

## A Comparative Study of Selected Physiological Variables Between State Level Sprinters And Middle Distance Runners

**Dr. Jagdish Narayan Saini,**

**Director Physical Eduaction**

**S.J.T. College Ranawas, Pali (Raj.)**

### **Abstract**

This study is conducted on different physiological variables among State Level Sprinters and Middle Distance Runners. The main aim of the study is the comparison between Sprinters and Middle Distance Runners with different physiological variables resting heart rate, blood pressure (systolic and diastolic), vital lungs capacity, maximum oxygen consumption Sprinters and Middle Distance Runners. In present study investigator has taken a total of 60 players (30 sprinters and 30 Middle Distance Runners). For interpretation of data a comparative analysis of the selected variable, the 't' test is applied. The data of both groups are collected separately for both the variable. Statistic such as mean and standard deviation is computed. The level significance is set at 0.05. It is found the Sprinters and Middle Distance Runners do not have significant deference between the variables: resting heart rate, blood pressure (systolic and diastolic), vital lungs capacity, maximum oxygen consumption.

**Keywords:- resting heart rate, blood pressure (systolic and diastolic), vital lungs capacity, maximum oxygen consumption.**

**Introduction:-** There are many important physiological characteristics required for improved performance in players and officials, in individual sports and team sports. Although each of these sports is on distinctive skills, tactics and movement patterns, they all have similar physiological demands such as high aerobic power, high lactate tolerance and increased anaerobic capacity. These physiological capacities allow the team-sports players to repeat sprints often with quite short recovery periods over a prolonged duration. This type of activity commonly reoffered to as prolonged high-intensity intermitted exercise.

Running is a classical "athletic sport" and can be considered both simple and difficult; simple because it is an instinctive natural skill performed at some time by all but unfortunately most of the people without understanding the complexity running movement is brought by a combination of forces exerted both internally and externally by the body to produce movements thus making it is difficult process. Good running calls for coordinated action of the entire body which refers to fitness.

Exercise physiology is concerned with changes in function brought about by participation in physical exercise. Even when there is no clear evidence present that physical changes requires regular exercise there is simple evidence that physical challenges can be meet more successfully if one begins program of physical activity early in life and persists in such activity throughout

the years. Successful distance running primarily requires development of aerobic endurance. The deviation of the activity with result in muscle contraction but more the performance in the activity will be limited by the functioning of the heart, blood vessels, blood and lungs. The degree to which circulation and respiration limit once performance depends upon many factors, chief of which is the intensity of the exercise. Distance running is a relatively low intensity activity consisting mostly of rhythmic, non-static mostly contraction and is limited mainly by aerobic capacity. Performance in distance event is influenced by several physiological variables and some of the important variables are aerobic power, anaerobic power, amount of hemoglobin in the blood, body composition, vital capacity, heart rate, hemoglobin content, body surface area etc. The present study would help in developing prediction equations based on selected physiological variables in assessing the performance of sprinters and middle distance runners in athletics.

Grant et al (1997) selected 16 well trained middle and long distance runner to study the relationship between 3 km running performance and selected physiological variables. They concluded that in respect of well trained runners, the running velocity at the lactate thresh hold was the best predictor of running performance.

In the present, Competitive sports leads to a new era where the competitive sports performance has matter scientist of different field to come to common platform and work together harmoniously to achieve excellence in a particular discipline. The knowledge of the demands, put on the individual through different sports activity is necessary for the selection of the activity for achieving certain goals. For the physiological system of the body to be fit, the system must function well enough to support the specific activity that the individual is performing.

More understanding of the physiology is needed for acclimatization. There is better medical control over change injection and above all there is greater attention paid to the development of the psychological attitudes necessary to successful competition. But mostly the improvement due to the athletes themselves in the sprints, jumps and the throwing events at least, it is hard to resist the conclusion that the modern athlete is actually better endowed physically better suited to his particular task.

Different activities make different demands upon the organism with respect to circulatory, respiratory, metabolic, and neurological and temperature regulating functions. Physiological systems are highly adaptable to exercise. It has been known for many years that regular exercise such as running will eventually cause, but there is still not experimentally verified explanation precisely how this training effect is brought about. Red Fiber has more of this protein and like hemoglobin, processes an attraction for oxygen. It is therefore aerobic in character, while white fiber is anaerobic; endurance events are considered aerobic events because they require an efficient oxygen transport and utilization system, while sprint events are anaerobic as oxygen transport is of little or no importance depending on the distance.

**Hypothesis:-** There would be no significance difference of resting heart rate, blood pressure (systolic and diastolic), vital lungs capacity, maximum oxygen consumption between sprinters and middle distance runners.

**Objective of the study:-** The study deals with immediate objectives and certain goals as follows.

1. To compare the resting heart rate, blood pressure (systolic and diastolic), vital lungs capacity, maximum oxygen consumption between sprinters and middle distance runners.
2. To find out the dominance of resting heart rate, blood pressure (systolic and diastolic), vital lungs capacity, maximum oxygen consumption between sprinters and middle distance runners.

**Significance of the study:-** The finding of this study is likely to provide criteria for transfer of training. It would help physical instructor and coaches to develop sound training programs. The study will help to know the better to resting heart rate, blood pressure (systolic and diastolic), vital lungs capacity, maximum oxygen consumption between sprinters and middle distance runners. Present study will be helpful to know the relation in training between sprinters and middle distance runners.

**Methodology:-** A sample of Rajasthan State Level 60 male players were selected as subjects 30 Sprinters and 30 Middle Distance Runners. The ages of the player were 18 to 25 years.

**Test applied:-** The data is collected with the help of heart rate, stop - watch, sphygmomanometer, stethoscope, Spiro meter, Harvard's step test, sergeant jump, as standard procedure.

**Methods of analysis:-** To analysis collected data "T" test is applied to find out the significant difference.

#### **Discussion of findings:-**

**Table-1**

Significance of mean difference between Sprinters and Middle Distance Runners on the resting heart rate.

Group	Sample	Mean	SD	"T"
Sprinters	30	61.63	4.18	14.85*
Middle Distance Runners	30	45.90	4.02	

\* Significance at 0.05 \* Table value at 0.05 =2.00

A perusal of table -1 indicates that a mean and standard deviation values with regard to sprinters on resting heart rate variable are 61.63 and 04.18 whereas in case with middle distance runners the same are recorded as 45.90 and 04.02 respectively. These are significant difference between Sprinters and Middle Distance Runners found as the calculated t-value (14.85) is more then tabulation t-value (2.00) at 0.05 levels. As the results indicate research hypothesis is rejected.

**Table-2**

Significance of mean difference between Sprinters and Middle Distance Runners on the Systolic Blood Pressure.

Group	Sample	Mean	SD	"T"
Sprinters	30	52.86	07.78	0.62
Middle Distance Runners	30	51.46	09.54	

\* Significance at 0.05 \* Table value at 0.05 =2.00



The table -2 indicates that a mean and standard deviation values with regard to sprinters on Systolic Blood Pressure variable are 52.86 and 07.78 whereas in case with middle distance runners the same are recorded as 51.46 and 09.54

respectively. These are no significant difference between Sprinters and Middle Distance Runners found as the calculated t-value (0.62) is less than tabulation t-value (2.00) at 0.05 level. As the results indicate research hypothesis is accepted.

**Table-3**

Significance of mean difference between Sprinters and Middle Distance Runners on the Diastolic Blood Pressure.

Group	Sample	Mean	SD	"T"
Sprinters	30	51.50	08.64	0.23
Middle Distance Runners	30	50.93	09.71	

\* Significance at 0.05 \* Table value at 0.05 =2.00

The table -3 indicates that a mean and standard deviation values with regard to sprinters on Diastolic Blood Pressure are 51.50 and 08.64 whereas in case with middle distance runners the same are recorded as 50.93 and 09.71 respectively. These are no significant difference between Sprinters and Middle Distance Runners found as the calculated t-value (0.23) is less than tabulation t-value (2.00) at 0.05 level. As the results indicate research hypothesis is accepted.

**Table-4**

Significance of mean difference between Sprinters and Middle Distance Runners on the Vital Lungs Capacity.

Group	Sample	Mean	SD	"T"
Sprinters	30	48.30	12.70	01.35
Middle Distance Runners	30	44.80	06.21	

\* Significance at 0.05 \* Table value at 0.05 =2.00

The table -4 indicates that a mean and standard deviation values with regard to sprinters on Vital Lungs Capacity are 48.30 and 12.70 whereas in case with middle distance runners the same are recorded as 44.80 and 06.21 respectively. These are no significant difference between Sprinters and Middle Distance Runners found as the calculated t-value (01.35) is less than tabulation t-value (2.00) at 0.05 level. As the results indicate research hypothesis is accepted.

**Table-5**

Significance of mean difference between Sprinters and Middle Distance Runners on the Maximum Oxygen Consumption Variable.

Group	Sample	Mean	SD	"T"
Sprinters	30	50.13	12.38	0.46
Middle Distance Runners	30	48.86	08.33	

\* Significance at 0.05 \* Table value at 0.05 =2.00

The table -5 indicates that a mean and standard deviation values with regard to sprinters on Maximum Oxygen Consumption Variable are 50.13 and 12.38 whereas in case with middle distance runners the same are recorded as 48.86 and 08.33 respectively. These are no significant difference between Sprinters and Middle Distance Runners found as the calculated t-value (0.46) is less than tabulation t-value (2.00) at 0.05 level. As the results indicate research hypothesis is accepted.

**Conclusion:-** On the basis of results and in the limitation of study, the following conclusions are drawn:-

The researcher has undertaken study titled as “blood pressure (systolic and diastolic), vital lungs capacity, and maximum oxygen consumption” Sprinters and Middle Distance Runners a comparative study. There is no significant difference noticed. Therefore from the statically analysis the following inferences are derived: No significant differences are observed in the blood pressure systolic between Sprinters and Middle Distance Runners. There are no significant differences observed in the blood pressure diastolic of Sprinters and Middle Distance Runners. There are no significant differences noticed on the maximum oxygen consumption between Sprinters and Middle Distance Runners. There are significant differences found among Sprinters and Middle Distance Runners in the resting heart rate.

**References:-**

1. AAHPERD:- Health related physical fitness test manual, Reston,va: American Alliance for health physical education, recreation and dance,1958.
2. Ali G.E.S. (2009) “Effect of Using of Genetic Guidance to Guide Training on Some Physical and Physiological Variables of Medium and Short Distances Racers: World Journal of Sports5 (1), 12-17, 2012.
3. D.K. Kansal “Test and Measurement” in sports and physical education DVS Publication, New Delhi 1996.
4. Grant S, Craig I, Wilson J, Aitcheson T (1997). The Relationship Between 3km Running Performance and Selected Physiological variable. Journal of Sports Science, 15(4):403-10.
5. H.Singh,: Sports Training: General Theory and methods NSNIS, Patiala,1984.
6. H. Harrison Clarke and David H. Clarke: Prentice hall Inc. Englewoods cliffs, New Jersey, Sixth Edition 1982.
7. Hardayal Singh: Science Of Sports Training, DVS Publication New Delhi, 1995.
8. Kenneth L. Jones Louis W. Shainberg and Curtes, O’byer: Total fitness, Harper and Row Inc.San Francisco, 1972.
9. Kenney W.L. and Hudson J.L.(1985) Variables Predictive of Performance in Elite Middle-distance Runner, British Journal Of Sports Medicine 19:207-209.
10. Lamb, David R (1983). Physiology of Exercise Responses and Adaptation. New York; Macmillan Company.