

A CRITICAL STUDY OF CARDIO-PULMONART INDEX AND PHYSICAL EFFICENCY INDEX OF SOCCER AND HOCKEY PLAYERS

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Abstract:

The purpose of the study was to find out the difference in Cardio- Pulmonary Index and Physical Efficiency Index between the players of Soccer and Hockey. The objective of the study was to determine the relationship between Cardio Pulmonary Index and Physical Efficiency Index of Soccer and Hockey players. The data pertaining to this study were collected on twenty players from each game of Degree College of Physical Education, Amravati by administering the test items of Hymen's Cardio- Pulmonary Index and Harvard Step test. Mean Difference method (t-test) was used to find out the difference in C.P.I. and P.E.I. of Soccer and Hockey players. The data were further tested with Pearson's Product Moment Correlation method to establish the relationship in between C.P.I. and P.E.I. of Soccer and Hockey players. The result of the study revealed that there were no significant difference in C.P.I. ($t=0.021$) and P.E.I. ($t=1.37$) between the players of Soccer and Hockey at 0.05 level of confidence. The insignificant difference might have occurred due to the nature of activities of selected games are very similar. The result was farther disclosed that C.P.I. was found to significant relationship with P.E.I. of Soccer ($r=0.857$) as well as Hockey players (0.843), it might be attributed to the fact that both the Indexes are solely depended on the efficiency of Heart, Blood Vessels and Lungs of the individual.

Keywords: Cardio-Pulmonary Index, Physical Efficiency Index, Soccer and Hockey.

Introduction:

Cardio-Pulmonary Index and Harvard step test both measure the cardio vascular efficiency. And it is common belief that Soccer & Hockey all demand cardio vascular efficiency with varying degrees, but it becomes difficult to determine which particular game and sports requires what amount of cardiovascular efficiency and their relationship. The circulatory system otherwise known as the cardiovascular system is a closed system. Cardiac means, pertaining to the heart and vascular refer to 'the vessels that contain fluid'. All the cells of the body depend upon the cardiovascular system to carry to them such vital substances as oxygen and the products of digestion and to remove carbon dioxide from them. The circulatory system itself is of importance to the functioning of the body as a whole. The blood is pumped by heart through arteries to the various part of the body.

The heart, a little organ, creates the blood pressure. The pressure will be maximum or minimum and accordingly systolic and diastolic pressures are maintained at the level depending upon the environment and bodily conditions. To everyday life, the blood pressure and pulse rate are variable according to the deter minds that one makes on his body and brain. Factors upon which the bloodpressur depends are pumping action of the heart; the peripheral resistance offered to the outflow of blood from arteries which very elasticity, vasoconstriction and the volume of the circulatory blood

The word Physical refers to the body. It often used in regard to various bodily characteristics such as physical strength. Physical development, physical powers, physical health, and physical appearance. It refers to the body contrasted to the mind. Therefore, when the word education is added to the word physical it becomes physical education. It refers to the process of education that concerns with activities that develop and maintain the human body.

Physical Education has long been concerned with the measurement of cardio-vascular endurance. This form of endurance involves the continued activity of the entire organism, during which major adjustments of the circulatory and respiratory systems are necessary as in Running for long duration, playing Soccer and Hockey etc. Here, endurance is not dependent upon the strength of the muscles involved in the activity but must rely greatly on the effective functioning of the circulatory and respiratory systems. The cardio-respiratory endurance refers to the ability to carry work load for relatively prolonged period. It has very significant value in various games and sports, especially in long distance running in track and field, basketball, Soccer, Hockey and other vigorous and long duration game.

The ability to continue in certain physical activities such as Soccer and Hockey, Distance running, Swimming and Cycling are basically dependent upon the capacity of the heart and also on the circulatory system of blood to distribute working muscles. The Respiratory system must provide oxygen to make its way from environmental air to the blood. In addition chemical waste products must be removed by the blood and brought to special organs in order to be excreted or changed chemically. The greater the intensity of exercise the greater is the demand upon the circulatory and respiratory systems. In fact, in some activities, circulatory and respiratory efficiency determines performance quality to a much greater extent than muscle strength.

Statement of the Problem:

“A Critical Study of Cardio-Pulmonary Index and Physical Efficiency Index of Soccer and Hockey Players”

Significance of the Study:

- The result of this study would help to know the status of the Cardio-Pulmonary Index as well as Physical Efficiency Index of the Soccer and Hockey players.
- This study would highlight the differences if exist in cardiovascular efficiency of the Soccer and Hockey players.
- A sound training programme could be developed for the player belonging to same nature of sports.

Hypothesis:

On the basis of literature, discussion with the experts and schools own understanding it was hypothesized that-

- There might be difference in the selected variables (CPI and PEI) between the players of Soccer and Hockey.
- There might be significant relationship in between Cardio-Pulmonary and Physical Efficiency Index.

Delimitations:

- 20 players each from both the games were selected.
- Only male players were selected from the Soccer and Hockey games for the study.

- The age of the players were being ranging from 18 to 25 years.

Limitations:

- The diet, health habit, style of the daily living, and cultural background of the subjects taken for the present study on which the scholar had no control over them, which might be influencing the result of the study.
- The coaching and physical education background of the players was unknown.
- No motivational technique was adopted while collecting the data might be influencing the result of this study

Method of study:

This chapter includes the information regarding Sources of Data, Selection of Variables, Criterion Measures, Selection of test, Description of the Test and Collection of data are described.

For the purpose of these study twenty players from each game of soccer and hockey team from Degree College of Physical Education, Amravati were be selected as subject. The age of the subjects was ranging from 18 to 25 years.

Selection of Test:

The Hyman's Cardio Pulmonary Index and Harvard Step Test for P.E.I. were employed to measure the efficiency of the Cardio- Pulmonary System based on the formula derived by Hyman.

$$C. P. I. = \frac{V.C.+M.E.P+M.B.H+Age}{S.P.+D.P.+P.R.}$$

Physical Efficiency Index:

$$P.E.I = \frac{\text{Duration of exercise period in seconds} \times 100}{2 \times \text{sum of threepuls counts after exercise}}$$

Analysis and interpretation of data:

The data were examined by employing Mean Difference method (t ratio) to out significant difference if any, between the Soccer and Hockey players in Cardio-Pulmonary Index as well as Physical Efficiency Index. The data were further treated with Pearson's Product Moment Correlation method to establish the relationship in between Cardio-Pulmonary Index and Physical Efficiency Index of both Soccer and Hockey Players. To test the hypothesis, the level of significance was chosen at 0.05 level of confidence, which was considered adequate and reliable for the purpose of this study.

The significance of difference between the means of Soccer and Hockey players in Cardio-Pulmonary index and Physical Efficiency Index has been presented in the Table 1 and 2 independently.

Table – 1

Difference between the Means of Soccer and Hockey Players in Cardio- pulmonary Index

Group	Mean	Standard Deviation	Mean Difference	Standard Error of Mean	t-ratio
Soccer	0.916	0.153	0.057	0.047	0.21@
Hockey	0.859	0.148			

@ Not significant at 0.05level of confidence.

Tabulated $t_{.05(38)}=2.025$

Table – 2

Comparison of Means of Soccer and Hockey Players in Physical Efficiency Index

Group	Mean	Standard Deviation	Mean Difference	Standard Error of Mean	t-ratio
Soccer	87.432	7.487	3.293	2.39	1.37@
Hockey	84.139	7.656			

@ Not significant at 0.05level of confidence.

Tabulated $t_{.05(38)}=2.025$

The findings of table 1 and 2 revealed that there were no significant mean differences in Cardio-Pulmonary Index and Physical Efficiency Index of Soccer and Hockey Players.

Table -3

Relationship of Cardio-Pulmonary Index and Physical Efficiency Index of Soccer and Hockey Players

Variables Correlated	Co-efficient (r- value)
Cardio-Pulmonary Index and Physical Efficiency Index of Soccer Players	0.857*
Cardio-Pulmonary Index and Physical Efficiency Index of Hockey Players	0.843*

*Significant relationship at 0.05 level of confidence.

Tabulated $r_{.05(18)}=0.444$

An examination of Table-3 indicates that Cardio Pulmonary Index is found to be significant relationship with physical efficiency index in the case of Soccer as well as Hockey players. As the calculated r-value of .857 and .843 are greater than the tabulated r-value of .444 at .05 level, hence, statistically there are significant relationship in between these two independent variables.

Discussion of Findings :

The findings of Table 1 and 2 revealed that there were no significant mean differences in Cardio- Pulmonary Index and Physical Efficiency Index of Soccer and Hockey players, it may be attributed to the fact that both the selected games are very much similar in nature as per as basic movements are concerned except the total duration of the game. The duration of Soccer games is normally of Ninety minutes where as Hockey is of Seventy minutes, during this stipulated period of play every players have to have excellent cardio respiratory efficiency so as to optimal oxygenated blood are to be supplied to the desirable parts of the body hence a good performance is exhibited by the player. The mean values of Soccer players in Cardio Pulmonary Index and Physical efficiency Index are 0.916 and 87.432 respectively are greater than the mean value of 0.859 and 84.139 for the Cardio pulmonary Index and Physical Efficient Index of Hockey players. It might be due to difference of the duration of game.

The findings of Table – 3 indicated that there were significant relationships in between Cardio Pulmonary Index and Physical Efficiency Index of Soccer players ($r=0.857$) and hockey players ($r=0.843$). It may be because both the indexes solely depended upon the efficiency of Heart, Blood vessels and Lungs functions. Hence, significant relations are shown in this study.

Conclusion:

- There is significant positive co-relationship in between Cardio-Pulmonary Index and Physical Efficiency Index of Soccer and Hockey players.
- There is no significant mean difference in Cardio-Pulmonary Index Physical Efficiency Index of Soccer and Hockey players.

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