International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsciencejournal.com
Volume 4; Issue 2; March 2018; Page No. 194-195

Prediction of stature from hand length in under-graduate students in medical college

Dr. Hema Narayan[1], Dr. Suman Kumar[2*]
Tutor, Department of Anatomy Vardhman Institute of Medical Sciences Pawapuri, Nalanda, Bihar, India
Assistant Professor, Department of Community Medicine, Nalanda Medical college and Hospital, Patna, Bihar, India

Abstract
Human height varies greatly between individuals and across populations for a variety of complex biological, genetic, and environmental factors, among others. Due to methodological and practical problems, its measurement is also subject to considerable error in statistical sampling.
The study was planned in Department of Anatomy, Vardhman Institute of Medical Sciences, Nalanda, Pawapuri, Bihar. The total 100 undergraduate students from the medical courses like MBBS. The approval of the institutional ethical committee was taken for the present study.
The results indicate that both hand and foot lengths can be efficiently used for the estimation of stature. The correlation coefficients between foot hand length, stature, and the estimates of stature based on these regression formulae are population specific.

Keywords: hand length, stature estimation, medical students etc.

Introduction
Human height is determined by a combination of genetics and environmental factors making it an active area of research in both the sciences and social sciences. Recent breakthroughs in sequencing the human genome have allowed identification of 697 genetic variants that influence the height of an individual. Although genetics plays an important role in understanding variation within a given population, human growth can be limited by poor childhood nutrition and illness. This makes height strongly correlated with living standards and hence a good proxy for them. Changes to heights over time and within countries paints a picture of economic development. One major advantage of using height as a proxy is the availability of data in the pre-statistical period.
It is important to stress that height is not used as a direct measure of well-being. In the absence of any abnormality or extremes, we should not expect that changing an individual's height makes them any more or less happy all other things being equal.
Human height varies greatly between individuals and across populations for a variety of complex biological, genetic, and environmental factors, among others. Due to methodological and practical problems, its measurement is also subject to considerable error in statistical sampling.
The average height in genetically and environmentally homogeneous populations is often proportional across a large number of individuals. Exceptional height variation (around 20% deviation from a population's average) within such a population is sometimes due to gigantism or dwarfism, which are caused by specific genes or endocrine abnormalities. It is important to note that a great degree of variation occurs between even the most 'common' bodies (66% of the population) [1], and as such no person can be considered 'average'
Human height or stature is the distance from the bottom of the feet to the top of the head in a human body, standing erect. It is measured using a stadiometer, usually in centimetres when using the metric system, or feet and inches when using the imperial system [2].
A particular genetic profile in men called Y haplotype I-M170 is correlated with height. Ecological data shows that as the frequency of this genetic profile increases in the population, the average male height in a country also increases.
When populations share genetic background and environmental factors, average height is frequently characteristic within the group. Exceptional height variation (around 20% deviation from average) within such a population is sometimes due to gigantism or dwarfism, which are medical conditions caused by specific genes or endocrine abnormalities.
The development of human height can serve as an indicator of two key welfare components, namely nutritional quality and health. In regions of poverty or warfare, environmental factors like chronic malnutrition during childhood or adolescence may result in delayed growth and/or marked reductions in adult stature even without the presence of any of these medical conditions.
Various body segments (head, trunk and extremities) has been proportionately related with height of an individual. Many studies have been conducted in which an attempt is made to estimate stature from the length of long bone, but, few studies are reported which correlate stature with fragmentary remains of the body part [3].
The study was planned to generate the regression equation to

calculate stature from the length of hand which will be immensely useful to the forensic pathologist in the identification of a living or deceased individual.

Methodology

The study was planned in Department of Anatomy, Vardhman Institute of Medical Sciences, Nalanda, Pawapuri, Bihar. The total 100 undergraduate students from the medical courses like MBBS. The approval of the institutional ethical committee was taken for the present study.

Following was the inclusion and Exclusion criteria of the study:

Inclusion Criteria: Undergraduate students from the different medical courses like MBBS, BDS & Nursing were included in the study.

Exclusion Criteria: Students with physical debilities, skeletal defects and past history of diseases affecting bones and joints and subjects who are on any form of hormonal medications were excluded from the study.

The Hand length and Stature (height) were measured with the maximum precautions without any biasness and errors.

Results Discussions

The 100 undergraduate students from the medical courses like MBBS, were included in the study. The hand length and the height of the patients were collected and presented as below.

Table 1: Height & Hand length

	Male	Female
Height	155.2-186.6	144.5-175.6
Right Hand	16.90-21.50	15.80-20.70
Left Hand	16.80-22.0	16.90-21.3

Table 2: Regression Coefficient

Gender	Side	Correlation coefficient (r)	r2 (coefficient of determination)	P values
Male	Right	0.63	0.39	<0.05
Left		0.63	0.39	<0.05
Female	Right	0.71	0.51	<0.05
Left		0.7	0.49	<0.05

We had recorded the height in males as 155.2-186.6 cm and in females as 144.5-175.6 cm/ The Right hand length in males was observed as 16.90-21.50 cm and in females as 15.80-20.70 cm. The left hand length in males is 16.80-22.0 cm and in females is 16.90-21.3 cm.

Stature estimation is useful when height cannot be measured directly due to deformities such as kyphosis, scoliosis. The human hand, for instance, is considered the most used and flexible part of the body and has been of great scientific significance to investigators in the feld of anthropometry, ergonomics, and orthopedic surgery. With the alarming rate of disasters such as plane crash, terror atacks, earthquakes all over the world, estimation of stature from the hand and its dimensions becomes necessary in identification of victims especially since this is required during medico-legal examinations [4].

In a study by Wakode *et al*, the stature was found to correlate positively with hand length in both sexes, correlation coefficient in males being 0.69 and 0.66 for right and left hands respectively and that in females being 14.9 on right and 15.2 on left hand [5]. Likewise, Ilayperuma conducted a study on 258 medical students (140 male and 118 female) in University of Ruhuna, Sri Lanka and observed a significant correlation between stature and hand length of both males and females [6]. All these findings support the result of the current study in which, a significant positive correlation was noted between stature and hand length in both the sexes; correlation coefficient being 0.63 and 0.71 on both sides in males and females respectively.

According to Pal *et al*, the coefficient of determination for regression equations (to estimate height from hand length) in medical students of Kolkota was 58.3% and 48.7% for both hands in male and female respectively [7].

Conclusion

The results indicate that both hand and foot lengths can be efficiently used for the estimation of stature. The correlation coefficients between foot hand length, stature, and the estimates of stature based on these regression formulae are population specific.

Reference

1. Stadiometers and Height Measurement Devices. stadiometer.com. stadiometer.com.
2. Using the BMI-for-Age Growth Charts. cdc. gov. Center for Disease Control. Archived from the original on, 2014.
3. Carter Pamela J. Lippincott's Textbook for Nursing Assistants: A Humanistic Approach to Caregiving. USA: Lippincott, Williams & Wilkins, 2008, 306.
4. Krishan K. Estimation of stature from cephalo-facial anthropometry in north Indian population. Forensic Sci Int. 2008; 181(52):1-6.
5. Wakode NS, Wakode SL, Ksheersagar DD, Tajane VD. Prediction of Stature based on Measurement of Hand Length in Maharashtra Region. Indian Journal of Clinical Anatomy and Physiology. 2015; 2(3):131-4.
6. Ilayperuma I, Nanayakkara G, Palahepitiya N. Prediction of personal stature based on the hand length. Galle Medical Journal. 2009; 14(1).
7. Pal A, Aggarwal P, Bharati S, Madhusmita P, Indra D, Roy P. Anthropometric measurements of the hand length and their correlation with the stature in Eastern Indian population. National J Med Research. 2014; 4(4):303-5.