

## **Abstract**

### **Introduction**

The human hand is a very complex structure and devoted to the functions of manipulation. Hand grip strength is used in clinical settings as an indicator of overall physical strength and health.

### **Research background**

Several studies were conducted on hand length and forearm circumference to estimate the hand grip strength. But those studies did not analyze the correlation between age, body mass index, hand length, and forearm circumference. However, there is no study in Malaysia to analysis the hand and forearm dimensions among three major ethnic groups of Malaysian students. Hence, this study was conducted to fulfill the lacunae in this regard.

### **Objectives**

This cross-sectional study was performed to study the correlation between hand grip strength with anthropometric measurements such as forearm length, forearm circumference (at higher level, mid-level, and lower level), hand length, hand breadth and body mass index in three major races in Malaysia such as Malay, Chinese and Indian.

### **Materials and Methods**

This study was conducted in AIMST university and UiTM university, Kedah, Malaysia in the year 2018 where various anthropometric dimensions were taken to measure the hand grip strength among three hundred students comprising of Indian males (n=50), Indian females (n=50), Chinese males (n=50), Chinese females (n=50), Malay males (n=50) and Malay females (n=50) aged between 18 and 30 years of age.

Descriptive statistics, Pearson's correlation coefficient, and linear regression were employed for the statistical analysis of the data.

## **Results**

Based on the results of this study, a significant positive correlation was observed between forearm and hand parameters with dominant and non-dominant hand grip strength among the three races. The best prediction power for estimation of dominant hand grip strength (DHG) was observed in dominant forearm circumference (DFC) at lower level for Indian males, dominant hand breadth (DHB) for Indian females, non-dominant forearm length (NDFL) for Chinese males, DFC at lower level for Chinese females, non-dominant forearm circumference (NDFC) at higher level for Malay males and NDFC higher level for Malay females. The best prediction power for estimation of non-dominant hand grip strength (NDHG) was observed in DFC at lower level for Indian males, NDFC at mid-level for Indian females, dominant forearm length (DFL) for Chinese males, DFL for Chinese females, NDFC at mid-level for Malay males and DFC at lower level for Malay females. It was also observed that there was no significant correlation between body mass index (BMI) with hand grip strength.

## **Conclusion**

From the results of the present study, it may be concluded that hand grip strength had a significant relationship with hand and forearm dimensions among the three races of the Malaysian population.

## **Keywords**

Hand grip strength, dominant hand grip strength (DHG), non-dominant hand grip strength (NDHG), Malaysian population.