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**Research Papers**

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**TO PREDICT THE PERFORMANCE ABILITY OF SPRINTERS IN  
RELATION TO SELECTED PHYSIOLOGICAL VARIABLES****Dr. Baiju Abraham**

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**Abstract**

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*The purpose of this study was to predict the performance ability of sprinters in relation to selected physiological variables. Twenty male athletes aged between 14-18 years were selected from Sports Authority of India (SAI) Lucknow. To find out the Physiological variables to the athletic performance correlations, multiple correlation and regression analysis statistical technique were employed. The result of the study showed significant difference except in Resting pulse rate, Negative breath holding time, Body composition, Systolic blood pressure, Diastolic blood pressure, Respiratory rate and Maximum expiratory pressure.*

The physiological variables namely Positive breath holding time are significantly related to 100mtrs sprint performance. The multiple linear regression equations developed in the study for independent variables are physiological variables which have shown significant relationship to 100mtrs sprint performance are positive breath holding time can be effectively used for prediction of 100mtrs sprint performance.

**Key words:-**Sprinters and Physiological variables

According to Adolph (1974) although the number of components that they suffer displacement during a bout off exercise be large, they are evidently linked with one another in a pattern of inter locking controls. For examples, pulmonary ventilation, frequency of heartbeat and rise of blood pressure are each a part of exercise syndrome. Each environment and surface in a component may be regarded as a strain to which the physiological body subjected.

Mann (1983) examined the application of modern science and technology to sports is an effort to analyze and improve performance and is not a new idea. These efforts command little attention until a number of small innovates countries begin to organize program dedicated to the scientific development of Olympic athletes. The world of sports then became intrigued with the sports sciences area of bio-mechanics, physiology, sports sciences and sports psychology and the application of practical methods including carbohydrates loading, blood doping, slow analysis, attitude training, relaxation technique and numerous others. There was a sudden realization that sports sciences offered the key to athlete domination.

**OBJECTIVE OF THE STUDY:-**

The purpose of the study was to predict the performance ability of sprinters in relation to selected physiological variables. It was hypothesized that there may not be significant relationship between the performance ability of sprinters and physiological variables.

**PROCEDURE AND METHODOLOGY:-**

Twenty male athletes aged between 14-18 years were selected for this study. These subjects were selected from Sports Authority of India (SAI) Lucknow. The following physiological variables such as Resting pulse rate, Positive breath holding time, Negative breath holding time, Body composition, Systolic blood pressure, Diastolic blood pressure, Respiratory rate and Maximum expiratory pressure were selected. The necessary data was collected by administering various tests for the chosen variables. The time chosen for assessing the performance ability was administered in the Athletic ground of Sports Authority of India (SAI). To find out the physiological variables to the athletic performance, following statistical technique were employed: Reliabilities, correlations, multiple correlations and regression analysis.

**RESULTS OF THE STUDY:-**

**Table-01:-** Descriptive Analysis of Physiological Variables with 100mtrs Sprint Performance of Sprinters

Variables	Mean	S.D	Min	Max
Resting pulse rate	60.00	4.32	54.00	66.00
Positive breath holding time	50.25	5.65	39.00	59.00
Negative breath holding time	29.65	4.92	20.00	38.00
Body composition	11.39	2.14	7.80	14.70
Systolic blood pressure	111.60	3.77	104.00	117.00
Diastolic blood pressure	75.50	2.60	72.00	80.00
Respiratory rate	160.60	7.37	150.00	172.00
Maximum expiratory pressure	3.78	0.44	3.10	4.60

Table-01 shows Descriptive analysis of Physiological variables (Mean, S.D, Minimum and Maximum) with 100mtrs sprint performance of sprinters. Mean and S.D of physiological variables are 60.00 and 4.32; 50.25 and 5.65; 29.65 and 4.92; 11.39 and 2.14; 111.60 and 3.77; 75.50 and 2.60; 160.60 and 7.37; 3.78 and 0.44 respectively.

**Table-02:-** Relationship of Physiological Variables with 100mtrs Sprint Performance of Sprinters

Variables	Coefficient of Correlation 'r'
Resting pulse rate	0.165
Positive breath holding time	-0.501*
Negative breath holding time	-0.002
Body composition	-0.132
Systolic blood pressure	-0.116
Diastolic blood pressure	-0.234
Respiratory rate	-0.373
Maximum expiratory pressure	-0.285

From Table-02 it is clear that one physiological variables have significant relationship with 100mtrs sprint performance. They are positive breath holding time (-0.501). In respect to other physiological variables (resting pulse rate, negative breath holding time, body composition, systolic blood pressure, diastolic blood pressure, respiratory rate and maximum expiratory pressure) the relationship with 100mtrs sprint performance is not found to be statistically significant at 0.05 level as they are below tabulated value i.e.0.444.

The relationship of physiological variables and 100mtrs sprint performance (positive breath holding time) is graphically presented in figure:-

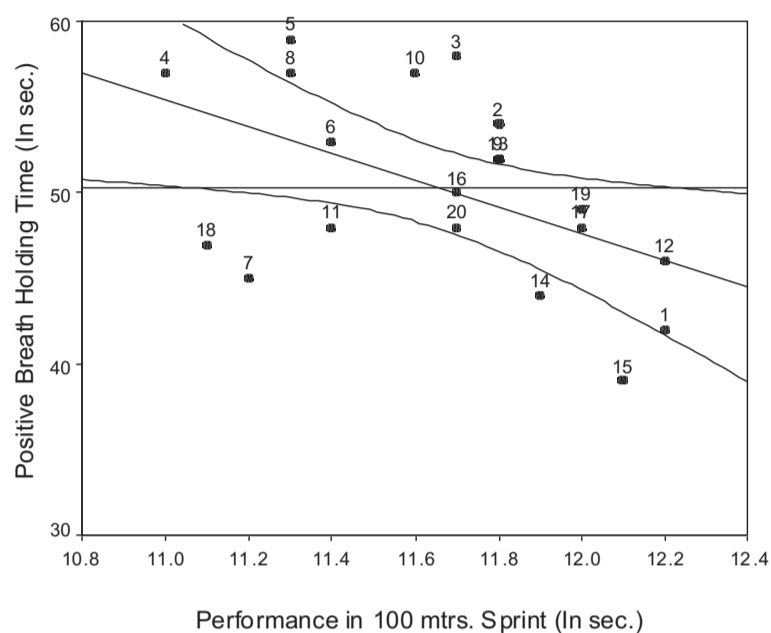


Fig. 01: Linear regression and relationship between Positive breath holding time and Sprint (100 meters).

**Table-03:-** Combined Contribution of Physiological Variables with 100mtrs Sprint Performance of Sprinters

Multiple Variables	Coefficient of Variables	Criterion		Independent
		Correlation	Multiple Correlation	
100mtrs Sprint	Positive breath holding time	(25)	Rc. (25)	0.960*

\*Significant at 0.05 level of confidence

Table-03 has disclosed that the combined contribution of physiological variables of 100mtrs sprint performance are Positive breath holding time (25); is significantly at 0.05 level of confidence as the computed value of 0.960\* (Rc.(25)) for multiple correlation was more than the value of 0.444 required for the multiple correlation coefficient to be significant at 0.05 level of significant with 18 degree of freedom. From the obtained value of multiple correlations it can be deduced that all the above variables taken together contribute to 100mtrs sprint performance.

**Table-04:-** Linear Regression Equations of Physiological Variables with 100mtrs Sprint Performance of Sprinters

1.  $y = 13.27 + 0.03$  (positive breath holding time)

Where y = Criterion Variables i.e. 100mtrs sprint performance  
Multiple Linear Regression Analysis

The Multiple Linear Regression Analysis in order to predict 100mtrs sprint performance.  
For 100 meter Sprint Performance

$Y = 4.283$  (constant)  $- 0.012$  (positive breath holding time).

The result of the study revealed that there is a significant relationship between positive breath holding time and 100mtrs sprint performance.

As a whole, the physiological variables which have shown high relationship i.e (positive breath holding time) with 100 meters sprint performance. The insignificant coefficient of correlation or low correlation ((resting pulse rate, negative breath holding time, body composition, systolic blood pressure, diastolic

blood pressure, respiratory rate and maximum expiratory pressure) shown by the variables does not mean that those variables are not contributing to the performance may be due to the small sample size.

#### **DISCUSSION OF HYPOTHESIS:-**

It was hypothesized at the beginning of the study that there may not be significant relationship between performance of sprinters and physiological variables. The result of the study showed significant difference except (resting pulse rate, negative breath holding time, body composition, systolic blood pressure, diastolic blood pressure, respiratory rate and maximum expiratory pressure) and the hypothesis is rejected. However positive breath holding time variables are found significantly related and hence the hypothesis is accepted.

#### **CONCLUSIONS:-**

1. The physiological variables namely and positive breath holding time are significant related to 100mtrs sprint performance.
2. The physiological variables namely resting pulse rate, negative breath holding time, body composition, systolic blood pressure, diastolic blood pressure, respiratory rate and maximum expiratory pressure are not found to be significantly related to 100mtrs sprint performance.
3. The multiple linear regression equations developed in the study for independent variables are physiological variables which have shown significant relationship to 100mtrs sprint performance are positive breath holding time can be effectively used for prediction of 100mtrs sprint performance.

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