ESTIMATION OF STATURE FROM HAND LENGTH AND LENGTH OF PHALANGES

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HOW TO CITE THIS ARTICLE:

Jyoti Agrawal, Leena Raichandani, Sushma K, Surbhi Raichandani. "Estimation of stature from hand length and length of phalanges". Journal of Evolution of Medical and Dental Sciences 2013; Vol2, Issue 50, December 16; Page: 9651-9656.

ABSTRACT: CONTEXT: Stature or body height is one of the most important and useful anthropometric parameter that determine the physical identity of an individual. The study was done to estimate stature from the hand and length of phalanges. **Study design:** descriptive cross sectional study. **Place of Study:** department of Anatomy, Dr.S.N. Medical College, Jodhpur **MATERIAL:** One hundred males and one hundred females with the age of 18to 25yrs of, Dr.S.N. Medical College, Jodhpur. **METHOD:** Measurement of stature using standiometer and hand length and phalangeal length of right hand with a slide caliper respectively. **RESULT:** The present study showed significant correlation between the stature and hand lengths and phalangeal length.provide multiplication factors for stature with other parameters.

KEY WORDS: anthropometric measurement, hand length.

INTRODUCTION: Stature or body height is one most important and useful anthropometric parameter that determines the physical identity of an individual. Stature prediction occupies relatively a central position in anthropometric research.

Anthropometric technique commonly used by anthropologists and adopted by medical scientists has been employed to estimate stature for over a hundred years. Stature provides insight into various features of a population including nutrition, health and genetics; geographical location, environment and climatic condition. The stature of an individual is an inherent characteristic; its estimate is considered to be an important assessment in the identification of unknown human remains. Adult height may be attained anywhere from the early teens to early twenties, though it is most commonly reached during mid-teens for females and the late-teens for males.

There is an established relationship between stature and various body parts like head, trunk, upper and lower extremities. It is common to find the peripheral parts of the body such as hand and foot in explosions, aircraft and railway accidents. So many studies have been conducted in different ethnic groups to estimate stature from hand dimensions. Estimation of stature from hand length and length of phalanges can be use an alternative measure to stature when stature cannot be measure directly due to deformities like Kyphosis, Lordosis and Scoliosis, Contracture or Missing legs.

A number of workers have studied the correlation between stature and various long and short bones of the body. Many of them have correlated the dimensions of hand with the stature. But very few studies of stature estimation are reported based on digits and phalanges of hand. Even more limited are the studies taking into account all the digits and phalanges of hand. Thus the present study is planned to find out a relationship of length of hand and phalangeal length with body stature in Jodhpur region.

REVIEW OF LITERATURE:

Vitruvius (1883), the architect says in his work on architecture that the measurements of human body are distributed by nature as follows that is that 4 fingers make 1 palm and 4 palms make 1 foot, 6 palms make 1 cubit; 4 cubits make a man's height. And 4 cubits make one pace and 24 palms make a man; and these measures he used in his building and he says the length of a man's outspread arms is equal to his height. **S R Habib, N N Kamal (2009)** examines the relationship between stature and hand and phalanges lengths among Egyptians. Stature, hand and phalanges lengths of 159 subjects, 82 males and 77 females (18–25 years) were measured. Statistical analysis indicated that bilateral variation was insignificant for all measurements. Sex differences were significant for all measurements. Linear and multiple regression equations for stature estimation were calculated. Correlation coefficients were found to be positive, but little finger measurements of male and distal phalanges of female fingers were not correlated with stature. Regression equations were checked for accuracy by comparing the estimated stature and actual stature. **K. Yoganarasimha et al (2010)** conducted study on 500 north and south Indian subjects in Manipal, India, to establish the stature of an individual using the middle finger length. Measurements were analysed statistically to establish the relationship between person's middle finger length and their stature. The study shows that the middle finger length bears a significant relation to stature and can be an important tool for stature estimation.

MATERIAL AND METHODS: Present study will be conducted on the students and staff of North Indian origin of S.N. Medical College, Jodhpur, Rajasthan, who are willing to participate in the study comprising of both the genders 100 males and 100 females in the age group of 17-30 years belonging to various parts of North India Landmarks and techniques involved in taking anthropometric measurements:

Stature: It is measured as the vertical distance from the vertex to the floor, where the vertex is the highest point on the head when the head is held in Frankfurt Horizontal (FH) plane. The subject was made to stand barefoot in an erect posture against the wall with both feet kept close together and hands hanging down on the sides.

Hand Length: Distance from middle of the distal wrist crease to the distal end of most projecting point of hand.

Proximal phalangeal length: Distance from middle of metacarpophalangeal crease to proximal phalangeal crease. Middle phalangeal length; Distance from middle of proximal phalangeal crease to middle of distal phalangeal crease.

Distal phalangeal length: Distance from middle of distal phalangeal crease to the tip of the digit.

For measurements on hand, all the digits including the thumb will be kept fully extended. Thumb of the both the hands are not included in the present study

Fig. 1: hand length measurement

Fig. 2: phalangeal length measurement

OBSERVATIONS: Findings were subjected to statistical computation and results have been presented in the following tables and illustrated through graphs.

(Measurements) C.M.	M a l e	f e m a l e
S t a t u r e	170.71±8.572	161.6±7.627
H a n d l e n g t h	19.594 ± 1.115	19.673±1.1377
Index finger ppl	5.038 ± 1.071	4.9166±0.7939
Index finger mpl	3.523 ± 1.549	2.9033±0.463
Index finger dpl	2.859± 1.0956	2.571±1.923
Middle finger ppl	5.4330 ± 1.0956	5.285±1.1202
Middle finger mpl	3.7122± 0.6518	3.32±0.6530
Middle finger dpl	3.030±1.16886	2.383±0.5239
Ring finger ppl	4.9949±1.03	4.946±0.985
Ring finger mpl	3.762±2.6813	3.93±0.947
Ring finger dpl	2.693±0.587	2.306±0.7104
Little finger ppl	4.103±0.973	3.8933±0.89
Little finger mpl	2.75±0.744	2.463±0.552

Table 1: SOMATOMETERIC DATA OF RIGHT HAND
(MEAN±SD) (DESCRIPTIVE STATISTICS)

Table no. 1 representing data of right hand of both male and female student.

Table no. 1 shows the mean height and standard deviation of male student is 170.71cms ±8.5121 and for female students mean height and standard deviation is 161.6 cm ±7.62. Right hand length of male students is 19.594±1.115 cm for and female students is 19.67±1.1377 cm and also shows mean length in cm and standard deviation of proximal , middle and distal phalanges of index, middle ring and little finger of both male and female students.

Parameters	Male right hand	Female right hand
Height	001	001
HL	0.608	0.658
IFPPL	0.452	0.588

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IFMPL	0.539	0.426
IF DPL	0.478	0.398
MFPPL	0.594	0.475
MFMPPL	0.478	0.512
MGDPL	0.613	0.526
RFPPL	0.379	0.466
RFMPPL	0.396	0.329
RGDPL	0.356	0.386

Table 2: Somatometric data of hand (RIGHT)
Corelated with stature in both male and Female

Table no. 2 Showing co-relation of other parameters with stature ranging from 0.329 to 0.683.

PARAMETER	MULTILICATION FACTOR (CO- RELATE WITH HEIGHT)	
	MALE	FEMALE
HAND LENGTH	8.835	8.215
IFPPL	33.876	32.86
IFMPL	48.446	44.84
IFDPL	59.709	62.85
MFPPL	31.420	30.577
MFMPPL	45.986	41.224
MGDPL	.3399	58.81
RFPPL	34.176	32.66
RFMPPL	.3774	44.44
RGDPL	63.66	65.07

Table 3: Multiplication factors for other
parameters correlated with stature

Table no.3 showing multiplication factors for other parameters correlated with stature.

DISCUSSION: From the present study we found some multiplication factor..Multiplying these multiplication factors with respective parameter we found some estimated statures which were correlate with the measured stature .All the measurements in this study were a positive as well as a statistically significant correlation with the stature.

CONCLUSION: From the present study we found some multiplication factors which will be helpful for estimation of stature from right hand length and phalangeal length for both male and female of North India . That may be helpful for those who work in this area especially in the various medical disciplines, anthropologists.

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Date of Submission: 13/11/2013.
Date of Peer Review: 14/11/2013.
Date of Acceptance: 20/11/2013.
Date of Publishing: 10/12/2013