KIU Journal of Social Sciences Copyright©2019
Kampala International University ISSN: *2413-9580*; 5(1): 277–282

Assessment of 50 Meters Dash on Physical and Physiological Characteristics of Male Nigerian University Athletes

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Abstract. The application of modern scientific technological principles in the selection and training of athletes in different sports disciplines has been responsible for the incredible high sporting standards registered in modern competitions. Moreover, frequent changes in officiating rules of different sports discipline necessitate the development of new equipment of new training technologies and methodologies. Available research evidence indicates specific physical and physiological characteristics relevant to certain sports. This research was therefore conducted to assess 50 meters dash on physical and physiological characteristics of Nigerian Male University Athletes. Four universities from each of the seven administrative zones of Nigerian Universities were selected; eight athletes from each university were selected. The groups are, individual sports, speed endurance sports, combat sports, racket sports and ball games, totaling 32 athletes were selected from each zone, totaling 225 athletes representing their various universities at the NUGA championships. The athletes thus selected were tested in the 50 meters dash to determine speed. The data thus collected were statistically analyzed. One way analysis of variance (ANOVA) was used to determine if there was any significant difference among the selected groups of sports. It was observed from the result that ball games recorded the highest score in height and weight measures, while the individual sports recorded the highest scores in the 50 meter run test by the individual sport. People with speed and medium height are more suitable for speed endurance sports like soccer and hockey and therefore such people are to be selected when it comes to sport competitions.

1. Introduction

Physical and physiological characteristics have been shown to determining factors in the successful performance of many sports discipline (Kreighbuam & Bartheles, 1985; Venkateswarlu, 2010). It has also been shown that some physical measures like structure, weight, length, and arm length were more important for success in some sporting events than in others (Ireland and Ott, 2004). For example, basketball, volleyball, and track event like high jump have been reported as sports in which the absolutes height of the body was

important to success. (Accurater & Ross, 2005) in order words the taller the better. However, there have been applications of talent identification within sports requiring more decision making may not be very useful as success in this sports, depend more on decision making processes, (Falk, Lidor, Lander, & Lang, 2004). It is the belief of this investigator that physical physiological characteristics identified among athletes of different sports discipline can be used to identify talents for different sports. If such characteristics of Nigerian elite' sports of men and women are known, they can be used to identify talents for different sports earlier in life.

According to Toshiyuki, Hidehiko, Yusuke, & Paola, (2010), reported on the activity profiles of field-based team sports players (e.g. soccer, handball, and basketball) fluctuate randomly depending on game situation, from brief periods of maximal or near maximal intensity to longer periods of low-intensity activity. On the other hand, the activity patterns of track athletes are nearly constant. The purpose of this study was to compare the characteristics of physical fitness for field-based team sports players, endurance runners and sprinters from the view point of energy supply during intermittent sprint exercise. Twenty-four university-trained males (field-based team sports players: F:n =8, endurance runners: E:n = 8 and sprinters: S: n =8) completed an intermittent sprint exercise test. The test consisted of three 5 x 30m (every 40s) repeated sprints, with sprints separated by a 4-min rest period. Sprint times were recorded during intermittent sprint exercise test from 0-15m, 15-30m, and 0-30m by electronic photo cells. Oxygen uptake (VO_2), minute ventilation (VE), Heart Rate (HR), and blood lactate concentration (La) were also measured during the test. An incremental treadmill rest and a 40s anaerobic power test were also performed to determine maximal aerobic and anaerobic capacities.

The F group had a significantly faster 0-15m sprint time than E ($P < 0.05$), but not when compared with the S group; while, the F group had a significantly slower 15-30m sprint time than the S group ($P<0.05$). The F group had a significantly lower La during intermittent sprint exercise test than the S group also had a significantly ($P<0.05$), but not when compared with the E group. In contrast, VO_2, during intermittent sprint exercise test in the interval phase showed no significant differences among the groups. Although no significant differences were observed, lower La indicated a sufficient phospocreatine resynthesis in the interval phase in the F and E groups.

These findings showed that the F group performed the repeated-sprint as fast as the S group from 0-15m with lower anaerobic energy supply. Furthermore, the results suggested the need for regular implementation of repeated-sprints in the F group. In conclusion, field-based team sports players have superior repeated-sprint ability than sprinters, especially over short distances such as 15m.

2. Methodology

The research design adopted in this study was the one- shot research design. According to (Thomas & Nelson, 1996), the subjects were tested for their physical physiological and anthropometric measures without giving any treatment. The treatment was their participation in training and competitions in their various fields of sport before they were tested. The population for this study consisted of male athletes from the Nigerian universities and within the seven Nigerian university administrative zones of the 6 geo-political zones of Nigeria. The sample for this study was selected by using stratified random sampling technique, in this technique, the male Nigerian University athletes were stratified into 5 groups of sports namely; individual sport, speed endurance sport, ball game, racket game and combat sport. Individual sport consisted of track and field and swimming; speed endurance sport consisted of soccer, hockey and rugby; ball game consisted of basketball and volleyball and handball, racket game consisted of tennis and badminton, table tennis, and squash; combat sport consisted of judo and taekwondo and karate and kick boxing. Because this study was primarily concerned with Nigerian University male athlete, from each of these 5 groups of sports, track and swimming were selected under

the individual sport, hockey and soccer were selected under speed endurance sport, volleyball and basketball were selected under ball game, badminton and tennis were selected under racket sport and finally judo and taekwondo were selected under combat sport at random by using dip and pick method, in this method, the names of all the groups of sports were neatly written on a piece of paper and thus track and swimming were picked under the individual sport, hockey and soccer were also picked under speed endurance sport, tennis and badminton were also picked under racket game, basketball and volleyball were also picked under ball game and finally judo and taekwondo were also picked under combat sport.

The five chosen groups of sport serve as strata for this study. Using the same method, 8 athletes from each of the university representing each zone of the Nigerian university administrative zones were selected, 4 universities were selected from each zone of Zone A to G within the Nigerian university administrative zone. Thus, the sample for this study consisted of 225 athletes from the 5 male groups of the Nigerian university administrative zone. (Adeyanju, Mamudu, & Danıa, 2005) used the cup and dip method in simple random selection, when they investigated power, speed, and strength in the lower limbs of male college athletes. They further explained that this method ensures that the different characteristics that exist within the population are taken care of.

2.1 Testing Procedure

Height and Weight Measurement

The standard anthropometric protocol of the international working group on kinanthropometry (1 WGK) has described by Ross, (1983), were used to measure height and weight, in this respect, due to unavailability of the equipment for the anthropometric protocol of the international working group, the measurement of weight and height was done using a calibrated standio-meter and a weighing scale. The height was taken meters and weight in kilograms, the subjects dressed in a minimum sportswear and without shoes.

50 Meters for Speed: Speed was tested by means 50 meters sprint (AAHPERD, 2007). The test measures the subjects speed ability, that is, the minimum time required for a subject to run 50 meters. The test was administered to five subjects at a time from one group of sport. Each subject took a crouch position behind the starting line. The starting command was "Go" command was given, the starter made a downward sweep of the arm to give a visual signal of the arm to give a visual signal to timers who stand at the finishing line. On the command "Go" the subjects run the entire 50 meters as fast as possible, passing through the plane of the finishing line. The score is the time elapse between the starter's signal and the time he crossed the finish line. Time is recorded in second to the nearest tenth of a second.

3. Result

Table 1: The physical characteristics of the subjects by sport group of male Nigerian University athletes is presented in

Table 1: Means and Standard Deviation of the Stature and Body Mass of Male University Male Athletes used for this Study

Sport Groups	Height (meter)		Weight (kilogramme)	
	Mean	SD	Mean	SD
Speed endurance sport	1.7	0.5	67.1	8.9
Ball game	1.7	0.5	69.6	6.7
Individual sport	1.7	0.6	63.4	10.9
Combat sport	1.7	0.10	71.2	6.9
Racket game	1.7	0.6	65.9	10.4

Table 1: shows the means and standard deviation of the physical (stature) and body mass of the subjects. Observation of the table revealed that all the athletes did not very much in stature. However, the combat sport athletes were heavier than all other groups followed by the ball game players.

To test this hypothesis, data collected on the performance of each athletic group is shown in table 2

Table 2: Mean Standard Deviation and Standard Error of Estimate 50 Metres Speed Run Test of the Different Athletic Groups

Test	Groups	N	Mean	SD	SEE
	Speed endurance	112	7.2438	1.07606	.10168
	Ball game	112	6.6334	1.73436	.06939
50meter run	Track & Individual	112	7.2021	1.19698	.11310
test	Combat	112	7.2267	1.17460	.11099
	Racket	112	7.8724	1.22872	.11610
	Total	**560**	**7.2357**	**1.16165**	**.04909**

An observation of the performance of the different athletic groups in 50metre run test revealed that speed endurance, track and individual, combat and Racket athletic groups had higher mean performances (7.243±1.076, 7.202±1.196, 7.226±1.174, 7.872±1.228 and 7.235±1.161) respectively than the ball game sport group (6.633±1.734).

To find out whether there are statistical significance differences in the performance of the different sport groups in 50metres run test, the data was analyzed with one way analysis of variance (ANOVA 1) and presented in table 3

Table 3: Analysis of Variance (ANOVA) for Differences in 50 Meter Speed Run between Different Selected Athletic Groups of Male Nigerian University Athletes

Test	Source	SS	MS	DF	F
50metres run	Between Groups	86.179	21.545	4	17.896*
test	Within Groups	668.152	1.204	555	
	Total	**754.331**	**5.3848**	**559**	

F (4,555) =2.37, P = ≤ 0.0 *Significant

It was revealed that individual sports had significant higher mean than other male athletic groups in their 50 meter speed run test; therefore it was concluded that there are significant differences among selected male athletic groups in their 50meter speed run test.

The null hypothesis of no significant difference was therefore rejected, post hoc result of scheffe test for difference of mean further showed that the five male athletic groups were different from each other in their 50 meter run test as indicated in table 3

4. Discussion

Height

A Weish Statistician, Kholsa (2010) argued and produced graphs to illustrate that elite sports favour tall people. Team games are sports where height, shape and body composition and fitness play an important role in providing distinct advantage of specific playing positions, particularly at the highest level of performance where there is high degree of player specialization (Bale, 2000). But significantly higher means value for height than its male counterparts, although, there were significant differences in height among the other groups of the male groups.

Body Weight

Body weight is of important consideration especially in elite combat athletics as, quite often, competition had been based on different height categories (Encarta Encyclopedia Standard Edition, 2004). But male basketball players had significantly higher mean value for body weight than male volleyball counterpart. The judo group also has a significant higher mean value than its taekwondo counterparts in body weight. An inherent problem existed, however, as body weight measurement alone might be inadequate because it did not present the full picture of the component that make up the body weight in terms of body fat and or lean body mass (Stout et al 1996, Troiano, Hidehiko, Yusuke, Paola, 1996. Walberg-Rankin & Atkinson, 1996). Athletic performance is also influenced by body physique, excessive amount of fat or Fat Free Weight (FFW) negatively affects long distance run performance, as the excess weight has to be transported by the lower extremities and this requires extra energy. Thus the excess fat weight causes the runner to be less efficient, since more leg power is needed during running.

50 Meters Speed Run

According to Nelson (1982), speed is the velocity of a body part of an object, that is, the rate of motion, speed is basically the result of rapid application of force to a mass. This force is caused by muscle contraction. If the force is greater than the resistance, the movement occurs as the force becomes proportionately greater, the speed with which the mass moves increases based on Newton's second law of motion. It was observed that the male individual sport had significantly higher mean ± SE value for 50 meter speed run than their male counterparts.

Watson, (1983) pointed out that speed of contraction is apparently inherent in muscle tissue, because even when muscle receives constant artificial stimuli, they contract at varying rates.

Total body speed can be measured by timing the athletes over a set distance from 50-100meters. Running speed can be evaluated from 10meters, 20 meters, 40meters, 50 meters, to 100 meters sprint using electronic timing device. Individual sports are sports that requires speed since the events involved in it are more of anaerobic in nature.

5. Conclusion

It was observed from the result recorded in this study that ball game recorded the highest score in height and weight measures, while the individual sports recorded the highest scores in the 50 meter run test by the individual sport.

6. Recommendation

The following recommendation is made:

People with speed and medium height are more suitable for speed endurance sports like soccer and hockey and therefore such people are to be selected when it comes to sport competition.

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