Original Research Article

VARIATIONS IN THE FACIAL AND CEPHALIC INDEX AMONG MEDICAL STUDENTS

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ABSTRACT

Background: The morphological features of the face of every individual are unique and complicated and will change with growth and age. Morphometric of face depends on many factors like gender, nutritional, genetic factors, ethnicity and geographical location. Variations in facial and head dimensions and face and head types have practical implications mainly in the field of anatomy, forensic medicine and anthropologist. Hence the objective of the study was to determine the variations in facial morphometry among the medical students. **Materials and Methods:** The cross-sectional study was done among 200 medical students of World College of Medical Sciences aged between 18 to 23 years. The cephalic and facial indices were derived after measuring length and breadth of head and face. Facial index = (Facial breadth/Facial length) x 100. Cephalic Index = (Head breadth/Head length) x 100. The collected data was entered in excel and analyzed with SPSS 22.0 software. **Result:** The present study observed that the most common type of face was Hyperleptoprosopic 150 (75%) followed by Leptoprosopic 40 (20%) and Mesoprosopic10 (5%). Similarly, the most common type of head was Dolicocephalic 156 (78%), followed by Mesocephalic 39 (19.5%), and Brachycephalic 5 (2.5%). **Conclusion:** This study concluded that the hyperleptoprosopic face was most common type and the least common type was euryprosopic face. The most common type of head was found to be dolicocephalic and the least common type was found to be brachycephalic. Personal identification is essential in medico-legal purposes by anatomist, anthropologists and forensic scientists.

INTRODUCTION

Anthropometric analysis is a quantitative method employed to determine the measurements of the different body parts either in living or dead.[1] The morphological features of the head and face of every individual are unique and complicated and will change with growth and age.[2] Variations in facial and head dimensions and face types have been point of interest for researcher since long time as it have practical implications mainly in the field of anatomy, forensic medicine anthropologist and surgeons.[3,4] Facial anthropometric indices have importance in plastic and cosmetic surgery, oral surgery, diagnostic comparisons between patients and normal population.[5] Morphometry of face and head have direct or indirect influence on many factors like gender, nutritional, genetic factors, ethnicity of the communities and geographical location.[6] At birth the development of face is completed by 40% followed by 65% within next 7 years and growth in the bizygomatic width by 15% within 10 years.[7]There are few study on variations in the morphometry of face and head. The morphometry of face and head are variable between different individuals. Hence the objective of the study was to determine the variations in facial morphometry among the medical students.

MATERIALS AND METHODS

This cross-sectional study was conducted from March 2025 to October 2025 among 200 medical students (110 female and 90 male) of World College of Medical Sciences aged between 18 to 23 years. The participants were informed about the study protocols and consent from the students was taken before the data collection. The physically fit students were included in this study. The students with any head injuries, traumatic and congenital

cephalo-facial deformities were excluded from the study. Anthropometric Measurements were recorded with the help of scale, thread and measuring tape.

The measurements taken are as follows:
1. Facial length:
2. Facial breadth:
3. Cephalic head length:
4. Cephalic head breadth:

The facial length is measured as the distance from nasion to gnathion (lowest point in mandible) and breadth is measured as the distance between two zygomatic prominences. The cephalic head length is measured as the distance from glabella to inion of skull and breadth is measured as the distance between two parietal prominences of skull. Facial length and width was measured and facial index was calculated by using the formula, Facial index (FI) = (Facial breadth/Facial length) x 100. Cephalic head length and breadth was measured and cephalic index was calculated by using the formula, Cephalic Index (CI) = (Head breadth/Head length) x 100. The collected data was entered in excel and analyzed with SPSS 22.0 software and differences in measurements among students was calculated.

All the measurements were taken with the individual sitting in a relaxed position and head in Franfort's horizontal plane. The type of face and head were classified into 5 different types by Martin and Sallerclassification.[8] The five face types are Hypereuroprosopic (very broad face, FI=<80), Europrosopic (broad face, FI=80-84.9), Mesoprosopic (round face, FI=85-89.9) Leptoprosopic (long face, FI=90- 94.9) and Hyperleptoprosopic (very long face, FI=>95). The five head types are Dolicocephalic (long head, CI=<76), Mesocephalic (round head, CI=76-80.9), Brachycephalic (broad head, CI=81-85.9), Hyperbrachycephalic (very broad head, CI=86-90.9) and Ultrabrachycephalic (short and flat head, CI=>91).

RESULTS

The study was conducted on 200 medical students out of which 90 (45%) were males and 110 (55%) were females students respectively. The mean value of both facial length and breadth were shown higher in male students as compare to female students (Table 1). The mean value of head length and breadth were shown higher in male students as compare to female students (Table 2). The study observed that the most common type of face was Hyperleptoprosopic 150 (75%) followed by Leptoprosopic 40 (20%) and Mesoprosopic10 (5%) shown in Table-3 and Figure-1. Similarly, the most common type of head was Dolicocephalic 156 (78%), followed by Mesocephalic 39 (19.5%), and Brachycephalic 5 (2.5%) shown in Table-4 and Figure-2.

Table1: Measurement of Face in cm

Face Measurement	Mean ± SD for Male	Range	Mean ± SD for Female	Range
Length	11.23±0.44	11-13	10.46±0.62	10.2-12
Breadth	12.46±0.42	11-13.2	12.24±0.60	11-13.1
Facial index	88.42±4.22	85-100	85.66±4.20	85-96

Table 2: Measurement of Head in cm

Head Measurement	Mean ± SD for Male	Range	Mean ± SD for Female	Range
Length	17.88±0.47	17-19	17.46±0.62	16-18
Breadth	14.64±0.32	13-15	12.84±0.32	12-14
Cephalic index	74.66±2.48	66-84	72.45±4.22	64-82

Table 3: Face Type

Face type	Male No. (%)	Female No. (%)	Total No. (%)
Hypereuroprosopic	0 (0%)	0 (0%)	0 (0%)
Europrosopic	0 (0%)	0 (0%)	0 (0%)
Mesoprosopic	2 (2.22%)	8 (7.20%)	10 (5%)
Leptoprosopic	16 (17.78%)	24 (21.80%)	40 (20%)
Hyperleptoprosopic	72 (80%)	78 (71%)	150 (75%)

Table 4: Head Type

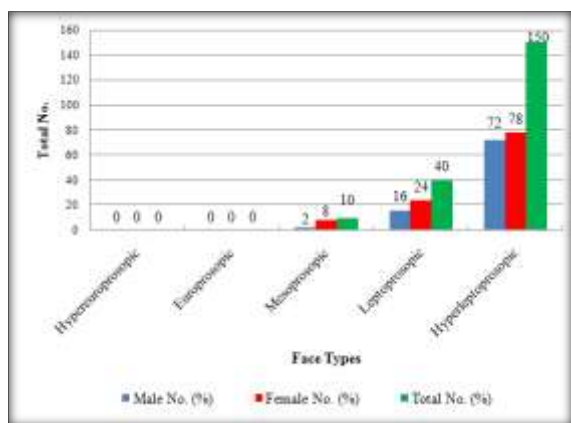| Head type	Male No. (%)	Female No. (%)	Total No. (%)
Dolicocephalic	70 (77.8%)	86 (78.20%)	156 (78%)
Mesocephalic	18 (20%)	21 (19.10%)	39 (19.5%)
Brachycephalic	2 (2.20%)	3 (2.70%)	5 (2.5%)
Hyperbrachycephalic	0 (0%)	0 (0%)	0 (0%)
Ultrabrachycephalic	0 (0%)	0 (0%)	0 (0%)

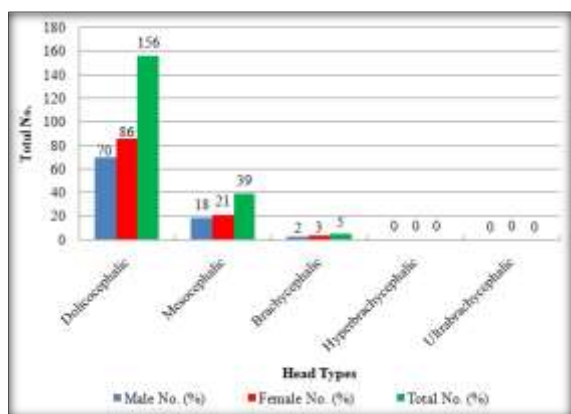**Figure 1: Showing different types of face in male and female**

Figure 2: Showing different types of head in male and female

DISCUSSION

The present study was done to measure the different parameters of face and head and to analyze their correlation by using standard statistical analysis. Facial dimensions and facial index varies with gender and ethnic groups.[9,10]

The present study found the mean facial index of male and female was 88.42±4.22 and 85.66±4.20 respectively which were almost comparable to that of Jeremic D et al. study.[11] Prasanna et al,[12] observed that the facial index of male and female was 101.04±1.95 and 107.7±7.69 respectively which values were higher than the values of present study. The mean facial length of the present study of male and female were 11.23±0.44cm & 10.46±0.62cmrespectively showed lower values than the measurements 12.56±0.93cm in male and 12.00±0.64cm in female respectively obtained by Chandimal K et al. studies.[13]

The present study observed that the most common type of face was Hyperleptoprosopic followed by Leptoprosopic and Mesoprosopic in both genders which were almost comparable to that of. Jaberi KR et al. and Rexhepi A et al. studies.[14,15] Heidari et al.,[16] study reported the most common type of face was euryproscopic which was contraindications from the result of present study. Variations in these findings may be due to environmental and genetics affect on their facial morphology.

The most common type of head was found to be Dolicocephalic, followed by Mesocephalic, and Brachycephalic in the present study. A study done by Saini et al,[17] also reported dolicocephalic to be the most common type of head which was comparable to the present study. A study done by Torres Restrepo AM et al,[18] found that the mesocephalic was the second common type of head which was comparable to the present study. But a study conducted by Rauten AM et al,[19] reported mesocephalic type of head as the dominant type in their study. A study done by Timsina R & Gogoi P also reported that the mesocephalic type of head to be the most common among Medical students.[20] A study was conducted by Rao et al. reported the least type of head was the brachycephalic among their population which was in accordance to the present study.[21] This study has investigate the variations in the facial and cephalic index among medical students However, this study is limited by several factors that may affect the generalizability and accuracy of its findings. The sample size was small and drawn from a single institution, limiting its representativeness. Additionally, the sample lacked diversity in terms of religions and ethnicity, which could influence the facial and cephalic indices observed.

CONCLUSION

The morphometry of face and head are variable between different individuals. The study concluded that both head length and breadth and facial length and breadth were shown higher in males as compare to females. This study also concluded that the hyperleptoprosopic face was most common type and the least common type was mesoprosopic face. The most common type of head was found to be dolicocephalic and the least common type was found to be brachycephalic. The study data obtained may be useful for further research and other medico-legal purposes by anatomist, anthropologists and forensic scientists.

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