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Original Research Paper

Anatomy

ESTIMATION OF STATURE USING HAND LENGTH IN THE POPULATION OF NORTH ARCOT DISTRICT -TAMILNADU

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ABSTRACT Data from the National Crime Records Bureau reveals that a 2,22,446 bodies were passed off as "unidentified" by the police in the past six years, That to determine the physical identity of an individual, body height or Stature is one of the most important useful anthropometric parameter when bodies are found in mutilated state, We designed a study to estimate the stature from the hand length on four hundred and forty five individuals of north arcot district. Study design: descriptive cross sectional study. Place of Study: Department of Anatomy, MAPIMS hospital, Melmaruvathur. MATERIAL: 445 male attenders aged between 18 to 25 years. we measured anthropometrically in respect to their height and length of right and left hand. METHOD: Measurement of stature and hand length of right and left side was taken with a standard anthropometer and a slide caliper respectively. The present study showed significant ($p < 0.001$) positive correlation between the hand lengths and stature.

KEYWORDS : Stature Estimation, Hand Length, North Arcot

INTRODUCTION:

According to oxford dictionary- stature is a term which dated back to mid 19th century derived from latin – statura, stature was defined as 'a person's natural height'. Stature estimation is among the big four (identifying age, sex, stature and ancestry or race) in forensic antropology , finding identity of a deceased person without any identification details is a common problem for the police investigators now a days, According to national crime record bureau a total of 34,592 unidentified dead bodies were recovered at all India level, In past many authors have documented that stature can be estimated from dimensions of hands and feet successfully[1] . Stature throws light into various features of a population like nutrition, health, genetics, geographical location, environment and climatic condition[2]. According to Renu Kamal, "In 1888, Rollet was first to conduct a research in this field. He used measurements from 50 male and 50 female corpses to show the relationship between various body measurements and the stature. In 1899, Pearson, a mathematician, used this data to derive the regression equations, which he suggested were population specific"[3]. knowing the stature of a particular group of people in a defined geographical area, throws light into various parameters, antropometrically the obtained data will lead to many interesting variables about their origin and evolution, during the time of natural calamities and disasters these data's will help to identify the ethnicity of the individual, though various parameters like lower body – bones estimation or available, using hand as the estimation tool for stature have been supported by many authors[4]. And also studies have also shown that dimensions of the Hands & Feet vary in different races and also with the dominance of the hand used, they can form a reliable source of data for a given geographical location[5]

MATERIAL AND METHODS:

we designed this cross sectional study with some analytical components. The study was conducted at melmaruvathur adhiparasakthi institute of medical sciences and research, we selected nearly 445 healthy male attenders of the age group ranging between 18-25 years irrespective of caste, religion, dietary habits and socioeconomic stature etc. we excluded the subjects who are having disease or deformity. we examined the participants length of both hands to their height anthropometrically. The stature was measured using a standard anthropometer by calculating the vertical distance from the vertex to the floor. While measuring we made the the subject stand erect, bare footed on a horizontal resting plane having the palms of the hands turned inwards and the fingers pointing downwards with head oriented in Frank fort plane as mentioned by Manirul Islam[6]. Then, we brought the movable piece of the anthropometer in contact with the vertex in the mid sagital plane. Then we measured the length of each hand using a sliding caliper. The subject was asked to place his hand on a table with the abducted thumb and fingers together. The measurement was taken from the proximal crease of the wrist to the tip of middle finger when the hand was held straight and stretched.[7] The measurements were recorded in centimetres to the nearest 0.1cm.[8]

RESULT & OBSERVATIONS:

The stature varied from 140 cm to 170 cm with mean value of 164.88 cm and the standard deviation of 4.39 cm. On the other hand, mean hand length of the right and left were 19.35(±1.77) cm and 18.92 (±1.75) cm respectively. The stature and other measurements are shown in Table 1 along with the multiplication factors used to estimate the stature from these measurements. The table also shows the correlation coefficients (r) and p values to reveal the relationships between specific measurements and stature. In the present study there were a significant ($p < 0.001$) positive correlation between the stature and the length of the right and left hand (Figures 1 and 2).

Table 1: Measurement of height (Stature) and hand length in males

Variables	Range (cm)	Mean value (cm)	SD (cm)	Mean Multiplication factor	Correlation of the hand length measurement with stature
Height (Stature)	140-171	164.88	4.39		
Hand length (right)	14.10-21.90	19.35	1.77	8.52	0.399**
Hand length (left)	13.9-21.70	18.92	1.75	8.71	0.353**

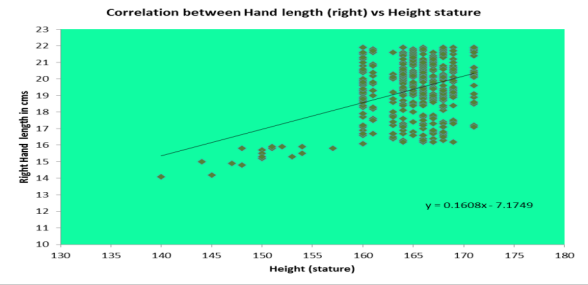
n= 445 Significant r: correlation coefficient p: probability ($p<0.05$ was considered as significant). Each multiplication factor is the ratio of the stature to the respective physical measurements.

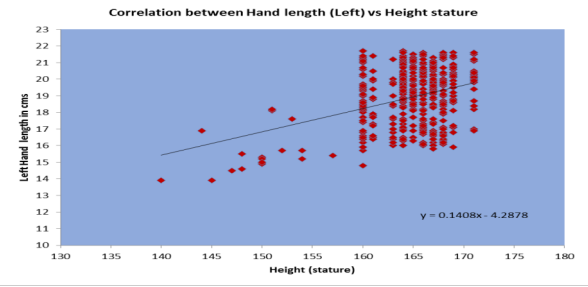
Table 2: Comparison of the measured stature with the stature estimated from hand length of the right and left side

Measurement from which the stature was estimated	Estimated stature cm	p value		
	Range (cm)	Mean value (cm)	SD (cm)	

Hand length (right)	120.13-186.59	164.83	15.05	0.944
Hand length (left)	121.07-189.01	164.80	15.25	0.912

The measured stature ranged from 140 to 171 cm with a mean (±SD) of 164.88(±4.39) cm. n=200 NS = Non-significant.





DISCUSSION:

Estimation of the stature of males of north arcot district of tamilnadu was not documented clearly upto our knowledge, knowing the stature of a particular population will be very helpful during the time of natural calamities, medicolegal examinations and for anthropological studies. We designed our study to estimate the stature from the measurements of hand and height, though Krishnan et al [9] examined the relationship between stature and dimensions of hands and feet, he mentioned lower limb bones are best to estimate the stature of an individual, even some authors estimated from the skull and cephalofacial parameters [10 – 12,] but we designed the study based on Akhlaghi M et al [13] who identified meanignfull correlation between upper limb and stature and also by Manirul Islam [6] who estimated stature in tiripura population kanchan et al [14] mentiones racial and ethnic variations arise among populations from different regions.

Hence, each ethnic group requires a different forensic standards, for which a region-based study of subjects is necessary, so we designed this study particularly for the males of north arcot district. The age group we selected was between 19 – 25 because the maximum height will be attained by 24, some authors have selected the same age group[15-16] and the participants were selected from local community who were accompanying the patients, because MS Supare et al[17] stated the ideal study to formulate regression equation for all population should be a community-based study, we calculated the multiplication factor and the estimated height accuracy was crosschecked by comparing the actual stature, our results correlates with saxena et al[18] and Thakur et al[19] where they estimated the stature from hand length.

In the present study the mean stature was 157.04 (±6.12) cm different authors like varun et al[20] and krishnan et al[21] mentioned different mean stature in various populations, the mean length of right hand was 19.35 (±1.77) correlates with Sunil et al[22] who published the length of right hand is 19.6 ± 1.3, the mean length of left hand was 18.92 (±1.75). The multiplication factor of right side was 8.52 and left side was 8.71.

Conclusion:

In this present study where the hand length of common population of males aged group between 18 to 25 of north arcot district were analysed and calculated the multiplication factors, by multiplying hand length with multiplication factors we found the estimated statures which correlates well with measured stature statistically by positive correlation.

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