groups of people. It also forms the basis of facial anthropometric research, genetic counseling, and forensic investigations.<sup>4</sup> Nose analysis is the most important factor that clinical surgeons usually take before performing

rhinoplasty surgery (for correcting the size and shape of the nose).<sup>5</sup> Therefore, nose parameters such as nose index, nose height, and nose width are generally accepted in the field of anthropology of parameters. It is one of the most useful clues to the origin of race and is very helpful in understanding the diagnosis.<sup>6</sup> Gender dimorphism is present in the larger noses of men. This is due to increased testosterone levels in men, which makes the edge of the eyebrow thicker.<sup>7</sup>

Some of the variables that determine the shape and size of the nose are race, tribe, and environmental climatic conditions, which are conducive to narrowing the nose in cold and dry climates, and widening the nose in hot climates. In other words, nasal elongation is affected by environmental adaptation.<sup>8</sup>

The nasal index is defined as the ratio of the maximum width of the nostril to the height of the nasal skeleton multiplied by 100.<sup>9</sup> The shape of the nose is divided into five types: Hyperleptorrhine is a very narrow nose with a nose index ranging from 40 to 54.9, Leptorrhine refers to a long and narrow nose with an index of 55-69.9, and Mesorrhine refers to a median nose of 1. The nose of 70-85, Platyrrhine is a short and wide nose with an index of 85-99.9. The fifth category is a high nasal mucus with an index of more than 100.<sup>10</sup> Therefore, the nasal index is very useful in anthropology. Used to distinguish racial and ethnic differences. The nasal index is very useful in anthropology and is one of the recognized clinical anthropometric parameters in nasal medicine and surgical management.<sup>11</sup> Anthropologists use the term Madheshis to refer to people of Indian descent living in Terai, Nepal, including various cultural groups such as Hindus, Terai Muslims, merchants, and indigenous caste groups.<sup>12</sup> Madheshis includes caste groups such as Brahmin, Teli, Suri, Yadav, Gupta, Kajasta, Bumihar and Dalit, as well as ethnic groups such as Maithir and Awajipuri And Buji Puri Bajika speakers.<sup>13</sup>

## Materials and Methods

This study was carried out among residents of Ramnagar Gaupalika-7, Sarlahi, Nepal, one of the core

region of Madhesh Nepal dated Jan 2021 to April 2021. The cohort consists of independent adults of age group 17-45 and consenting adults from the metropolis. Ethical approval was sought prior to conducting the study from the supervising ethical committee of the Nobel Medical College Teaching Hospital, Biratnagar, Nepal. Written consents were taken from the subjects for the recruitment in the study. Subjects were randomly selected and those who had scars on the nose other than the usual nasal piercing for rings and those with observable defect or growths were excluded from the study. No interventions or investigations were done.

#### *Sample size*

50 male and 50 female.

#### **Protocol of the Procedure**

In order to measure the Nasal Index (NI), the subjects were asked to sit on a chair in Anatomical position of head considering the Frankfurt's line. The measurement of NI was done by using the digital Vernier Caliper.

The anthropometric parameters studied were measured by the direct method. The following parameters were studied and measured by indirect methods

1. Nasal height: Nasion to tip of nose.
2. Nasal width: A line joining the two root of two alae of nose.
3. Nasal Index: Nasal width/Nasal height $\times$ 100.

#### **Statistical Analysis**

The results were calculated as mean $\pm$ standard deviation. The Pearson correlation will be used to institute the association between age, sex, and external ear anthropometry. The data were analyzed using BM SPSS Statistics for Windows, Version 20.0. Armonk, NY; IBM Corp., and  $p \leq 0.05$  considered as level of significance.

#### **Results**

The present study involved 100 subjects of equal males and females subjects of age groups 17-45 years

from Madheshis community of Nepal. The tables below shows the values obtained for different parameters for males and females. The mean value of nasal height for male and female is  $52.59 \pm 1.89$  and  $50.27 \pm 2.16$  mm and the nasal width for male and female is  $37.64 \pm 1.72$  mm and  $35.42 \pm 2.04$  mm and the value of mean nasal index for both the sexes are  $71.59 \pm 2.31$  and  $70.58 \pm 3.04$  respectively. The dominant type of the nasal morphology in both the sexes are the mesorrhine type and the leptorrhine type as well. The normal morphology of nose of Madheshis community showed the long length and lesser width. There was a highly significant differences in the nasal parameters among the male and females of the ethnic group.

There also exist the sexual dimorphism in the nasal index which is much important. There also observed the negative correlation in the nasal index of male and female.

#### **Discussion**

In the present study it is observed that the mean value of nasal height of male and female of Madheshis community were  $52.59 \pm 1.89$  mm and  $50.27 \pm 2.16$  mm respectively, nasal width were  $37.64 \pm 1.72$  mm and  $35.42 \pm 2.04$  mm and the value of nasal index of male and female were  $71.59 \pm 2.31$  and  $70.58 \pm 3.04$  respectively. In a similar study conducted by Koirala S et.al. in context of Nepal in the Mongoloid and Tharu community the nasal height was calculated to be  $47.8 \pm 2.8$  and  $44.1 \pm 4.9$  in male and female of Mongoloid whereas in case of Tharu of male and female was  $44.0 \pm 2.9$  and  $40.5 \pm 2.3$  respectively. The mean nasal width were  $35.7 \pm 3.0$  and  $33.5 \pm 3.0$  among Mongoloid and  $36.9 \pm 2.5$  and  $33.4 \pm 2.3$  among the Tharu. Whereas the nasal index was observed as  $84.6 \pm 3.1$  and  $75.9 \pm 5.1$  in male and female of Mongoloid respectively and in case of the Tharu the values of nasal index for male and female were  $83.8 \pm 3.0$  and  $82.4 \pm 2.5$  respectively.<sup>14</sup> After comparing the present study with the study done on other ethnic groups it is observed that the mean value of the various nasal parameters are greater than that of the Tharu and Mongoloid populations of Nepal. In the present

Table 1. Nasal parameters of male and female of Madheshis Populations

Nasal Parameters	Male	Female	P value
Nasal Height	52.59±1.89	50.27±2.16	0.938
Nasal Width	37.64±1.72	35.42±2.04	0.981
Nasal Index	71.59±2.31	70.58±3.04	0.718

Table 2. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Nasal Height	50	.011	.938
Pair 2	Nasal Width	50	.003	.981
Pair 3	Nasal Index	50	-.052	.718

Table 3. Prevalence of Types of Morphology of Nose based on the Nasal Index

Classes	Range	Male (%) 50	Female(%)50
Hyperleptorrhine	40-54.9	----	----
Leptorrhine	55-69.9	20%	40%
Mesorrhine	70-84.9	80%	60%
Platyrrhine	85-99.9	----	----
Hyperplatyrrhine	≥100	----	----

study it is also observed that the nasal parameters of male are greater than that of the female which is showing the sexual dimorphism among the community.

Study done among the Iranian population, the mean nasal index for male and females were 68.91 and 66.05 respectively where they observed that the leptorrhine type of nose was the most prevalent.<sup>15</sup> In the present study the prevalent type of nose was the Mesorrhine type in both the male(80%) and female(60%) subjects of Madheshis community. The next prevalent type of nose was the Leptorrhine in both the male(20%) and female(40%) subjects. Other type of nose was not prevalent. A study from the Gwalior showed that a significantly lower nasal index values (80.59 and 77.29 respectively) and mesorrhine nose types was the most

prevalent.<sup>16</sup> In a study from UP of India had the value of nasal index as  $73.96 \pm 1.9$  and mesorrhine type of nose was the prevalent type.<sup>17</sup> Based on the result of this study, it was observed that there were significant differences in the nasal parameters of Madheshis community compared to the other ethnic groups of Nepal. So from the present study and the data obtained will be useful in the inter-racial dimorphism of the different races of Nepal.

### Conclusion

The human nose is a dominant feature in facial region which differs in anatomy and morphology among racial groups and of the most characteristic differences during the analysis of ethnic and racial differences. The dominant type of the nasal index is the mesorrhine type in

both the male and female of the Madheshis community. Hence the data obtained here will be useful for the differentiation of different ethnic groups of Nepal as well as in the field of forensic science and rhinoplastic surgery. The present study also confirmed that the nasal parameters of the males are greater than that of the female of same ethnic groups.

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