H36 Multiplication Factor versus Regression Analysis in Stature Estimation from Hand and Foot Dimensions

Kewal Krishan, PhD, Panjab University, Department of Anthropology, Sector-14, Panjab University, Chandigrarh, 160 014, INDIA; Tanuj Kanchan, MD, Kasturba Medical College, Department of Forensic Medicine, Light House Hill Road, Mangalore, Karnataka 575 001, INDIA; and Abhilasha Sharma, MSc, Panjab University, Department of Anthropology, Sector-14, Chandigarh, Chandigarh 160 014, INDIA*

After attending this presentation, attendees will understand the usefulness of stature estimation methods in forensic examinations and will realize the variability in estimated stature and actual stature using multiplication factor and regression analysis methods as the literature on this aspect has been scanty.

This presentation will impact the forensic science community by confirming that stature estimation is more accurate and reliable with regression analysis method than that of multiplication factor method.

Estimation of stature is an important parameter in identification of human remains in forensic examinations. The objective of the present study is to compare the reliability and accuracy of stature estimation and to demonstrate the variability in estimated stature and actual stature using multiplication factor (MF) and regression analysis (RA) methods. The study is based on a sample of 246 subjects (123 males and 123 females) from North India aged between 17 to 20 years. Four anthropometric measurements; hand length, hand breadth, foot length and foot breadth taken on the left side in each subject were included in the study. Stature was measured using standard anthropometric techniques. Multiplication factors were calculated and linear regression models were derived for estimation of stature from hand and foot dimensions. Derived multiplication factors and regression formulae were applied to the hand and foot measurements in the study sample. The estimated stature from the multiplication factors and regression analysis was compared with the actual stature to find the error in estimated stature. Significant male-female differences were observed for stature, based on hand and foot measurements (p-*value* < 0.001). Significant sex differences were also observed for the MF derived in the study (p-*value* < 0.05) except for the MF derived for Hand Length that was almost similar in males and females (p-*value* = 0.712). Hand and foot measurements show a significant correlation with the stature in males and females (p-*value* < 0.001). Mean actual stature and stature derived from MF analysis and from regression analysis did not show any differences between them. However, it is evident that the range of stature estimated from MF analysis is broader and that from regression analysis is narrower than that of the actual stature. It is apparent that the MF analysis overestimates the maximum actual stature whereas the regression analysis underestimates it. The minimum actual stature is mostly underestimated in MF analysis and overestimated in regression analysis. However when error of estimate was calculated, it is observed that the minimum and maximum error in estimating stature in the study group is significantly larger in multiplication factor analysis than from the regression analysis. The study showed that the range of error in estimation of stature from the regression analysis method is less than the multiplication factor method; thus indicating that the regression analysis method is better than multiplication factor analysis in stature estimation.

Forensic Anthropology, Personal Identification, Methods of Stature Estimation

 ** Presenting Author*