Relationship between height and head circumference in Haryanvi population in Panchkula region.

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Abstract

Introduction: Height estimation by measurement of various long bones has been attempted by several research fellows with variable degree of success. Each research fellow has derived his own formula for calculating the stature from long bones. Stature has a definite and proportional biological relationship with each and every part of the human body, i.e. head, face, trunk and extremities. This relationship helps a forensic scientist to calculate stature from dismembered and mutilated body parts in forensic examinations.

Aims: To study the relationship of human height with human head circumference.

Materials and methods: The present study was conducted Panchkula region of Haryana. The study carried out 75 individuals aged between 18 and 35 years. Pearson's correlation coefficient was employed for the statistical data and data was observed.

Results : The mean height is found to be 169.54 $\pm$ 6.71 in male and 161.6 $\pm$ 5.31 in females. head circumference of male and female is found to be 54.60$\pm$2.24 and 54.13$\pm$2.44 respectively. it was observed that there was a strong positive correlation between height and head circumference (0.068).

Conclusion : It was observed in present study that there was a strong positive correlation between height and head circumference in both males and females but as such gender difference did not showed much difference.

Key words: height, head circumference, correlation, anthropometry.

Introduction

Height estimation by measurement of various long bones has been attempted by several research fellows with variable degree of success. Each research fellow has derived his own formula for calculating the stature from long bones[1]. Stature has a definite and proportional biological relationship with each and every part of the human body, i.e. head, face, trunk and extremities. This relationship helps a forensic scientist to calculate stature from dismembered and mutilated body parts in forensic examinations.

Measurement of adult head circumference in neurodevelopmental conditions is relevant for clinical and research purposes. Measurement of occipito -frontal head circumference (HC) is an essential part of most pediatric medical examinations. There are many syndromes associated with microcephaly and macrocephaly [2-5]. Since studies have shown that up to 50% of normal variation in head size is familial, the first thing we usually do when we are concerned about an infant with a big head is to decide whether a parent has a large head [6,7]. The pediatric charts do not include head circumference references for persons older than 16 or 18 years of age. All that can be done is usually to measure the head sizes of the parents and guess whether they are large.

MATERIALS AND METHODS

The study carried out in Panchkula region of Haryana between ranged from 18 to 35 years. The measurements were taken and their mean value has been considered. Then the Data has been collected & entered in a master chart in Microsoft® Excel and has been analyzed. Prior consent has been taken from all participants. Individual height and head circumference was measured using anthropometer and non stretchable tape.

HEIGHT (HT) is the distance between vertexes to floor & measured by anthropometer. The subject should stand on a horizontal platform with the heels together, stretching upward to the fullest extent, aided by gentle upward pressure by the measure on the mastoid processes and by encouraging subject to stand tall, take a deep breath and relax. The subject's back should be as straight as possible, which may be achieved by rounding or relaxing the shoulders and manipulating the posture. The subject's heels must be watched to make sure they do not leave the ground and the medial border of the feet will be at an angle of about 60 degree.

Head circumference (HC) to measure the widest part of the head. Set the tape right above the ears so it's nearly touching them and line up on forehead so it sits over the bows.

Statistical Methods used : Data was analyzed then the mean and standard deviation has been computed for height and head circumference. Pearson's correlation coefficient has been used to find the correlation between height and head circumference. P value <0.05 has been considered as statistically significant.

The height varied from 152.7 cm to 185.3 cm with the mean height of 169.54 ± 6.71cm SD in male and from 152.2 cm to 171.9 cm with the mean height of 161.6. ± 5.31 cm SD in female. It was observed that height of male was more than the height of female. The head circumference ranges from 52.21 cm to 64.95 cm with an average of 54.78 ± 2.31 cm SD in male and from

50.61cm to 59.24 cm with an average of 54.56 ± 2.17 cm SD in female. The height of combined male and female varied between 152.7 cm – 185.3 cm with the mean height of 168.06 ± 7.15 cm SD and the head circumference varied from 50.61 cm to 64.95 cm with the mean of 54.746 ± 2.3 cm SD.

The gender wise comparison revealed that there was no statistically significant difference in mean values of head circumference in males and females.

It was observed that there was no or negligible correlation relationship between height and mean head circumference which was statistically significant (r = 0.068). The correlation of height with head length in males and females also revealed a no or negligible correlation relationship which was statistically significant. But correlation between height with head circumference is found to be highly strong which explains that the height of an individual can be estimated from head circumference. This will be helpful in medico-legal cases in identifying various unknown bodies.

Comparison of mean difference in head circumference of males and females.

PARAMETERS	MALES	FEMALES
HEIGHT	169.54+6.71	161.6+5.31
HEAD CIRCUMFERENCE	54.60 ±2.24	54.13 ±2.44

Correlation of height with head circumference

PARAMETERS	CORRELATIONS	MEAN HEAD CIRCUMFERENCE
HEIGHT	Pearson correlation	0.068
	P value	0.55

Correlation of head circumference with human height in males and females

Sex	Correlations	Mead head circumference
Males	Pearson's correlation	0.17
	p value	0.188
Females	Pearson correlation	0.14
	P value	0.63

DISCUSSION

Various studies has been conducted on relationship between height and head circumference of an individuals. In the present study height and head circumference found to be no relationship or negligible almost. According to the Pearson's coefficients r value =

+.70 or higher	Very strong positive relationship
+.40 to +.69	Strong positive relationship
+30 to +.39	Moderate positive
+.20 to +.29	Weak positive
+.01+.19	No or negligible relationship
0	No or zero correlation
-.01 to -.19	No or negligible relationship
-.20 to -.29	Weak negative relationship
-.30 to -.39	Moderate negative relationship
-.40 to -.69	Strong negative relationship
-.70 or higher	Very strong negative relationship

Krishna et al studied 252 koli male adolescents from north India and suggested that head circumference were significantly correlated with stature. their correlation coefficient between head circumference and height was +0.781 which was more according to Pearson's coefficient which comes to be very strong positive relationship between height and head circumference.

Akhtar et al measured head circumference and height of garo adult female +0.278 showed significant positive correlation with height.

B danborno et al concluded that of boys have larger head length where as girls had larger cephalic index as well as head circumference due to relative larger head breadth which statistically showed no significant difference.

Jadav et al concluded a head length and height of individuals (+0.53)have strong positive relationship where as seema et al have also reported (+0.52)strong positive relationship .

Rajani et al concluded that correlation coefficient for males between head length   (0.74)and head height(0.58) are very high and moderate high relationship

Sumit et al reported correlation coefficient between height with head length (+0.215) and height with head breadth (+0.232) in males where as height with head length and height with head breadth are found to be (+0.341) &(+0.291) in females respectively. Which is found to be significant positive correlation in both.

Neetu et al found height with head length in male is (+0.41) and female (+0.351) where as height with head breadth in male is (0.084) and in female (-0.028) respectively. Which shows head length and breadth are positively correlated with height except head breadth in female studied.

Vinitha et al studied head length and height are positively correlated in boys (0.20) girls (0.41) and combined (0.39)which was highly significant.

Girish shiv et al showed weak positive correlation between height and head length in both male and females(0.276).

Mansur et al concluded strong positive relationship between height and head circumference(0.398).

Conclusion

The present study concluded that head circumference has strong positive relationship with height of an individuals in Haryanvi population of Panchkula region. But the gender differences doesnot showed much relation between height and head circumference. Therefore height of individual can be estimated from head circumference. These type of studies help to study medico-legal cases in identification of an individual.

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REFERENCES

1. Patel SM, Shah GV and Patel SV. "Estimation of height from measurements of foot length in Gujarat region." J Anat Soc India. 2007; 56(1): 25-27.
2. Jones KL. In: Smiths Recognizable Patterns of Human Malformation. WB Saunders. Philadelphia 1988:411.
3. Bale SJ, Amos JI, Parry DM, Bale AE. Relationship between head circumference and height in normal adults and in the nevoid basal cell carcinoma syndrome and neurofibromatosis type I. Am J Med Genet 1991;40:206-10.
4. Fishman MA. Developmental defects. In: Principles and Practice of Pediatrics, 2nd ed. (Eds. FA Oski, CD DeAngelis, RD Feign, JA McMillan, JB Warshaw) JB Lippincott Comp. Philadelphia 1994: 2015-9.

5. Behrman RE, Vaughan VC, Nelson WE. Nelson Textbook of Pediatrics, 13th ed. WB Saunders Comp. Philadelphia 1987: 1303-4.

6. Weaver DD, Christian JC. Familial variation of head size and adjustment for parental head circumference. J Pediatr 1980;96: 990-4.

7. Sanchez-Andres A, Mesa MS. Heritabilities of morphological and body composition characteristics in a Spanish population. Anthropol Anzeiger 1994;52: 341-9.

8. Krishan K. Estimation of stature from cephalo-facial anthropometry in north Indian population. Forensic Science International 2008; 181: 52.e1–52.e6

9. Akhter Z, Begum JA, Banu LA, Alam MM, Hossain S, Amin NF et.al. Stature Estimation Using Head Measurements in Bangladeshi Garo Adult Females. Bangladesh Journal of Anatomy 2009; 7(2): 101-4.

10. B Danborno, P Nuhu, K Yandev. Relationship between Growth Pattern and Head Dimensions in Nigerian Children (5-15Years). The Internet Journal of Biological Anthropology. 2007; 2(1):1- 6

11. Jadav HR, Shah GV. Determination of personal height from the length of head in Gujarat Region J.Anat.Soc.India. 2004;53 (1):20-21.

12. Singh, R. Estimation of stature and age from head dimensions in Indian population. Int. J. Morphol.2013;31(4):1185-1190.

13.Agarwal S, Agarwal SK, Jain SK. Correlation Between the Stature and Cranial Measurements in Population of North India. Acta Medica International. 2014;1(2):99-102.

14. Neetu Purohit, J K Khatri. Dereviation of Regression Equation for the Estimation of   Stature from Cranial Dimensions in Western Rajasthan Populations. Sch. J. App. Med. Sci.,2015;3(5B):1903-1905.

15. Vinitha G, Sampada P Kadadi, Mallikarjun M, Jayprakash B R. Correlation of stature in   relation to head length in children. International Journal ofHealthcare Sciences. 2015;2(66-71):71-66.

16. Girish shiv Shankar ,veena vidya Shankar,shailaja shetty,radhika k.correation of human height wiyh head length in Indian individuals .international journal of anatomy and research.int j anat res ,vol 5(4.3):4723-26.

17. Mansur DI, Haque MK, Sharma K, Mehta DK, Shakya R. Use of Head Circumference as a Predictor of Height of Individual. *Kathmandu Univ Med J* 2014; 46(2):89-92.