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ORIGINAL ARTICLE

COMPARISON OF SELECTED RESPIRATORY FUNCTION VARIABLES OF ATHLETES ENGAGED IN INDIVIDUAL SPORTS AND TEAM SPORTS

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Abstract:

The purpose of the study was to compare the respiratory function variables of athletes engaged in individual sports and team sports. The present study was conducted on a sample of sixty (N=60) male athletes, which includes thirty each, individual sports (N_1=30, mean ± SD: age 21.13 ± 1.43 years, height 176.43 ± 5.11 cm, weight 67.87 ± 6.03 kg, BMI 21.70 ± 1.61) and team sports (N_2=30, mean ± SD: age 20.50 ± 1.96 years, height 178.90 ± 6.29 cm, weight 71.03 ± 7.95 kg, BMI 22.14 ± 1.61) athletes who participated in inter-college competitions of Guru Nanak Dev University, Amritsar, Punjab, India. All the participants were informed about the aim and methodology of the study and they volunteered to participate in this study. All the participants were assessed for height, weight and selected pulmonary function variables. The height of the subjects was measured with anthropometric rod to the nearest 0.5 cm. The weight of subjects was measured by using portable weighing machine to the nearest 0.5 kg. Respiratory function variables i.e. vital capacity, forced vital capacity and maximum voluntary ventilation, were measured with "Med-Spiror" a computerized spirometer. The independent samples t-test was applied to assess the differences between individual sports and team sports athletes. The level of significance was set at 0.05. The results of present study revealed significant differences between individual sports and team sports athletes with regard to vital capacity (p? 0.05), forced vital capacity (p? 0.05) and maximum voluntary ventilation (p? 0.05) respectively. While comparing the means, it revealed that team sports athletes had significantly better vital capacity (VC), forced vital capacity (FVC) and maximum voluntary ventilation (MVV) respectively than individual sports athletes.

KEY WORDS:

Individual sports, team sports, vital capacity, forced vital capacity, maximum voluntary ventilation.

INTRODUCTION

Respiratory system is an important system of human body where gaseous exchange takes place with diffusion of enormous amounts of oxygen into the blood during physical activity (Khurana, 2005). Respiratory function values are influenced by race, age, sex, height, weight, physical activity, as well as environmental, genetic, socioeconomic and technical parameters (Woolcock et al., 1972; Budhiraja et al., 2010). From a physiological point of view, the respiratory function test, like other physiological tests must be of the utmost importance for measuring the fitness of an athlete (Astrand & Rodahl, 1970). Physically fit athletes possess superior respiratory functions relative to less fit subjects (Johnson et al., 1981; Johnson et

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al., 1991). Respiratory function parameters tend to have a relationship with lifestyle such as regular exercise and non- exercise (Wasserman et al., 1995; Twisk et al., 1998). Due to regular exercise, athletes tend to have an increase in respiratory capacity, especially when the exercise is strenuous (Adegoke & Arogundade, 2002). Less strenuous physical training may not perhaps lead to much significant improvement in the respiratory functions (Lakhera et al., 1984). It is suggested that the respiratory functions depend on genetic (age, gender, height) and non-genetic (level of training) factors in terms of performance and that the genetic factors have an effect of 47%, and in the case of non-genetic factors, an effect of 53% (Bouchard et al., 1997). Respiratory function tests provide qualitative and quantitative evaluation of respiratory functions (Belman & Mittman, 1980; Robinson & Kjeldqard, 1982). Therefore, the purpose of this study was to compare the selected respiratory function variable between individual sports and team sports athletes.

MATERIAL AND METHODS

Subjects:

A sample of sixty (N=60) male athletes, which includes thirty each, individual sports (N_1=30, mean ± SD: age 21.13 ± 1.43 years, height 176.43 ± 5.11 cm, weight 67.87 ± 6.03 kg, BMI 21.70 ± 1.61) and team sports (N_2=30, mean ± SD: age 20.50 ± 1.96 years, height 178.90 ± 6.29 cm, weight 71.03 ± 7.95 kg, BMI 22.14 ± 1.61) athletes who participated in inter-college competitions of Guru Nanak Dev University, Amritsar, Punjab, India, was selected. All the participants were informed about the aim and methodology of the study and they volunteered to participate in this study. The purposive sampling technique was used to select the subjects.

METHODOLOGY:

Height and Weight:

Height measurements were taken by using the standard anthropometric rod (HG-72, Nexgen ergonomics, Canada) to the nearest 0.5 cm. Full attention was given to make sure that players' body was fully upright and their mandible was parallel to the ground. Taken values recorded in 'cm'. The subject's weight was measured with portable weighing machine to the nearest 0.5 kg. During measurements players were on bare feet and wearing underwear only. Measurements recorded in 'kg'.

Body Mass Index (BMI):

BMI was calculated by the formula of; Body Mass Index = Weight/Height^2.

Measurements of Respiratory Functions:

Respiratory functions were measured with a computerized spirometer "Med-Spiror" following the procedures and predicted values recommended by the American Thoracic Society. Before recording the respiratory function tests, subjects were shown a demonstration of the tests. Consequently, a minimum of three readings were recorded for each test of every subject and the best of the three was considered for having reproducibility and validity of the recorded test. The selected respiratory variables i.e. Vital capacity (VC), Forced vital capacity (FVC) and Maximum voluntary ventilation (MVV) were taken into consideration for this study.

Statistical Analyses:

Values are presented as mean values and SD. Independent samples t- test was used to test if population means estimated by two independent samples differed significantly. Data was analyzed using SPSS Version 16.0 (Statistical Package for the Social Sciences, version 16.0, SPSS Inc, Chicago, IL, USA).

RESULTS

Table-1. Demographic Characteristics of male athletes of Individual Sports and Team Sports.

Sports Group	Age (yrs)		Height (cm)		Weight (Kg)		BMI	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Individual Sports	21.13	1.43	176.43	5.11	67.87	6.03	21.70	1.61
Team Sports	20.50	1.96	178.90	6.29	71.03	7.95	22.14	1.61

Table-1: shows the demographic characteristics of male individual sports and team sports athletes. The mean age of individual sports athletes was 21.13 years and team sports athletes was 20.50 years. The mean height of individual sports athletes was 176.43cm and team sports athletes was 178.90cm. The mean weight of individual sports athletes was 67.87 kg and team sports athletes was 71.03 kg. The mean BMI value of individual sports athletes was 21.70 and team sports athletes was 22.14.

Table-2. Respiratory Function Variables of male athletes of Individual Sports and Team Sports.

VARIABLES	Individual Sports (N_1 = 30)		Team Sports (N_2 = 30)		Mean Difference	SEDM	t-value	Sig.
	Mean	*SD*	*Mean*	*SD*				
Vital Capacity (VC)	4.24	0.42	5.34	0.49	1.10	0.12	**9.42***	0.00
Forced Vital Capacity (FVC)	5.53	0.24	5.73	0.19	0.20	0.06	**3.62***	0.00
Maximum Voluntary Ventilation (MVV)	142.00	5.94	146.42	2.25	4.42	1.16	**3.81***	0.00

*Significant at 0.05 level $t_{.05}(58) = 1.671$

Table 2 presents the respiratory function variables of athletes engaged in individual and team sports. It is evident from the results that significant differences were found between individual sports and team sports athletes with regard to vital capacity ($p < 0.05$), forced vital capacity ($p < 0.05$) and maximum voluntary ventilation ($p < 0.05$) respectively. While comparing the means, it revealed that team sports athletes had significantly better vital capacity (VC), forced vital capacity (FVC) and maximum voluntary ventilation (MVV) respectively than individual sports athletes.

DISCUSSION

In the present study respiratory functions of male individual sports and team sports athletes have been evaluated and compared with each other. This study indicates the existence of differences between male individual sports and team sports athletes with regard to respiratory function variables i.e. vital capacity (VC), forced vital capacity (FVC) and maximum voluntary ventilation (MVV) respectively. The demographic characteristics of male individual sports and team sports athletes showed that team sports athletes were taller and heavier as compared to individual sports athletes. It is evident from the results that significant differences were found between individual sports and team sports athletes with regard to vital capacity, forced vital capacity and maximum voluntary ventilation respectively. While comparing the means, it revealed that team sports athletes had significantly better vital capacity (VC), forced vital capacity (FVC) and maximum voluntary ventilation (MVV) respectively than individual sports athletes. This difference may be due to lower level of physical fitness in individual athletes as compare to team game athletes. It is suggested that physically fit athletes possess superior respiratory functions relative to less fit subjects (Johnson et al., 1981; Johnson et al., 1991). The findings of the present study supported by the study of Holmen et al. (2002). They performed a study on non-smokers in athletes who were 13-19 years old, and they determined that athletes engaged with team sports like football, volleyball, basketball and handball had higher respiratory values in compare to individual sports i.e. swimmers, long-distance runners and skiers. Percival et al. (1982) concluded that every individual has different level of fitness, which may change from time to time, it may also change from place to place and sometimes it may changes with work

or situation also. The results of present study do not agree with the study of Saini (1996). He undertook a study. No significant difference was found between athletes of individual and team sports in kinesthetic perception and differentiation ability.

CONCLUSION

Significant differences were found between male individual sports and team sports athletes with regard to respiratory function variables. On average, the male team sports athletes were taller and heavier as compared to individual sports athletes. The team sports athletes had significantly better vital capacity (VC), forced vital capacity (FVC) and maximum voluntary ventilation (MVV) respectively than individual sports athletes.

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