

A multivariate analysis to propose linear models for the stature estimation in the Sabahan young adult population

ABSTRACT

Stature is one of the significant parameters to confirm a biological profile besides sex, age, and ancestry. Sabah is in the Eastern part of Malaysia and is populated by multi-ethnic groups. To date, limited studies on stature estimation have been conducted in Sabah. Hence, this study aims to construct population-specific stature estimation equations for the large ethnic groups in Sabah, Malaysia. The aim is to propose linear models using different hand dimensions (hand span, handbreadth, hand length, middle finger length, and the second inter-crease in the middle finger) for the young adult male and females of the major ethnic groups in Sabah. This cross-sectional study framework used stratified random sampling on 184 male and 184 female young adults. An unpaired t-test and a one-way ANOVA were used to assess the differences in the mean between sex and ethnicities, respectively. The link between the response variable and explanatory variables was initially investigated using simple linear regression, followed by multiple linear regression. The present study demonstrated the highest association for the quantitative explanatory variables among hand length and stature (right side: $r = 0.833$; left side: $r = 0.842$). Simple equations were specifically developed without sex indicators, and ethnic and multiple linear regression was developed with sex and ethnic indicators. Multiple linear regression provided good estimation $r^2 = 0.7886$ and adjusted $r^2 = 0.7853$. The stature of 18 to 25 year old large ethnic groups in Sabah can be estimated using the developed models $90.218 + 3.845 \text{ LHL} - 5.950 \text{ Sex} - 2.308 \text{ Bajau} - 1.673 \text{ KadazanDusun} + 2.676 \text{ L2ICL}$. While, formula for each ethnic and sex KadazanDusun Male: Stature = $88.545 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$, KadazanDusun Female: Stature = $82.595 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$, Bajau Male: Stature = $87.910 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$, Bajau Female: Stature = $81.960 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$, Malay Male: Stature = $90.218 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$, Malay Female: Stature = $84.268 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$, Chinese Male: Stature = $90.218 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$, and Chinese Female: Stature = $84.268 + 3.845 \text{ LHL} + 2.676 \text{ L2ICL}$.