

# Study of Cephalic Index in South Gujarat

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## Research Article

**Abstract:** Cephalic Index is race and sex specific parameter. Cephalic Index is different in various racial groups. The present study was determined to identify Cephalic Index of South Gujarat population and compare it with the available data of various Indian populations. The study revealed that Mean Cephalic Index for South Gujarat was 81.2. Cephalic Index shows sexual dimorphism. Mean Cephalic Index for males was 80.88 and for females it was 82.48. We also found that in all available data as well as in our findings Cephalic Index was higher in females compared to males. Such data is of great medico legal and forensic importance which indicates that Cephalic Index can be used as marker of ethnicity, sex and race.

**Key words:** Anthropometry, Cephalic Index, Head length, Head Breath.

## Introduction

Anthropometry refers to measurements of living or dead humans for the purpose of understanding variation in their physical dimensions. Morphological evaluation of human head or Cephalometry is used in identification of human species in Forensic Medicine, Plastic Surgery, Orthodontics and Archeology. Body dimension are affected by ecological, biological, geographical, racial, gender and age factors as quoted by Imami[6]. Lifestyle, nutrition, intercaste marriage, environment, geographical variation and ethnic composition of population lead to change in body dimension and require regular updating of anthropometric data. Ever since the human life came to existence, constant changes are occurring in morphological appearance[2]. Cephalic Index is ratio of maximum breadth of head to its maximum length. Cephalic Index is useful in forensic science to identify unknown identity of individuals. It has its multiple uses in commercial production of Helmets, Caps, Eye Gears (Sun glasses, Spectacle) and Ear Gears (Head Phones). Ethnicity is variable that affects craniofacial dimension which is required to be studied in all ethnic groups of India. Gujarat population has been studied before by Shah and Jadav [7]. We in our study tried to include South

Gujarat region which is one of the biggest parts of Gujarat. As not much research has been conducted in this area, we tried to establish and compare Cephalic Index of South Gujarat population with available data of various Indian populations.

## Material and Methods

This cross sectional research study was done on 800 subjects between the age groups of 18 to 25 years. Subjects were collected from various region of South Gujarat. Gujarat is very big state with 5 major geographic zones –North Gujarat, South Gujarat, Madhya Gujarat, Saurashtra and Kutch. We in our study tried to find out Cephalic Index in South Gujarat population. Major Population here belongs to Desai, Purohit, Gamit and Koli Patel. Subjects included in the study belong to South Gujarat with their forefather belonging to this region. None of the subject had history of inter caste marriage. All the measurements were done on the subjects sitting in chair with relaxed condition. The anatomical landmarks like Glabella (G), Inion (I), and Euryon was marked. All the measurements were measured in centimeter and were used to calculate Cephalic Index.

## Anatomical Landmarks

Glabella- A point above the nasal root between the eyebrows and intersected by mid-sagittal Plane.

Inion-Distal most point on external occipital protuberance in midsagittal plane.

Euryon- The lateral most point on the side of the head.

Using above anatomical landmark Head length and Head breadth was calculated. Cephalic Index was determined on the basis of International anatomical Description. [11]

Head Length- Summit of Glabella to Inion

Head width- Maximum Horizontal diameter.

Cephalic Index= Head Breadth / Head length X 100

Depending up on the index the classification of different type of head shapes were followed

Head Shape	Cephalic Index
Dolicephalic	CI<74.9
Mesocephalic	75>CI<79.9
Brachycephalic	80<CI<84.9
Hyperbrachycephalic	85<CI<89.9

Data of each individual was recorded in special form and analysed statistically (p value)

## Result

From the collected data we found that minimum Cephalic Index was 69.06 and maximum Cephalic Index was 89.55. Mean Cephalic Index is 81 for South Gujarat population. For male it was 80.88 and for female it was 82.48.  $p < 0.05$  which is significant.

## Discussion

Our finding suggests that male had mean Cephalic Index lower than that of females for South Gujarat region. The mean Cephalic Index for South Gujarat population was 81 and they belong to Brachycephalic type of head. Our findings are confirmative with the observation of Shah and Jadav [7] According to Shah and Jadav [7] Cephalic Index of Gujarati students was 80.81 which are lower than our findings, but in both studies male had lower Cephalic Index than that of females. Bhargav and Kher [4] found in their study on Bhils and Barelis of central India had Cephalic Index of 76.98 and 79.8 which is significantly lower than our study and they belongs to Mesocephalic groups. Basu A [3] studied Cephalic Index of kayasthas of Bengal which was 79.5 which is remarkably lower than South Gujarati population. Anupama et al [ 1] stated that Punjabi had mean Cephalic Index of 85.53. Punjabi male (81.34) and female (85.75) shows gender difference in Cephalic Index. Anitha et al [1] stated in their study Cephalic Index of North Indian was 79.7 in which mean index for male was 79.1 and females it was 80.7 which suggest that Northern population of India had lower Cephalic Index than South Gujarat Population. Salve et al [10] found Cephalic Index of Andre population was 76.94. For Andhra males it was 75.6 and for females it was 78.2. This is lower than our findings. Andhra male had Cephalic Index 75.68 which significantly lowers than Gujarati males. Andhra females (78.2) also had lower Cephalic Index than Gujarati females. (Graph -1) In above all studies it is observed that the entire female counterpart had mean Cephalic Index

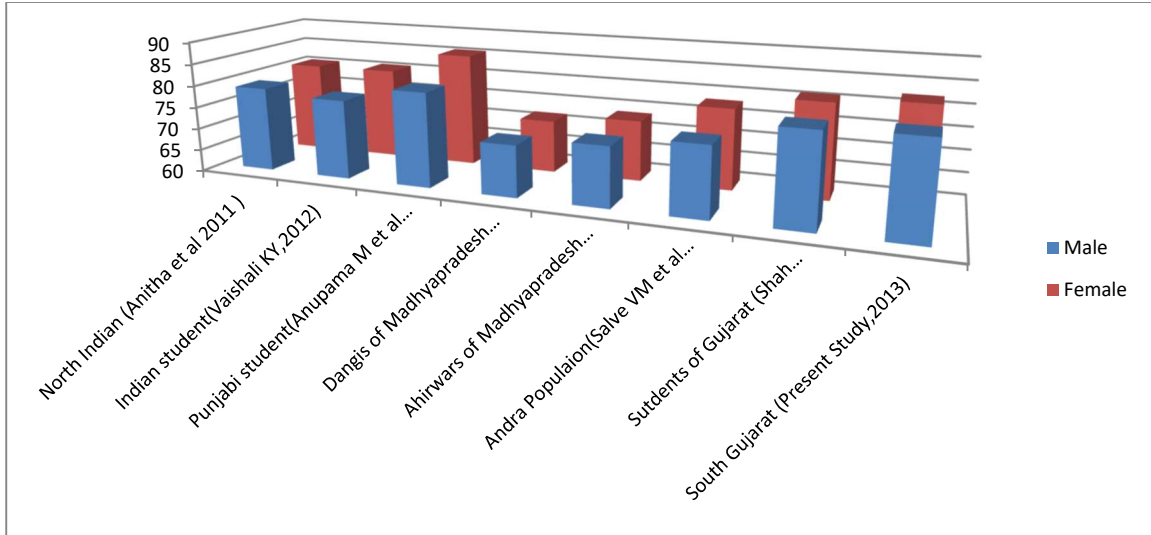
larger than that of males which is required to be further elaborated research. From the above graph it is obvious that the Cephalic Index of South Gujarati, Gujarati and Punjabi populations was much higher than the Ahirwars, Dangi, Andhra populations. Such results are important for the anthropologist, forensic scientist, and reconstructive surgeons.

## Conclusion

From the above study we can conclude that South Gujarati male and female belong to Brachycephalic type of head. Present study revealed that females had larger Cephalic Index than that of males. Study should be done in other parts of India which can help us to form a human anthropometric atlas that will be of great use in the subjects of Forensic, Anthropology and Evolution.

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**Graph 1:** Cephalic Index in Males and Females

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