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Baseline data of facial parameters in the population of Haryana: An anthropometric study

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Abstract

Context: Anthropometry plays an important role in the assessment of ethnicity and identification of an individual. There is paucity of literature on various facial parameters in Haryanvi population. Thus, the present study was an initiation to collect this database in Haryanvi population. **Aim:** The aim of the present study was to create a database of craniofacial parameters of Haryanvi population. **Materials and Methods:** The study was conducted on 300 individuals of Haryanvi ethnicity. A digital vernier caliper was used for the measurement of facial parameters. **Statistical Analysis:** Chi-square test, *t*-test, and Pearson's correlation test were used for finding the difference between the measurements for various parameters. **Results:** In the present study, mesoprosopic was the predominant facial phenotype in both males and females. A significant sexual dimorphism was found between all the facial parameters measured in the study. However, upper facial height and facial index did not follow the same pattern in relation to gender determination. **Conclusion:** Based on the present study findings, we conclude that craniofacial parameters could be used as an important tool to assess the ethnicity and gender of an individual. In addition, our data could be used as a baseline for further studies in the identification of a Haryanvi individual.

Key words: Anthropometry, ethnicity, facial index, Haryanvi, identification

Introduction

In the present scenario, there has been a devastating increase in human-made disasters (bomb blasts, terrorist attacks, and mass murders) and natural mass disasters (earthquakes, landslides, tsunamis, and floods). In addition, in the past few decades, a vast change has occurred in social, economic, cultural, and environmental background of human beings. Thus, the abovementioned disasters necessitate the correct identification of individuals in cases when the body is highly decomposed or dismembered to intentionally hide the identity of an individual.[1] Anthropometry has emerged as a promising branch of forensic science for personal identification, but, currently, it is in its infancy as forensic anthropologists are involved in discovering new methods of identification from skeletal remains, cadavers, and living beings. Anthropometry (anthropos – man; metry – measure)

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is a science which is used for the identification and understanding of human physical features and plays an important role in assessing the ethnicity and identification of human remains.[2] Craniofacial anthropometry forms an integral part of anthropology and deals with the measurement of face and head. It has a pivotal role in the identification of individuals especially as facial measurements depend on various factors such as gender, race, ethnicity, genetics, and climate.[3] Creation of a database consisting of craniofacial values for various populations is indispensable so that ethnicity and gender of an unknown could be appraised. Once the vital information is collected anthropometrically, other techniques would be helpful for more accurate identification of the individual. Thus, the need of the hour is to encourage newer studies on craniofacial anthropometry from different populations of the world. After extensive search, we found that different studies in the past have used different criteria to assess ethnicity from facial profile in various populations. Thus, the motive behind this study was to use all the parameters which have been studied by different researchers either individually or collectively and to use them in one study to determine the facial profile in Haryanvi population. However, there is paucity of literature on various facial parameters in Haryanvi population. Thus, the present study was conceptualized to initiate this database collection where 300 Haryanvi individuals were anthropometrically evaluated and, to the best of our knowledge, ours is the first study to use all these parameters collectively on Haryanvi population.

Table 1: Anatomical landmarks used for measurements of facial dimensions

Landmarks	Anatomical description
Tr	The midpoint of the hair line at the top of the forehead
N	The midpoint of the nasofrontal suture
Gn	In the midline, the lowest point on the lower border of the chin
Zygomatic prominences, Zy	The most lateral point on the zygomatic arch
En	The inner corner of the eye fissure where the eyelids meet
Sn	In the midline, the junction between the lower border of the nasal septum and the cutaneous portion of the upper lip
Angles of mouth	Right and left

Tr: Trichion, N: Nasion, Gn: Gnathion, En: Endocanthion, Sn: Subnasale, Zy: zygion

Table 2: Parameters recorded in the study

Parameters	Definitions
PFL	The distance between Tr and Gn
MFL	The distance between N and Gn
Width of face	The distance between left and right Zy
Intercanthal distance	The distance between two endocanthi
Nasal height/UFH	The distance from N to Sn
LFH	The distance from Sn to Gn
Width of mouth	The distance between the angles of a mouth

Tr: Trichion, N: Nasion, Gn: Gnathion, En: Endocanthion, Sn: Subnasale, Zy: zygion, PFL: Physiognomic facial length, MFL: Morphological facial length, UFH: Upper facial height, LFH: Lower facial height

Table 3: Classification of the facial phenotype based on facial index

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

Aims and objectives

The aim of the present study was to create a database of craniofacial parameters for Haryanvi population. The objectives were to collect craniofacial data from the population of central Haryana and to compare these data with previous data reported in literature. A gender-based comparison for these measurements was also done.

Materials and Methods

The present study was carried out on 300 individuals (150 males and 150 females) aged 17–30 years. The participants were purely of Haryanvi ethnic origin and were selected at random from the patients who reported to the outpatient department of our institute. During the selection of participants, their ethnic origin was confirmed by inquiring about their great grandfathers and ancestors. Individuals who confirmed that their ancestors were also from Haryana were included in the study. Individuals with any past and existing craniofacial trauma, facial deformities, facial scars, and facial asymmetries were excluded from the study.

Each participant was explained about the measurement process, and informed consent was obtained from him or her before recording the same. All measurements were carried out by the same observer and under the same conditions. The participants were made to relax in a sitting position, with the head in the correct anatomical position. A digital vernier caliper was used to measure the facial parameters. The reference points which were used to determine various measurements are described in Table 1 and depicted in Figure 1.[2,4-7]

The parameters which were recorded in the study using the abovementioned landmarks are summarized in Table 2.[2,4-7]

The following formula was used to calculate the facial index (FI):[4,8]

$$\text{Facial Index } (\text{FI}) = \frac{\text{Morphological facial length}}{\text{Width of face}} \times 100$$

The FI has been used to classify the facial phenotype into five categories [Table 3].[4,8] Based on the above criteria, we also attempted to classify the facial phenotype using the FI.

Statistical analysis

Data obtained from the 300 individuals were subjected to statistical analysis. Chi-square test, *t*-test, Pearson's correlation test, mean, and standard deviation were used to find if any significant relationship existed between males and females. $P < 0.05$ was considered statistically significant.

Results

In the present study, mesoprosopic (53) facial phenotype was most predominantly seen in males followed by euriprosopic (43), leptoprosopic (27), hyperleptoprosopic (16), and hypereuriprosopic (11)

Table 4: Relationship between males and females for each parameter

Parameters	Mean±SD (mm)		Range (mm)		*t*-test for equality of means	
	Males	Females	Males	Females	*t*	*P*
Nasion-subnasale	55.6±3.396	55.33±3.395	47-64	47-65	0.680	0.497 (NS)
Subnasale-gnathion	65.83±4.202	60.35±4.299	56-78	49-69	11.178	<0.001 (S)
Width of mouth	51.57±4.632	47.08±3.206	41-61	38-59	9.755	<0.001 (S)
Intercanthal distance	32.69±2.146	31.77±2.329	27-38	27-40	3.532	<0.001 (S)
Width of face	139.65±7.347	134.94±6.811	124-157	116-155	5.762	<0.001 (S)
Physiognomic facial length	178.2±9.815	163.23±8.052	156-198	137-190	14.445	<0.001 (S)
Morphological facial length	121.43±5.053	115.68±5.807	110-138	101-131	9.154	<0.001 (S)
FI	87.17±5.632	85.90±5.532	75.32-103.22	71.61-98.43	1.969	0.050 (NS)

S: Significant, NS: Nonsignificant, SD: Standard deviation, FI: Facial index

Table 5: Correlation between each parameter in males

	Nasion-subnasale	Subnasale-gnathion	Width of mouth	Intercanthal distance	Width of face	Physiognomic facial length	Morphological facial length	Facial index
Nasion-subnasale								
Pearson's correlation	1	-0.128	0.085	-0.010	0.011	0.248**	0.566**	0.372**
Significant (two tailed)		0.119	0.302	0.904	0.893	0.002 (S)	<0.001 (S)	<0.001 (S)
n	150	150	150	150	150	150	150	150
Subnasale-gnathion								
Pearson's correlation	-0.128	1	0.048	0.239**	0.100	0.304**	0.746**	0.401**
Significant (two tailed)	0.119		0.557	0.003 (S)	0.225	<0.001 (S)	<0.001 (S)	<0.001 (S)
n	150	150	150	150	150	150	150	150
Width of mouth								
Pearson's correlation	0.085	0.048	1	0.130	0.239**	0.078	0.097	-0.126
Significant (two tailed)	0.302	0.557		0.113	0.003 (S)	0.344	0.236	0.125
n	150	150	150	150	150	150	150	150
Intercanthal distance								
Pearson's correlation	-0.010	0.239**	0.130	1	0.080	0.092	0.192*	0.048
Significant (two tailed)	0.904	0.003 (S)	0.113		0.328	0.265	0.019 (S)	0.562
n	150	150	150	150	150	150	150	150
Width of face								
Pearson's correlation	0.011	0.100	0.239**	0.080	1	0.113	0.090	-0.754**
Significant (two tailed)	0.893	0.225	0.003 (S)	0.328		0.170	0.272	<0.001 (S)
n	150	150	150	150	150	150	150	150
Physiognomic facial length								
Pearson's correlation	0.248**	0.304**	0.078	0.092	0.113	1	0.419**	0.184*
Significant (two tailed)	0.002 (S)	<0.001 (S)	0.344	0.265	0.170		<0.001 (S)	0.024 (S)
n	150	150	150	150	150	150	150	150
Morphological facial length								
Pearson's correlation	0.566**	0.746**	0.097	0.192*	0.090	0.419**	1	0.583**
Significant (two tailed)	<0.001 (S)	<0.001 (S)	0.236	0.019	0.272	<0.001 (S)		<0.001 (S)
n	150	150	150	150	150	150	150	150
FI								
Pearson's correlation	0.372**	0.401**	-0.126	0.048	-0.754**	0.184*	0.583**	1
Significant (two tailed)	<0.001 (S)	<0.001 (S)	0.125	0.562	<0.001 (S)	0.024	<0.001 (S)	
n	150	150	150	150	150	150	150	150

S: Significant, FI: Facial index. **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed)

Table 6: Correlation between each parameter in females

	Nasion-subnasale	Subnasale-gnathion	Width of mouth	Intercanthal distance	Width of face	Physiognomic facial length	Morphological facial length	Facial index
Nasion-subnasale								
Pearson's correlation	1	0.127	0.009	0.078	0.099	0.326**	0.679**	0.445**
Significant (two tailed)		0.121	0.911	0.346	0.227	<0.001 (S)	<0.001 (S)	<0.001 (S)
n	150	150	150	150	150	150	150	150
Subnasale-gnathion								
Pearson's correlation	0.127	1	0.021	0.060	0.169*	0.293**	0.815**	0.500**
Significant (two tailed)	0.121		0.800	0.469	0.038 (S)	<0.001 (S)	<0.001 (S)	<0.001 (S)
n	150	150	150	150	150	150	150	150
Width of mouth								
Pearson's correlation	0.009	0.021	1	0.042	0.096	0.125	0.021	−0.065
Significant (two tailed)	0.911	0.800		0.610	0.242	0.129	0.800	0.430
n	150	150	150	150	150	150	150	150
Intercanthal distance								
Pearson's correlation	0.078	0.060	0.042	1	0.154	0.011	0.089	−0.047
Significant (two tailed)	0.346	0.469	0.610		0.059	0.890	0.277	0.565
n	150	150	150	150	150	150	150	150
Width of face								
Pearson's correlation	0.099	0.169*	0.096	0.154	1	0.161*0	0.183*	−0.646**
Significant (two tailed)	0.227	0.038 (S)	0.242	0.059		0.049 (S)	0.025 (S)	<0.001 (S)
n	150	150	150	150	150	150	150	150
Physiognomic facial length								
Pearson's correlation	0.326**	0.293**	0.125	0.011	0.161*	1	0.407**	0.191*
Significant (two tailed)	<0.001 (S)	<0.001 (S)	0.129	0.890	0.049 (S)		<0.001 (S)	0.019 (S)
n	150	150	150	150	150	150	150	150
Morphological facial length								
Pearson's correlation	0.679**	0.815**	0.021	0.089	0.183*	0.407**	1	0.630**
Significant (two tailed)	<0.001 (S)	<0.001 (S)	0.800	0.277	0.025	<0.001 (S)		<0.001 (S)
n	150	150	150	150	150	150	150	150
FI								
Pearson's correlation	0.445**	0.500**	−0.065	−0.047	−0.646**	0.191*	0.630**	1
Significant (two tailed)	<0.001 (S)	<0.001 (S)	0.430	0.565	<0.001 (S)	0.019 (S)	<0.001 (S)	
n	150	150	150	150	150	150	150	150

S: Significant, FI: Facial index. **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed)

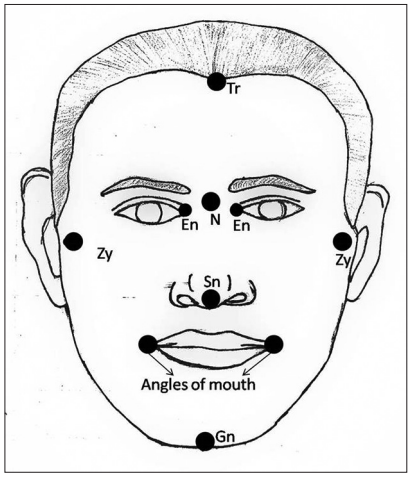

Figure 1: Reference points which were used to determine various measurements in the study

facial phenotypes. In females, the most commonly observed facial phenotype was mesoprosopic (50) followed by euriprosopic (46), leptoprosopic (26), hypereuriprosopic (18), and hyperleptoprosopic (10) facial phenotypes. No significant difference was observed between males and females on the basis of facial phenotype ($P = 0.512$).

Table 4 summarizes the mean, standard deviation, and range of each parameter in males and females. A significant difference was observed between the mean among males and females with respect to subnasale-gnathion (lower facial height [LFH]), width of mouth, intercanthal distance, width of face, physiognomic facial length, and morphological facial length (MFL). No significant difference was observed between the mean among males and females with respect

Table 7: Values for upper and lower facial height from different populations

	Number of subjects studied	UFH		LFH	
		Male	Females	Male	Females
Population of Hyderabad studied by Khan *et al*., 2012[2]	40	1.19 cm	1.06 cm	-	-
Garhwali population studied by Hatwal *et al*., 2015[3]	200 (100 male and 100 female)	48.051 mm	45.864 mm	57.344 mm	54.8 mm
Nigerian population studied by Adamu *et al*., 2016[5]	283 (147 males and 136 females)	40.67 mm	45.61 mm	62.98 mm	58.05 mm
Study by Agnihotri *et al*., 2011, done in Indo-Mauritius population[6]	150 (75 males and 75 females)	5.27 cm	5.20 cm	-	-
Indian population studied by Farkas *et al*., 2005[7]	60 (30 males and 30 females)	47.2 mm	43.7 mm	62.7 mm	57.2 mm
Bangladeshi females studied by Mostafa *et al*., 2013[10]	100 females	-	4.32 cm	-	-
Population of Mangalore studied by Jagadish Chandra *et al*., 2012[15]	100 (50 males and 50 females)	56.82 mm	58.58 mm	54.54 mm	59.12 mm
Onges group of Andaman and Nicobar islands studied by Pandey, 2006[16]	53 (27 male and 26 female)	1.50	1.30	-	-

UFH: Upper facial height, LFH: Lower facial height

Table 8: Values for morphological facial length, physiognomic facial length, and facial index from different populations

	Number of individuals studied	MFL		PFL		FI	
		Males	Females	Males	Females	Males	Females
Garhwali population studied by Hatwal *et al*., 2015[3]	200 (100 male and 100 female)	105.395 mm	100.664 mm	-	-		
Indian population studied by Shetti *et al*., 2011[4]	100 (66 males and 34 females)	11.08 cm	10.48 cm	-	-	87.19	86.75
Malaysian population studied by Shetti *et al*., 2011[4]	200 (96 males and 104 females)	11.14 cm	10.48 cm	-	-	85.72	87.71
Study by Agnihotri *et al*., 2011, done in Indo-Mauritius population[6]	150 (75 males and 75 females)	11.58 cm	11.00 cm	17.85 cm	16.46 cm	-	-
Indian population studied by Farkas *et al*., 2005[7]	60 (30 males and 30 females)	112.5 mm	101.5 mm	161.3 mm	163.0 mm	-	-
Bangladeshi females studied by Mostafa *et al*., 2013[10]	100 Females	-	10.59 cm	-	-	-	77.22
Haryanvi Banias studied by Kumar and Lone, 2013[11]	600 (300 of either sex)	11.07 cm	10.21 cm	-	-	86.09	84.84
North Indian population studied by Prasanna *et al*., 2013[12]	100 (50 males and 50 females)	123.6 mm	117.0 mm	-	-	101.04	107.7
South Indian population studied by Prasanna *et al*., 2013[12]	100 (50 males and 50 females)	119.7 mm	101.0 mm	-	-	100.28	85.39
Population of Mangalore studied by Jagadish Chandra *et al*., 2012[15]	100 (50 males and 50 females)	119.98 mm	119.95 mm	-	-	101.59	107.41
Onges group of Andaman and Nicobar islands studied by Pandey, 2006[16]	53 (27 male and 26 female)	10.18	9.31	16.17	15.06	77.98	75.29
Gujarati population studied by Shah *et al*., 2016[17]	901 (676 males and 225 females)	9.85 cm	8.54 cm	16.4 cm	14.76 cm	-	-
North Indian population studied by Kataria *et al*., 2015[18]	400 (200 males and 200 females)	11.35 cm	10.376 cm	-	-	86.449	85.024
Bini ethnic group of Nigeria studied by Omotoso *et al*., 2011[19]	450 (230 males and 220 females)	-	-	-	-	87.98	85.88
Population of Central Serbia studied by Jeremic *et al*., 2013[20]	700 (360 males and 340 females)	121.42 mm	110.84 mm	-	-	94.04	92.38

PFL: Physiognomic facial length, MFL: Morphological facial length, FI: Facial index

to nasion-subnasale (upper facial height [UFH]) and FI, respectively [Table 4].

In our study, we found a correlation between different parameters with each other in males [Table 5] and females [Table 6]. However, we did not find any other study which tried to correlate the various parameters in males and females separately with each other.

Discussion

Anthropology encompasses the study of origins and development of human beings and their cultures, investigating the whole range of human development and behavior, including biological variation, geographic distribution, and evolutionary history. Forensic anthropology is the application of the scientific processes

Table 9: Values for width of mouth, width of face, and intercanthal distance from different populations

	Number of individuals studied	Width of mouth		Width of face		Intercanthal distance	
		Males	Females	Males	Females	Males	Females
Population of Hyderabad studied by Khan *et al*., 2012[2]	40	1.16 cm	1.08 cm	-	-	0.65 cm	0.75 cm
Malaysian population studied by Shetti *et al*., 2011[4]	200 (96 males and 104 females)	-	-	13.02 cm	11.97 cm	-	-
Indian population studied by Shetti *et al*., 2011[4]	100 (66 males and 34 females)	-	-	12.73 cm	12.12 cm	-	-
Nigerian population studied by Adamu *et al*., 2016[5]	283 (147 males and 136 females)	50.4 mm	47.3 mm	116.83 mm	118.3 mm	31.72 mm	31.08 mm
Study by Agnihotri *et al*., 2011, done in Indo-Mauritius population[6]	150 (75 Males and 75 Females)	-	-	14.39 cm	14.00 cm	-	-
Indian population studied by Farkas *et al*., 2005[7]	60 (30 males and 30 females)	51.0 mm	46.5 mm	135.8 mm	124.9 mm	34.1 mm	30.9 mm
Bangladeshi females studied by Mostafa *et al*., 2013[10]	100 females	-	-	-	13.74 cm	-	3.12 cm
Haryanvi Banias studied by Kumar and Lone, 2013[11]	600 (300 of either sex)	-	-	13.08 cm	12.35 cm	-	--
North Indian population studied by Prasanna *et al*., 2013[12]	100 (50 males and 50 females)	-	-	122.2 mm	108.8 mm	-	-
South Indian population studied by Prasanna *et al*., 2013[12]	100 (50 males and 50 females)	-	-	119.3 mm	118.5 mm	-	-
Population of Mangalore studied by Jagadish Chandra *et al*., 2012[15]	100 (50 males and 50 females)	-	-	118.62 mm	112.38 mm	-	-
Onges group of Andaman and Nicobar islands studied by Pandey, 2006[16]	53 (27 male and 26 female)	-	-	13.00	12.36	-	-
Gujarati Population studied by Shah *et al*., 2016[17]	901 (676 males and 225 females)	-	-	13.07 cm	11.4 cm	-	-
North Indian population studied by Kataria *et al*., 2015[18]	400 (200 males and 200 females)	-	-	13.149 cm	12.237 cm	--	-
Population of Central Serbia studied by Jeremic *et al*., 2013[20]	700 (360 males and 340 females)	-	-	129.12 mm	119.98 mm	-	-

of physical/biological anthropology in a medicolegal context. Data useful for the identification of living and dead individuals include the assessment of their ethnicity, age, gender, religion, etc.[9] Craniofacial anthropometry plays an important role in assessing the ethnicity and gender of an individual as intra- and interpopulation variations are affected by ecological, biological, geographical, racial, gender, and age factors.[10] Thus, this study was conducted with the aim of determining the craniofacial measurements of Haryanvi population and to compare them with populations from different ethnicities.

In the present study, the mean distance between nasion-subnasale (UFH) was 55.6 mm in males and 55.33 mm in females. However, Farkas *et al*.[7] in 2005 reported that, in Indian population, the mean UFH was 47.2 mm in males and 43.7 mm in females. The mean distance between subnasale-gnathion (LFH) in our study was 65.83 mm and 60.35 mm in males and females, respectively. Farkas *et al*.[7] in Indian population found mean LFH to be 62.7 mm in males and 57.2 mm in females.

The mean MFL in the present study was 121.43 mm in males and 115.68 mm in females. Kumar and Lone[11] in their study on Harvanyi Banias reported that the mean MFL in males and females was 11.07 cm and 10.21 cm, respectively. The mean width of face in the present study was 139.65 mm in males and 134.94 mm in females. In their study, Kumar and Lone[11] found that the mean width of face was 13.08 cm and 12.35 cm in males and females, respectively. This slight difference in MFL and width of face between the two studies can be explained on the fact that Kumar and Lone[11] in their study have included individuals from a single caste of Haryana, whereas in our study, we included Haryanvi individuals irrespective of their caste.

We found that mesoprosopic facial type was prominent in both males and females in Haryanvi population, which was consistent with the findings of Kumar and Lone[11] who also reported that the predominant facial type in Haryanvi Banias was mesoprosopic. Prasanna *et al*.[12] in their study compared the FI between North Indian and South Indian populations. They reported that males from both the population were hyperleptoprosopic, whereas North Indian females presented hyperleptoprosopic as the predominant type, but females from South India have very broad face (hypereuriprosopic) predominantly.

When we compared the facial characteristics between males and females, most of the features observed in our study showed significant sexual dimorphism, whereas there was no statistical difference with respect to nasion-subnasale (UFH) and FI. Studies by Baral *et al*.[13] and Obaidi[14] revealed that there was no significant difference in facial height proportions between males and females in different population groups. However, Hatwal *et al*.[3] reported that the mean values of UFH, LFH, and total facial heights were greater in males as compared to females in Garhwal population from Uttarakhand.

To establish the role of craniofacial anthropometry in assessing ethnicity, we compared the findings of our study with those of populations from different regions of India and also among the populations from different parts of the world [Tables 7-9].

Conclusion

It was concluded that the predominant facial phenotype in the Haryanvi population is mesoprosopic. Other than FI and UFH, all the other facial parameters can be used to distinguish individuals on the basis of gender. Therefore, our data could act as a reference for Haryanvi population in assessing the ethnicity and identification of an individual. In addition, the data obtained in our study may prove useful in anthropological research, forensics, genetic research, and reconstructive surgery.

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Conflicts of interest
There are no conflicts of interest.

References

1. Kanchan T, Krishan K. Personal identification in forensic examinations. Anthropology 2013;2:114.
2. Khan N, Leela V, Annapuravu G. A study of craniofacial anthropometrics in Hyderabad (Deccan) and a review of literature. J Med Allied Sci 2012;2:54-7.
3. Hatwal P, Atal DK, Das S. Correlation of upper facial and lower facial height in Garhwali population of Uttarakhand. J Indian Acad Forensic Med 2015;37:281-2.
4. Shetti RV, Pai SR, Sneha GK, Gupta C, Chethan P, Soumya. Study of prosopic (facial) index of Indian and Malaysian students. Int J Morphol 2011;29:1018-21.
5. Adamu LH, Ojo SA, Danborno B, Adebissi SS, Taura MG. Sex determination using facial linear dimensions and angles among Hausa population of Kano State, Nigeria. Egypt J Forensic Sci 2016;6:459-67.
6. Agnihotri AK, Kachhwaha S, Googoolye K, Allock A. Estimation of stature from cephalo-facial dimensions by regression analysis in indo-Mauritian population. J Forensic Leg Med 2011;18:167-72.
7. Farkas LG, Katic MJ, Forrest CR, Alt KW, Bagic I, Baltadjiev G, *et al.* International anthropometric study of facial morphology in various ethnic groups/races. J Craniofac Surg 2005;16:615-46.
8. Williams P, Dyson M, Dussak JE, Bannister LH, Berry MM, Collins P, *et al*. Gray's Anatomy. 38th ed. London: Churchill Livingston; 1995. p. 607-12.
9. Adebisi S. Forensic anthropology in perspective: The current trend. Internet J Forensic Sci 2008;4.
10. Mostafa A, Banu LA, Rahman F, Paul S. Craniofacial anthropometric profile of adult Bangladeshi Buddhist Chakma females. J Anthropol 2013;2013.
11. Kumar M, Lone MM. The study of facial index among Haryanvi adults. Int J Sci Res 2013;2:51-3.
12. Prasanna LC, Bhosale S, D'Souza AS, Mamatha H, Thomas RH, Sachin K. Facial indices of North and South Indian adults: Reliability in stature estimation and sexual dimorphism. J Clin Diagn Res 2013;7:1540-2.
13. Baral P, Lobo SW, Menezes RG, Kanchan T, Krishan K, Bhattacharya S, *et al.* An anthropometric study of facial height among four endogamous communities in the Sunsari district of Nepal. Singapore Med J 2010;51:212-5.
14. Obaidi HA. Variation of facial heights among the class I, II and III dentoskeletal relationships (cephalometric study). Al Rafidain Dent J 2006;6:98-105.
15. Jagadish Chandra H, Ravi MS, Sharma SM, Rajendra Prasad B. Standards of facial esthetics: An anthropometric study. J Maxillofac Oral Surg 2012;11:384-9.
16. Pandey AK. Cephalo-facial variation among Onges. Anthropologist 2006;8:245-9.
17. Shah T, Patel MN, Nath S, Menon SK. Determination of sex using cephalo-facial dimensions by discriminant function and logistic regression equations. Egypt J Forensic Sci 2016;6:114-9.
18. Kataria DS, Ranjan RK, Perwaiz SA. Study of variation in total facial index of North Indian population. Int J Health Sci Res 2015;5:122-7.
19. Omotoso DR, Oludiran OO, Sakpa CL. Nasofacial anthropometry of adult Bini Tribe in Nigeria. Afr J Biomed Res 2011;14:219-21.
20. Jeremic D, Kocic S, Vulovic M, Sazdanovic M, Sazdanovic P, Jovanovic B, *et al*. Anthropometric study of the facial index in the population of central Serbia. Arch Biol Sci 2013;65:1163-8.