



**THE RELATIONSHIP OF RUNNING PERFORMANCE WITH
SELECTED VARIABLES OF PHYSIOLOGY,
AND BODY COMPOSITION**

By

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Abstract

The purpose of this research was to investigate the relationship of running performance with the selected variables of physiology and body composition i.e. vital capacity, fatigue index and BMI, body fat, and leg muscles mass. Vital capacity was measured by using peak flow meter whereas Running Based Anaerobic Test (35m X 6) was applied to assess fatigue index. BMI, body fat and leg muscles mass were measured by body composition analyzer. 37 boys, age 10 to 18 years who regularly come to play one or the other game at sports club were selected as the subjects for the study purpose. Product moment correlation coefficient test (r at 0.05 level of significance) was applied to test hypothesis. Result of the study shows that there is not any significant relationship found between running performance and vital capacity. There is negative significant relationship between running performance and fatigue index, and leg muscles mass whereas positive significant relationship between running performance and BMI, and Body fat.

Key words: 100mtr Running Performance, Vital Capacity, Fatigue Index, Body Fat, and Leg Muscles Mass.

Introduction

"When we try to pick out anything by itself,
we find it hitched to everything else in the universe."

Each and every thing in this world is interconnected and may be interdependent also. When it comes to researches it is always a question of many coaches or sports trainer that what actually affects the performance of the player.

Researches show that basic variables of fitness i.e. speed, strength, endurance, flexibility and agility affect the actual or final performance of every player of any sports. These are the bases for each and every aspect of sports training. Any sports person has to develop basic strength, endurance, and flexibility than and there only that individual can be trained for specific strength and specific endurance. Apart from this there are some other factors which really affect the sports performance i.e. physiological factors, body composition, and anthropometrical variables.

Further fatigue index refers to the rate at which power declines for the athlete. The lower the value the higher the ability for the athlete to maintain anaerobic performance.

In many sports, body composition is important for optimal physical performance. Generally, a relatively low body fat is desirable to optimize physical performance in sports requiring jumping and running. A large muscle mass enhances performance in strength and power activities. Because of this performance - related implication, coaches, parents, exercise scientists, sports medicine specialists, and of course the athletes themselves have an interest in body composition. For years, exercise scientists and sports medicine professionals have examined the physiological profiles of elite athletes. Typically, athletes and physical active individuals are leaner than sedentary individuals, regardless of gender.

Delimitations

1. The study was delimited to the 35 to 40 boys regularly come to play different games at sports club.
2. The study was delimited to the age between 10 to 18 years of boys only.
3. The study was further delimited to the assessment of the selected variables of physiology i.e. vital capacity and fatigue index.
4. The study was further delimited to the assessment of the selected variable of body composition i.e. BMI, body fat, and leg muscles mass.

Limitations

1. For the subjects; factors like diet, daily routine life style, habits etc. which may affect the result of the study will not be controlled by the investigators.

Hypothesis

It was hypothesized that there will be significant relationship of running performance with the selected variables of physiology and body composition.

METHODOLOGY

Selection of Subjects

For this study 37 boys who regularly come to play different games in sports club were selected as the subjects.

Table – 1

Variables, Unites of Measurement and Test Applied for Data Collection

No	Variable	Unit of Measurement	Test
1	Vital Capacity (VC)	L/min	Vital Capacity using a Peak Flow Meter
2	Fatigue Index	Watts/sec	Running-based Anaerobic Sprint Test (RAST)
3	BMI	Kg/m ²	Body composition analyzer model no HBF-362 of Omron
4	Body Fat	Percentage	
5	Leg Muscles Mass	Percentage	

Design of the Study

For the purpose of this study 37 boys age 10 to 18 years who regularly come to play some or the other game at Rander Gymkhana were selected as subjects. On first day height, weight, standing broad jump, sit and reach test and Running-based Anaerobic Sprint Test (RAST) was conducted and on the second day vital capacity, body fat, leg muscles mass were assessed. Data regarding 100m running performance were taken during their annual sports day events.

Statistical Procedure

To find out the relationship of running performance with selected variables of physiology, and body composition coefficient of correlation (r test) was applied. The level of significance to check the relationship of running performance with the selected variables of physiology and body composition was set at 0.05 level which was considered appropriate for the purpose of the study.

ANALYSIS OF DATA AND RESULTS OF THE STUDY

Table - 2

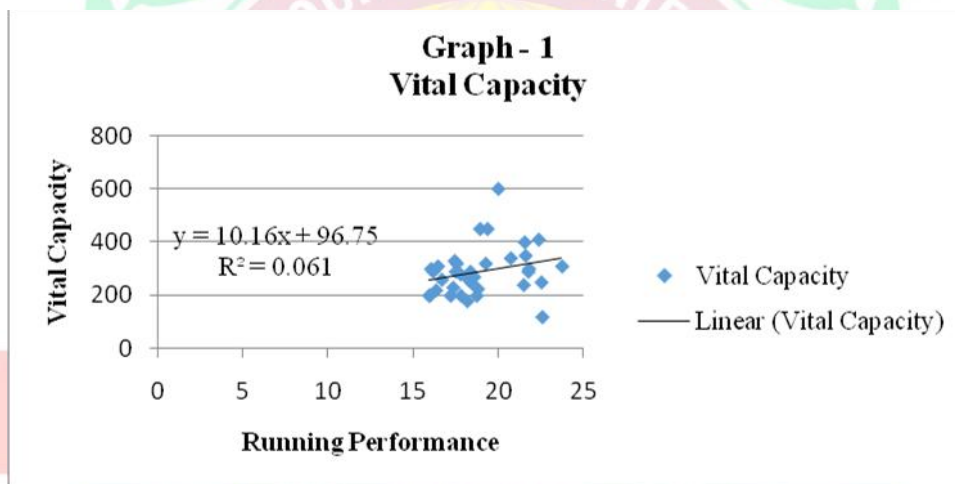
Table showing the correlation coefficient of running performance with Vital Capacity, Fatigue Index, BMI, Body Fat and Leg Muscles Mass

No	Variable	Correlated Correlation Coefficient
1	Vital Capacity (VC)	0.248
2	Fatigue Index	-0.553*
3	BMI	0.808*
4	Body Fat	0.478*
5	Leg Muscles Mass	-0.459*

r - 0.05 (35) 0.325

Graph – 1

Graph showing the correlation coefficient of running performance with Vital Capacity.



Result (Vital Capacity)

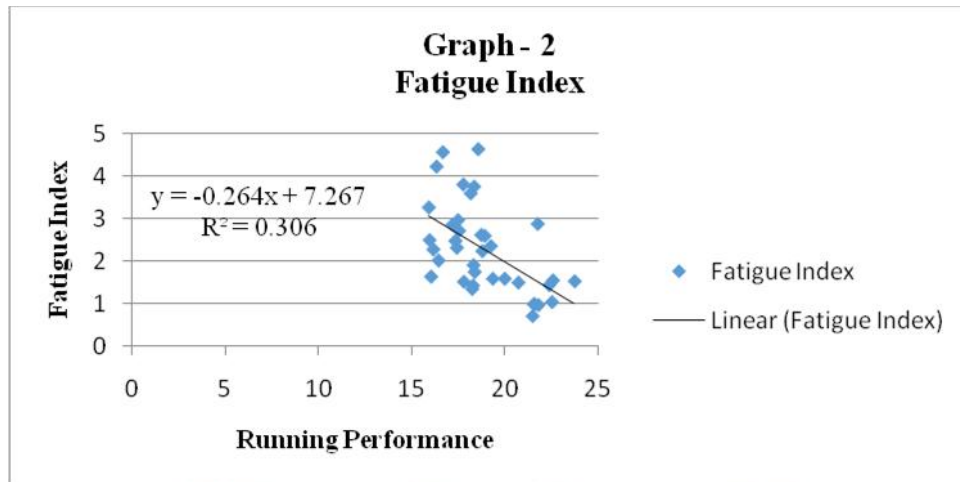
It is evident from Table No - 2 that the calculated value of r (0.248) is less than the tabulated value r - 0.05 (35) 0.325, thus correlation between the running performance and vital capacity is not significant at 0.05 level of significance.

Discussion

There is not significant relationship between running performance and vital capacity; which means that there is absence of linear relation between running performance and vital capacity. Here increase or decrease in vital capacity does not affect running performance at all and vice versa. The reason for the insignificant relationship between running performance and vital capacity could be that vital capacity is more connected variable with aerobic activities and 100 Mtr. running activity is more an anaerobic activity than an aerobic activity.

Graph – 2

Graph showing the correlation coefficient of running performance with fatigue index.



Result (Fatigue Index)

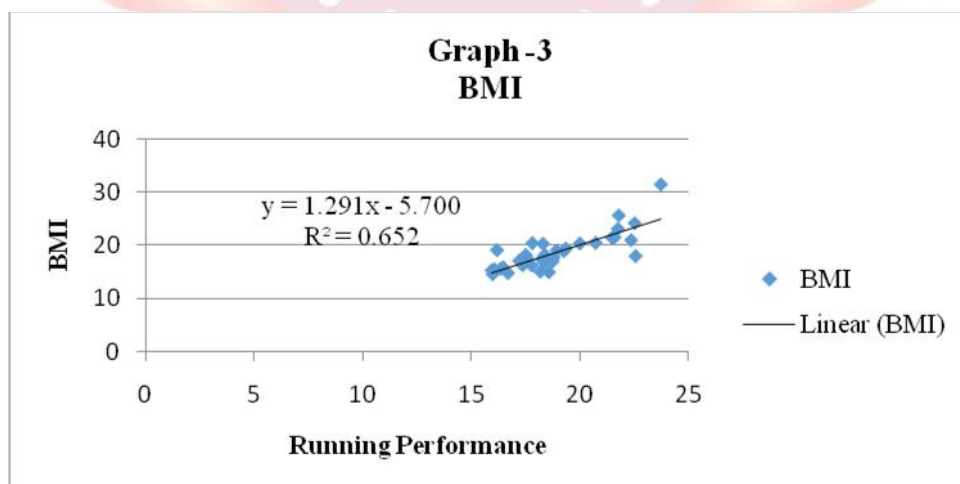
It is evident from Table No - 2 that the calculated value of r (-0.553) is greater than the tabulated value $r = 0.05$ (35) 0.325, thus correlation between the running performance and Fatigue Index is significant at 0.05 level of significance.

Discussion

There is negative significant relationship between running performance and Fatigue Index; which means that there is negative linear relation between the running performance and fatigue index. Here any amount of increase in fatigue index is followed by the decrease in the running performance by the approximately same amount and vice versa. There may be some other factors that affect fatigue index and running performance. Here is the scope for further researches.

Graph – 3

Graph showing the correlation coefficient of running performance with BMI.



Result (BMI)

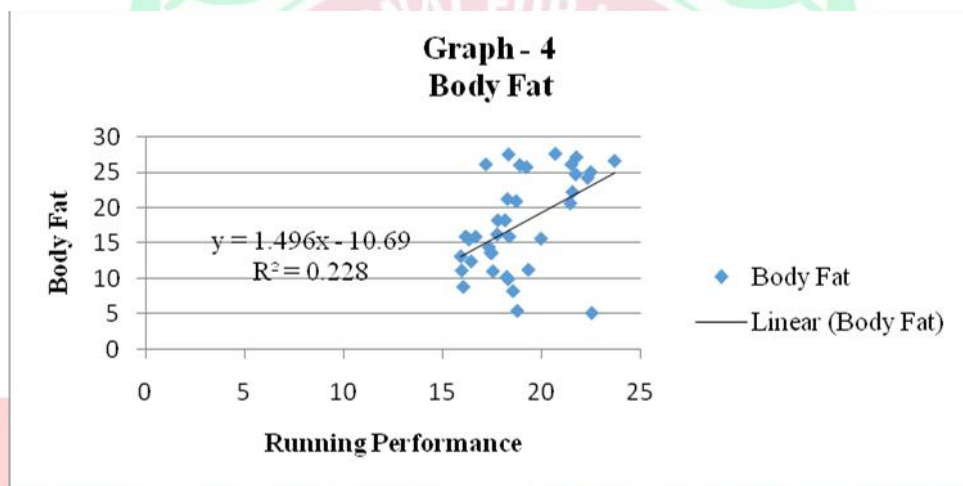
It is evident from Table No - 2 that the calculated value of r (0.808) is greater than the tabulated value $r - 0.05$ (35) 0.325, thus correlation between the running performance and BMI is significant at 0.05 level of significance.

Discussion

There is positive significant relationship between running performance and BMI; which indicates that there is positive linear relation between the running performance and BMI. Here increase in BMI by any amount is followed by the increase in running performance by the approximately same amount and vice versa. The reason for the same could be that the higher value of BMI denotes higher weight ratio and which requires higher strength for movement.

Graph – 4

Graph showing the correlation coefficient of running performance with body fat.



Result (Body Fat)

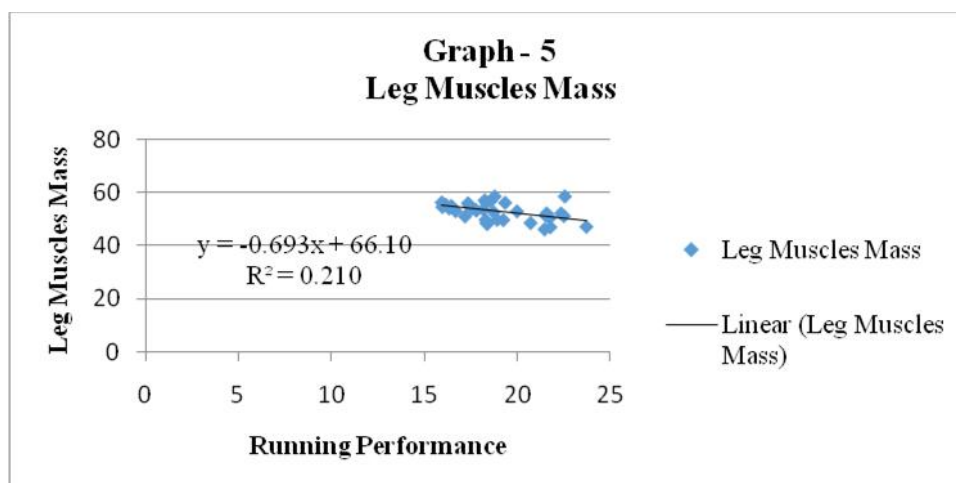
It is evident from Table No - 2 that the calculated value of r (0.478) is greater than the tabulated value $r - 0.05$ (35) 0.325, thus correlation between the running performance and Body Fat is significant at 0.05 level of significance.

Discussion

There is positive significant relationship between running performance and body fat; which indicates that there is positive linear relation between the running performance and body fat. Here increase in body fat by any amount is followed by the increase in running performance by the approximately same amount and vice versa. The reason for the same could be that the higher value of body fat denotes higher weight ratio and which requires higher strength for movement.

Graph – 5

Graph showing the correlation coefficient of running performance with leg muscles mass.



Result (Leg Muscles Mass)

It is evident from Table No - 2 that the calculated value of r (-0.459) is greater than the tabulated value $r = 0.05$ (35) 0.325, thus correlation between the running performance and Leg Muscles Mass is significant at 0.05 level of significance.

Discussion

There is negative significant relationship between running performance and leg muscles mass; which indicates the negative linear relation between the running performance and leg muscles mass. Here any amount of increase in leg muscles mass is followed by the decrease in running performance by the approximately same amount and vice versa. The reason for the same could be a larger amount of muscles can produce more strength for movement.

Recommendation

1. The same type of study can be conducted with different age group.
2. The same type study can be conducted selecting girls as a subject for the study.
3. The same type of study can be conducted selecting players of specific sports.
4. Similar study can be conducted selecting other specific component highly related with running performance.
5. Similar study can be conducted considering distance running performance.

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