Comparative Study of various anthropometric parameters in cricket and football players

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Abstract

Background: Anthropometric scales express the physical potential of football players and can be used to compare them with other sports. Anthropometric proportions play a key role in cricket.

Aims and Objectives: To comparison of various anthropometric parameters in cricket and football players.

Material and Methods: The present research was carried out in the Sports Physiology Laboratory of the Department of Physiology. The period of the study from December 2012 to November 2014 and the form of study is not followed up. Test analysis is conducted to conduct a comparative study of anthropometric parameters in cricket and football players.

Results: We did a test sample with 60 subjects (30 cricket players and 30 football players). The average value of the height of football players is more than that of cricketers. The average weight value of cricket players is higher than that of football players. BMI, percent body fat, percent lean body weight, mid-upper arm circumference, mid-upper arm area, corrected mid-upper arm muscle area, arm fat index, is substantially higher in Cricket players than in Football players.

Conclusion: In our research, we notice that, in our cricket and football players, the majority of anthropometric parameters such as height, weight, percent lean body mass, mid-upper arm diameter, mid-upper arm area, and corrected mid-upper arm muscle area are lagging when compared to international cricketers and football players.

Keywords: Anthropometric variables, Cricketers, BMI.

Introduction

Anthropometry is a measurement of the proportions and size of the body. Measurements include body weight, height, diameter, the thickness of the skin fold and bone widths, and lengths. Anthropometry is a branch of science that deals with the comparative measurement of the human body, its components, and its form and proportions. It is an analysis of human body measurements in the dimensions of bone, muscle, and adipose tissue. Anthropometry has been used to assess the gross structure and function. There are multiple factors that are responsible for the performance of a sportsman. Anthropometry is the calculation of

proportions and body size the form of the body and body, including height, shape, and shape, is considered to play a significant role in this respect. At present, athletes are selected on the basis of the physical structure and body size for superior success in any sport.

Related physical characteristics or anthropometric profiles have been well established to indicate whether an athlete would be able to perform at the highest level in a specific sport (Slater et al., 2005) [1]. These anthropometric and morphological parameters are the sensitive measures of the physical growth and nutritional status of athletes for their optimal performance.

Systematic measures of the scale, shape, and proportion of the human body may be described as a physique or anthropometric profile. "The elementary component of the physique, somatotype, is the sensitive predictor of physical growth and dietary characteristics for sportspeople and people from all walks of life" (Chatterjee et al., 2006) [2]. "Specific physical attributes or anthropometric profiles indicate whether an athlete in a particular sport will be accepted for competition at the highest level" (Johnstone et al., 2014 and Pyne et al., 2006) [3, 4].

Mathew et al. (1985) [5] indicated that "The estimation of competitive success in sports was enhanced by calculating anthropometric components along with height and age". Stuelcken et al. (2006) [6] suggest that "Anthropometric profile plays a major role in high success, including the height and weight of professional athletes". Evaluation of these variables aims at quantifying morphological characteristics that may be important for elite athletes in relation to body structure and sports performance (Gil et al., 2007) [7].

In this study, we have compared anthropometric parameters in these cricket and football players.

Materials and Methods

Study design:

The current research was performed in the Department of Physiology Sports Physiology Laboratory Period of study from December 2012 to November 2014 and is not a follow-up form of study. Subjects were chosen based on parameters for inclusion and exclusion. The current research was accepted by the College Institution Ethics Committee.

Source of data:

The data was obtained from the district-level players of the Football and Cricket Academy. Comparative analysis of handgrip strength and anthropometric parameters in crickets and football players is conducted in a test study of 60 participants (30 cricket players and 30 football players).

Inclusion criteria:

• Normal healthy cricket players and football players must have to play cricket and football for the last 3 years.

• Subjects who were selected for the university team and still playing at the university level, state-level, or national level.

• Subjects with age group between 15-25 years.

• Subjects practicing daily for 2-3 hrs for 6 days a week.

Exclusion criteria:

• The subject age group below 15 years and above 25 years.

- Subjects who were not regularly practicing.

Method of Collection of Data

To rule out any history of past and current damage to the right hand or medical condition that could affect the strength of the handgrip and anthropometric parameters, the participants were evaluated verbally and visually. Medical history has been asked to be reviewed in the light of exclusion criteria. A brief explanation of the procedure was also given to the subjects and a demonstration of what was being studied. Help from an interpreter was used in times of need. Readings were documented in the form of data collection that included demographic data from all participants prior to the start of the test, including name, age, gender, hand dominance, ht, and wt.

Anthropometric Measurements:

Twelve anthropometric characteristics, viz. Height, weight, BMI, Mid Upper Arm Diameter, Body Fat Percentage, Bicep Skin Fold Thickness, Lean Body Mass Percentage, Mid Upper Arm Area, Corrected Mid Upper Arm Muscle Area, Mid Upper Arm Fat Area, and Arm Fat Index were calculated in triplicate with the median value used as the criterion for each subject.

Statistical Analysis:

The data were summarized using descriptive statistics such as percentage, mean, S.D. Information on the distribution, variability, and central tendency of a variable is generated by descriptive statistics. Descriptive statistical analysis has been carried out in the present study. These tests were used to determine whether or not the variation in statistical parameters between different samples was due to the variance in sampling. The comparison between cricketers and football players for the variables of BMI, simple anthropometry, the strength of hand grip, was subjected to unprecedented measures of significance applied in this current research. A correlation of anthropometric parameters with hand grip intensity was defined by the Pearson correlation coefficient. All statistical calculations were performed using the software SPSS for windows (statistical package for social sciences) version 19.0.

Results

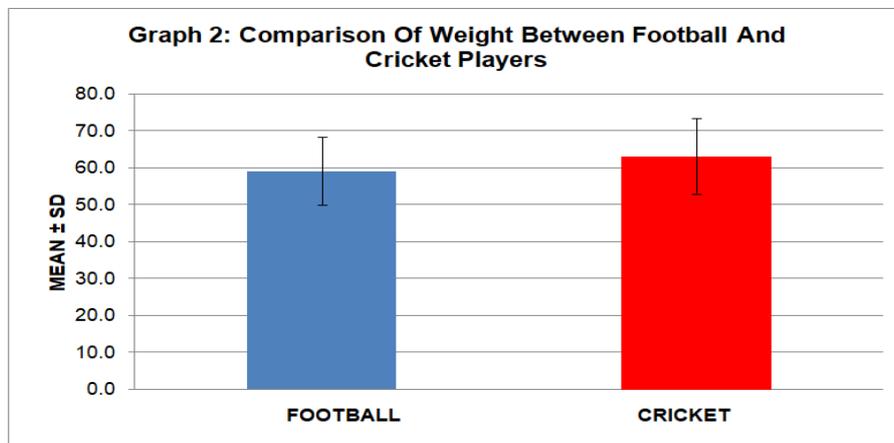**Table 1: Comparison of Height between Football and Cricket players**

Height (meter)	Football players	Cricket players
N	30	30
Mean	1.70	1.68
SD	0.06	0.06
t test	1.26 ($p < 0.05$)	
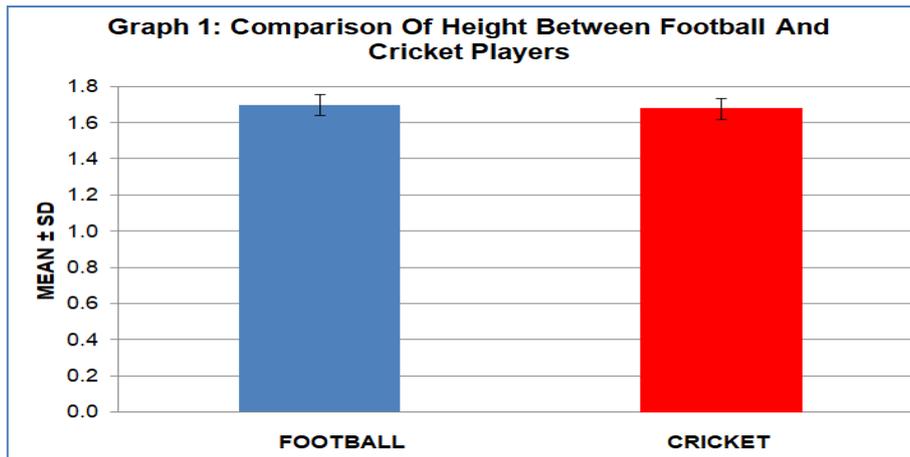
Statistically there is no significant difference observed in height between Football and Cricket players (p<0.05).

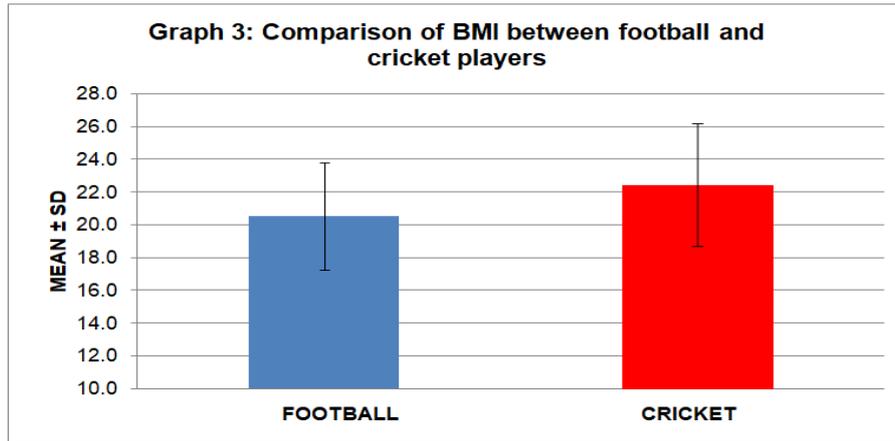**Table 2: Comparison of Weight between Football and Cricket Players**

Weight (Kg)	Football players	Cricket players
N	30	30
Mean	59.14	63.11
SD	9.19	10.25
t test	1.55 (p>0.05)	

Statistically there is no significant difference observed in weights between Cricket players and Football players (p>0.05).

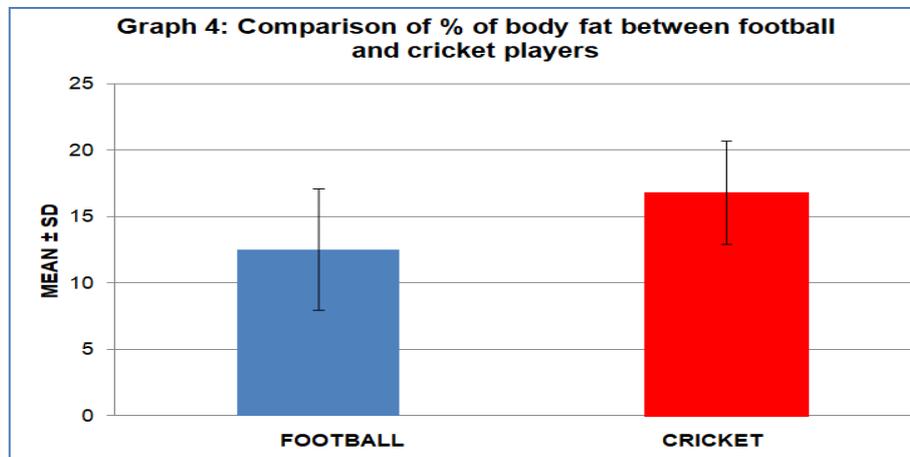**Table 3: Comparison of BMI between Football players and Cricket players**

BMI (Wt/Ht^2)	Football players	Cricket players
N	30	30
Mean	20.53	22.44
SD	3.27	3.75
t test	2.07 (p < 0.05)	

Graph 3: Comparison of BMI between football and cricket players

Statistically there is significant difference observed in BMI between Football and cricket players (p < 0.05).

**Table 4: Comparison of % Of Body Fat between Football and Cricket players**

% of Body fat	Football players	Cricket players
N	30	30
Mean	12.53	16.81
SD	4.55	3.88
t test	3.85 (p<.0.01)	

Graph 4: Comparison of % of body fat between football and cricket players

Statistically there is highly significant difference observed in % of Body fat   between Football and Cricket players (p<0.01).

**Table 5: Comparison of % of Lean Body Mass between Football and Cricket players**

% of Lean body mass	Football players	Cricket players
N	30	30
Mean	87.47	83.19
SD	4.55	3.88
t test	3.85 (p<0.01)	

Graph 5: Comparison of % of lean body mass between football and cricket players
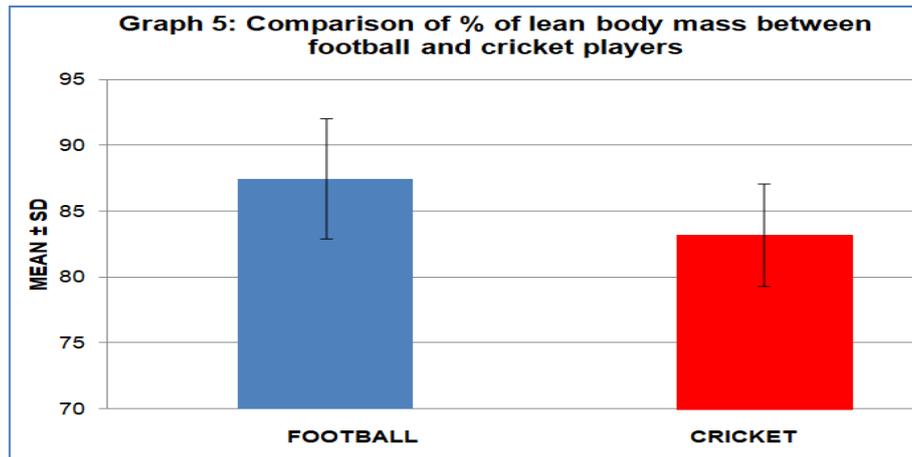
Statistically there is highly significant difference observed in % of Lean body mass between Cricket players and Football players (p<0.01).

Table 6: Comparison of Mid Upper Arm Circumference (MUAC) between Football and Cricket players
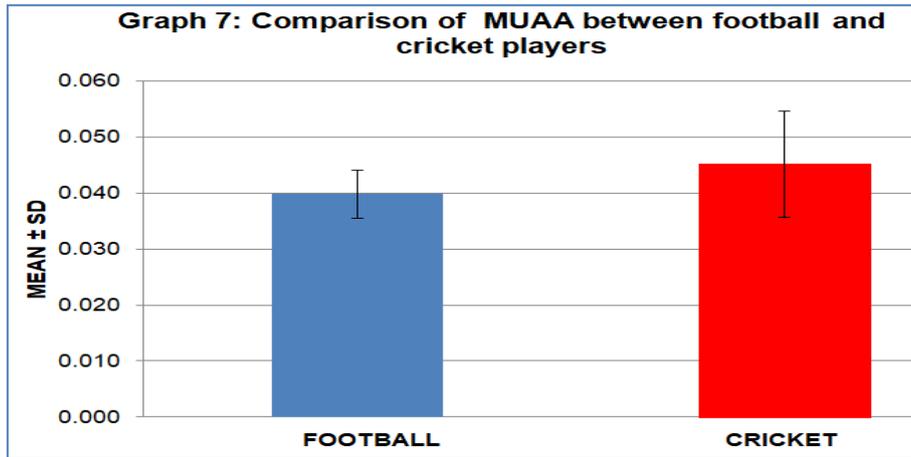
MUAC(meter)	Football players	Cricket players
N	30	30
Mean	0.24	0.28
SD	0.02	0.03
t test	5.66 (p<0.01)	

Graph 6: Comparison of MUAC between football and cricket players
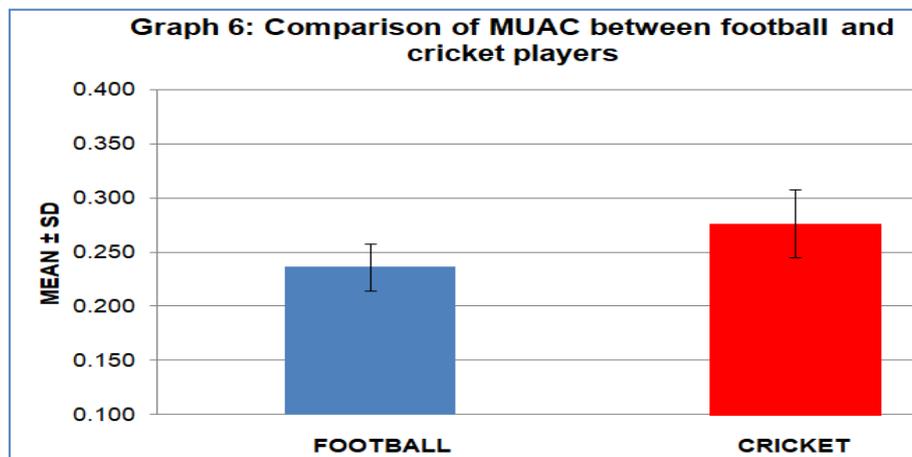
Statistically there is highly significant difference observed in MUAC between Football and Cricket players (p<0.01).

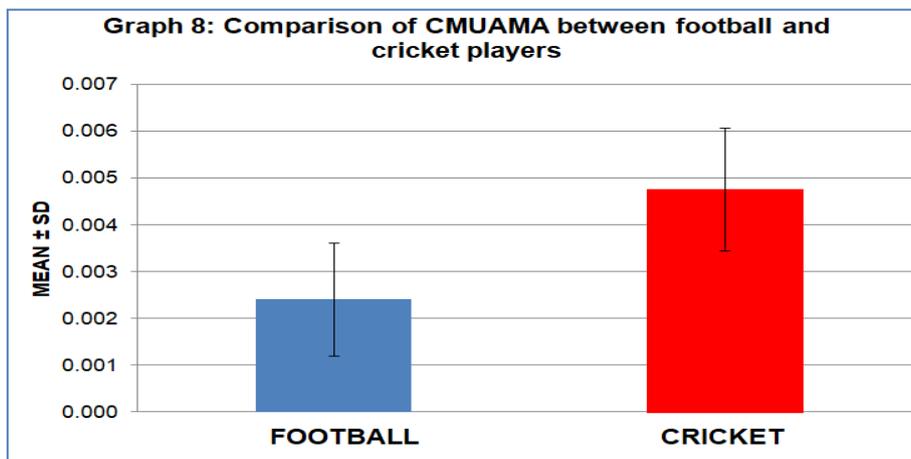**Table 7: Comparison of Mid Upper Arm Area (MUAA) between Football and Cricket players**

MUAA (meter)	Football players	Cricket players
N	30	30
Mean	0.040	0.045
SD	0.004	0.010
t test	2.76 (p<0.01)	

Statistically there is highly significant difference observed in MUAA between Football and Cricket players (p<0.01).

**Table 8: Comparison of corrected Mid Upper Arm Muscle Area (CMUAMA) between Football and Cricket players**

CMUAMA (meter)	Football players	Cricket players
N	30	30
Mean	0.002	0.005
SD	0.001	0.001
t test	7.10 (p<0.01)	

Statistically there is highly significant difference observed in CMUAMA between Football and Cricket players (p<0.01).

**Table 9: Comparison of Mid Upper Arm Fat Area (MUAFA) between Football and Cricket players.**

MUAFA (meter)	Football players	Cricket players
N	30	30
Mean	0.037	0.040
SD	0.004	0.009
t test	1.64 (p>0.05)	

Graph 9: Comparison of MUAFA between football and cricket players
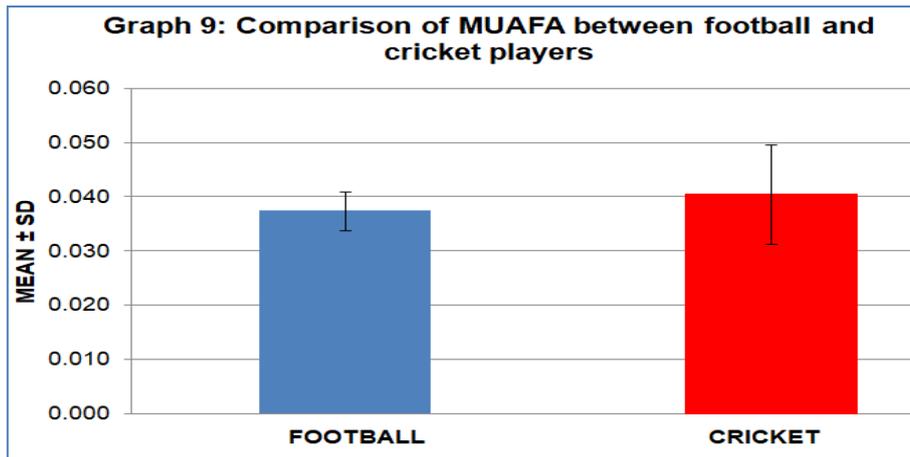
Statistically there is no significant difference observed in MUAFA between Football and Cricket players (p>0.05).

Table 10: Comparison of arm fat index (AFI) between Football and Cricket players

AFI (%)	Football players	Cricket players
N	30	30
Mean	94.12	89.21
SD	2.52	3.50
t test	6.13 (p<0.01)	

Graph 10: Comparison of AFI between football and cricket players
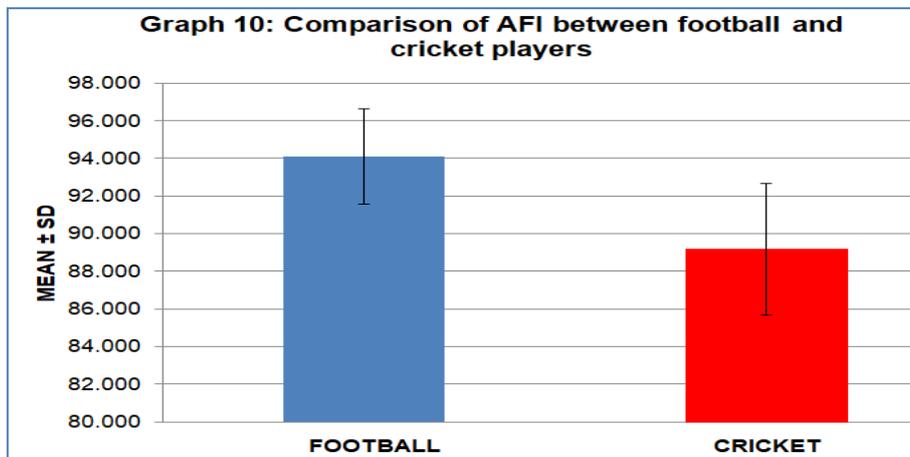
Statistically there is highly significant difference observed in AFI between Football and Cricket players (p<0.01).

Discussion

Height

In this study, the mean and S.D of height for football players is 1.70, 0.06 and for a cricketer, it is 1.68, 0.06 respectively. No significant difference is observed in cricket and football player's height but the mean height of football players is more than that of cricketers. (p > 0.05) (Table 1, Graph 1)

Serbian, Australian, Spanish, United Kingdom football players show a dissimilar range of height with our football player's height, in a study done by Veale JP (2010 mean height

1.87), [8] and Reilly T (2000, mean ht 1.77) [9] respectively. Both of them show more height of football players than our football players in the study.

Young WB (2007), [10] shows that height is an important parameter in football and a good predictor of performance while in contradiction with this statement.

From our results, it is concluded that Football players have more height than cricket players. It may be due to genetic and environmental factors. Methods used by sports scientists to partition genetic and environmental factors are known as quantitative genetics. It shows the degree of similarity exhibited by individuals in multi-factorial traits is proportional to no. of genes of parents, they have in common. [9] Height is strongly influenced by genetic factors, with a heritability coefficient of 0.85

Weight

In this study, the mean and S.D. of weight for football players is 59.14, 9.19 and for cricketers is 63.11, 10.25 respectively. It does not show a significant difference in them but the mean value of the weight of a cricket player is more than a football player. ($p > 0.05$) (Table 2, Graph 2)

Serbian, Spanish, Australian, united kingdom football players show a dissimilar range of weight i.e. more weight when compared with our football player's weight, in a study done by Veale JP (2010, mean weight 86.06), [8] Reilly T (2000, mean weight is 76.4) [9].

Reilly T (2000) states that the measurement of weight has importance in selecting sports personal [9]. Young WB (2007), [10] Veale JP (2010) [8] shows that weight is an important parameter in football and a good predictor of performance. Body mass comes into play since football is a body contact game.

From our results, it is observed that "the mean weight of cricket players is more than football players. It may be due to genetic variation, racial factors, and environmental change. From our results, it is also concluded that our cricket and football players are lagging behind the international standards, therefore, this fact may give coaches better working knowledge of this particular group of players and suggest they follow recent selection process methods and more carefully during the recruitment. This factor should be considered while planning sports training".

BMI

In this study, the mean and S.D of BMI for football players 20.53, 3.27, and cricketers is 22.44, 3.75 respectively. They show a significant difference in them. ($p < 0.05$) (Table 3, Graph 3)

From our results, it is observed that "the BMI of our cricketers is more than football players which may be due to variations of height and weight. The height of a football player and the weight of the cricketer player is more in our results". So, BMI will give more results in favor of cricketers.

% of body fat

In this study, the mean and S.D of % Of Body Fat for football players is 16.81, 3.88 and cricketers are 12.53, 4.55 respectively. It shows the highly significant difference between them. ($p < 0.01$) (Table 4, Graph 4)

As far as football is concerned, Serbian, Spanish, Australian, United Kingdom football players show a different range of percent body fat, i.e. lower percentage of body fat, relative

to the percentage of body fat played by our players in the Veale JP (2010, mean of 11.10 percent body fat) study [8], Reilly T (2000, mean of 10.6 percent body fat)[9]. Noakes (2000)[11], Bartlett (2003)[12] states that "cricketers have an average body fat content of 12-14 percent". Our player is similar to this statement.

Kemi (2003) [13] and Stolen (2005) [14] suggest that "football is a primarily aerobic sport, as in previous results reports. This would also lead to a lower percentage of body fat.135,136" and Sporis (2008)[15] stated that "anaerobic energy is necessary only for success in high-intensity runs and duel plays both of which can contribute to the outcome of the game".

According to our study, "the percentage of body fat present in football players is substantially lower than that of cricket players. Although the present study showed a proper percentage of body fat in the players, proper training should be maintained. Aerobic activity increases fat utilization during exercise, which may be the cause of decreased fat levels after training. Therefore, low percentages of body fat, as well as an improvement in fat-free body weight, play a key role in maintaining physical health".

% lean body mass

In this study, the mean and S.D of % Lean Body Mass for football players is 87.47, 4.55 and cricketers are 83.19, 3.88 respectively. They show a highly significant difference in them. ($p < 0.01$) (Table 5, Graph 5)

Australian football players show a similar range of % lean body mass when compared with % of lean body mass of our football player in the study done by Veale JP (2010, mean of % of LBM 84.72). [8]

Our findings indicate that "there is slightly more percentage lean body mass present in football players than cricket players. It may be due to genetic variation, environmental factors, diet, and exercise variation. So the percentage of lean body mass should be maintained within the usual range to ensure the performance of cricket and football players. Proper and relevant preparation, methodologies, food plans, nutritional factors, hourly practice, and an appropriate guidance plan should be considered. To produce better performance, the coach can control all of the above variables regularly".

MUAC

In this study, the mean and S.D of Mid Upper Arm Circumference (MUAC) for football players is 0.24, 0.02 and cricketers are 0.28, 0.03 respectively. They show a significant difference in them. ($p < 0.05$) (Table 6, Graph 6)

Dasgupta (2009) [16] stated that "MUAC is an important predictor of nutrition marker".

From our results, it is observed that "MUAC is more in cricketers than football players. It may be due to the upper body portion is more used in cricketers. In cricket, activities are batting, bowling, throwing mainly. So this exercise may lead to more MUAC".

MUAA

In this study, the mean and S.D of the Mid Upper Arm Area (MUAA) for football players is 0.040, 0.004 and cricketers are 0.045, 0.010 respectively. They show a highly significant difference in them. ($p < 0.01$) (Table 7, Graph 7)

From our results, it is also observed that "significantly more MUAA than is present in cricketers than football players. This may be due to the upper body portion is more used in cricketers. In cricket, activities are batting, bowling, throwing mainly. So this exercise may lead to more area of the arm. Where in football, the lower body portion is more involved, in kicking, running continuously".

CMUAMA

In this study, the mean and S.D of corrected Mid Upper Arm Muscle Area (CMUAMA) for cricketers is 0.005, 0.001, and football players are 0.002, 0.001 respectively. They show a highly significant difference in them. $(p < 0.01)$ (Table 8, Graph 8)

From our results, it is also observed that "CMUAMA is more in cricketers than football players". This may be due to the upper body portion is more used in cricketers. In cricket, activities are batting, bowling, throwing mainly. So these exercises maybe lead to more CMUAMA of arm.

MUAFA

In this study, the mean and S.D of Mid Upper Arm Fat Area (MUAFA) for football players is 0.037, 0.004 and cricketers are 0.040, 0.009 respectively. They show a significant difference in them. $(p < 0.05)$ (Table 9, Graph 9)

From our results, it is observed that "MUAFA is significantly more in cricketers than football players". This may be due to the upper body portion is more used in cricketers. In cricket, activities are batting, bowling, throwing mainly. So these exercises lead to more MUAFA of the arm.

AFI

In this study, the mean and S.D of arm fat index (AFI) for football players is 89.21, 3.50 and cricketers are 94.12, 2.52 respectively. They show a highly significant difference in them. $(p < 0.01)$ (Table 10, Graph 10)

From our results, it is observed that "AFI is significantly more in cricketers than football players, this may be due to the upper body portion is more used in cricketers". In cricket, activities are batting, bowling, throwing mainly. So these exercises lead to more AFI of the arm.

Conclusion

In our research, we notice that, in our cricket and football players, the majority of anthropometric parameters such as height, weight, percentage of lean body weight, mid-upper arm circumference, mid-upper arm area, corrected mid-upper arm muscle area and handgrip strength (dominant and non-dominant) are lagging when compared to international cricketers and football players. The average value of the height of football players is more than that of cricketers. The average weight value of cricket players is higher than that of football players. The mean value of the weight of cricket players is more than football players. BMI, % of Body fat, % of Lean body mass, mid-upper arm circumference, mid-upper arm area, corrected mid-upper arm muscle area, arm fat index, handgrip strength is significantly more in Cricket players than Football players.

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