

Cephalic index of Gurung community of Nepal - An anthropometric study

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Abstract

Cephalic Index (CI) is useful in differentiation of racial and sexual differences. There is no published literature about CI of Gurung community in Nepal. Hence, we under took this study to document the cephalometric characteristics and gender differences in CI of a Gurung community. Head length, head breadth and CI were determined for 267 subjects of Gurung village. The mean CI for male was 83.1 and for female 84.6 which was statistically significant. On comparison with the existing literature the Gurung community can be categorized as brachycephalic and the data presented can be useful for experts in forensic science.

Key words: Cephalic Index, Gurung Community, Brachiocephalic

Physical differentiation between the people of different ethnic groups is usually markedly descrambled. The physical differences between people can be recorded by measurements and based on these measurements different indices can be worked out. CI is one such index which is useful in differentiation of racial and gender differences. Comparison of CI between parents, offsprings and their siblings can give a clue towards genetic transmission of inherited characteristics. Cephalometric study is also important in forensic science for the facial reconstruction of disputed identity.

Although Nepal is a relatively small country, it is a conglomeration of different ethnic, linguistic and religious groups. In spite of ethnic diversity, there is a remarkable coexistence among the people of Nepal. One such community that dwells in Nepal is Gurung Community. Gurungs are the original inhabitants of Nepal and maintain tradition, customs and social order of ancient Nepalese. A Medline search (1966 to January 2005) using the search items, cephalic index, ethnic differences and Nepal found no studies on CI of the Gurung community in Nepal. Hence we under took this study to document the Cephalometric characteristics and sexual differences in CI of a Gurung community in Nepal.

Materials and methods

Study Design: A cross-sectional survey was conducted in the Gurung village of Gandhruk, Kaski District, Western Nepal. Gandhruk is a Gurung village located in Annapurna range of the

Himalayas. The village is exclusively inhabited by the Gurung community. All the adults aged 25 to 45 years were selected for the study. Individuals with any faciocranial abnormality were excluded from the study.

Anthropometric Measurements:

The anatomical landmarks, glabella (g), inion (I) and euryon (eu) were marked. The anatomical landmarks were defined as follows:

Glabella: A point above the nasal root between the eyebrows and intersected by mid sagittal plane.

Inion: The distal most point placed on the external occipital protuberance in the mid sagittal plane.

Euryon: The lateral most point placed on the side of the head.

All the measurements were taken with the subjects sitting on the chair; head in anatomical position and the measurements were taken to the nearest 1mm. The head length was measured with a spreading caliper from glabella to Inion. Head breadth was measured as the maximum transverse diameter between the two euryons using a spreading caliper.

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Data Analysis

The data was entered into the computer and analyzed using Statistical Package for Social Sciences (SPSS) version 7.5. CI was calculated by following formula: Head Breadth / Head Length X 100. The results were

presented as rates and proportions. The differences in means of head length, head breadth and CI between male and female were tested for statistical significance by independent samples 't' test.

Results

Table 1: Head breadth of the study subjects according to gender

Head Breadth	Male	Female	Total (%)
12.01 – 13	4	0	1 (1.5)
13.01 – 14	13	20	33 (12.4)
14.01 – 15	69	62	131 (49.1)
15.01 – 16	58	24	82 (30.7)
16.01 – 17	10	4	14 (5.2)
17.01 – 18	3	0	5 (1.1)
Total	157	110	267 (100)

Table 2: Head length of the study subjects according to gender

Head Breadth	Male	Female	Total (%)
15.01 – 16	3	3	6 (2.2)
16.01 – 17	16	35	51 (19.1)
17.01 – 18	54	53	107 (40.1)
18.01 – 19	70	19	89 (33.3)
19.01 – 20	14	0	14 (5.2)
Total	157	110	267 (100)

Table 3: Cephalic index of the study subjects according to gender

Cephalic Index	Male	Female	Total (%)
< 70	3	0	3 (1.1)
70.01 – 75	6	0	6 (2.2)
75.01 – 80	38	24	62 (23.2)
80.01 – 85	62	40	102 (38.2)
85.01 – 90	32	28	60 (22.5)
90.01 – 95	11	15	26 (9.7)
95.01 – 100	3	3	6 (2.2)
> 100	2	0	2 (0.7)
Total	157	110	267 (100)

Table 4: Descriptive statistics of anthropometric measurements

Parameter	Mean (Standard deviation)		
	Male	Female	Total
Head breadth (cms)	14.9 (0.83)	14.7 (0.60)	14.8 (0.83)
Head length (cms)	18 (0.85)	17.4 (0.78)	17.7 (0.88)
Cephalic Index	83.1 (6.08)	84.6 (5.14)	83.7 (5.75)

Student's "t" test P<0.05

A total 267 adults were studied out of which 157 (58.8%) were male and 110 (41.2%) were females. The study subjects were aged between 25 and 45. The mean head length was 17.7 cms (SD = 0.88) and mean head breadth was 14.8 cms (SD = 0.76). For males, mean head breadth was 14.9 cms (SD = 0.83) and mean head length was 18 cms (SD = 0.85). For females, mean head breadth was 14.7 cms (SD = 0.6)

and mean head length was 17.4 cms (SD = 0.78). The mean CI was 83.7 (SD = 5.69). The mean CI for male was 83.1 (SD = 6.08) and female 84.6 (SD = 5.14). The head length, head breadth and CI were compared between male and female subjects. The mean difference in the head length, head breadth and CI between the males and females was statistically significant.

Discussion

Since all the individuals of Gurung village were examined the data presented here is representative of the Gurung community. Moreover, the village in which the study was carried out represents an ancient settlement of the Gurung community. In the present study the mean CI for male is 83.1 and for females it is 84.6. According to the classification by Peter L Williams, Gurung community belongs to brachycephalic¹. Magnitude of CI varies significantly in different geographic zones. In tropical zones head form is longer (dolichocephalic), but in temperate zones the head form is more round (mesocephalic or brachycephalic)². Since Nepal is in the temperate zone, the present classification of Gurung community as brachycephalic is in accordance to variation of CI according to different geographic zones as reported by Bharati et al² Kondo et al showed that, the head breadth will reach maximum at the age of 14 and head length will increase even after the age of 14. He also showed brachycephalization and secular change in head length in Japanese population³. Susanne C and Sharma PD in their study proved that genetic factors and environmental influence in the cranial shape⁴. Kasai et al in his study showed the effect of food habits influencing the craniofacial form⁵. A similar study was conducted in different Indian groups and CI was found to be different for different groups. According to Bhargav and kher it is 76.98 (mesocephalic) for Bhils and 79.80 (mesocephalic) for barelas and according to Shah GV, for Gujaratis the CI is 80.81⁶. Although the sample of individuals examined was small it is representative of the Gurung community. To obtain a more valid estimate of CI which is true representative of the Gurung community a study with a larger sample covering a wider geographic area of the Gurung settlements is necessary.

Conclusions

The results of the present survey show that Gurung community can be classified as brachycephalic. There was a significant gender difference in the CI. Since there is no published data on CI of Gurung community the data presented in the present report can be useful for experts in forensic science.

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