ORIGINAL RESEARCH PAPER

Health Education

SPORTS SPECIFIC EFFECT ON VITAL CAPACITY IN SPORTSMEN AND NON SPORTSMEN.

KEY WORDS: Vital Capacity; Athletes; Sports; Respiratory function tests.

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ABSTRACT

OBJECTIVE: The objective of this research was to analysis the Vital capacity in different types of sports and compare them with controls in order to find out which sports improve lung function the most.

METHODS: This was a cross-sectional study involving 7 different groups on which study was carried out these groups are cricket(N=35), Judo(N=25), Archery(N=25), Handball(N=25), Yoga(N=25), Football(N=25) and non sportsmen(N=120). The vital capacity (VC) was measured with Minispir ® New, Computer based Spirometer.

RESULTS: Results shows that cricketers, judokas, footballers, handballers are having better Vital Capacity (VC) as compare to the non sportsmen as there exist a significant difference between them.

CONCLUSIONS: Our results suggest that the different sport activities performed ≥16 h per week have a significant impact on respiratory profile of the individual.

INTRODUCTION

Spirometry is an excellent method of pulmonary function test, which helps in measuring the lung capacities and flow rates related to lungs. It is widely used and one of the key methods for the prevention, diagnosis, and evaluation of various respiratory impairments [1].large number of people die every year due to pulmonary diseases . These diseases may be mainly due to pollution. To predict an individual's health pulmonary function testing is used[3]. Pulmonary functions are very important as far as the health is concern and they are govern by some unknown variables which are having large range of normalcy. Physical training benefits in working capacity [2].Regular exercise decrease the rate of decline of most of the physiological functions that are often relate with health and fitness like muscle strength, aerobic capacity and flexibility [8] Pulmonary function is governed by genetic, environmental and nutritional factors and confirms that physical training during growth help in developing a greater endurance in respiratory muscles [4]. Indian athlete posses lower lung volumes as compared to American athletes due to the reason that Americans train right from the childhood.[5]

Air pollution and sedentary lifestyles has negative effect on lung functions, Due to regular exercises, athletes tend to have an increase in pulmonary capacity when compared to non-exercising individuals [4,5]. The development of pulmonary functions in an individual also depends on the type and severity of activity in which that person is engaged. Swimmers had better pulmonary functions as compare to the middle distance runners [7]. A study found that swimmers have more significant effect on pulmonary functions as compare to yoga players [6] number of researchers found that duration of exercise, its type and intensity also have effects on lung functions [9,10,11]In the present study an attempt has been made to evaluate lung functions of people with sedentary life styles and elite athletes of cricket, Judo, Archery, Handball, Yoga, and Football with the age ranging of 18-25 years. This study was designed to find out whether sportsmen have better lung functions than people with sedentary life styles; and if so, how they differ amongst themselves with respect to various spirometric variables.

METHODOLOGY:

The present study was conducted on 280 subjects belonging to different games. There are 7 different groups on which study was carried out these groups are cricket(N=35), Judo(N=25), Archery(N=25), Handball(N=25), Yoga(N=25), Football(N=25) and non sportsmen(N=120). Only those players are selected for the study who currently participated in inter university tournaments and national tournaments and are engaged in particular sports for more than 16 hours per week. The age of subjects was between 18 years to 25 years. And they are students of different universities of Haryana state. The non sportsperson group was selected from the different institutes of Haryana and those are never participated in any competition of sports.

The instrument used to measure vital capacity (VC) is **MINISPER SPIROMETER** (made in Italy). The subjects which are selected for the study are made sure that they never suffered from any disease related to lungs. And further the subjects who are suffering from any type of infections like influenza or viral fever are ruled out. Test was carried out only on the subjects who are medically fit and not suffering from any types of disease.

Minisper spirometer is a pc based instrument which measure PEFR. It consists of spirometer instrument with a detachable turbine and a disposable mouthpiece, which is connected with pc through a USB cable. When a subjects inhale and exhale air through the mouthpiece of the spirometer it measures the FVC and shows on the pc screen.

The subjects are asked to inhale and exhale in to the mouthpiece of the spirometer with full effort for 5 -6 seconds. During this it was made sure that any air does not leak through the sides of the mouthpiece to get the best results. After every single test the mouthpiece of the instrument was changed to rule out the possibility of contamination. The reusable turbine was also cleaned with antiseptic solution and alcohol. Every subject was gone through this procedure until three successful readings were taken.

Table 1.1 (ANOVA) Analysis of variance (ANOVA) For Vital Capacity (VC) Liters in the subjects of various categories

		Sum of Squares	df	Mean Square	F	Sig.
Vital Capacity (VC)	Between Groups	184.004	6	30.667	24.87**	.000
	Within Groups	336.616	273	1.233		
	Total	520.620	279			

*- significant at 0.01% level

Table 1.1 represents the Analysis of Variance for the Vital Capacity (VC) liters in the subjects of various categories has been presented. The F value is 24.87, which is more than the table value at 0.01 level of significance. As F value is significant, it indicate that there exists a significant difference within and between the all seven categories of subjects for Vital Capacity (VC) liters. Further to know the degree and direction of difference in the various groups Post Hoc test was used.

Table 1.2 Significance of difference between Mean of Non-Sports persons and players of various Sports Categories for Vital Capacity (VC)

S. No.	Categories	M1	M2	M.D.	S.D1	S.D2	Sig.
1	Non-Sportsmen v/s cricket Players	4.27	5.97	1.70*	0.93	1.07	0.00
2	Non-Sportsmen v/s judo players	4.27	5.76	1.48*	0.93	1.46	0.00
3	Non-Sportsmen v/s Archery players	4.27	4.48	0.21	0.93	.64	0.99

4	Non-Sportsmen v/s handball players	4.27	5.84	1.57*	0.93	1.07	0.00
5	Non-Sportsmen v/s yoga players	4.27	4.68	0.42	0.93	1.44	0.82
6	Non-Sportsmen v/s football players	4.27	6.35	2.07*	0.93	1.54	0.00

*- significant at 0.05% level

In the table 1.2 the mean scores for Vital Capacity (VC) for Non sportsmen and cricketers is shown. The mean value of Vital Capacity (VC) for cricketers and non sportspersons is 5.97± 1.07 and 4.27±0.93 respectively. Whereas the mean difference of both the group is 1.70.The mean of judo players is 5.76 liters. The standard deviation for judokas is 1.46 the mean difference of both the group is found to be 1.48. The mean value of Vital Capacity (VC) for football players and non sportspersons is 6.35± 1.54 and 4.27±0.93 respectively. Whereas the mean difference of both the group is 2.07. The mean value of Vital Capacity (VC) for handballers is 5.84 liters and standard deviation is 1.07 the mean difference between non sportsmen and handball players is 1.57. The table shows that there exist a significant difference between the mean values of Vital Capacity (VC) among cricketers, judokas, footballers, handballers and non sportspersons, so it is concluded that cricketers, judokas, footballers, handballers are having better Vital Capacity (VC) as compare to the non sportsmen.

The mean value of Vital Capacity (VC) for archery players is 4.48 liters with a standard deviation of 0.64 and the mean difference difference with non sportsmen is 0.21.The mean values of Vital Capacity (VC) for yoga players were 4.68 liters whereas the standard deviation was 1.44. the mean difference between non sportsmen and yoga players was 0.42. The table shows that there is no significant difference between mean values of Vital Capacity (VC) among non sportsmen archery players, and yoga players. However the yoga players are having slightly higher mean values but it is concluded that there is no difference in Vital Capacity (VC) of non sportsmen archery and yoga players.

RESULTS :

Results shows that cricketers, judokas, footballers, handballers are having better Vital Capacity (VC) as compare to the non sportsmen as there exist a significant difference between the mean values of Vital Capacity (VC) among cricketers, judokas, footballers, handballers and non sportspersons. Whereas there is no difference in Vital Capacity (VC) among non sportsmen, archery and yoga players.

DISCUSSION OF RESULTS:

These results are in support with previous reports which found that all athletes, regardless of the sport, had higher lung volumes than physically inactive persons [12,13,14,15]. Resistance training when performed with the correct repetition scheme and load can produce skeletal muscle hypertrophy, strength, or local muscle endurance. Skeletal muscle also controls many crucial elements of aerobic conditioning including lung ventilation. The diaphragm, external and internal intercostals, scalene, and abdominal muscles (i.e. respiratory muscles) help to facilitate the increased ventilation needed to sustain blood oxygenation during exercise [16]. The present study is in favor of previous studies as it has concluded that if regular exercise is performed and the activity which has higher degree of movements can significantly improves the vital capacity(VC) whereas the games and sports that not have higher degree of movement like yoga and archery they does not have significant effect on the vital capacity(VC).

CONCLUSIONS: This study agrees with previous reports and supports that regular exercise improves lungs functions. The study revealed that the sedentary subject's performance onvital capacity was not good when compared with sportsmen who have been engaged in sports for ≥16 h per week and represented their Universities/State (Haryana, India) in the All India Interuniversity/National in cricket, judo, archery, handball, yoga and football.

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