

Relationship of Anthropometric Variables with the Physical Variables of Sprinters

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Abstract – The purpose of the study was to find the relationship of anthropometric variables with the physical variables of sprinters. For the study, 25 sprinters were selected as subjects. The study was delimited to following anthropometric variables: height, weight, arm length, chest circumference, thigh circumference, calf circumference and leg length & physical variables: speed, explosive leg strength, agility, abdominal strength and shoulder strength. For analyzing the data, descriptive statistics and Pearson product moment correlation was used at 0.05 level of significance. The results of the study revealed that a positive relationship was found between the Weight and the selected physical measurements of sprinters i.e. Speed, Shoulder Strength and agility.

Keywords: Anthropometric, Circumference, Pearson Product Moment

INTRODUCTION

Track & Field Athletics is the words oldest sports which is the inevitable outgrowth of basic energies and urges in man. To run, to jump, to throw are not nearly natural activities of large muscles and organs of the body. They are the primary source of their development, as much so as vocalization is to take vocal cards (Doherty, 1964).

There is verity of races in Track or running events. Racing short distance has been a part of the competitive play of every civilization (Kenneth, 1964). Speed, strength, relaxation, nervous temperament and age are all important factors in sprinting, but innate speed is definitely the most important. If athlete doesn't have natural speed he can never become a champion sprinter. An athlete's time in 100 mts. race can be improved by good training considerably by improving his start and his running form, but basic speed is inherited and can't be improved through practice. A boy must be physically strong to become a good sprinter.

Sprinting is a type of running in which the participant runs the entire distance at near maximum speed. It differs from fast running in that the stride is usually longer, the number of strides per second is greater, and the force of the driving leg against the ground is less. In other words, it is an all out effort by the contestant to move as he can over the indicated distance in as short a time as possible (Mortensen and Cooper, 1931).

Scientists and physiologist have been of the view that anthropometry and physical components of an athlete have a lot to do with the performance, more than the techniques and tactics of a player of a team. The research findings show that a high level of technical perfection alone has nothing to do with the success in competitive sports. Most of the games demand a greater amount of speed, strength, endurance, flexibility, co-ordination and maximum fitness of the organism (Johnson and Huskirk, 1974).

An athlete's anthropometric characteristics represent important prerequisites for successful participation in any given sport. An athlete's anthropometric and physical characteristics may represent important prerequisites for successful participation in any given sport (Gualdi-Russo & Zaccagni, 2001).

Therefore, the purpose of the study is to find the relationship between selected anthropometric variables with the selected physical variables of sprinters.

METHODOLOGY

Selection of subjects

25 sprinters were selected as subjects, age ranging from 18-25 years, from 05 Universities of M.P (D.A.V.V., Indore, R.D.V.V., Jabalpur, B.U., Bhopal, L.N.I.P.E., Gwalior, Jiwaji University, Gwalior).

Selection of variables

	Anthropometric variables		Physical variables.
1.	Height	1.	Speed
2.	Weight	2.	Explosive Leg Strength
3.	Arm length	3.	Agility
4.	Chest circumference	4.	Abdominal Strength
5.	Thigh circumference	5.	Shoulder Strength
6.	Calf circumference		
7.	Leg length		

CRITERION MEASURES

S.N.	Variables	Tests / Equipments	Unit
1	Height	Stadiometer	Centimeter
2	Weight	Weighing machine	Kilogram
3	Arm Length	Gullick tape	Centimeter
4	Chest Circumference	Gullick tape	Centimeter
5	Leg Length	Gullick tape	Centimeter
6	Thigh Circumference	Gullick tape	Centimeter
7	Calf Circumference	Gullick tape	Centimeter
8	Speed	50 m Dash	Seconds
9	Explosive Leg Strength	Standing broad Jump	Centimeter
10	Agility	Shuttle Run	Seconds
11	Abdominal Strength	One Min.Sit ups	No. of Sit ups
12	Shoulder Strength	Pull-ups	No. of pulls-ups

Statistical analysis

To attain the objectives of the study, the analysis part includes the following statistical techniques:

- ◆ Descriptive statistics were used to describe the nature and characteristics of the data.
- ◆ Pearson product moment correlation was employed to find out the relationship between selected anthropometric variables with the physical variables of different categories of athletes.
- ◆ Level of significance was set at 0.05

RESULTS AND DISCUSSION

Table 1

Descriptive statistics of Anthropometric variables of Sprinters

Anthropometric variables	N	Mean	SD
Height (Cm)	25	167.68	3.74
Weight (Kg)	25	60.95	6.26
Arm Length (Cm)	25	78.24	2.80
Chest Circumference (Cm)	25	85.04	4.30
Leg Length (Cm)	25	95.60	2.90
Thigh Circumference (Cm)	25	52.16	3.26
Calf Circumference (Cm)	25	35.00	2.62

Table 1 shows the descriptive statistics of selected Anthropometric variables of Sprinters i.e. Height, Weight, Arm Length, Chest Circumference, Leg Length, Thigh Circumference and Calf Circumference.

Table 2

Descriptive statistics of Physical variables of Sprinters

Physical variables	N	Mean	SD
Speed (Seconds)	25	6.40	.12
Explosive Leg Strength (Mt)	25	2.40	.12
Shoulder Strength (In counts)	25	14.44	1.85
Agility (Second)	25	7.80	.38
Abdominal Strength (In counts)	25	54.56	4.82

Table 2 shows the descriptive statistics of selected Physical variables of Sprinters i.e. Speed, Explosive Leg Strength, Shoulder Strength, Agility and Abdominal Strength.

Table 3

Relationship of selected Anthropometric variables with selected Physical variables of Sprinters

Anthropometric variables	Physical Variables	Corr. r =	Sig.
Height	Speed	.260	.104
	Explosive Leg Strength	.259	.106
	Shoulder Strength	.129	.269
	Agility	.313	.064
	Abdominal Strength	.149	.239
Weight	Speed	.368*	.035
	Explosive Leg Strength	.314	.063
	Shoulder Strength	.366*	.036
	Agility	.345*	.046
	Abdominal Strength	-.058	.391
Arm Length	Speed	.006	.488
	Explosive Leg Strength	.022	.458
	Shoulder Strength	.011	.479
	Agility	-.003	.495
	Abdominal Strength	-.017	.469
Chest Circumference	Speed	-.104	.311
	Explosive Leg Strength	-.104	.310
	Shoulder Strength	-.133	.263
	Agility	-.118	.287
	Abdominal Strength	-.067	.375
Leg Length	Speed	-.026	.451
	Explosive Leg Strength	-.034	.435
	Shoulder Strength	-.121	.282
	Agility	.039	.426
	Abdominal Strength	.210	.157
Thigh Circumference	Speed	-.014	.474
	Explosive Leg Strength	-.005	.490
	Shoulder Strength	.181	.193
	Agility	-.021	.461
	Abdominal Strength	.209	.158
Calf Circumference	Speed	-.143	.248
	Explosive Leg Strength	.181	.193
	Shoulder Strength	-.009	.484
	Agility	.083	.346
	Abdominal Strength	-.260	.105

*Significant at .05 level

On the basis of obtained correlation in Table - 3 no significant relationship was found between the height and all the selected physical variables of sprinters. No significant relationship was found between the Arm Length and all the selected physical variables of sprinters. No significant relationship was found between the Chest Circumference and all the selected physical variables of sprinters. No significant relationship was found between the Leg Length and all the selected physical variables of sprinters. No significant relationship was found between the Thigh

Circumference and all the selected physical variables of sprinters. No significant relationship was found between the Calf Circumference and all the selected physical variables of sprinters. No significant relationship was found between the Weight and the selected physical variables of sprinters i.e. Explosive Leg Strength and Abdominal Strength at .05 level of significance.

On the other hand significant relationship were found between the Weight and the selected physical measurements of sprinters i.e. Speed ($r = .368, p = .035$), Shoulder Strength ($r = .366, p = .036$) and Agility ($r = .345, p = .046$) at .05 level of significance.

CONCLUSIONS

On the basis of analysis of data and the results of the study following conclusions are drawn:

A positive relationship was found between the Weight and the selected physical measurements of sprinters i.e. Speed, Shoulder Strength and Agility at .05 level of significance.

On the other hand, No significant relationship was found between the height and all the selected physical measurements of sprinters. No significant relationship was found between the Arm Length and all the selected physical measurements of sprinters. No significant relationship was found between the Chest Circumference and all the selected physical measurements of sprinters. No significant relationship was found between the Leg Length and all the selected physical measurements of sprinters. No significant relationship was found between the Thigh Circumference and all the selected physical measurements of sprinters. No significant relationship was found between the Calf Circumference and all the selected physical measurements of sprinters. No significant relationship was found between the Weight and the selected physical measurements of sprinters i.e. Explosive Leg Strength and Abdominal Strength at .05 level of significance.

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