Original Research Article

An analysis of the discrepancies in distance between zygion and mention across the residents of the Gurkha and Kumauni ethnic groups of Uttarakhand region of India

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ABSTRACT

Background and Objectives: Studying human subjects is the focus of anthropology. As a result of a differential growth process, facial morphology varies between individuals and helps us to identify them. In this study, the variation between Zygion to mention distance in Gurkha and Kumauni ethnic groups of the Dehradun, Uttarakhand, area of India, was examined with the help of anthropometric tools.

Materials and Methods: In present study, there are two hundred subjects including hundred males and hundred females from ethnic groups of Gurkha and Kumauni ethnic groups, born and gowned from their actual remote areas of Uttarakhand, age group selected from 20 years and to 35 years living subjects. The study sample comprised of random selection from their remote areas. The distance between two bony landmarks is known as the Zygion to mention distance.

Result: The correlation is much similar to the threshold value. Its mean that the parameter; Zygion to Mention distance, it is the appropriate anthropometric parameter for the identification of ethnic groups of Gurkha and Kumauni of Uttarakhand region of India.

Discussion and Conclusion: In case of both Gurkha genders the statistical data indicates that the result is showing significance. In Kumauni male and female genders, the statistical data indicates that the result is statistically highly significant. Thus statistic indicates that the correlation is much again similar to the threshold value in case of both ethnic groups.

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1. Introduction

Facial morphology is the study of the shape and structure of a person's face. The physical features of the face are referred to as facial morphology. According to the study human faces get used in the superimposition technique for observing any missing person.[1] The use of physical anthropology in a legal context, typically to identify discovered skeletonized human remains, is known as forensic anthropology.[2–4] However, it is taken into consideration while creating the facial framework and in some plastic procedures. Face width alone does not have much medicolegal significance.[5,6] The various bones of the human skeleton have been used to predict sex and reconstruct stature by many scientists with varying degrees of success.[7–9] Prehistorians strive to utilize ancient remains as a means to elucidate population movements in relation to racial dynamics. By examining skeletal remains, artifacts, and other archaeological evidence, these scholars endeavor to gain insight into the migration patterns and interactions of ancient populations, shedding light on the historical distribution and movement of different racial groups.[10] There are several important cephalometric dimensions that can be used to describe differences between races and

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sexual orientations, including nasal dimensions.[11–14] There are three anatomical facial prominences; lips, nose, and chin that have received considerable attention throughout history.[15,16] The Jaunsari Tribe has similarities with both Indo-Aryan and Mongol ethnic groups who have settled in the Himalayan provinces in terms of their physical appearance.[17] Based on blood type and facial features, the Tharu tribes are Mongoloid. Sharma N. and Ali S.[18] Varying the Interzygomatic Distance of the Facial Parameter between Terai and Kumauni Ethnic Groups in the Uttarakhand Region.[19] Anthropometric measures of the human body, including circumferences, lengths, breadths, and skinfold thicknesses, are all included in the discipline of anthropometry. Other measures include weight, height, and size.[20]

2. Inclusion criteria

Individual individuals older than 20 years and their parents are both members of the Gurkha and Kumauni Tribes of Uttarakhand. Participants in the research appeared to be healthy people with no obvious bony or facial anomalies.

2.1. Exclusion criteria

People under the age of 20 and more than 35 years, Gurkha and Kumauni people from states other than Uttarakhand were omitted from the research. The study excludes those with physical indications of endocrine problems such dwarfism or gigantism, as well as those with antecedents of craniofacial dismorphologies, orthodontic procedures, severe face injuries, and craniofacial trauma.

3. Materials and Methods

The current study was conducted at the Department of Anatomy, sgrrims, and hs. Two hundred participants aged 20 to 35 years are studied since the bones are fully developed and stabilized at this age range. The participants, 100 boys and 100 females from the ethnic groupings of Gurkha and Kumauni were born and raised in the Uttarakhand area.

3.1. Methodology

This investigation employed the use of a clear graded ruler and steel measuring tape, as well as a computerized sliding vernier caliper.

3.2. Anthropometric measurement

To show the distance measured to the nearest unit in millimeters (mm), use zygion.

Corresponding ethnic group the following figures represent the subject measurements:

Figure 1: In the study, the reference picture shows the bony landmarks, Zygion to mention distance with the help of digital sliding vernier caliper.

Figure 2: Image showing distance between zygion to mention distance in the present study.

Figure 3: Image showing points that were utilized to derive various metrics in the present research.

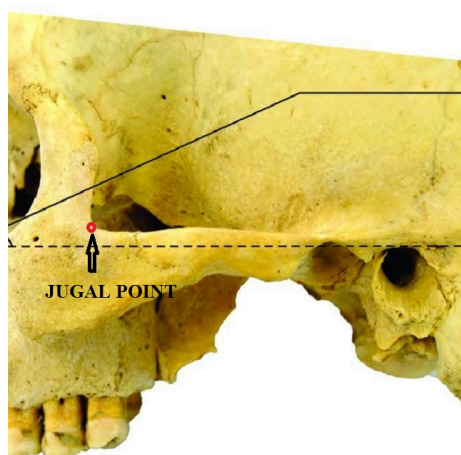**Figure 4:** Image showing points that were utilized to derive various metrics in the present research.

Figure 5: Image showing points that were utilized to derive various metrics in the present research.

3.3. Statistical analysis

In this study, the statistics like; mean, range, and standard deviation of face dimensions are calculated, and correlations are made with excel spreadsheet in Microsoft office. SPSS 24.0 version was used for statistical data analysis in the present study. The level of statistical significance was used at P 0.05 or the 95% confidence interval.

4. Result

The mean distance between zygion to mention for Gurkha males is found to be more than that for Gurkha females. In the current investigation, both male and female (1.1107

p value / regression equations (SE/standard error) (1.3212 p value / The Gurkha ethnic group's regression equation (SE/ standard error) revealed a modest positive connection between Zygion to Mention distance and number of individuals. In Kumauni males 0.0364 p-value / Regression equation (SE/ 1.0473 standard error) were discovered to be equivalent to the degree of importance and in Kumauni females, 0.0294 p-value / Regression equation (SE/ 0.9061 standard error) were found to be similar to the level of significance (Table 1 & 2). The confidence interval in Gurkha males is 88.61 ± 2.17 and in Gurkha females are 85.55 ± 2.590. Same wise the confidence interval in Kumauni males is 95.48 ± 2.053 and in Kumauni females is 83.66 ± 1.776. The correlation is much again similar to the threshold value hence it signifies that the result is statistically significant in the case of both ethnic groups' p-values. All the statistical analysis finally shows that the p value is less than 0.005. Its shows that the parameter; Zygion to Mention distance, is the appropriate facial indices for the identification of ethnic groups of Gurkha and Kumauni of uttarakhand region of India.

5. Discussion

Both the Gurkha males and girls in this research had a p-value of 0.05653. The p-value for the results for both Gurkha genders suggests that the outcome is roughly statistically significant. The correlation is significantly near the threshold value in the case of Garhwali men, where the p-value is close to 0.05. In the case of Kumauni girls and males, the p-values are 0.0294 and 0.0364, respectively. According to the p-value, the outcome is statistically extremely significant for Kumauni females. Male Kumauni have a p-value that is once again less than 0.05, indicating that the correlation is very comparable to the threshold value and that the results are statistically significant for both ethnic groups. Table No. 3 compares the distance between zygion studies with various researches in regard to gender.

6. Conclusion

The measurement of the zygion to mention distance of the human face may be merged with facial indices parametric observations in this age of modern technology to make them more useful in establishing identification. One of the most trustworthy methods of identifying someone is the use of facial indices based on surface bony markers, which may be used on living subjects when DNA or fingerprints cannot be utilized. In plastic surgery, forensic medicine, and anthropometric research, the medical and legal significance of facial anthropometric indices is significant. Physical anthropometry therefore offers the tools to evaluate and define the morphological variances that occur across various human populations. In India's Uttarakhand area, there are a lot of landslides and other natural catastrophes

Table 1: The descriptive examination of several factors in Gurkha ethnic group members of both genders

Sex	Variable (ZN-MN)	Mean	sd	Regression equation (SE)	ci	r - value	Singificancy
Gurkha males	Zygion to Mention distance	88.61	7.85	1.11	88.61 ± 2.177	0.08	0.05653
Gurkha females	Zygion to Mention distance	85.55	9.34	32	85.55 ± 2.590	0.10	0.05653

SD: Standard deviation, mm: millimetre, r: coefficient of variance, Zn: zygion, Mn: mention, se: standard error.

Table 2: The descriptive examination of numerous factors in both genders of the Kumauni ethnic group

Sex	Variable (ZN-MN)	Mea N	sd	Regression equation (SE)	ci	r -value	Singificancy
Kumauni males	Zygion to Mention distance	95.48	7.40	1.04	95.48 ± 2.053	0.07	0.0364
Kumauni females	Zygion to Mention distance	83.66	6.40	0.90	83.66 ± 1.776	0.07	0.0294

SD: Standard deviation, mm: millimetre, r: coefficient of variance, Zn: zygion, Mn: mention, se: standard error.

Table 3: Comparison of Different Parameters with different studies in relation to Ethnic groups.

S.No.	Authors	Parameter	Difference across gender
1	Jaunsari Tribe- Uttarakhand	Cephalic Index	Significant
2	Jaunsari Tribe Uttarakhand	Nasal Index	Significant
3	Jaunsari Tribe Uttarakhand	Morphological- facial index	Significant
4	Males and females of Tharu	BMI	Significant
5	Adult Tharu Population	Nutritional Status	Significant
6	Terai males	Interzygomatic distance	Non-significant
7	Terai females	Interzygomatic distance	Significant
8	A Study on Garhwali and Jaunsari subjects.	Distance between rhenion to zygion (mm)	Weak significant difference
9	A Study on Garhwali and Terai subjects.	Intergonion Distance	Significant
10	Healthy subjects males of dehradun	Face width / dependent variable	Significant
11	Healthy subjects females of dehradun	Face width / dependent variable	Significant
12	Present study	Distance between zygion to mention	Significant

that cause numerous injuries, including face and physical deformity. Historical earthquakes can provide insight into the seismicity of the Indian subcontinent's populous areas in the future. Physical anthropometry therefore offers the methods to evaluate the measurements of the human face and to explain the morphological variances that exist among various human populations. The current study has given this particular community useful information that may be utilized for future research and as anthropometric criteria to determine any demographic changes. So, while designing protective gear for this population, such as helmets, goggles, or other applications, such as masks, headphones, etc., it should take this into account. This data will be used by the surgeon to help in face reconstruction in this demographic. For this group of people, accessories include helmets with goggles or other items for different purposes like masks, headphones, etc.

7. Declaration of Subjects

The patients were made aware that while every effort would be made to keep their identities a secret.

8. Declaration by Authors

I hereby state that the content I've created is unique to me and that I own all the associated rights.

9. Ethical Approval

Ethical Approval is proven to adhere to the ethical standards outlined in the Helsinki statement.

10. Conflict of Interest

None.

11. Source of funding

12. Acknowledgement

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