

COMPARISON OF PHYSICAL VARIABLES AMONG DIFFERENT DISTANCE RUNNERS

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ABSTRACT

The purpose of the present investigation was to compare the physical variables among different distance runners (short distance, middle distance and long distance runners). For this study total thirty (30) male subjects; ten of each distance were randomly selected from Institute of Professional Studies, College of Physical Education, Gwalior (M.P.). The age of all subjects ranged between 20-30 years. The data was collect for each variable administering their respective tests. To ensure that the data was reliable, each subject was given sufficient time to perform the tests for each variable. To analyse the collected data one way analysis of variance (ANOVA) was used for each variable separately for both Physical and Physiological variables. Level of significance was set at 0.05. The study reveals there is significant difference in case of Height, Weight and Leg length.

Keywords: Sprints, Leg, Speed, Endurance, Middle Distance and Long Distance.

INTRODUCTION

Running is one of the most natural of athletic activities movements. Every track event has running as its essence, sometimes alone, sometimes with a team and sometimes between obstacles. Every training and conditioning programme contains an element of running, and tests of fitness or physical ability always include running for speed. Running on a track requires more energy than walking to cover the same distance due to air resistance at higher speeds. Running is executed as a sequence of strides, which alternate between the two legs. Each leg's stride can be roughly divided into three phases: support, drive, and recovery. Support and drive occur when the foot is in contact with the ground. Recovery occurs when the foot is off the ground. Since only one foot is on the ground at a time in running, one leg is always in recovery, while the other goes through support and drive. Then, briefly, as the runner leaps through the air, both legs are in recovery. The motions of the upper body are essential to maintaining balance, and a forward motion for optimal running. They compensate for the motions of the lower body, keeping the body in rotational balance. A leg's recovery is matched by a forward drive of the opposite arm, and a leg's support and drive motions are balanced by backward movement of the opposite arm. The shoulders and torso are also involved. Because the leg drive is slower than the kick of recovery, the arm thrusting backward is slower also. The forward arm drive is more forceful and rapid. The more force exerted by the lower body, the more exaggerated the upper body motions have to be to absorb the momentum. While it is possible to run without movements of the arms, the spine and shoulders will generally still be recruited. Using the arms to absorb the forces aids in maintaining balance at higher speed. Otherwise, optimal force would be hard to attain for fear of falling over. The faster the running, the more energy has to be dissipated through compensating motions throughout the entire body. This is why elite sprinters have powerful upper body physiques. As the competitive distance increases, there is a rapid drop in the upper body and overall muscle mass typically exhibited by the people who compete at a high level in each respective event. Long distance runners typically have lean muscles. Running can also have psychological benefits, as many participants in the sport report feeling an elated, euphoric state, often referred to as a "runner's high". Running is both a competition and a type of training for sports that have running or endurance components.

METHODOLOGY

Selection of Subjects

Total thirty (30) male subjects; ten of each distance were selected for this study. All subjects were selected from Institute of Professional Studies, College of Physical Education, Gwalior (M.P.).

Selection of Variables

The variables selected for the study were as follows-

Height was measured by Stadiometer and recorded to nearest centimetres.

Weight was measured by weighing machine and recorded in kilogram.

Leg length was measured by steel tape and recorded in centimetres.

Statistical Technique

To analyse the collected data one way analysis of variance (ANOVA) was used for each variable separately. Level of significance was set at 0.05.



RESULTS OF THE STUDY

TABLE NO. 1
DESCRIPTIVE ANALYSIS OF HEIGHT OF DIFFERENT DISTANCE RUNNERS

S. No.	Short Distance Runners	Middle Distance Runners	Long Distance Runners
Minimum	170.00	163.00	160.00
Maximum	178.00	171.00	174.00
Range	8.00	8.00	14.00
Mean	174.40	167.10	168.50
S.D	2.79	2.60	3.89

Table no. 1 indicates the descriptive analysis of height of different distance runners where minimum, maximum, mean, standard deviation and range are described in detail. For sprinters height minimum is 170.00, maximum is 178.00, range is 8.00, mean is 174.40 and standard deviation is 2.79. For middle racers height minimum is 163.00, maximum is 171.00, range is 8.00, mean is 167.10 and standard deviation is 2.60. For long racers height minimum is 160.00, maximum is 174.00, range is 14.00, mean is 168.50 and standard deviation is 3.89.

TABLE NO. 2
ANALYSIS OF VARIANCE OF THE HEIGHT OF DIFFERENT DISTANCE RUNNERS

Sources of Variances	df	Sum of Square	Mean Square	'F'ratio
Between Group	2	300.20	150.10	15.13*
Within Group	27	267.80	9.91	

*Significant at .05 level of Significance tab F (0.05) (2, 27) =3.35.

Table no. 2 revealed that there is significant difference among height of sprinters, middle distance runners and long distance runners. As calculated F-ratio i.e. 15.13 is greater than the tabulated value i.e. 3.35 required at 0.05 level of significance. Hence null hypothesis get rejected in above finding. Graphical representation of above table is made in fig. no. 1.

TABLE NO. 3
LSD POST-HOC COMPARISON OF MEANS OF HEIGHT DIFFERENT DISTANCE RUNNERS

Sprinters	Middle Distance	Long Distance	Mean Difference	Critical Difference
174.40	167.10		7.30**	
	167.10	168.50	1.40	2.87
174.40		168.50	5.9	

*Significant at .05 level of Significance

Table no. 3 reveals no pair wise difference of mean with critical difference; this is evident that there is significant difference between means of sprinters and middle distance runners and also between sprinters and long distance runners. Whereas there is no significant difference was found between middle distance runners and long distance runners as there mean difference (1.40) is less than critical difference i.e. 2.87.



TABLE NO. 4
DESCRIPTIVE ANALYSIS OF WEIGHT AMONG DIFFERENT DISTANCE RUNNERS

S. No.	Short Distance Runners	Middle Distance Runners	Long Distance Runners
Minimum	65	62	49
Maximum	80	66	75
Range	15	14	26
Mean	71.40	60.50	63.70
S. D	2.79	5.14	6.78

Table no. 4 indicates the descriptive analysis of weight of different distance runners where minimum, maximum, mean, standard deviation and range are described in detail. For sprinters weight minimum is 65.00, maximum is 80.00, range is 15.00, mean is 71.40 and standard deviation is 5.75. For middle distance runners weight minimum is 62.00, maximum is 66.00, range is 14.00, mean is 60.50 and standard deviation is 5.14. For long racers weight minimum is 49.00, maximum is 75.00, range is 26.00, mean is 63.70 and standard deviation is 6.78.

TABLE NO. 5
ANALYSIS OF VARIANCE OF THE WEIGHT DIFFERENT DISTANCE RUNNERS

Sources of Variances	df	Sum of Square	Mean Square	F'ratio
Between Group	2	664.46	332.23	8.34*
Within Group	27	1075.00	39.81	

*Significant at .05 level of Significance tab F (0.05)(2,27)=3.35.

Table no.5 revealed that there is significant difference among weight of sprinters, middle distance runners and long distance runners. As we find that the calculated value of F-ratio is 8.35 which were greater than the tabulated value 3.35 required for the F- ratio (2, 27) at the level of significance. So we find that the null hypothesis is rejected. Graphical representation of above table is made in fig. no. 2.

TABLE NO. 6
LSD POST-HOC COMPARISON OF MEANS OF WEIGHT OF DIFFERENT DISTANCE RUNNERS

Sprinters	Middle distance	Long distance	Mean difference	Critical difference
71.40	60.50		10.90**	
	60.50	63.70	3.20	5.78
71.40		63.70	7.70	

Table no. 6 no reveals pair wise difference of mean with critical difference; this is evident that there is significant difference between means of sprinters and middle distance runners and also between sprinters and long distance runners. Whereas there is no significant difference was found between middle distance runners and long distance runners as there mean difference (3.20) is less than critical difference i.e. 5.78.



TABLE NO. 7
DESCRIPTIVE ANALYSIS OF LEG LENGTH AMONG DIFFERENT DISTANCE RUNNERS

S. No.	Short Distance Runners	Middle Distance Runners	Long Distance Runners
Minimum	38.00	35.00	36.50
Maximum	42.00	39.00	41.00
Range	4.00	4.00	4.50
Mean	40.30	37.20	38.60
S. D	1.22	1.31	1.44

Table no. 7 indicates the descriptive analysis of leg length of different distance runners where minimum, maximum, mean, standard deviation and range are described in detail. For sprinters leg length minimum is 38.00, maximum is 42.00, range is 4.00, mean is 40.30 and standard deviation is 1.22. For middle racers leg length minimum is 33.00, maximum is 39.00, range is 4.00, mean is 37.20 and standard deviation is 1.31. For long racers leg length minimum is 36.50, maximum is 41.00, range is 4.50, mean is 38.60 and standard deviation is 1.44.

TABLE NO. 8
ANALYSIS OF VARIANCE OF THE LEG LENGTH DIFFERENT DISTANCE RUNNERS

Sources of Variances	df	Sum of Square	Mean Square	'F'ratio
Between Group	2	48.20	24.10	13.52*
Within Group	27	48.10	1.78	

*Significant at .05 level of Significance tab F (0.05) (2, 27) =3.35.

Table no.8 revealed that there is significant difference among leg length of sprinters, middle distance runners and long distance runners. As we find that the value of F-ratio obtains 13.52 which were greater than the tabulated value 3.35 required for the F-ratio (2, 27) at the level of significance. So we find that the null hypothesis is rejected. Graphical representation of above table is made in fig. no. 3.

TABLE NO. 9
LSD POST-HOC COMPARISON OF MEANS OF LEG LENGTH OF DIFFERENT DISTANCE RUNNERS

sprinters	Middle distance	Long distance	Mean difference	Critical difference
40.30	37.20		3.10**	
	37.20	38.60	1.40	1.22
40.30		38.60	1.70	

Table no. 9 reveals no pair wise difference of mean with critical difference; this is evident that there is significant difference between means of sprinters and middle distance runners and also between sprinters and long distance runners. Significant difference was also found between middle distance runners and long distance runners.



CONCLUSIONS

Within the limitation of the study the following conclusions were drawn that significant difference was found in relation to Height, Weight and Leg length among different distance runner i.e., Sprinter, Middle and Long distance runners. In-case of Height of different distance runner highest height was of Sprinter where smallest was long distance runners. In-case of Weight of different distance runner lightest was middle distance runner and heaviest was sprinters. And incase leg length of different distance runners longest was of sprinter and smallest was of middle distance runners.

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