



A Comparism of the Cardio-Respiratory Fitness and Muscular Endurance of Basketball and Soccer Players

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ABSTRACT

The purpose of this study was to compare the anthropometric variables and somatotype of University of Lagos Basketball players and soccer players. The anthropometric variables included height, weight, leg length, and body mass index, and percentage body fat (Skinfold measurement). Thirty males students comprising of fifteen basketball players and fifteen soccer players participated in this study, their age range from 16-29 years. Blood pressure, pulse, height, weight, three Skinfold site (Chest, abdomen and thigh), body mass index BMI, leg length and hand length were measured according to standard procedure. SPSS version 14 was used to analyse the t-test and the level of significance was set at 0.05. The result revealed that there is a significant difference in some of the Anthropometric variables between the Basketball players and soccer players. A significant difference revealed in their height, leg and hand length with basketball players being the tallest. There was no significant difference in the BMI and body fat percent of the two groups. The basketball players exhibited linearity with combination of muscularity while the soccer players are within an average weight and height. It was therefore concluded that the basketball players have the characteristics of an ectomorphic mesomorphic while the soccer players are more of mesomorphic endomorphs. Indeed, it can be assumed that athlete's anthropometric characteristics can in some way influence his/her performance, at the same time helping to determine a suitable physique for certain sports. Tall people are naturally attracted to basketball while in soccer height also plays an important role although it all depends on the position at which the athlete is playing. Therefore the anthropometric characteristic of an athlete must be considered relative to the specific sport, athlete's position or the type of event.

INTRODUCTION

The ideal body type varies with each sport. The physical characteristics of athletes that are easiest to describe and observe are simple the person's height, weight or combination of both. This characteristics however, must be considered in the context of the individual sport (Fogelhon, 1994).

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The objective of the basket ball game is to put the ball through a basket placed 10 feet high from the ground. It can be clearly seen that tall players will have advantage over short players in this game. To compensate for their disadvantages, short players must develop tremendous leg strength and jumping power. This of course requires extra energy utilization.

It is also important to note that height is an advantage in sport like basketball but can be an obstacle in other sports such as gymnastics. The distant runner strives for leanness minimizing the load carried during a distance run, but the Sumo Wrestler tries to maximize body weight because the tradition of the sport dictates that bigger is better. Just like soccer is widely embraced and adored in Nigeria, most teenager, youth and adult as well deem it purposeful to acquire skills in soccer bearing in mind the resourcefulness and not minding their body structure. Everyone tends to be interested in soccer, even those that are physically well structured for other sporting events.

Coaches and athletes today are aware of the importance of achieving and maintaining optimal body weight for peak performance in sports. Appropriate size, build and body composition are critical to success in almost all athletic endeavors. Body shape, size and composition are largely predetermined by the genes inherited from one's parents (Wilmore 1995). Although size and body build can be altered only slightly, body composition can change substantially with diet and exercise (Barr, 1994). Resistance training can be substantially increase muscle mass, and a sound diet combined with vigorous exercise can significantly decrease body fat. Such changes can be of major importance to achieving optimal athletic performance. Body build refers to morphology or the form and structure of the body. Most scientific systems for classifying. The body have identified three major components which are:-

- Muscularity
- Linearity
- Fatness

Each athlete's in certain sports usually exhibit a predominance of one component over the other. The body builder exhibits primarily muscularity, the basket baller who weighs 82kg exhibits linearity while the Sumo Wrestler exhibits fatness. Most athletes are more balanced between muscularity and linearity, but muscularity tends to dominate in male athletes. Body size refers to the height and mass weight of an individual. Body size is often categorized as short or tall, large or small, heavy or light. Distinctions in these categories can vary on the specific performance requirements, so body size must be considered relative to the specific sport, the athletes position, or the type of event. For example, among men a height of 1.7m would be short for a professional basketball player but tall for a long distance runner.

Body composition refers to the body's chemical composition. Belinke (1994) originally proposed the concept of lean body mass, defined to include fat free mass and essential-fat necessary for survival. Although this model is

conceptually sound, it presents measurement problems. It is not possible to differentiate between essential fat. Consequently, most scientists have adopted the two components model that includes fat mass and fat-free mass. Fat mass is often discussed in terms of the total body mass that is composed of fat. Fat free mass simply refers to all body tissue that is not fat which includes bone, muscle, organs and connective tissues. Although total body size and weight are important for most athletes, an athletes body composition is generally of greater concern. Being overweight is usually not a problem but being over weight typically has a negative impact on athletic performance. Excessive body fat is associated with decreased athletic performance in activities where the body mass must be moved through space. Speed, endurance, balance, agility and jumping ability are all negatively affected by a high level of fatness. The ideal body composition varies with different sports, but in general the less fat mass, the greater the performance.

METHODOLOGY

The research method used for this study was the one shout case method. The researcher adopted this method because the subjects to any treatment rather their anthropometric measurements were taken.

Population

The population of this study consisted of athletes from the following athletic groups of University of Lagos .

1. Male basket ball players
2. Male soccer players

Sample and Sampling Technique

The sample for this study consisted of 30 subjects fifteen subjects were measured for each sport.

Research Instruments Used

Five different test items in all were administered on each subject throughout the duration of the study. All the tests were administered with the help of two research assistant. The test materials include the following:-

- i. **Electronic Stpygmomanometer**:- this was used to measure their blood pressure and pulse.
- ii. **Stadiometer**: this was used to take the height in meters.
- iii. **Weighing Scale**: this was used to measure the weight in kilogramme.
- iv. **Skin fold caliper**: was used to measure the body fat percent.

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- v. **Anthropometric tape:** was used to take measurement of the hand length and leg length and also girth.

Measurement Location

The measurement was conducted at the University of Lagos sport center with the aid of two assistants.

Procedure for Data Collection

Before the test were administered, informed consent forms were given to the subjects which were completed and returned. The tests were administered independently on the two groups under the same condition. The two groups were basket ball and soccer. Each group had it's members names drawn and assigned numbers for easy identification and to avoid confusion. The test measures items include Blood Pressure, Pulse, Height, Weight skinfold, hand length and leg length.

Data Presentation

The mean, standard deviation, range, minimum, maximum and variance of University of Lagos basketball players in different variable are given in the table below:

Table 1: descriptive statistics for basketball players

	N	Rang	Minimum	Maximum	Mean	Std	Variance
Age	15	13	16	29	22.33	4.402	19.381
Weight kg	15	35	60	95	76.93	11.061	122.352
Height m	15	0.71	1.69	2.40	1.8853	0.16634	0.028
Pulse b/m	15	28	58	86	70.60	6.557	43.257
D/Bp mmHg	15	47	106	153	125.73	15.210	231.352
S/BP mmHg	15	33	51	84	68.07	8.556	73.210
Hand Length cm	15	23	71	94	87.27	6.756	45.638
Leg Length cm	15	24	100	123	112.03	7.705	59.374
BMI kg/m ²	15	20	13	33	22.06	4.690	22.000
Skin Fold mm	15	27.5	12.5	40.0	19.433	6.7872	46.067

The table above shows the age, sex, weight, height, blood pressure, pulse, arm length, leg length, body mass index (BMI) and skinfold of the male basketball players of University of Lagos.

The mean age is 22.33 with a standard deviation of 4.402 the mean height is 1.8853m with a standard deviation of 0.16634. The mean weight is 76.93kg with a standard deviation of 11.061. The mean blood pressure is 125/68mm/hg with mean pulse of 70.60bpm.

The mean arm length is 87.27cm with standard deviation of 6.758 the men leg length is 112.03cm with a standard deviation of 7.705.

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The mean BMI is 22.06kg/m² with a standard deviation of 4.690. The mean skinfold measurement is 19.433mm with standard deviation of 6.7872.

Table 2: Descriptive statistics for soccer players.

	N	Rang	Minimum	Maximum	Mean	Std	Variance
Age	15	7	18	25	21.93	2.251	5.067
Weight kg	15	31	52	83	70.80	9.667	93.457
Height m	15	0.22	1.64	1.86	1.7720	0.07408	0.005
Pulse b/m	15	32	60	92	66.93	8.746	76.495
D/Bp mmHg	15	43	107	150	120.87	13.627	185.695
S/Bp mmHg	15	35	51	86	67.40	9.672	93.543
Hand Length cm	15	12	76	88	81.40	4.517	20.400
Leg Length cm	15	18	97	115	104.53	5.527	30.552
BMI kg/m ²	15	8.4	17.2	25.6	22.547	2.5011	6.256
Skin Fold mm	15	29	12	41	17.83	7.386	54.560

This table displays the mean standard deviation, range, minimum, maximum and variance of the variables of soccer players of University of Lagos. The table above shows the age, sex, weight, height, blood pressure pulse, arm length, leg length, BMI and skinfold measurement of University of Lagos soccer players. The mean age is 21.93 years with standard deviation of 2.251. The mean weight is 70.80kg with standard deviation of 9.667. The mean height is 1.7720m with standard deviation of 0.07408. The mean arm length is 81.40cm with standard deviation of 5.527. The mean BMI is 22.547kg/m² with standard deviation of 2.5011 and mean skinfold measurement as 17.83mm with standard deviation of 7.386.

Table 1 and 2 shows that there's no significant difference between the ages of the two groups, with the soccer players being the youngest with mean age of 21.93 years while 22.33 years for basket ballers. From the table, the basket ballers a mean of 76.93kg while the soccer players weigh 70.80kg. the mean height of the basket ball players is higher than that of the soccer players, with mean of 1.8853m while that of soccer is 1.7720m. The height of the basket ball players tends to agree with Sohi (1986) who said that height is an advantage in basketball, but can be an obstacle in other sports such as gymnastics. The blood pressure and pulse of the two groups are almost the same and at a normal stage.

The leg length of the basketball player is 112.03cm and that of the soccer players is 104.53cm, the arm length of the basketball players is 87.27cm, that of the soccer players is 81.40cm.

The BMI of the basketball players is 22.06kg/m² which is slightly below that of the soccer players BMI of 22.547 kg/m².

The skinfold measurement of the basketball player is 19.433mm. While that of the soccer player is 17.83mm.

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Table 3: student t-test and f-test determining level of significance between basketball and football players.

	Height	Weight	BMI	Pulse	Leg length	Hand length	Skin fold
T-Test	T-Test Difference: 0.113395 %	T-Test Difference: 6.1333 95% CI: 13.9031 to 1.6364 = 1.617 Df = 28p = 0.1171	T-test difference: 0.4867 95% CI: 2.3247 to 3.2981 T = 0.355 Df = 28p = 0.7256	T-test difference: 3.667 95% CI: 9.4545 To = 2.1211 T = 1.298 df = 28p = 0.2050	T-Test Difference: 75000 95% CI: 12.5155 To = 2.4845 T = 3.063 df = 28p = 0.0048	T-test difference: 5.8667 95% CI: 10.1647 to = 15687 T = 2.796 df = 28p = 0.0092	T-test difference: 16000 95% CI: 6.9055 to 3.7055 T = 0.618 df = 28p = 0.5417

The unpaired t-test is used to test the null hypothesis that the difference between the two means is equal to 0. If the probability (p-value) is less than the conventional 0.05, the null hypothesis is rejected and the conclusion is that the two differ significantly.

DISCUSSION

The findings of this study shows that the body size, build and composition is specific to individual sport. From the analysis of the t-test. It reveals that the basketballers are the tallest, with a height 1.88m. Elite sport generally favors tall people Kolsa (1983) previous studies have shown that basketballers, volley ballers and throwers are taller than others (Bale 1986). Also studies have shown that height is an advantage in basketball and so tall people are therefore attracted to this basketballer.

The findings also shows that the basket ball players are heavier than the soccer players that is why Wootten (1992) advocate work design to develop the specific muscles that a basket ball player uses. He said that the work program has proven successful for them over the years and it also helped significantly in the prevention of serious injuries. Ikulayo (1990) views physique as an athlete’s body type and physical capabilities which has a prominent role to play in the success or failure in soccer performance and participation in general.

The longer limb length of the basketball players may be explained on the basis that they provide a greater advantage in playing basketball that explains the reason for their victory in the last west Africa university game which took place in Ghana 2008 where they emerged as winners in the basketball event. Both groups have a mean BMI of 22.06kg/m² for basketball and 22.54 kg/m² for soccer, which indicated that the two groups are at an acceptable body weight according to Horger and Horger BMI value table. This is in agreement with Joseph (1996) who said that soccer is a game of physical and mental challenges. You must execute a skilled movement under game related condition of restricted space, limited time, physical and mental fatigue and

opposing players. You must be able to run several miles during a game mostly at sprint like speed and respond quickly to a variety of rapidly changing situations during play. An over weight athlete will find it difficult to accomplished this task.

The basketballers and soccer players of University of Lagos both have a body fat percent of which according to Table 4.9 of Horger and Horger body composition classification table are at a high physical fitness standard.

The size, build and body composition of an individual definitely play a role in the performance of that individual and so body size must be considered relative to the specific sport, athletes position or the type of event. Each athletic build is a unique combination of the three body types. (Endomorph, Mesomorph and Ectomorph). Athletes in certain sports usually exhibit a predominance of one component over the other two from the analysis of the result, the basket ball players exhibits a predominance of ectomorphic characteristics with the muscularity of a mesomorph. Therefore they can be regarded as ectomorphic mesomorphs.

While the soccer players exhibit the characteristic height of a mesomorph with shorter legs and hands than the basket ballers. Therefore can be regarded as mesomophic endomorphs. In certain sports usually exhibit a predominance of one component over the other two from the analysis of the result, the basket ball players exhibits a predominance of ectomophic characteristics with the muscularity of a mesomorph. Therefore they can be regarded as ectomorphic mesomorphs.

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