PHYSIOLOGICAL DIFFERENCES BETWEEN ATHLETES OF SELECTED EVENTS IN TRACK AND FIELD – A COMPARATIVE STUDY

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ABSTRACT

Purpose of the study was to find out the physiological differences between the athletes of selected events in track and field. A total of 30 subjects (10 from each event) were selected by purposive sampling from LNUPE, Gwalior. The variables selected for this study were Vital Capacity, Resting Pulse Rate and Blood Pressure. The resting pulse rate of each of the subject was recorded in the morning on their bed, just after the sound sleep. It was recorded through the radial artery. The blood pressure was measured (diastolic and systolic) with sphygmomanometer (dial-type) and the stethoscope in millimeters of mercury (mmHg). Maximal volume forcefully expired after maximal inspiration (Vital Capacity) was measured with the help of dry Spiro-meter in liters. The One Way Analysis of Variance was employed for the analysis of data. The level of significance was set at 0.05. The result of the study was found that there was a significant difference in the vital capacity and resting pulse rate of sprinters, jumpers and long distance runners. But, no significant differences were found in case of Blood Pressure (i.e. systolic and diastolic blood pressure).

Key Words: *Physiological Variables, Sprinters, Jumpers and Long Distance Runners.*

INTRODUCTION:

In today's techno scientific age the world has completely changed in all aspects due to discovery and research (bhalla, 1992).The main aspects to be emphasized in order to achieve high level of performance in physiological fitness. For the physiological system of the body to be fit, the must function well enough to support the particular activity that the individual in performing since different activities make different demands upon the organism (Lawrence, 1982).

The sport of track and field encompasses a variety of events with different physical requirements. Athletes participating in power events (e.g., sprints, hurdles, jumps) train at maximal or near maximal intensity in short bursts. Conversely, athletes participating in endurance events (e.g., middle-distance and distance running) train at lower intensity levels for extended periods.

For different type of event, a sportsperson requires many different and specific physical (strength, endurance etc.) and physiological components (pulse rate, blood pressure etc.). The purpose of this study was to compare the various selected physiological variables among athletes of selected track and field events.

METHODS:

Selection of the subjects:

A total of 30 subjects (10 from each event) were selected by purposive sampling from LNUPE, Gwalior. The subjects were sprinters, long distance runners and jumpers (10 from each group) who represented LNUPE, Gwalior at All-India Inter-University level.

Selection of variables:

Through both the critical and allied literature pertaining to the problem under consideration the following physiological variables were selected-

1. Vital Capacity
2. Pulse Rate
3. Blood Pressure

The selection of these variables was also based on the feasibility criteria and the equipment available as well as the scholar owns experience in conducting the test and measurement to these variables.

ADMINISTRATION OF THE TEST:

Resting Pulse Rate:

The resting pulse rate of each of the subject was recorded in the morning on their bed, just after the sound sleep. It was recorded through the radial artery.

Blood Pressure:

The blood pressure was measured (diastolic and systolic) with sphygmomanometer (dial-type) and the stethoscope in mmhg.

Vital Capacity:

Maximal volume forcefully expired after maximal inspiration was measured with the help of dry Spiro-meter in liters.

RESULT:

The data obtained was analyzed by applying One Way Analysis of Variance. The descriptive table for the data obtained is shown as below.

Table 1: The descriptives of the selected physiological variables of sprinters, jumpers and Long distance runners.

		N	Mean	Std. Deviation	Std. Error
Vital Capacity	Sprinters	10	3.6	.25	.08
	Jumpers	10	3.4	.35	.11
	Long Distance Runners	10	4.1	.45	.14
	Total	30	3.7	.46	.08
Resting Pulse Rate	Sprinters	10	62.3	5.75	1.81
	Jumpers	10	63.0	4.13	1.30
	Long Distance Runners	10	57.6	3.20	1.01
	Total	30	60.6	4.90	.89
Systolic BP	Sprinters	10	80.3	2.71	.85
	Jumpers	10	80.4	2.95	.93
	Long Distance Runners	10	78.1	3.81	1.20
	Total	30	79.6	3.26	.59
Distolic BP	Sprinters	10	130.0	6.58	2.08
	Jumpers	10	130.6	7.79	2.46
	Long Distance Runners	10	125.6	6.68	2.11
	Total	30	128.7	7.16	1.30

To compare the means of all the selected variables of sprinters, jumpers and long distance runners One Way Analysis of Variance was employed and the table for the same is shown below.

Table 2: Anova Table for the data on selected physiological variables of sprinters, jumpers and long distance runners

		Sum of Squares	df	Mean Square	F	Sig.
Vital Capacity	Between Groups	2.579	2	1.289	9.76*	.001
	Within Groups	3.566	27	.132		
	Total	6.145	29			
Resting Pulse Rate	Between Groups	152.467	2	76.233	3.78*	.036
	Within Groups	544.500	27	20.167		
	Total	696.967	29			
Systolic BP	Between Groups	33.800	2	16.900	1.65	.210
	Within Groups	275.400	27	10.200		
	Total	309.200	29			
Diastolic BP	Between Groups	149.067	2	74.533	1.50	.240
	Within Groups	1338.800	27	49.585		
	Total	1487.867	29			

*Significant at 0.05 level of significance

The table of ANOVA on selected physiological variables shows that the F- ratio was significant in case of Vital Capacity and Resting pulse rate. But in case of Systolic and Diastolic Blood pressure it was found insignificant at level of significance 0.05. To find out the critical difference between the means of the selected variables Post Hoc Test (LSD) was employed and the table of that is shown below.

Table 3: Post Hoc Test (LSD) for the selected physiological variables of sprinters, jumpers and long distance runners

Dependent Variable	(I) Sport	(J) Sport	Mean Difference (I-J)	Std. Error	Sig.
Vital Capacity	Sprinters	Jumpers	.21100	.16253	.205
		Long Distance Runners	-.48900*	.16253	.006
	Jumpers	Sprinters	-.21100	.16253	.205
		Long Distance Runners	-.70000*	.16253	.000
	Long Distance Runners	Sprinters	.48900*	.16253	.006
		Jumpers	.70000*	.16253	.000
Resting Pulse Rate	Sprinters	Jumpers	-.70000	2.00832	.730
		Long Distance Runners	4.70000*	2.00832	.027
	Jumpers	Sprinters	.70000	2.00832	.730
		Long Distance Runners	5.40000*	2.00832	.012
	Long Distance Runners	Sprinters	-4.70000*	2.00832	.027
		Jumpers	-5.40000*	2.00832	.012
Systolic BP	Sprinters	Jumpers	-.10000	1.42829	.945
		Long Distance Runners	2.20000	1.42829	.135
	Jumpers	Sprinters	.10000	1.42829	.945
		Long Distance Runners	2.30000	1.42829	.119
	Long Distance Runners	Sprinters	-2.20000	1.42829	.135
		Jumpers	-2.30000	1.42829	.119
Distolic BP	Sprinters	Jumpers	-.60000	3.14913	.850
		Long Distance Runners	4.40000	3.14913	.174
	Jumpers	Sprinters	.60000	3.14913	.850
		Long Distance Runners	5.00000	3.14913	.124
	Long Distance Runners	Sprinters	-4.40000	3.14913	.174
		Jumpers	-5.00000	3.14913	.124

*Significant at 0.05 level of significance

Post hoc test for the critical difference between the means of the selected variables shows that there was a significant difference in Vital Capacity of long distance runners as compared with sprinters and jumpers. But there was no significant difference found in Vital capacity of sprinters and jumpers.

In case of resting pulse rate also post hoc test shows that there was a significant difference in resting pulse rate in long distance runners as compared with sprinters and jumpers. But there was no significant difference found in Vital capacity of sprinters and jumpers.

DISCUSSION OF FINDINGS:

This study was done to compare the selected physiological variables among the sprinters, jumpers and long distance runners. The variables selected were Vital Capacity, Resting Pulse Rate and Blood pressure. The One Way Analysis of Variance was employed for the data analysis. The level of significance was set at 0.05.

The Anova table shows that there was a significant difference in the vital capacity and resting pulse rate of sprinters, jumpers and long distance runners. But, no significant differences were found in case of Blood Pressure (i.e. systolic and diastolic blood pressure).

The result of the study shows that the blood pressures of all groups are same and there was no difference in their blood pressure at level of significance 0.05. It may be concluded that these insignificant differences found were due to the error.

The vital capacity of sprinters and jumpers was found significantly lower than the long distance runners. These differences may be attributed to the type of workout of all the groups. The long distance runners used to run continuously for a long period. The workout of jumpers and sprinters in terms of intensity and volume is approximately same. That is why there was no significant difference found in their vital capacity. Long distance continuous running helps the long distance runners in improving their lung functions and vital capacity. But in case of sprinters and jumpers the lung functions does not play dominant role. There the anaerobic capacity, muscle strength, reaction time and speed play an important role. That's why these differences were found in vital capacity of the groups.

Likewise, the resting pulse rate of sprinters and jumpers was found significantly higher than the long distance runners. These differences may also be attributed to the type of workout of all the groups. Their training can lead to cardiovascular changes including hypertrophy of the left ventricle and angiogenesis within muscle tissue. This leads to a state known as athletic heart syndrome, as distinct from the pathological enlargements of the ventricles in ventricular hypertrophy which is directly related to the pulse rate. Due to this factor the pulse rate of the long distance runners are lesser than other groups.

CONCLUSION:

The study concludes that a workout which is continued for a longer duration of time is helpful in the development of the cardio-respiratory fitness. But the workout which is not continuing for a longer duration is not having any significant effect on cardio-respiratory fitness.

RECOMMENDATIONS:

1. The same type of study can be done by taking others games and sports into consideration.
2. Similar studies can be done by taking a large sample and various age groups.

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