

ORIGINAL ARTICLE**Evaluation of Cephalic Index in Female Population in Kermanshah, west of Iran****Ali Arfa¹, Tooba Mehrannia^{2*}, Simin Arfa³, Sara Arfa⁴**

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Corresponding author: Tooba Mehrannia, email: toobamehrannia@gmail.com**ABSTRACT**

The aim of this study is to determine cephalic parameters of females in Kermanshah, west of Iran. The study sample comprised four hundred females with age ranging from 16 to 55 years. Head length and head breadth, frontooccipital circumference were measured and cephalic index (CI) was determined for all groups. Head type of subjects was recorded. The result showed that the mean cephalic index was 78.29. Mesocephalic phenotype with 40.5% was dominant while the hydrocephalic type with 13.8% was rare amongst female population of Kermanshah. This data presented can be useful in anthropology, genetics, and craniofacial surgery and in forensic science.

Keywords: Anthropology, Cephalic index, Head length, Head breadth, Race.

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INTRODUCTION

The cephalic index is one of the important cephalometric indexes. The shapes of head are classified according to cephalic index which is very valuable anthropologically to find out racial variances [1] and sexual differences [2]. Comparison of changes between parents, offspring and siblings can give a clue to genetic transmission of inherited character [1]. To improve diagnostic comparison between patients and the normal population the standardized cephalometric records is essential for each population [3]. A large number of reports exist on the cephalic index in different populations such as Japanese, Australians, Colombians, Sri Lankan [4-8].

Attempts have been made to classify races according to phenotypic variations. Most classifications are based on one or two phenotypic characters and thus not being the true representative [9]. Cephalic index provides information of how genetic characters are transmitted between people [10]. Length and width of the head are the most important cephalometric dimensions [2]. According to the cephalic index, head shapes divided into four international categories include: Dolichocephal, Brachycephal, Mesocephal and Hyperbrachycephal [11]. These measurements are used routinely in pediatric, plastic surgery, orthodontics and oral surgery, as well as in diagnostic comprehension between patients and normal healthy population [10]. Based on the literature, there is no previous report on cephalic index of females in the west of Iran. So, the aim of the current study was to determine cephalic index of female's population in Kermanshah in the west of Iran.

MATERIAL AND METHODS*Subjects*

In this study 400 healthy volunteer native females in Kermanshah with age ranging 16-55 years old were selected. The subjects were apparently healthy and without any craniofacial deformity. They allocated into four experimental groups based on their age; 16-25, 26-35, 36-45 and 46-55 years old.

Study protocol

Head length and breadth were measured with spreading calipers. The head length was measured from glabella to inion. Head breadth was measured as the maximum transverse diameter between parietal eminences.

The cephalic index was determined using the following formula [12]:

$$\text{Cephalic index} = \frac{\text{Head breadth}}{\text{Head length}} \times 100$$

The index was determined on the basis of the international anatomical descriptions [12]. Depending on this index, the types of head shapes were followed as [12]:

Table I. The index of the head type based on the international anatomical descriptions [12].

Head type	cephalic index (CI) range
Dolicocephalic	< 74.9
Mesocephalic	75-79.9
Brachycephalic	80-84.9
Hyperbrachycephalic	>85

The data of each person was recorded in a special form.

RESULTS

The anthropometric index of subjects was expressed in centimeters. Head was classified by cephalic index. Mean and SD of cephalic index in females was 78.29 ± 1.42 . Therefore, mesocephalic type with 40.5% was dominated and hyperbrachycephalic type with 13.8% was rare in Kermanshah females (table II, III).

Table II. The distribution of different head types

Head type	N	%
Dolicocephalic	74	18.5
Mesocephalic	162	40.5
Brachycephalic	109	27.3
Hyperbrachycephalic	55	13.8

Table III. Cephalic index in females

	Mean \pm SD
Head Length(cm)	17.50 \pm 1.05
Head Breadth(cm)	13.91 \pm 0.43
CI(cm)	78.29 \pm 1.42
FOM(cm)	55.60 \pm 1.89

CI: Cephalic Index

FOM: Frontooccipital circumference

The cephalic types of the females of Kermanshah, Iran are shown in table IV. As it can be seen the highest prevalence of Dolicocephalic was observed among range of 16-25 years (10.8%) and the lowest in 36-45 years old (1.3%). Also, the highest Mesocephalic index was almost all similar among the different groups however was lower in 46-55 years old women. Furthermore the highest Brachycephalic type observed in age of 36-45 years old (10.3%) and lowest in 16-25 years (3.5%). No Hyperbrachycephalic type detected in the group age ranging between 16-25 years while the higher distribution was seen in the 46-55 years old women (7.8%).

Table IV. Distribution of head types amongst females in Kermanshah

Head type	Age (years) (n, %)				Total
	16-25	26-35	36-45	46-55	
Dolicocephalic	43 (10.8%)	16 (4.0%)	5 (1.3%)	10 (2.5%)	74 (18.5%)
Mesocephalic	43 (10.8%)	42 (10.5%)	45 (11.3%)	32 (8.0%)	162 (40.5%)
Brachycephalic	14 (3.5%)	27 (6.8%)	41 (10.3%)	27 (6.8%)	109 (27.3%)
Hyperbrachycephalic	-	15 (3.8%)	9 (2.3%)	31 (7.8%)	55 (13.8%)
Total	100 (25%)	100 (25%)	100 (25%)	100 (25%)	400 (100%)

On the other hand, in the group age of 16-25 years people had higher distribution of Dolicocephalic and Mesocephalic head types. Women had more frequently the Mesocephalic index in the groups of 26-35, 36-

45 and 46-55years old (figure 1). The study showed that mesocephalic head type with 40.5% was dominant among subjects. Also 27.3% of the individuals were brachycephalic, 18.5% dolicocephalic and 13.8% hyperbrachycephalic (Table II).

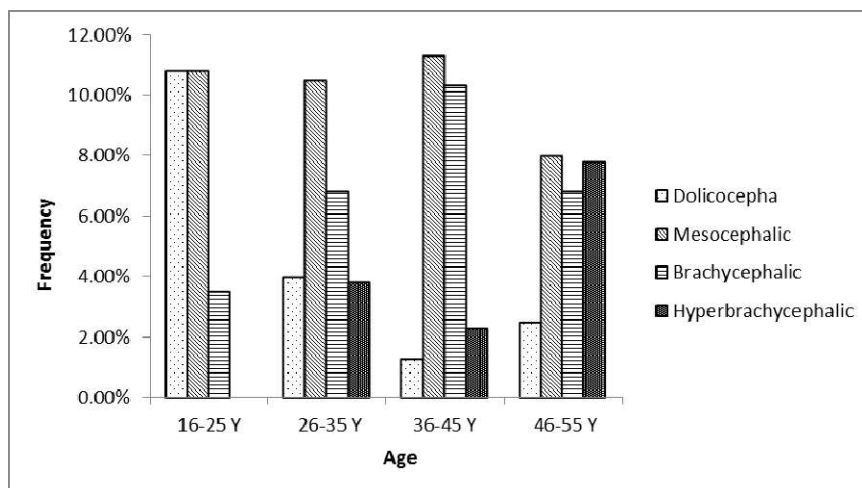


Figure 1. the cephalic itypes of the females population of the Kermanshah, Iran

DISCUSSION

The results of this study indicated Mesocephalic and Brachiocephalic head types had higher distribution among the age group 16-25 years old. Also, females had more frequently the Mesocephalic head type in the age of 26-55years.

The results demonstrated that dominant type of head shape was mesocephalic (40.5%). This finding is not similar to another study in Iran that [13] hyperbrachycephalic (52%) and [11] brachycephalic (36.6%) were stated as the dominant head type.

A study in India [14] showed that 58.5% of the subjects were dolicocephalic. Furthermore, in a study, Kumar and Gopichand reported that 69.3% of Haryanvi females were dolicocephal. Shah and Jadhav [1] reported that 40% of the individuals were mesocephal.

In our study mesocephalic and brachicephalic head types were more detected among Kermanshah females.

Head shape is affected by factor of time as reported by Nakashima, [16] in japan that head shape had changed during 30 years. The type of diet could also play a role in influencing the dominant head shape. Additionally, age can also induce the gradual expression of genetic characteristics in individuals. The gender differences in cranial morphology emphasize the significance of applying the anatomical variation data to an individual subject in a given population [6]. In conclusion, it is observed females population of the Kermanshah has typical Mesocephalic phenotype and these data presented can be useful in forensic science, anthropology and in genetics.

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