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## Relationship of distance running ability and cardiorespiratory endurance among school boys

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### Abstract

Endurance in sports is usually looked upon as the ability of an athlete to tolerate fatigue. This ability corresponds largely with the effective functions of heart and lungs. The higher capacity to deliver and utilize oxygen indicates a more efficient cardio respiratory system; therefore it is essential to prolonged vigorous exercise. The purpose of the study was to examine the relationship of distance running ability and cardiorespiratory endurance among school boys. To achieve this purpose, forty students were randomly selected as subjects who were from the school at age between 13 to 14 years. Cardiorespiratory endurance was measured using Harvard step test, and running ability was measured by 4min, 8min, 12min continuous run. The study was formulated by static group design and statistically analyzed by the Pearson's product correlation Scatter gram method. The 'r' was statistically tested for significance at the level of 0.05 level of confidence. The obtained correlation values 0.94, 0.91 and 0.91 are higher than the required value for significance at 0.05 level is 0.304. The result reveals that there is a significant relationship existed between distance running ability and cardiorespiratory endurance among school boys. In graphical method, a linear regression line was used for analyzing the relationship of distance running ability and cardio respiratory endurance. It also appeared that the longer the running distance, the higher its degree of relationship of Physical Efficiency Index.

**Keywords:** Endurance, cardiorespiratory endurance, distance running ability, fatigue

### 1. Introduction

All the sports activities depends motor qualities such as speed, flexibility, endurance, agility and coordination with respect to the nature of the activity.

In everyday language the term Endurance is used to describe an ability of an object or an individual ability to tolerate circumstances that are less than pleasant. In sports to sustain some form of physical activity.

Endurance can generally define as the ability of the body to resist fatigue. However, in athletic events requiring great endurance, the main limitation is the ability of the circulatory system to supply oxygen to the working muscles and to keep the muscle cells free from the waste product.

Endurance can be divided into two kinds, namely muscular endurance and cardio-respiratory endurance. Muscular endurance which is characterized by contraction of large muscle groups for relatively long period of time. Cardio-respiratory endurance is the ability of heart and lungs to absorb transport and utilize oxygen over extended period of time during physical exertion.

Cardio-respiratory fitness, it is measure of an efficient heart and lung system and can only developed by exercise which involves the heart and lungs and their capacity to supply oxygen to the working area to withstand oxygen debt, whereas local endurance concern fatigue is one particular set of working muscles.

Cardio-respiratory endurance is the basic component of physical fitness. Many sports activities required a high standard of cardio-respiratory endurance capacity. Jogging and distance running are demand high level of cardiorespiratory endurance.

Cardiorespiratory function is based on the joint effort produced by circulatory and respiratory system. The more efficient of the cardio-respiratory function the longer, will be the person able to sustain work. It is regarded as most important of all the basic components of health and performance related sports activity, because of the benefit which is derived from improved cardio-respiratory function, such as potential. It has for preventing circulatory and respiratory disease, improving work capacity and providing greater distance from fatigue.

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Continuous running is fundamental for so many sports, and can be referred as the base of the pyramid. Regular training of this kind makes the lungs work more effectively, allowing more air to reach blood. It also increases the capacity of the blood to carry oxygen and deliver it to the muscles.

The physiologists agree that the main limitation in most endurance performance is the supply of oxygen to the working muscles. The cardio-respiratory system is directly responsible for supplying oxygen to the tissues and removes carbon dioxide and other waste product. Therefore cardio-respiratory endurance is essential for vigorous activity.

During prolonged exercise, a fit individual with high level of cardiorespiratory endurance is able to deliver the required amount of oxygen to the tissues easily. But, unfit individual has to work the cardiorespiratory system much harder, the heart has to work at a higher rate, less oxygen is delivered to the tissues, and the individual fatigues faster. The higher capacity to deliver and utilize oxygen indicates a more efficient cardio respiratory system; therefore it is essential to prolonged vigorous exercise.

In the field of physical education and sports a number of test are commonly being used for measuring one's fitness. An attempt has been made to validate endurance running test of varying distance as predictors of higher cardiorespiratory endurance.

**2. Materials and Methods**

The purpose of this study was to determine the relationship of distance running ability and cardio-respiratory endurance among school boys. To achieve this purpose of the study, forty students were selected as subjects who were from V.S. Sengottai Memorial High School at age between 13 to 14 years. The study was formulated by static group design. Cardio-respiratory endurance was measured by using Harvard step test and distance running ability was measured by 4min, 8min and 12min running.

Stop watches, measuring tape and 18 inch bench are used in this study. The subjects were oriented to the procedure of taking test and making measurement before the actual collection of data. The data collected on distance running and cardiorespiratory endurance was statistically analyzed by the products movement correlation method. The test of significance was fixed at 0.05 level of confidence. The obtained 'r' was statistically tested for significance at the level of confidence. The scattergram was prepared by representing the physical efficiency Index on the X axis and distance running performance representing on the y axis and the co-efficient of correlation was calculated. The value of 'r'

required to be significant at 0.05 level with 38 df was 0.304.

**3. Results & Discussion**

The mean, standard deviation and range values for the performance results of the subjects are presented in Table-1. The correlation between Physical Efficiency Index and Distance running ability are presented in Table – 2 and fig – 1. The Table - 2 reveals that there is a significant relationship existed between distance running ability and cardio-respiratory endurance among school boys. The obtained correlation values 0.94, 0.91 and 0.91 are higher than the required table value for significance at 0.05 level is 0.304. From the results it is clear a significant relationship existed between distance running ability and cardio-respiratory endurance among school boys.

In fig – 1 the nature of regression line in 4 min, 8 min, and 12min are almost equal liner and observed very sharp. Analyzing the regression lines, it also appeared that the longer the running distance the higher its degree of relationship of Physical Efficiency Index. From the analysis of regression lines it was evident that there was a significant relationship between distance running and cardio-respiratory endurance of high school boys.

**3.1 Tables and Figures**

**Table 1:** Description on selected Data in Cardio-respiratory Endurance and Physical Efficiency Index

Variables	Mean	S.D.	Range
Cardio-respiratory Endurance			
Distance covered in 4 min (mts)	677.63	59.86	588-816
Distance covered in 8 min (mts)	1013.25	89.75	806-1213
Distance covered in 12 min (mts)	1557	109.86	1398-1822
Physical Efficiency Index	109.75	8.40	94.04-133.04

Performance results of the subject (N=40)

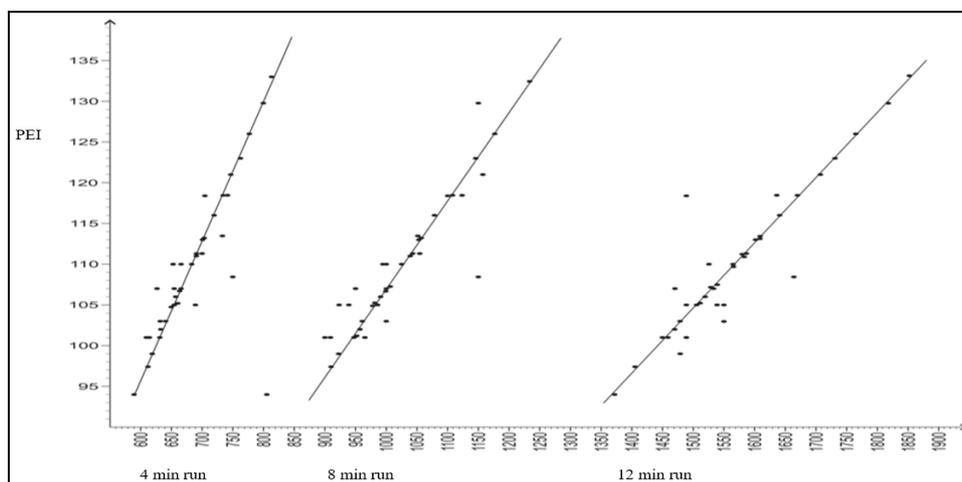
**Table 2:** Product Movement correlation coefficient on Physical Efficiency Index and Distance Running

Distance Running	Product Moment Correlation coefficient 'r'
4 min	0.94*
8 min	0.91*
12 min	0.91*

Number = 40

\*Significant at 0.05 level of confidence

The value 'r' required to be significant at 0.05 level with 38 df was 0.304.



**Fig 1:** Linear correlation between physical efficiency index and 4 min, 8 min and 12 min run

#### **4. Conclusion**

From the results for the study it was concluded that there was a significant correlation 'r' existing between distance running ability and cardio-respiratory endurance.

This study confirmed that cardio-respiratory endurance was an advantageous factor in distance running events.

It may be mentioned that continuous running ability at various distance is a good indicator of cardio respiratory endurance.

#### **5. Reference**

1. Astrand PO, Rodahl K. Text Book of Work Physiology, Mac Graw- Hill Book Company, 1970, 121.
2. Bucher, Charles A, Deborah A Wuest. Foundation of Physical Education and Sports, St. Louis: Times Mirror Mosby College Publishing, 1987, 147.
3. Barrow, Rober M, Rose Mary McGee. A Practical Approach to Measurement in Physical Education, Philadelphia: Lea and Febiger, 1979, 113.
4. Marley, William P. Health and Physical Fitness, Philadelphia: Saunders College Publishing, 1972, 6.
5. Uppal AK. Foundation of Physical Education, Baroda: Friends Publications, 1994, 12.
6. Watson AWS. Physical Fitness and Athletic Performance, New York: Longman Publishing, 1983, 23.