Indian Streams Reserach Journal
Vol.2,Issue.II/March ; 12pp.1-4

ISSN:-2230-7850

Research Papers

COMPARISON OF ANTHROPOMETRIC CHARACTERISTICS AMONG ALL INDIA INTER-UNIVERSITY SPRINTERS

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Abstract

The purpose of the study was to determine the differences on the dependent variables such as Standing height, Sitting height, Upper leg length, Lower leg length among the categorical variables of 100m, 200m and 400m sprinters. For the purpose of this study, subjects were selected from the 72th All India Inter-University Athletic Championship held at the Rajiv Gandhi University of Health Sciences in Mangalore from 17th to 21st December, 2011. In this athletic championship 1257 male athletes of 151 universities were participated. Out of these athletes, all the 47 male sprinters who have qualified for the semi-finals and finals of 100m, 200m and 400m were selected as subjects. Thus, the present study comprised of 16 sprinters from 100m, 13 sprinters from 200m and 18 sprinters from 400m respectively.

The sprinters who have participated more than one sprinting event were not included in this study. Further, One Way ANOVA was applied followed by Scheffe S' Post Hoc Test if necessary, to find out the differences between the dependent variables among the three groups of Sprinters (Independent variables). The results of the study reveal that 400m sprinters were significantly taller than 100m sprinters and ankle girth was significantly more for 200m sprinters than 100m sprinters. Besides, other dependent variables have taken for this study did not differ significantly among the three categories of sprinters.

Key Words: Anthropometric Characteristics, Inter-university and Sprinters.

Introduction

Anthropometry is a technique to measure physical characteristics (body size, shape of specific body parts and proportion) of living beings, including men. Anthropometry has been widely applied in a broad range of disciplines, such as ergonomics and health sciences. Because of its convenience, anthropometry has also been applied to understand physical characteristics of athletes in the field of sports science which targets improvement of athletic performance. Since correct application of anthropometric techniques and interpretation of the information assist management of health status in athletes and also improves their performance, it is important that support staff in the athletic fields, including sports dieticians, share the knowledge associated with anthropometry. To date, the measurement protocol proposed by the International Society for the Advancement of Kinanthropometry (ISAK) has been recognized as an international standard for anthropometric measurements in health and sports science and has been applied across many countries. It is hoped that the international measurement protocol such as that by ISAK to be recognized widely in the sports sciences also and will

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lead to development of human resources skilled in anthropometry (Masaharu and Kagawa, 2008).

Sprinting is the short distance race which remained important part of competitive play of world's important civilizations. Sprinting is considered to be the oldest form of athletic competition. In specific terms, it is not easy or even possible to give a list of qualities necessary for an athlete to become a successful sprinter. However, on the basis of top class sprinters, some of these qualities can be mentioned. Generally an athlete of long height can become an outstanding sprinter easily. His weight should not be more than 170 pounds. For fast sprinting, drive power is very important irrespective of the fact that whether the which type of muscle length athlete possess, i.e., short or long (Sharma, N.P., 2005).

Methodology

The purpose of the study was to determine the differences on the dependent variables such as Standing height, Sitting height, Upper leg length, Lower leg length , among the three categorical independent variables of 100m, 200m and 400m sprinters.

For the purpose of this study, subjects were selected from the 72th All India Inter-University Athletic Championship held at the Rajiv Gandhi University of Health Sciences in Mangalore from 17th to 21st December, 2011. In this athletic championship 1257 male athletes from 151 universities were participated. Out of these athletes, all the 47 male sprinters who have qualified for the semi-finals and finals of 100m, 200m and 400m were selected as subjects. Thus, the present study comprised of 16 sprinters from 100m, 13 sprinters from 200m and 18 sprinters from 400m respectively. The sprinters who have participated more than one sprinting event were not included in this study.

Results and Discussion

The data collected on Standing height, Sitting height, Upper leg length, Lower leg length for 100m, 200m and 400m Inter-university sprinters were subjected to one way analysis of variance to determine any significant difference on dependent variable among the three categories of sprinters. Whenever the F ratio was found to be significant Scheffe S' post hoc test was applied to find out significant difference among the paired mean. The results obtained are presented below in Table 1

Table – I

One Way ANOVA for Standing height, Sitting height, Upper leg length and Lower leg length among 100m, 200m and 400m Inter-University Sprinters

Variables	Sprinters – Groups	Mean	S. D.	N	SS	df	MS	F Ratio
Standing Height	100m	170.0313	5.13312	16	358.493	2	179.246	5.704*
	200m	172.2308	5.76128	13	1382.667	44	31.424	
	400m	176.4167	5.88680	18				
Sitting Height	100m	123.8437	3.89752	16	69.079	2	34.539	2.408
	200m	125.1923	3.93456	13	631.198	44	14.345	
	400m	126.6944	3.57746	18				
Upper leg length	100m	45.9063	8.78677	16	167.450	2	83.725	1.052
	200m	49.7692	5.37205	13	3501.987	44	79.591	
	400m	45.3056	10.83993	18				
Lower leg length	100m	42.0937	4.83811	16	59.131	2	29.566	1.500
	200m	43.2308	4.30898	13	867.528	44	19.717	
	400m	44.7222	4.15587	18				

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Table-II
Scheffes' Post Hoc Test for Differences between The Paired Means on Standing Height among 100m, 200m and 400m Inter-University Sprinters

100m Sprinters	200m Sprinters	400m Sprinters	Mean Differences	Confidence Interval
170.03	172.23	_	2.20	5.31
170.03		176.42	6.39*	4.91
	172.23	176.42	4.19	5.11

The mean difference on standing height between 100m and 200m sprinters was 2.20 and it was less than the confidence interval of 5.31 required for significance at .05 level of confidence. The mean difference on standing height between 100m and 400m sprinters was 6.39 and it was higher than the confidence interval required for significance at .05 level of confidence. The mean difference between 200m and 400m sprinters on standing height was 4.19 and it was less than the confidence interval required for significant at .05 level of confidence. It is inferred that 400m sprinters were significantly taller than 100m sprinters but there were no significant differences in standing height between 100m and 200m sprinters and 200m and 400m sprinters.

Table I indicates that the means and standard deviations on sitting height among 100m, 200m and 400m Inter-university sprinters were 123.84 ± 3.90, 125.19 ± 3.93 and 126.69 ± 3.58 respectively. The obtained F ratio 2.41 was less than the table value of 4.91 required for significance at .05 level of confidence for df 44 and 2. It is inferred from the results of the study that there was no significant difference in sitting height among three categories of sprinters.

The Table I also indicates that the means and standard deviations on upper arm length among 100m, 200m and 400m Inter university sprinters were 30.50 ± 1.18, 32.35 ± 6.06 and 31.42 ± 1.96 respectively. The obtained F ratio1.03 was less than the table value of 5.11 required for significance at .05 level of confidence for df 44 and 2. It is inferred from the results of the study that there was no significant difference in upper arm length among three categories of sprinters.

The Table I further indicates that the means and standard deviations on lower arm length among 100m, 200m and 400m inter university sprinters were 27.50 ± 2.58, 29.77 ± 6.74 and 28.42 ± 3.28 respectively. The obtained F ratio 0.98 was less than the table value of 3.21 required for significance at .05 level of confidence for df 44 and 2. It is inferred from the results of the study that there was no significant difference in lower arm length among three categories of sprinters

Findings / Conclusion
Discussion on findings

There are many factors that determines athletes success in sprint events and the most important are the anatomical, morphological and physiological parameters Baechle 1994; Crowder et al. 1992; Dintiman et al. 1997; Javer 1995; Telez 1994. Further Hay 1993 has stated that the skill of sprinting is actually depending upon athletes' ability to combine the action of the legs, trunk, and arms so on into a smoothly coordinated whole action. Hence the upper leg length, lower leg length, sitting height and standing height as dependent variables and in addition three categories of sprinters namely 100m, 200m and 400m sprinters as independent variables or categoriacal variable. It is also stated that greater relative muscle mass in the thighs with strong quadriceps muscles will result in strong driving force for sprinter. Hence in addition to the standing height, sitting height, upper leg length and lower leg length, an addition of three more variables viz. were also selected as dependent variables. The result of the study indicated that the 400m sprinters had significantly taller than 100m sprinters. The speed depends upon two factors i.e. stride length and stride frequency. In short sprints like 100m and 200m sprints, the frequency of the stride is more important than the stride length whereas as the distance of the run increases the length of the stride plays relatively more role even at the cost of reduced stride frequency. In this study though there is no significant difference in upper leg length, lower leg length and sitting

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height, the standing height was significantly higher for 400m sprinters than 100m sprinters. It is also interesting to note that the trend of the score also shows that the upper leg length, lower leg length and sitting height increased trend as the distance of sprint increases. To understand a clear picture either application of MANOVA or computation of ratio of leg length relative to standing height and also ratio of upper leg length and lower leg length relative to the total height would give a clear picture about influence of lower and upper leg length to sprint performance.

Conclusions

The following conclusions were drawn within the limitation of the present study.

1. 400m sprinters were significantly taller than 100m sprinters.
2. There was no significant difference in standing height between 100m and 200m sprinters and also between 200m and 400m sprinters.
3. There was no significant difference in sitting height, upper arm length and lower arm length among three categories of sprinters.

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