



## The Morphometrical Variation of adult's Human Face in Nepal

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### ABSTRACT

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**Background:** The evaluation and measurement of human body dimensions are achieved by physical anthropometry. Cephalometry is a branch of anthropometry science in which the head and face anatomical dimensions are measured. This research was conducted in view of the importance of anthropometric indices of the face in forensic medicine, surgery, paediatrics and medical imaging.

**Material and Methods:** This cross-sectional study was set up to determine and compare the face shapes Nepalese populations aged between 17 & 30 -year-old males and females. The length and width of faces were determined by using Digital vernier calliper and martin spreading calliper respectively. The shape of faces in among male and female of Nepalese population were determined and was compared with other studied and population.

**Results:** In this research, we found that mean values face height and width among male and female were  $115.78 \pm 7.02$  and  $112.78 \pm 4.7$  and were  $127.19 \pm 6.59$  and  $130.18 \pm 7.44$  respectively. Prosopic Index among male and female were  $89.01 \pm 3.82$  and  $88.83 \pm 3.82$  respectively. The result showed that both male and female was found to round face. This showed that Nepali population face was Mesoprosopic (round)  $PI = 85 < PI < 89.9$ .

**Conclusion:** This study determined the possible effect of ethnicity on the diversity of face shapes in males and females adult Nepalese and was found to Mesoprosopic face.

### KEYWORDS:

Anthropometry, Cephalometry, Prosopic Index, Hypereurisopic etc.

### INTRODUCTION

Craniofacial Anthropometry is an important branch of physical anthropometry and medicine and used to determine the morphology of head and face<sup>1</sup>. Face is a complex anatomical unit. The shape of face influences by many factors such as gender, race, climate, ethnicity, socioeconomic, nutritional and genetic factors<sup>2</sup>. The analysis and evaluation of facial parameters is of great important for facial trauma, congenital malformation, traumatic deformities and easier identification of certain congenital malformation in the facial region<sup>3</sup>.

Studying intra- and inter-population variations in different morphological characters have long been an interest of anthropologists<sup>4</sup>. Although anthropometric studies of new borns, other age groups and their relationship in health and disease have been achieved, there is currently a need for research in different geographical area<sup>5</sup>.

The dimensions of the human body are affected by ecological, biological, geographical, racial, gender and age factors. On the basis of the above factors, anthropometrical studies have been conducted on the age, gender and racial groups in certain geographical zones<sup>6</sup>. Cephalometry is one of the important parts of anthropometry, in which the dimensions of the head and face are measured. Cephalometric results are used in forensic medicine, plastic surgery, oral surgery, paediatrics, dentistry, and diagnostic knowledge between the patient and normal populations<sup>7</sup>.

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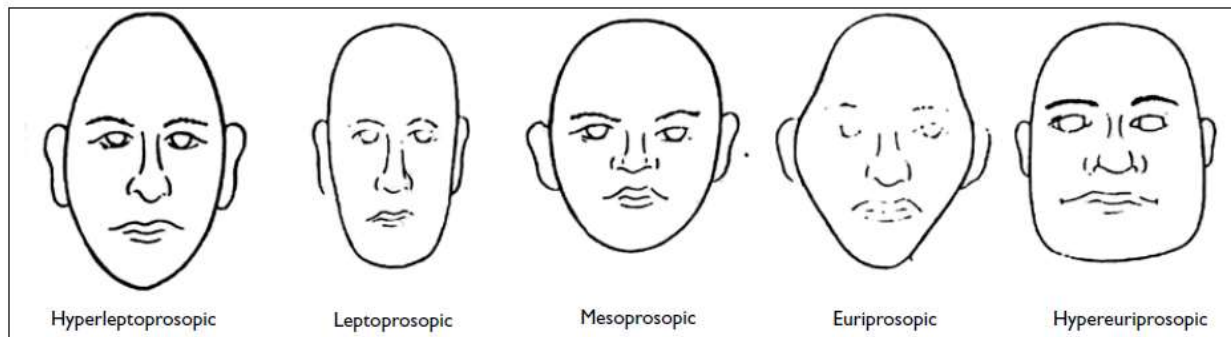
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**Clinical Significance of Facial parameters**

The assessment and evaluation of facial parameters is helpful for the cranial facial dysmorphogenesis such as developmental anomaly like cleft palate. The research on the facial parameters is significant for the affected family requiring genetic counselling as requirement for screening procedure

and also has importance for facial assessment in surgery and forensics investigation for individual identification in the Nepali population.

Face shape was classified by Williams et al, 1995 and Panero 1979<sup>8-9</sup>.



**Fig 1: Classification of Face according to Prosopic Index<sup>8-9</sup>**

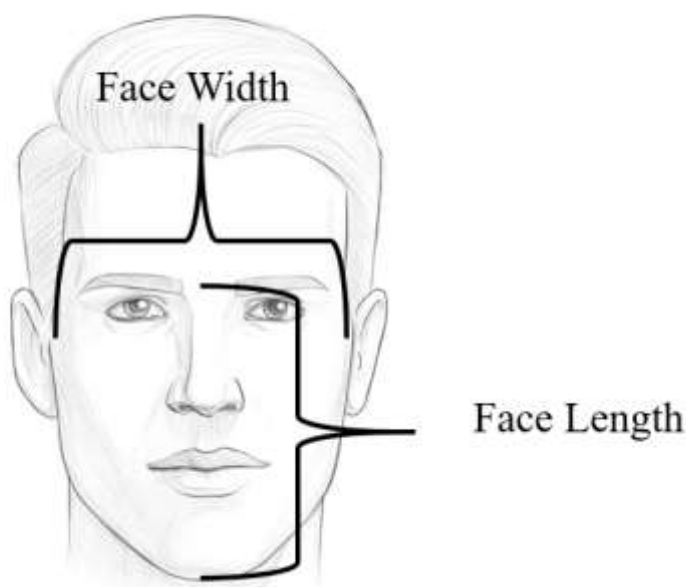
Face shape	PI Range
Hypereuriprosopic	<79.9
Euriprosopic	80-84.9
Mesoprosopic	85-89.9
Leptoprosopic	90-94.9
Hyperleptoprosopic	>95

The collected data can be used in anthropometry, forensic medicine for the identification of racial and sexual difference as well as in reconstructive facial surgery.

**METHODOLOGY**

This cross-sectional study was set up to determine and compare the face shapes Nepalese populations aged between 17 & 30 -year-old males and females from September 2017 to February 2018 in Nepal. The total number of 404 subjects both sex were taken for the study, out of which 190 were male

and 214 were female participants respectively. The length and width of faces were determined by using Digital vernier calliper. The shape of faces in among males and females of Nepalese population were determined and was compared with other studied and population.



**Fig 2: Measurement of Face<sup>8</sup>**

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Face Length was measured form distance from nasion to gnathion as fig. 2

Face Width was taken the bityomatic distance as fig. 2.

Mathematically, Prosopic Index: Face height/ Face Width  $\times 100$  <sup>9</sup>.

For the statistical analysis, mean, Standard deviation, P-value were calculated by using Statistical Package for Social Science SPSS 22 as statistical software and t- test for calculation of facial parameters.

### RESULTS

**Table: 1**

Parameters/ Sex	Male	Female	P- Value
Face Length (mm)	115.78 $\pm$ 7.02	112.78 $\pm$ 4.75	0.001
Face Width (mm)	130.18 $\pm$ 7.44	127.19 $\pm$ 6.59	0.001
Prosopic Index	89.01 $\pm$ 3.82	88.83 $\pm$ 4.62	0.001

According to our finding, mean of facial length, facial width and prosopic index with statically significance ( $p \leq 0.001$ ) were tabulated in table 1. The result of our study showed that mean face length, face width and prosopic index were greater value in male than female.

**Table 2: Comparison of Face length, Face width and Prosopic Index our study with other studies.**

Race /Group	Authors	Gender	Face Length (mm)	Face Width (mm)	Prosopic Index
Nigerian population	RajiJM, GarbaSH, NumanAI, WaziriMA, MainaMB (2010) <sup>10</sup>				95.86
Rajput Individuals Bikaner, Rajasthan	Rakesh Mani (2013) <sup>11</sup>	Male	113.6	121.7	92.91
Irani Population (Baluchi) (2006)	H. Zahra(2006) <sup>12</sup>	Female			84.84
Irani Population ( Sistani )	H. Zahra (2006) <sup>12</sup>	Female			83.22
Chinese	Xuetong et al <sup>13</sup>	Male	125.8 $\pm$ 6.57	142.6 $\pm$ 5.11	88.22
		Female	120.13 $\pm$ 5.05	139.3 $\pm$ 4.36	86.23
Indian Onges	Ashok K. P. ( 2006 ) <sup>14</sup>	Male			77.98
		Female			75.29
Caucasians	Farkas et al (2007) <sup>15</sup>	Male	124.7 $\pm$ 5.7	139.1 $\pm$ 5.3	89.64
		Female	111.4 $\pm$ 4.8	130.0 $\pm$ 4.6	88
African Americans	Farkas et al (2007) <sup>15</sup>	Male	125.6 $\pm$ 8.0	139.0 $\pm$ 5.3	90.35
		Female	116.5 $\pm$ 6.1	130.5 $\pm$ 4.8	89.27
Malaysians Indians	Ngeow & Aljunid (2009) <sup>16</sup>	Male	116.4 $\pm$ 4.7	136.3 $\pm$ 4.8	85.5
		Female	126.7 $\pm$ 3.9	126.7 $\pm$ 3.9	85.4
Malaysia	Shetti et al ( 2011 ) <sup>17</sup>	Male	111.4 $\pm$ 0.54	130.2 $\pm$ 0.63	85.72
		Female	104.8 $\pm$ 0.5	119.7 $\pm$ 0.68	87.71
Chinese Population	L.Du, et al (2008) <sup>18</sup>	Male	117.3 $\pm$ 5.6	147.5 $\pm$ 4.7	79.76
		Female	110.3 $\pm$ 7.2	139.9 $\pm$ 6.2	78.84
North Indian	Chhabra N., Mishra B.K. (2015) <sup>19</sup>	Male	112.84 $\pm$ 6.23	124.7 $\pm$ 7.61	90.68
		Female	108.84 $\pm$ 5.21	121.51 $\pm$ 7.35	89.73
Nepali Population	Present study	Male	115.78 $\pm$ 7.02	130.189 $\pm$ 7.44	89.01 $\pm$ 3.82
		Female	112.78 $\pm$ 4.75	127.19 $\pm$ 6.59	88.83 $\pm$ 4.68

Comparison of prosopic index our finding with other studies were tabulated in table 2. The Prosopic Index of present study was found to be Mesoprosopic (Round Face).

### DISCUSSION

The previous study showed that ethnicity and racial difference influence in mean value of the prosopic index. The

mean value of prosopic index observed in present study were found to be greater in male than female. The result of our study showed that the dominant type of face were Mesoprosopic in the both male and female population of Nepal.

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L. Du. et al 2008, observed in the Chinese population that face length and width of male were  $117.3 \pm 5.6$  mm and  $147.5 \pm 4.7$  mm and that of female were  $110.3 \pm 7.2$  mm and  $139.9 \pm 6.2$  mm respectively. In present study face length and face width of male were  $115.78 \pm 7.02$  mm and  $130.18 \pm 7.44$  mm and that of female were  $112.78 \pm 4.75$  mm and  $127.19 \pm 6.59$  mm respectively. The present results showed the parameters for face were significantly differ in the value. Similar Prosopic Index of north Indian were 90.68 and 89.73 among male and female respectively and found to Leptoprosopic and Mesoprosopic in male and female respectively. In the present study the values of Prosopic Index among male and female were  $89.01 \pm 3.82$  and  $88.83 \pm 4.62$  respectively and face type was found to Mesoprosopic (round) with significant different in male.

Chhabra N., Mishra B.K (2015) reported that face length were 112.84 mm and 108.84 mm and face width were 124.70 mm and 121.51 mm among male and female of north Indian and found the value were greater in male than female respectively.<sup>19</sup> In present study face length and face width of male were  $115.78 \pm 7.02$  mm and  $130.18 \pm 7.44$  mm and that of female were  $112.78 \pm 4.75$  mm and  $127.19 \pm 6.59$  mm respectively. Comparing the value face length and width among male and female were found to be greater in male than female in both population. The prosopic index male and female of Chinese population were 79.78 and 78.84 respectively and type of face in Chinese was found to Hypereurisopic. In the present study the values of prosopic index among male and female were  $89.01 \pm 3.82$  and  $88.83 \pm 4.62$  respectively and prosopic index type of face was found to Mesoprosopic (round).

H. Zahra (2006) reported that in Iran population prosopic index were 84.84 and 83.22 Baluchi and Sistani of female respectively and found to be Euriprosopic<sup>12</sup>. In the present study result of prosopic index was 89.02 and 88.83 among male and female of Nepali population respectively and type of face encounter in Nepali population were Mesoprosopic type of classification. We found the variation of face type according to geographically differ from place to place. The type of facial may be also influence different factor like environment, genetic and climates.

### CONCLUSION

The result of study is showed that face shape of Nepali population is Mesoprosopic type according to classification. There are significant difference found in measurement face length and face width among male and female and prosopic index also found significant difference ( $p \leq 0.001$ ). This is agree with other author that sexual dimorphism on feature of face measurement is established.

After conducting the research, it was concluded that dominant type of face in population of Nepal is Mesoprosopic according to calculation of prosopic index. The data obtained

may be helpful for in further research such anthropology, forensics medicine, genetic research, maxillofacial surgeries, reconstructive surgery of face and medical clinical practice. The study is of the immense value for further researcher in different area of Nepal like in clinical practice, forensic anthropology, paleo-anthropological studies and development anatomy in genetic counselling.

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