ORIGINAL ARTICLE

A Craniometric Study of Adult Dry Skulls in South Punjab

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ABSTRACT

Craniometric studies demonstrated that head shape varies in different races and populations and it is related to the cephalic index. The aim and objectives of this study was to categorize our community of South Punjab into a type of population, whether they fall into dolicocephalic, mesocephalic, brachycephalic or hyperbrachycephalic cranial index. This was a descriptive study conducted at Anatomy Department Nishtar Medical College, Multan and Nishtar Institute of Dentistry, Multan from April, 2015 to September, 2015. This research was conducted upon 98 dried skull of adult size including both sex. Length, breadth of each skull was measured with vernier caliper and cephalic index was calculated for each skull. We calculated the frequency of different categories of skull like, dolichocephalic, mesocephalic, brachycephalic and hyperbrachycephalic. We also calculated the range in length breadth and cranial indices. The result of our study shows that majority of South Punjab (Saraiki) population is mesocephalic. This study will serve as a basic compassion for future studies on the other geographical region population.

Keywords: Cephalic index, dolicocephalic, mesocephalic, brachycephalic.

INTRODUCTION

Craniometry is the scientific measurement of skull useful for anthropometry, forensic, and orthodontic practice[1]. The shape of skull is classified according to the cephalic indexas the dolicocephalic (long headed), mesocephalic (intermediate in head form), brachycephalic (round or short headed) and hyperbrachycephalic (very short or round or broad headed)[2].

Cephalic index is one of the important parameter that helps to differentiate between different human races. Australians and South Africans are said to be dolicocephalic, Chinese and Europeans as mesocephalic and Mongols and Andoman Islanders are brachiocephalic[3].

The cephalic index was first defined by Swedish Professor of Anatomy Andess Retzius (1796-1860)[4]. He only described dolicocephalae to those individuals who had elongated skull shape and brachycephalae to those whose skulls were short. He did not used the term mesocephale which was introduced later. The measures used by Retzius when applied to a living individual are known as cephalic index and when used for dry skulls are called cranial index[5-6]. The most important of cephalometricdimension are length and width of head that they used in cephalic index determination. Comparison between cephalic indices and head shapes with race, age and sex is important. It is valuable for treatment monitoring and prediction of orthodontic treatment[7-8]. This knowledge is also very useful for plastic and reconstructive surgeries concerned with craniofacial deformities. Cephalic index could be helpful in indentifying race of an individual particularly in air accident where different passenger may belong to different countries of the world. So it is of extreme importance for the Forensic experts to determine the identity of a person in such incidents[9]. It has been reported that factors like race, ethnicity, genetic interpretation, tradition, nutrition, environment and climate influence head types[10]. It is a strong tradition in South Punjab that as the baby is born, the elder lady of the house immediately startmoulding its head and tries maximally to make it round.

MATERIALS AND METHODS

This study was conducted from April, 2015 to September, 2015. The research was conducted upon 98 dried adult skulls of both sexes. It was a descriptive study. Measurements were taken by use of vernier caliper. Length of skull was measured from Glabella to Opisthocranion and Breadth of skull can be measured from Euryon to Euryon. In the present study all dry human skulls of adults were included which were present in Anatomy Department of Nishtar Medical College, Multan and Nishtar Institute of Dentistry, Multan. All the fractured or damaged skulls and skulls belonging to children were excluded.

Glabella is the paint above the nasal root between the eye brows and intersected by mid sagittal plane. Opisthocranion is the most posterior point on the posterior protuberance of the head in the mid sagittal planes.

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Euryon is the most laterally placed point on the side of head. The point can be determined by measuring the maximum cranial breadth. The cephalic indices were calculated by Hrdlika's method. Cephalic index (C1) = Cranial Breadth / cranial length x 100. Depending upon this index the types of head shapes were classified as given by William et al.

Table 1:

Head shape	Cephalic index range
Dolicocephalic	70-74.9 cm
Mesocephalic	75.79.9 cm
Brachycephalic	80.84.9cm
Hyperbrachycephalic	85-89.9cm

All the data was analyzed using Microsoft Excel and SPSS version 22. Mean and standard deviation were calculated.

RESULTS

In our study we measured the maximum length and breadth of 98 weeks and calculated the cranial index of each skull as shown in table-1. We also calculated the percentage of different categories of skull like dolicocephalic, mesocephalic, brachycephalic and hyperbrachycephalic in our sample (Table 2).

Table 2: Range of maximum length and maximum breadth and cranial index of 98 skulls.

Length range in cm	Breadth range in cm	Range of cranial indices	Type of cranial index
16.9-18 cm	11.9-13 cm	70-74.71	Dolicocephalic
16.4-17.7 cm	12-14 cm	75-79.87	Mesocephalic
16.5-17.5 cm	13.6-14.3 cm	81.71-83.03	Brachycephalic
16.5-16.7 cm	14.1-14.5 cm	85.54-87.34	Hyperbra chycephalic

Table 3: Percentage of Different categories of skull

Type of cranial index	No. of skulls	%age
Dolicocephalic	21	21.42
Mesocephalic	56	57.14
Brachycephalic	16	16.32
Hyperbrachycephalic	5	5.10

DISCUSSION

Our studyprovides valuable data pertaining to cranial indices and cranial measurements on dry human skull belonging to South Punjab Population of Pakistan. Our study indicates that most of skulls belong to mesocephalic category (57.14%). The second most common category is dolicocephalic (21.42%). The 3rd common category is brachycephalic (16.32%) and the least common category is Hyperbrachycephalic (5.1%).Obikili E.M et al in his study has mentioned that variation in cephalic index between and within the population has been attributed to a complex interaction between genetic and environmental factors[11].Gabraet al found in his study on Maiduguri Nigeria that female crania were either dolicocephalic (43.3%)or mesocephalic (40.4%) whereas male crania were mostly dolicocephalic (66.7%) followed by mesocephalic (33.3%)[12]. Heidariet al in his study on female population of South East of Iran has similar results as in our study that most common crania was mesocephalic[13]. Results of Ratheeet al study from North India were alsosimilar to our study. Most of the skulls in both sexes were mesocephalic (53.33% Males and 62.85% Females)[14].

According to the Bhargava L and Kher study from the central India cephalic index was mesocephalic in both[15]. (76.98 inBhils and 79.8 in bareals). In another study by Shah and Jadav for Gujrates in India cephalic index was (80.81)[16]. Anupama M et al Also from India reported in his study that cranial index of most of the Punjabi students fall in Brachycephalic group[17]. In S.D Desai et al study from India majority of the skulls were mesocephalic[18]. A S Saqibet al in their study from upper Punjab Pakistan observed that most of the skulls were dolicocephalic[3]. But in our study from South Punjab most common category is mesocephalic.

CONCLUSION

The result of our study shows that most of the skulls of South Punjab belong to mesocephalic category. This could be used for future references in race determination and will be helpful to the orthodontics, anthropologists and forensic scientists.

REFERENCES

1. El-Feghi, I, M.A. Sid-Ahmad, M. Ahmadi. Automatic localization of craniofacial landmarks for assisted cephalometry. Pattern Recognition. 2004;37: 609-621.
2. William P, Dyson M, Dussaak JE, Bannister LH, Berry MM, Collins P, Ferguson MWJ. Gray's Anatomy. In: Skeletal system, 38thEdn. Elbs with Churchil Livingston, London. 1995: 607-612.
3. AS Saqib, Quddus UR, Mujeebullah. Significance of cephalic index in Race Determination. Medical Forum 2012 July; 27(7):39.40.
4. Anitha MR, Vijayanath V, Raju GM and Vijaymahantesh SN. Cephalic index of north Indian population. anatomicaKarnataka. 2011; 5(1):40-43.
5. Sicher H. Oral anatomy. 6th ed. St Louis: Mosby; 1975.
6. Rakosi T, Jonas I, Graber T. Orthodontic diagnosis (Color Atlas of Dental Medicine). 1st ed. Thieme; 1993.

7. Kappers A. The degree of the changes in the cephalic index correlated with age and environment. Proc Royal Acad Amsterdam. 1935;38:989-1001.
8. Little BB, Buschang PH, Pena Reyes ME, Tan SK, Malina RM. Craniofacial dimensions in children in rural Oaxaca, southern Mexico: secular change, 1968-2000. Am J PhysAnthropol. 2006;131(1):127-36.
9. Rao NG. Text Book of Forensic Medicine & Toxicity. 2nd ed. Japee brothers Medical Publisher (P) Ltd; 2010.p.93-94.
10. Franco FCM, Arujo TM, Vogel CJ, Quintao CCA. Brachycephalic, dolichocephalic and mesocephalic: Is it appropriate to describe the face using skull patterns? Dental Press J Orthod. 2013 May-June;18(3):159-63.
11. Obikili EM, Dhaegbulem C, Ekanem TB, UA Ligine KWE, SinghSP. Cephalic index in young adult Nigerian Population J ExpClin Ant 2004; 3 (2):4-7.
12. Garba SH, Human AL. Craniofacial classification of normal newborns in Maiduguri Metropolis. Nigeria. In Maiduguri Metropolis, Nigeria. International Journal of Morphology. 2008; 26(2):407-410.
13. Heidari Z, Sagheb HRM. Morphological evaluation of head and face in 18-25 years old woman in southeast of Iran. Journal of Medical Science. 2006; 6(3):400-404.
14. S.K. Rathee, Sanjay Gupta, Shelja, UshaDhall, Raghavan. Cranial index in north Indian crania (predominantly Haryanavi). Int J Anat Res., 2014; 2(2):400-402.
15. Bhargava I and Kher GA. A comparative anthropometric study of Bhils and Barelas of Central India. J AnatSoc India 1961; 10:26-33.
16. Shah GV and Jadav HR. The study of CI in students of Gujarat. J Anat. Soc. India 2004; 53 (1): 25-6.
17. Anupam M, Baljeet SK, Seena, Arvinder PSB. The study of cephalic index in Punjabi students. Journal PAFMT. 2009(9)66-70.
18. S-D Desai, Hussain SS, Muralidher P Shepur, Thomas ST, Mavishettar GF, Haseena S. A craniometric study of South Indian. Adult day skulls: J.Pharm.Sci&Res 2013; 5(2) 33-34.