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A study of Peak expiratory flow rate and Vital capacity between Indoor and Outdoor games male players

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Abstract

The present investigation was an attempt to find out the differences in Peak expiratory flow rate and Vital capacity between Indoor and Outdoor games male players. Total sixty players acted as subjects in this study (30 in each group) from Bilaspur district (C.G.). Indoor games were Badminton, Table Tennis and Boxing whereas Football, Hockey and Cricket were taken under Outdoor games. Ten players were taken from each game. The subjects were ranged from 16 to 25 years. Peak flow meter was used to measure Peak expiratory flow rate and Spirometer was used to record Vital capacity for collecting the data from the subjects. To find out the differences in Peak expiratory flow rate and Vital capacity between the groups (Indoor and Outdoor games Players) independent t-test was applied. After analyzing the data significant differences were reported between Indoor and Outdoor games Players.

Keywords: Peak expiratory flow rate, Vital capacity, Indoor games and Outdoor games

Introduction

Peak expiratory flow rate (PEFR) is the maximum flow rate generated during a forceful exhalation, starting from full lung inflation. Peak flow rate primarily reflects large airway flow and depends on the voluntary effort and muscular strength of the subjects. It measures the airflow through the bronchi of the lungs and thus the degree of obstruction in the airways. Peak flow readings are higher when we are well and lower when the airways are constricted. From changes in recorded values, we may determine lung functionality. Maximal airflow occurs during the effort-dependent portion of the expiratory maneuver, so low values may be caused by a less than maximal effort rather than by airway obstruction. In managing and keeping the records long-term daily peak flow rate monitoring may assist with measures related to the health and physical fitness. To interpret the significance of peak expiratory flow measurements, comparison is made to reference (normal, predicted) values based on measurements taken from the general population. Various reference values have been published in the literature and vary by population, ethnic group, age, sex, height and weight of the subjects. For this reason tables or charts are used to determine the normal value for a particular individual. More recently, medical calculators have been developed to calculate predicted values for peak expiratory flow. There are a number of non-equivalent scales used in the interpretation of peak expiratory flow. Some examples of reference values are given below. There is a wide natural variation in results from healthy test subjects.

Vital capacity (VC) is the greatest volume of gas that, following maximum inhalation, can be expelled during a complete, slow, forced exhalation; equal to Inspiratory capacity plus expiratory reserve volume. Factors affecting vital capacity:

- 1) Age – More in young.
- 2) Sex – 20-25% less in female.
- 3) Surface area – It is proportional to surface area.
- 4) Posture – Lying – Lowest (Pulmonary blood volume)
Sitting – More than lying
Standing – Highest
- 5) Strength of respiratory muscles - More the strength, more vital capacity such as athletes.
- 6) Disease in the lungs and pleura causes decrease vital capacity.

Vital capacity is an important index of respiratory functioning in the body. It is an index of lung function and provides useful information about abnormal ventilation due to airway

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obstruction, fibrosis of lungs, mechanical interference with chest expansion and compression and strength of respiratory muscles. More lung capacity ensures more supply of the Oxygen to the active body parts which in turn results in an enhanced physical endeavor and work force.

Peak expiratory flow rate as well as Vital capacity may vary in indoor and outdoor games players due to the diversities found in the execution along with the mechanism of both the types of the games. Indoor and Outdoor games vary in the ranges of the motion, patterns of the movements and at the front of physical and motor fitness components required for the sports performance considerably. So the researcher felt the need to and planned a comparative study in terms of peak expiratory flow rate and vital capacity between indoor and outdoor games male players.

Objectives of the Study

- To analyze and compare the peak expiratory flow rate and vial capacity of indoor and outdoor male players of age ranging from 16 to 25 years.
- To assist in developing the effective training programmes for experiencing the finest demonstration of sports excellence and nurturing the competent and outstanding sporting talents scientifically.
- To develop better understanding regarding the associated physical and motor fitness components and their responsiveness in relation to the respiratory mechanism during motor performance in different indoor and outdoor games.

Materials and Methods

Selection of subjects

Total sixty male players acted as subjects in this study (30 indoor players and 30 outdoor players) from district Bilaspur (C.G.). Indoor games were Badminton, Table Tennis and Boxing whereas Football, Hockey and Cricket were taken under Outdoor games. Ten players were taken from each game. The subjects were ranged from 16 to 25 years. All the players of different sports were engaged either in the preparation of inter-varsity competition or in regular practice

under different sports academies for various tournaments at least for two months in Bilaspur.

Selection of variables and materials

The physiological variables on which data collected were Peak expiratory flow rate and vital capacity. Peak flow meter was used to measure Peak expiratory flow rate in liter/minute and Spirometer was used to record Vital capacity in liter for collecting the data from the indoor and outdoor games male players.

Data Analysis

Statistical Analysis: For data analysis responses were expressed as mean and standard deviation. Independent ‘t’ test was performed for comparison between indoor and outdoor players, $p < 0.05$ was considered statistically significant. Data analysis was performed using SPSS 17.0 software under windows.

Results

To test the homogeneity of the variances of the groups on the selected variables, Levene’s Test was employed, is shown below in the Table 1.

Table 1: Test of Homogeneity of Variances

Variable	Levene Statistics	P-Value
Peak Expiratory Flow Rate	3.092	.084
Vital Capacity	2.267	.138

It is clearly understood from the above table that there was not any significant difference initially between the groups taken for the present study.

The statistical findings pertaining to the descriptive statistics of the male indoor and outdoor players from two groups on the selected physiological variables has been presented below. To compare peak expiratory flow rate and vital capacity between indoor and outdoor male players mean, standard deviation and ‘t’ test were computed. The findings are presented below in Table- 2.

Table 2

Variable	Group	N	Mean	Sd	‘t’ value
Pefr	Outdoor	30	410.23	31.29	2.695*
	Indoor	30	384.00	43.16	
Vital Capacity	Outdoor	30	4.2230	0.38131	2.550*
	Indoor	30	3.9883	0.32962	

*Significant at .05 level of significance

Table-2 above indicated that the means of the peak expiratory flow rate of outdoor and indoor games male players have been reported 410.23, 384.00 and standard deviation 31.29, 43.16 respectively. The obtained ‘t’ value was 2.695 which is greater than the tabulated value that reveals to be significant at 0.05 level of significance. Similarly vital capacity of outdoor and indoor games male players have been reported 4.2230, 3.9883 and standard deviation 0.38131, 0.32962 respectively. The obtained ‘t’ value was reported 2.550 which is also greater than the tabulated value that again reveals to be significant at 0.05 level of significance.

Comparing the means of two groups with critical difference it is evident that peak expiratory flow rate and vital capacity of outdoor games male players is significantly greater than the indoor games male players at 0.05 level of significance.

Discussion

The results of the study indicated that there was significant difference in peak expiratory flow rate and vital capacity between indoor and outdoor games male players. Indoor and outdoor games vary widely in terms of range of motion, continuity, movement patterns and physical and motor fitness components required to perform. In the present study peak expiratory flow rate and vital capacity were found slightly higher in outdoor games male players which may be attributed to the duration, intensity and nature of the outdoor games. In outdoor games the players have to perform continuously as running rigorously, changing positions rapidly for a prolonged period in a comparatively larger field of play which requires more amount of oxygen and high level of respiratory functioning. The outdoor games players’ regular participation conditioned demand and supply factor and later facilitated and

moulded their respiratory system to function efficiently to meet the challenges. Therefore a significant increment was observed in peak expiratory flow rate and vital capacity during the study.

Indoor games are performed with small ranged movements frequently with small intervals (at the time of service change) in a comparatively restricted and small field of play that causes discontinuous execution of skills and left with enough scope to recover from the exhaustion and therefore the demand of oxygen decreases considerably. Outdoor games players respiratory functioning was found more compatible to the rigorous, high intensity and prolonged duration activities which enabled their respiratory mechanism to function at higher level and their respiratory variables were observed in a better state than indoor games players.

Conclusion

In the light of the findings and limitations of the present study, it may be concluded that outdoor games male players' peak expiratory flow rate and vital capacity were significantly higher than indoor games players. Further the researcher also felt that there was enough scope for a detailed investigation to explore results thoroughly.

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