(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 7, Issue 5 , Page No: 43-51
September-October 2024

IJMSCR

Study Of Facial And Nasal Indices In Female Students Of Sharda University From North Central And North East Indian States

[1]Deepanjali Angra, [2]Dr. Aditi Bhatnagar*, [3]Dr. Rachna Rohatgi, [4]Dr. Nirupma Gupta, [5]Dr. Ritu Singh
[1]MBBS, Batch 2021, [2]Professor, [3]Associate Professor, [4]Dean & Professor (Anatomy),
[5]Assistant Professor,
[2,3,4,5]Department of Anatomy,
School of Medical Sciences and Research, Sharda University

***Corresponding Author:**
Dr. Aditi Bhatnagar
Professor, Department of Anatomy, School of Medical Sciences and Research, Sharda University

Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Introduction*:* In today's time, from cosmetic surgeries to face recognition programming in mobile phones, the morphology of the face has a role that affects us directly or indirectly in our daily lives. Anthropometry has provided a way that not only helps us to take face measurements accurately but also helps us to analyze them based on many factors such as age, sex, or geographical region. Of many indices, facial and nasal indices are the most important ones and form the basis of our study. India, being a diverse country from food to attire to languages, shows diversity even in the facial and nasal features. People from North-Central and North-East regions have striking differences in both facial and nasal variables. It thus becomes necessary to form a proper database of all these parameters for people from all regions across the country. This will help in present as well as future medical advancements.

Aim: Our study aims to collect facial and nasal measurements of female students of Sharda University to bring out the differences between the phenotypes of face and nose among the students from North-Central and North-East regions.

Materials and methods*:* The study design of the present study is cross-sectional study. This study was done in Anatomy Department, SMS&R, Sharda University. The total sample size was 100 female students, 50 from North-Central and 50 from North-East regions, aged 18 to 25 years. Digital Vernier calipers was used to take the measurements.

Result: Out of 50 North-Central students, 16 students had a Euryproscopic facial phenotype, 35 students had a Mesorrhine nasal phenotype. Out of 50 North-Eastern students, 18 students had a Mesoproscopic facial phenotype and 31 students had a Mesorrhine nasal phenotype.

Keywords: Anthropometry, Facial Indices, Nasal Indices

Introduction

Human morphology has been studied in great detail since time immemorial. It is known that two persons are never alike in their morphology. It has been studied previously in many anthropometric studies that morphological characteristics are affected by many factors as biological, racial, ecological, age, gender etc. (1). As per the WHO, Anthropometry is mentioned as non-invasive & also less expensive technique to assess morphological features as size, relation between factors and also the composition of human body (2). Anthropometry expresses quantitatively the body form and sexual dimorphism as phenotypic characteristics (3).

A number of measurements have been devised by Anthropologists to study man's morphology. These measurements are based on anatomical landmarks (4). It has been observed that morphological and anthropometric features such as height, facial phenotype, nasal and eye features vary among the individuals of different geological regions depending on the factors such as genetic, ecological, nutritional. (5).

There are many reasons to undertake facial and nasal measurements. The facial and nasal parameters can be useful to get information about the health of Individual, comparative anatomy study of people belonging from different regions and also improve accuracy in moulding and drawing for an artist (6). They can be of great help in situations such as road accidents, burns or recognizing a criminals and a missing person. Facial parameters along with dental records can help to identify victims with decomposed bodies. They also help to cure congenital and post-traumatic deformity of the face (7).

In forensic applications, facial measurements play an important role in facial reconstruction. They help a forensic expert to conclude an image of face. (8). Anthropometric studies play an important role in craniofacial surgery and syndromology (9). Facial and nasal anthropometric data becomes important even for those whose work involves correction of facial anomalies or enhancing aesthetics (10). Nowadays it is an important factor as in the cases of obstructive sleep apnoea correction of nasal parameters can be helpful, as europroscopic facial type have been mentioned better in the nasal breathing mode (11).

Size and shape of nose is believed to be influenced by age, gender, ethnic background and geographical conditions. Wide-sized noses are prominent among individuals of warmth tropics while narrow-sized noses are more common in temperate regions (12). Measurement of nasal index in healthy individuals is also useful for dysmorphologists as in the pre-natal diagnosis of any congenital deformity which is associated with some structural deformity like cleft lip and cleft palate which are also have nasal structural disorder during the embryonic life. (13).

India is a land of diverse population in terms of ethnic and genetic backgrounds. Multiple studies have been conducted from time to time to identify the anthropometric parameters among people residing in different regions of India. North-East is the home land of a large number of ethnic groups who came here from different regions at different historic times. This region is a home to several streams of Mongoloid people who came from North and East at different periods Australoids came before the coming of Mongoloids (14). The various groups of North-East belong to different racial community, speak different language and have mixed socio-cultural traditions (15). People from the North-East can be found in different regions of India including North India. The search through literature has shown that limited publications are available which documents the facial and nasal anthropometric data of the North-East people.

Aim:

This study aimed at providing the base line data and also draw distinction between the female population from North-Central and North-East India with respect to their facial and nasal anthropometry. The study also seeked to expand scientific research to create value for Surgeons who treat North-Central and North-East Indians.

Objectives

1. To document the facial and nasal anthropometric measurements for the female students of Sharda University from North – Central and North – East regions of India.
2. To classify the type of face and nose among female students from North – Central and North – East regions of India.
3. To compare the facial and nasal indices between the female students from North – Central and North – East regions of India.

Materials And Methods

Setting – The study was conducted by the Department of Anatomy, School of Medical Sciences and Research, Sharda University, Greater Noida in collaboration with students of other colleges of Sharda University.

Ethical clearance – Institutional Ehtical Committee clearance was taken prior the beginning of the study. Verbal and written informed consent were also taken from the subjects.

Study design – Cross-sectional study

Volume 7, Issue 5; September-October 2024; Page No 43-51
© 2024 IJMSCR. All Rights Reserved

Study period – For a period of one year

Inclusion criteria – Female students from 18 to 25 years of age of Sharda University were considered as the subjects for the study. Sampling was randomized.

Sample size – 50 North central and 50 North eastern students. Total sample size is 100 students.

Exclusion criteria – Students who did not give their consent. Students having history of cranio-facial trauma, facial scar, plastic surgery and congenital malformations.

Study variables – Demographical data including age and parental origin.

Procedure – The students sat comfortably on a chair in Frankfurt's plane with their heads held straight in an upright position and mouths closed. Written and verbal consent was taken from the subjects both in English and Hindi languages. Carbon fibre composites digital Vernier calipers – 6 inch from Oleander store and black marker was used for the measurements.

For measuring the facial height and breath, the landmarks marked are –

Nasion –The point where the frontonasal and internasal sutures meet (16).

Gnathion – The lowest point on lower border in midline of the chin.

Zygion – A point on the zygomatic arch which is prominent.

After marking the landmarks, facial height and breadth will be measured 3 times and then an average will be calculated to reduce the human error. The measured distances are-

Facial height –The distance between Nasion to Gnathion.

Facial breadth –The distance between two zygomatic prominences. (Fig.1)

Facial index = (facial height ÷ facial breadth) × 100

Fig. 1: The Measurement of facial breadth by using digital vernier caliper.

After calculation, we can use facial index in Banister's classification for classifying the faces (17).

Facial Types	Description	Facial Index (FI)
Hypereuryproscopic	Very broad face	< 79.9
Euryproscopic	Broad face	80 – 84.9
Mesoproscopic	Round face	85 – 89.9
Leptoproscopic	Long face	90 - 95
Hyperleptoproscopic	Very long face	>95

For measuring nasal height and breadth, the landmarks marked are –

Volume 7, Issue 5; September-October 2024; Page No 43-51

© 2024 IJMSCR. All Rights Reserved

Nasion – The point where the frontonasal and internasal sutures meet (16).

Subnasale – The point in the mid sagittal plane where nasal septum meets upper cutaneous lip.

Ala – It is a point on the lateral wall after the nose which is prominent.

After marking the landmarks, nasal height and breadth will be measured 3 times and then an average will be calculated to reduce the human error. The measured distances are–

Nasal height – The distance between Nasion and Subnasale. (Fig. 2)

Nasal breadth – The distance between two Ala.

Nasal index = (nasal breadth ÷ nasal height) × 100

Fig.2: The Measurement of nasal height by using digital vernier caliper.

After calculation, we can use nasal index in Martin and Saller classification for classifying the noses (18).

Nasal Type	Description	Nasal Index (NI) (on living head)	Nasal Index (NI) (on skull)
Hyperleptorrhine	Long narrow nose	40 – 54.9	---
Leptorrhine	Moderately narrow nose	< 70	< 47
Mesorrhine	Moderate or medium size nose	70 – 84.9	47 to 50.9
Platyrrhine	Moderately wide nose	85 – 99.9	51 to 57.9
Hyperplatyrrhine	Very wide nose	100 or more	58 or more

Volume 7, Issue 5; September-October 2024; Page No 43-51

© 2024 IJMSCR. All Rights Reserved

Observation Tables And Result

Tables from 1 - 4 are descriptive tables for each of the parameter.

Table 1

PARAMETER - FACIAL HEIGHT	MEAN (CM)	STD. DEVIATION (CM)	NO. OF CASES
NORTH CENTRAL	10.071	0.568	50
NORTH EAST	10.0361	0.51	50

Table 2

PARAMETER - FACIAL BREADTH	MEAN (CM)	STD. DEVIATION (CM)	NO. OF CASES
NORTH CENTRAL	11.447	0.688	50
NORTH EAST	12.142	0.912	50

Table 3

PARAMETER - NASAL HEIGHT	MEAN (CM)	STD. DEVIATION (CM)	NO. OF CASES
NORTH CENTRAL	4.108	0.32	50
NORTH EAST	4.407	0.26	50

Table 4

PARAMETER - NASAL BREADTH	MEAN (CM)	STD. DEVIATION (CM)	NO. OF CASES
NORTH CENTRAL	3.018	0.217	50
NORTH EAST	3.258	0.27	50

Table 1 shows that the mean (± standard deviation) for North Central and North East females for facial height are 10.071 ± 0.568cm and 10.0361 ± 0.5cm respectively.

Table 2 shows that mean (± standard deviation) for North Central and North East females for facial breath are 11.447 ± 0.688cm and 12.142 ± 0.912cm respectively.

Table 3 shows that the mean (± standard deviation) for North Central and North East females for nasal height are 4.108 ± 0.32cm and 4.407 ± 0.26cm respectively.

Table 4 shows that the mean (± standard deviation) for North Central and North East females for nasal breadth are 3.018 ± 0.217cm and 3.258 ± 0.27cm respectively.

Tables 5 – 6 show independent T - tests for each of the parameter.

Table 5

Volume 7, Issue 5; September-October 2024; Page No 43-51

© 2024 IJMSCR. All Rights Reserved

PARAMETER	FIGURE	SIGNIFICANCE	T TEST
FACIAL HEIGHT	0.161	0.008	-2.693
FACIAL BREADTH	4.063	0	-4.297

Table 6

PARAMETER	FIGURE	SIGNIFICANCE	T TEST
NASAL HEIGHT	0.444	0	-5.136
NASAL BRRADTH	0.96	0	-4.91

The P value (significance) for all the parameters are less than 0.05, showing that all of the parameters are significant.

Tables 7 – 8 show the calculated indices and the level of classification.

Table 7

PARAMETER FOR N.E.	RANGE	MOST COMMON TYPE	NO. OF CASES OF MC TYPE	MEAN OF THE CASES
FACIAL INDEX	80-84.9%	EURYPROSCOPIC	16	82.36%
NASAL INDEX	70-84.9%	MESORRHINE	35	75.30%

Table 8

PARAMETER FOR N.C.	RANGE	MOST COMMON TYPE	NO. OF CASES OF MC TYPE	MEAN OF THE CASES
FACIAL INDEX	85-89.9%	MESOPROSCOPIC	18	87%
NASAL INDEX	70-84.9%	MESORRHINE	31	76%

Table 7 shows the values for North East female students for facial and nasal indices. For facial index, 16 out 50 students showed Euryproscopic type of face having a mean value of 82.36% and for nasal index, 35 out of 50 students showed Mesorrhine type of nose having a mean value of 75.30%.

Table 8 shows the values for North Central female students for facial and nasal indices. For facial index, 18 out 50 students showed Mesoproscopic type of face having a mean value of 87% and for nasal index, 31 out of 50 students Mesorrhine type of nose having a mean value of 76%.

Discussion

The present study showed the range of facial index in North Central female students is Euryproscopic and in North East female students is Mesoproscopic. The range of nasal index in both North Central and North East female students is Mesorrhine.

Many studies had shown racial and ethnic differences in nasal index in different population. Mesorrhine nose type was seen in Jingpo population of China (19). Platyrrhine nose type was seen in Indo African (20) and Afro-American people (21). Kurnia et al (2012) did a study on Chinese population and presented that the facial index was 89.02 ± 4.92 for males and 88.52 ± 4.89 for females indicating a Mesoprscopic face type (22).

Volume 7, Issue 5; September-October 2024; Page No 43-51
© 2024 IJMSCR. All Rights Reserved

In India, anthropometric studies have been conducted region wise from time to time, all across the country.

AUTHOR	YEAR	REGION	SUBJECTS	FACIAL PHENOTYPE
Ghosh S et al. (23)	2007	West Bengal	400 females (total 800 subjects)	Hypereuryproscopic
Kumar M et al. (24)	2013	Haryana	300 females (total 600 subjects)	Mesoproscopic
Prasanna LC et al. (25)	2013	North and South Indian regions	100 females (total 200 subjects)	South Indian – Euryproscopic North Indian - Hyperleptoproscopic
Shah T et al. (26)	2015	Gujarat and non - Gujarat	225 Gujarati females (total 901 subjects) and 100 non – Gujarati females (total 300 subjects)	Hypereuryproscopic – Gujarati Euryproscopic – Non - Gujarati
Kataria DS et al. (27)	2015	North India	200 females (total 400 subjects)	Mesoproscopic
Ranjana G et al. (28)	2016	Chhattisgarh	100 females (total 200 subjects)	Hyperleptoproscopic
Radha K et al. (29)	2020	Andhra Pradesh, Karnataka, Kerala	110 females (total 200 subjects)	Hyperleptoproscopic
Current study	2022	North Central and North East India	50 North Central females and 50 North Eastern females (total 100 subjects)	Euryproscopic – North Central Mesoprscopic – North East

AUTHOR	YEAR	REGION	SUBJECTS	NASAL PHENOTYPE
Pandey (30)	2006	Andaman Islands	26 females (total 53 subjects)	Platyrrhine

Volume 7, Issue 5; September-October 2024; Page No 43-51
© 2024 IJMSCR. All Rights Reserved

Singh and Purkait (31)	2009	Madhya Pradesh	119 females (total 245 subjects)	Mesorrhine
Gangrade (32)	2012	Rajasthan	500 females (total 1000 subjects)	Mesorrhine
Kaushal (33)	2013	Punjab	300 females (total 600 subjects)	Leptorrhine
Sharma and Jehan (34)	2014	Madhya Pradesh	102 females (total 204 subjects)	Mesorrhine
Current Study	2022	North central and North East India	50 North Central females and 50 North Eastern females (total 100 subjects)	Mesorrhine for both of the regions

Conclusions

The most common type of facial phenotype in North Central female students was Euryporscopic and in North East female students was Mesoproscopic. For nasal phenotype, students from both regions had Mesorrhine type. The data interpreted can be helpful in Forensic Medicine for identification purposes, in surgeries for correction of facial defects, and in Biometrics application as well. This study can also be used for comparison with other studies exploring the same subject of Anthropometry.

References

1. Mostafa A, Banu L A, Rahman F, Paul S, Craniofacial Anthropometric Profile of Adult Bangladeshi Buddhist Chakma Females, Journal of Anthropology, vol.2013; Article ID 676924, 7 pages, 2013
2. Mar Mar Wai, San San Thwin, Tahamida Yesmin, Aqlan Ahmad, Atina Shahida Adnan, Auni Azrawati Hassan, Nabilah Ahmad, Nurul Izzati Zakariah, "Nasofacial Anthropometric study among University students of three races in Malaysia", Advances in Anatomy, vol.2015, Article ID 780756, 5 pages, 2015
3. T. Yesmin, S.S. Thwin, S. Afrin Urmi, M.M. Wai, P.F. Zaini, K. Azwan, A Study of Facial Index among Malay Population, Journal of Anthropology, vol.2014: Article ID 726974, 4 pages, 2014
4. Asharani S.K., Tejaswi H.L., Rajendra R., Surendra M., Study of Nasal Index among Students of Tertiary Medical Care Institute in Southern India, International Journal of Anatomy and Research.2015, vol 3(4):1675-79
5. Vangara Shanmukha Varalakshmi, Kumar Dhananjay, Arora Neel Kamal: A cross sectional study of facial index in Western Uttar Pradesh population between 18-25 years of age. Asian Journal of Medical Sciences.2021;12(6): 75-80
6. Raymond Saa-Eru M., Chrissie S.A., Joshua T., Nancy D.D., Obed Ohene-Djan A., Atta K.A., Thomas D., Anthropometric Study of Facial Morphology in two tribes of the Upper West region of Ghana, International Journal of Anatomy and Research.2017, vol 5(3.1):4129-35
7. Sharma K, Khanal K, Mansur DI. Variations in total facial index among students of Kathmandu University School of Medical Sciences. Nepal Med Coll J.2014;16(2-5): 173-6
8. Krishan K, Kumar R, Determination of Stature from Cephalo-facial Dimensions in a North Indian Population, Leg Med 2007 May; 9(3):128-33
9. Choudhary A, Choudhary DS. Comparative Anthropometric study of nasal parameters between two ethnic groups of Rajasthan state. International Journal of Medicine and Public Health.2012;2(2): 46-48

Volume 7, Issue 5; September-October 2024; Page No 43-51
© 2024 IJMSCR. All Rights Reserved

10. Wen YF, Wong HM, Lin R, Yin G, McGrath C. Inter-ethnic / racial facial variations: a systemic review and Bayesian meta – analysis of photogrammatic studies. PLOSOne.2015;10: e013452
11. Cakier et al. The relationship between Craniofacial Morphology and Obstructive Sleep Apnea in Whites and African-Americans, Am J Respir Crit Care Med.201; 163:947-50
12. Omotoso D.R., Adagbonyin O., Bienonwu E., Uwagbor V., Anthropometric evaluation of Nasal height, Nasal breadth and Nasal index among Bini children in Southern Nigeria, International Journal of Anatomy and Research.2019, vol 7(3.2):6896-6900
13. Esomonu U.G., Ude R.A., Lukpata P.U., Nandi E.M., Anthropometric study of the Nasal index of Bekwara ethnic group of cross river state, Nigeria, International Journal of Applied and Basic Science. 5(10): 1262-1265
14. K Saha, MK Bhowmik, D Bhattacharjee, "Anthropometric Measurement of north-east Indian faces for forensic face analysis", in computational Intelligence in Digital Forensics: Forensic Investigation and Applications, pp.125-144, Springer, Cham, 2014
15. Ali, A.N.M.I., Das, I, Tribal situation in North East India. Studies on Tribes and Tribals 1(2), 141-148 (2003)
16. Standring S. Gray's Anatomy: The anatomical basis of clinical practice. 42th edition. Elsevier. October 21, 2020; pp 558
17. Imami-Mibodi MA, Mastri-Farahani R. Study Of Normal Range Of Anatomical Dimensions of One-Day Old Newborn By Cephalometry. J Med Counc Islam Repub Iran. 1996; 14:1-8.
18. R. Martin, K. Saller, Lehrbuch der Anthropologie, Gustav Fischer Verlag, Stuttgart, 1975
19. Xu B, Wang Y, Ma J, Li M, Xu L. A computer-aid study on the craniofacial features of Archang race in Yunnan province of China. West China Journal of Stomatology. 2011;19: 394–396
20. Sparks CZ, Jantz RL. A reassessment of human cranial plasticity: Boas revisited. Proc Natl Acad Sci. 2002;99: 14636–14639
21. Ofodile FA, Bokhari F. The African American nose: Part II. Ann Plast Surg. 1995;34: 123–129
22. C. Kurnia, S. Susiana, W. Husin, Facial indices in Chinese ethnic students aged 20-22, Journal of Dentistry Indonesia, vol.19, no.1, pp.1-4, 2012
23. Gosh S and Malik SL, Sex difference in body size and shape among Santhals of West Bengal, Anthropology.2007; (9): 143-149 https://doi.org/10.1080/09720073.2007.11890992
24. Kumar M and Lome MM, The study of Facial index among Haryanvi adults. Int J Sci.2013; 2(9):51-53
25. Prasanna LC, Bhosale S, D'Souza AS, Mamatha H, Thomas RH and Sachin KS, Facial indices of North and South Indian adults, Reliability in stature estimation and sexual dimorphism. J Clin Diagn Res.2013;7(8):1540-1542
26. Shah T, Thaker MB and Menon SK, Assessment of Cephalic and Facial indices: A proof for ethnic and sexual dimorphism. J Foren Sci Criminol.2015;3(1)1-11
27. Kataria DS, Ranjan RK and Perwaiz SA, Study of variation in total Facial index of North Indian population. Int J Health Sci Res.2015;5(4): 122-127
28. Ranjana G, Rohini M and Manik C, Anthropometric assessment of morphological Facial index of Gond males and females of Uttar Baster Kanker, C.G. Int J Anat Res.2016;4(4): 3170-3174
29. Radha K and Srinivasan KR, Characterization of Facial Anthropometrics and Correlation with Sexual Dimorphism in 18-25 years South Indian Adult Population00000. Online J Health Allied Sci.2020;19(2):11
30. Pandey AK, Cephalofacial variation among Onges, Anthropologist 2006;8(4):245-249
31. Singh P, Purkait R, A Cephalometric study among sub caste groups of Dangi and Ahirwar of Khurai block of Madhya Pradesh, Anthropologist.2006;8(3):215-217
32. Gangrade PR, Babel H, Anthropometric study of Nasal index of the Bheel-Meena tribe of Southern Rajasthan, IJCRR.2012;4(19):88-91
33. Kaushal S, Patnaik VVG, Kaur P, Somatometric analysis of Nasal morphology in the Endogamous groups of Punjab, Hum Bio Rev.2013; 2(1):215-217
34. S.K. S, Massarat J, Raj Laxmi S, Sudhir S, Akhilesh T, Vipendra B, Anthropometric Comparison of Nasal parameters between male and female of Gwalior region, IOSR Journal of Dental and Medical Sciences.vol.13, pp 57-62, May 2014.

Volume 7, Issue 5; September-October 2024; Page No 43-51

© 2024 IJMSCR. All Rights Reserved