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THE EFFECT OF SELECTED PARAMETERS ON HAND GRIP STRENGTH AMONG CRICKET PLAYERS IN PRISON DEPARTMENT

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Objective Handgrip strength is a marker of upper body strength. The purpose of this study is to examine the relationship between the dominant handgrip strength and twelve selected parameters of cricket players in Sri Lanka Prison Department. The twelve selected variables are as follows; age, height, weight, arms subcutaneous fat percentage, skeletal muscle mass percentage, upper arm length, fore arm length, hand width, hand length, hand span, hand circumference and free testosterone hormone level.

Methods The study is conducted on a population of 35 cricket male players. Sample and population are the same. This population mainly consist of players, who practice and play regular matches for the club and exclude players who are suffering from any acute or chronic upper limb injuries and players, who under performed in the recent matches. Dominant handgrip strength and other selected parameters are measured via standard techniques. Blood samples were collected to determine free testosterone level of players, for better result this study collected blood samples were at 7.30 a.m. to 8.00 a.m after a better sleep at previous night. Ordinary electric centrifuge use to centrifuge the sample tubes. Once centrifugation is completed the serum is separated from the centrifuged blood sample used by pipette. This study used High-performance liquid chromatography (HPLC) method to analyze free testosterone hormone level of the samples. Handgrip strength tests were performed the same morning of blood sample collected. The purpose of this test in this study is to measure the maximum isometric strength of the hand and forearm muscles of players. This study used “camry eh101” electronic hand dynamometer to measure hand grip strength and strength was measured in kilograms. This study used “Karada scan” bioelectrical impedance analysis to estimate percentage of body fat and fat free muscle mass of cricket players. Anthropometric data was measured as follows; stands erect, looking straight ahead, heels together, weight distributed equally on both feet, and with his arms hanging naturally at his sides. All measurements were made on the dominant hand of the body using steel tape and the circumferences of body parts were measured with the help of flexible steel tape. Statistical analysis is carried out utilizing SPSS and Minitab software.

Results Pearson correlation of dominant handgrip strength (kg) and age = -0.521 at p-value = 0.001. Pearson correlation of dominant handgrip strength (kg) and height (cm) = 0.394 at p-value = 0.019. Pearson correlation of dominant handgrip strength (kg) and weight (kg) = 0.100 at p-value = 0.568. Pearson correlation of free testosterone level (pg/mL) and dominant handgrip strength (kg) = 0.496 at p-value = 0.002. Pearson correlation of dominant handgrip strength (kg) and arms subcutaneous fat percentage (%) = -0.424 at p-value = 0.011. Pearson correlation of dominant handgrip strength (kg) and arms skeletal muscle mass percentage (%) = 0.436 at p-value = 0.009. Pearson correlation of dominant handgrip strength (kg) and fore arm length (cm) = 0.591 at p-value = 0.000. Pearson correlation of dominant handgrip strength (kg) and upper arm length (cm) = 0.240 at p-value = 0.165. Pearson correlation of dominant handgrip strength (kg) and Hand width (cm) = 0.319 at p-value = 0.062. Pearson correlation of dominant handgrip strength (kg) and hand length (cm) = 0.608 at p-value = 0.000. Pearson correlation of dominant handgrip strength (kg) and Hand span (cm) = 0.407 at p-value = 0.015. Pearson correlation of dominant handgrip strength (kg) and hand circumference (cm) = 0.232 at p-value = 0.180. Correlation of age and free testosterone hormone

level (pg/mL) = -0.359 at p-value = 0.034. Correlation of age and arms subcutaneous fat percentage = 0.462 at p-value = 0.005. Correlation of age and arms skeletal muscle mass percentage = -0.619 at p-value = 0.000. Pearson correlation of weight (kg) and arms subcutaneous fat (%) = 0.596, P-value = 0.000. Correlation of weight (kg) and arms skeletal muscle mass (%) = -0.793 at p-value = 0.000. Pearson correlation of free testosterone hormone level (pg/mL) and arms skeletal muscle mass percentage (%) = 0.375 at p-value = 0.026. Standing height, correspondingly indicate significant a relationship with fore arm length, upper arm length, hand length, hand span and hand circumference. This indicates the when body height increase, it will subsequently lead to increment of the forearm length, upper arm length, hand length, hand span and hand circumference. Regression equation for dominant handgrip strength is (kg) = - 0.578 age + 3.79 hand length (cm). Observed test statistic (4.309) > at critical value 5 % (2.3205). It can be concluded with 95% confidence that at least one of the two variable significantly contribute for dependent variable of regression model. β_1 P value (0.019) < 0.05, β_2 P value (0.001) < 0.05. Therefore, predictor variables age and hand length are significant in this regression equation. Both age and hand length show a VIF value of 1.16 and which indicate that there is strong multicollinearity between the variables. Adjusted R-squared = 0.438 and it can be concluded that the fitted model is captured 43.8% of observed variability.

Conclusions Pearson correlation of dominant handgrip strength and height, free testosterone level, fore arm length, hand length, hand span, arms subcutaneous fat and arms skeletal muscle mass percentage have a statistically significant relationship. The direction of the relationship is positive. Meaning that these variables tend to increase together. Pearson correlation of dominant handgrip strength and age, arms subcutaneous fat have a statistically significant relationship. The direction of the relationship is negative meaning that these variables move in inverse, or opposite, directions. Pearson correlation of dominant handgrip strength and hand circumference, weight, upper arm length and hand width have no statistically significant relationship. Age and Free testosterone hormone level, arms skeletal muscle mass percentage have a statistically significant linear relationship. The direction of the relationship is negative. In other words, as Age increases, the free testosterone hormone level and arms skeletal muscle mass percentage decreases. Pearson correlation of Age and Arms Subcutaneous fat percentage have a statistically significant linear relationship. The direction of the relationship is positive. Weight and Arms Skeletal muscle mass percentage have a statistically significant linear relationship. The direction of the relationship is Negative. Pearson correlation of Weight and Arms Subcutaneous fat percentage have a statistically significant linear relationship. The direction of the relationship is positive. Pearson correlation of Free Testosterone hormone level and Arms Skeletal muscle mass percentage have a statistically significant linear relationship. The direction of the relationship is positive. 43.8% of handgrip strength depends on the variables age and hand length.

Coaches should periodically assess the free testosterone level and percentage of lean body mass of the players to maintain optimal level. Cricket coaches and team selectors can use age, height, fore arm length, hand length, hand span, free testosterone hormone level, arms subcutaneous fat and arms skeletal muscle mass percentage as talent predictors to select ideal players for cricket teams or to identify potential children/players. Cricket Brain Centers can use this research to analysis player performance and predict their future performance