

Original Research Article

# Study of prosopic index in Kashmir: A population based cross-sectional study

Suheel Hamid Latoo<sup>1\*</sup>, Sonia Gupta<sup>2</sup>, Mohammad Shafi Dar<sup>3</sup>

<sup>1</sup>Associate Professor, <sup>2</sup>Tutor, <sup>3</sup>Lecturer

Department of Oral Pathology, Govt. Dental College & Hospital, Srinagar, India

\*Corresponding author email: [oralpathgdcsg@gmail.com](mailto:oralpathgdcsg@gmail.com)

	International Archives of Integrated Medicine, Vol. 7, Issue 12, December, 2020.	
	Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a>	
	ISSN: 2394-0026 (P)	ISSN: 2394-0034 (O)
	Received on: 02-10-2020	Accepted on: 03-12-2020
	Source of support: Nil	Conflict of interest: None declared.
<b>How to cite this article:</b> Suheel Hamid Latoo, Sonia Gupta, Mohammad Shafi Dar. Study of prosopic index in Kashmir: A population based cross-sectional study. IAIM, 2020; 7(12): 39-43.		

## Abstract

**Introduction:** Facial analysis is anthropologically useful to identify the racial, ethnical and gender differences. Human facial contour has always been an interesting subject for anatomists, anthropologist, plastic surgeons and artists as well as identification of an individual's race has been a crucial element in forensic identification and reconstructive surgery.

**Aim and objectives:** To determine the gender difference and variation of facial index among Kashmiri population.

**Materials and methods:** A descriptive cross-sectional study was conducted on 80 subjects (40 males and 40 females) in the Department of Oral & Maxillofacial Pathology, Govt. Dental College & Hospital, Srinagar. The measurements of morphological parameters like facial height, facial width and prosopic index was determined in millimeters using sliding-anthropometric digital caliper.

**Results:** In the present study, mean facial height, mean facial width and mean facial index was significantly greater in males as compared to females. The prominent facial phenotypes were mesoprosopic and leptoprosopic in females and males respectively.

**Conclusion:** In this study, facial index being greater in males. Males had leptoprosopic face while females had mesoprosopic face. These parameters may be valuable for anthropological research, forensics, genetic research, as well as in medical clinical practice (reconstructive surgery).

## Key words

Prosopic index, Facial index, Kashmiri population.

## Introduction

Craniofacial anthropometry is a technique used in physical anthropometry comprising of precise

and systematic measurement of the bones of the human skull with wide applications in forensic medicine, plastic surgery, orthodontics, archeology and identification of determining the

origins of races. Two individuals are never identical in their measurable characters and thus study of intrapopulation and interpopulation variations among different morphological characters has long been an attention of the anthropologists [1-3]. Facial analysis is anthropologically useful to identify the racial, ethnical and gender differences. Human facial contour has always been an interesting subject for anatomists, anthropologist, plastic surgeons and artists as well as identification of an individual's race has been a crucial element in forensic identification and reconstructive surgery [4]. The evaluation of the changes in facial index between parents, offspring, and sibling can give the evidence to genetic transmission of inherited characters [5]. Precise facial analysis like facial height, facial width, and facial index is necessary for the diagnosis of genetic and acquired anomalies for the study of normal and abnormal growth and morphometric investigations. Facial index may be an important factor in increasing susceptibility to obstructive sleep apnea as euryprosopic facial type favors the nasal breathing mode [5-7]. Facial index (FI) has been used to explain the various facial types in anthropometry. It is the ratio of the morphological facial height to bizygomatic width (facial breadth) multiplied by 100. According to Martin-Saller's scale, facial phenotypes are classified into five types as hyperleptoprosopic, leptoprosopic, mesoprosopic, euryprosopic and hypereuryprosopic. The facial type of an individual has been stated to be influenced by sex, ethnicity and race, genetic, socio-economic and nutritional factors etc. [8, 9]. Facial index plays a very important role in personal identification in medico-legal investigations and hence gender determination also helps in facial reconstruction of unidentified bodies. The aim of the present study was to determine the gender difference and variation of facial index among Kashmiri population.

## Materials and methods

A descriptive cross-sectional study was conducted on 80 subjects (40 males and 40

females) in the Department of Oral & Maxillofacial Pathology, Govt. Dental College & Hospital, Srinagar. Subjects showing any type of facial deformity, malocclusion, endocrine disorders such as dwarfism and gigantism, congenital facial malformations were excluded. The individuals were asked to sit in a relaxed state, straight and to look forward. The measurements of morphological parameters like facial height, facial width and prosopic index was determined in millimeters using sliding-anthropometric digital caliper. Facial height and width was measured from nasion to gnathion and from right to left zygion respectively. Nasion is the intersection of nasofrontal suture with the mid sagittal plane. Gnathion is the most anterior and lowest median point on the lower jaw. The prosopic index was calculated by dividing the facial height by facial width and then multiplied by 100.

Statistical analysis was done to determine the significance of findings observed between both the genders using statistical software (SPSS version 21.0). Mean and standard deviation were calculated. They were compared by using the test of significance i.e. independent t-test. A probability value (p) of  $\leq 0.05$  was considered to be statistically significant.

## Results

In the present study, the mean facial height in males and females were  $120.12 \pm 8.98$  mm and  $109.08 \pm 5.86$  mm respectively. The mean facial width in males and females were  $128.60 \pm 7.89$  mm and  $123.18 \pm 6.43$  mm respectively (**Table - 1**).

In this study, the mean facial index in males and females were  $93.27 \pm 7.83$  and  $88.39 \pm 6.23$  respectively. The p-value was found to be statistically significant (**Table - 2**).

In females, the prominent facial phenotypes were mesoprosopic (42%) followed by euryprosopic (24%), leptoprosopic (22%), hyperleptoprosopic (7%) and hypereuryprosopic (5%) (**Figure - 1**).

**Table - 1:** Mean and standard deviation of facial height and width in males and females.

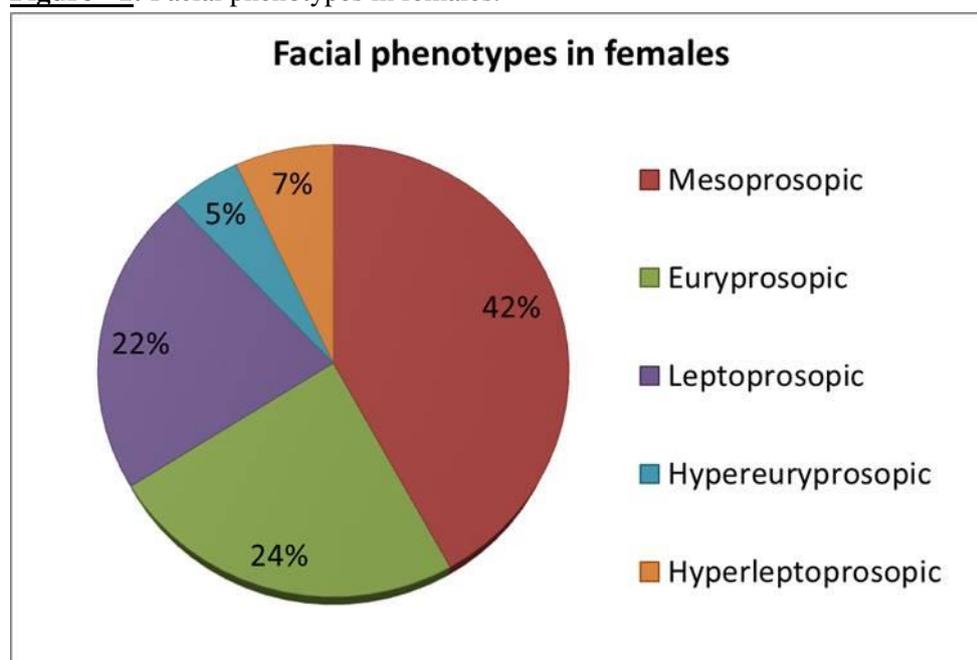
Parameters	Males	Females
Facial height in mm (Mean±SD)	120.12±8.98	109.08±5.86
Facial width in mm (Mean±SD)	128.60±7.89	123.18±6.43

SD- Standard deviation

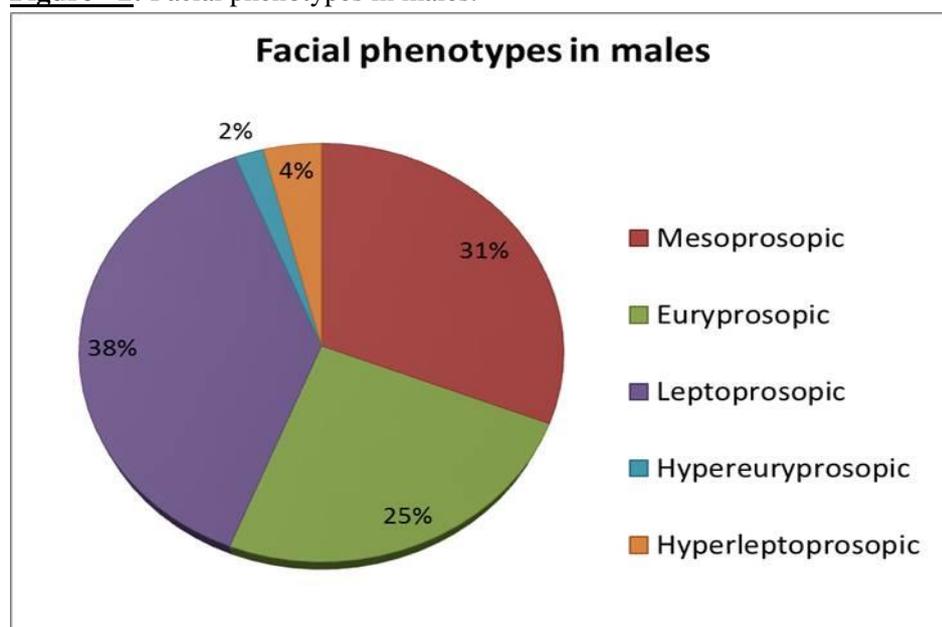
**Table - 2:** Mean and standard deviation of facial index in males and females.

Facial Index	Mean±SD	P-value
Males	93.27±7.83	0.002
Females	88.39±6.23	

**Figure - 1:** Facial phenotypes in females.



**Figure - 2:** Facial phenotypes in males.



In males, the prominent facial phenotypes were leptoprosopic (38%), mesoprosopic (31%), euryprosopic (25%), hyperleptoprosopic (4%) and hypereuryprosopic (2%) (**Figure - 2**).

## **Discussion**

Anthropometry is known as the human individual measurements which are vital in reconstructive surgery and forensic identification [10, 11]. Human facial contour has always been an attractive topic for artists, anthropologists, anatomists, and plastic surgeons. Face is developed from different bony structures, in which its final characteristics can be determined on the basis of changes in the proportion and position of these facial components. It has been established that the development and growth of humans are affected by different factors such as sex, race, age geography etc. [4, 12]. Each population has special anthropometric features for example in their facial dimensions which are important for identification of an individual and as well in the operational planning for patients with facial defects as a result of tumor, trauma, or congenital malformations [5]. Facial index plays a very key role in personal identification in medico-legal investigations and thus, gender determination also helps in facial reconstruction of unidentified bodies. The present study was done to determine the gender difference and variation of facial index among Kashmiri population.

In the present study, mean facial height, mean facial width and mean facial index was significantly greater in males as compared to females. These results were in accordance with the research carried out by Yesmin, et al. [11]; Priyadarshini, et al. [13] and Ravichandran, et al. [14] but Shethi, et al. [2] showed contradictory results in their study and they found that mean facial index was greater in females than that of males.

Omotoso, et al. [15] and Osunwoke, et al. [6] had carried out studies on Nigerian population on sexual dimorphism and significant difference

was found between male and female facial indexes. This may be due to the male hormone testosterone that causes the changes in the shape of the face between the two sexes. In the current study, the prominent facial phenotypes were mesoprosopic and leptoprosopic in females and males respectively. These results were in contrast with the study done by Salve, et al. [16] in the Indian population that dominant face type for males was mesoprosopic but for females it was euryprosopic type. However, the results of facial profile in our study were similar to study done by Chhabra, et al. [17]. This might be due to dietary, environmental and climatic conditions.

## **Conclusion**

In the present study, sexual dimorphism was observed in most parameters with linear measurements and index being greater in males. Males had leptoprosopic face while females had mesoprosopic face. These parameters may be valuable for anthropological research, forensics, genetic research, as well as in medical clinical practice (reconstructive surgery).

## **References**

1. Kanan U, Gandotra A, Desai A, Andani R. Variation in facial index of Gujarati males-a photometric study. *Int J Med Health Sci.*, 2012; 1(4): 27–31.
2. Shethi VR, Pai SR, Sneha GK, Gupta C, Chethan P. Study of prosopic (Facial) index of Indian and Malaysian students. *Int J Morphol.*, 2011; 29(3): 1018–1021.
3. Ngeow WC and Aljunid ST. Craniofacial anthropometric norms of Malays. *Singapore Medical Journal*, 2009; 50(5): 525–528.
4. Doni RPK, Janaki CS, Vijayaraghavan V, Raj UD. A study on measurement and correlation of cephalic and facial indices in male of south Indian population. *Int J Med Res Health Sci.*, 2013; 2(3): 439-446.
5. Kurnia C, Susiana S, Husin W. Facial indices in Chinese ethnic students aged

- 20-22. J Dent Indonesian, 2012; 19(1): 1-4.
6. Osunwoke EA, Amah-Tariah FS, Obia O, Ekere IM. Sexual dimorphism in facial dimensions of the Bini's of South-Southern Nigeria. *Asian J Med Sci.*, 2011; 3: 71-73.
7. Jeremić D, Sanja K, Maja V. Anthropometric study of the facial index in the population of central Serbia. *Arch Biol Sci Belgrade*, 2013; 65: 1163-1168.
8. Farkas LG, Katic MJ, Forrest CR. International anthropometric study of facial morphology in various ethnic groups/race. *J Craniofac Surg LWW*, 2005; 16(4): 615-646.
9. Maina MB, Mahdi O, Kalayi GG. Craniofacial forms among three dominant ethnic groups of Gombe State, Nigeria. *Int J Morphol Citeseer.*, 2012; 30(1): 211-216.
10. Navid S, Mokhtari T, Alizamir T, Arabkheradmand A, Hassanzadeh G. Determination of Stature from Upper Arm Length in Medical Students. *Anat Sci J.*, 2014; 11(3): 135-140.
11. Yesmin T, Thwin SS, Afrin Urmi S, Wai MM, Zaini P, Azwan K. A study of facial index among Malay population. *J Anthropol.*, 2014; 2014: 1-4.
12. Jahanshahi M, Golalipour M, Heidari K. The effect of ethnicity on facial anthropometry in Northern Iran. *Singapore Med J.*, 2008; 49(11): 940-943.
13. Priyadharshini KI, Ambika M, Sekar B, Mohanbabu V, Sabarinath B, Pavithra I. Comparison of cheiloscropy odontometric, and facial index for sex determination in forensic dentistry. *J Forensic Dent Sci.*, 2018; 10: 88-91.
14. Ravichandran S, Babu KY, Mohanraj KG. Correlation of facial and nasal index in gender determination. *Drug Interv Today*, 2018; 10(12): 2521-2523.
15. Omotoso DR, Oludiran O, Sakpa CL. Nasofacial anthropometry of adult Bini tribe in Nigeria. *African J Biomed Res.*, 2011; 14(3): 219-221.
16. Salve VM, Thota NR, Naralasetty A. A Study of facial (prosopic) index of Andhra Region (India) Students. *Novel Sci Inter J Med Sci.*, 2012; 1(8): 284-252.
17. Chhabra N and Mishra BK. Sexual dimorphism and ethnic variations in facial index. A study done on North Indian Adults. *Int J Health Sci Res.*, 2015; 5(4): 109-115.