ORIGINAL ARTICLE

Effects of Exercise on Lung Function Tests

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ABSTRACT

Aim: To assess the effect of exercise on lung function tests in healthy adult males.
Study Design: Prospective Cross sectional Study
Setting: Department of Physiology Baqai Medical University
Duration of Study: Study was carried over a period of six month from 01-07-2013 to 30-12-2013.
Methods: 100 healthy adult males with age ranging from 21-30 years were selected for study; they have no known co-morbid. Subjects were divided into two equal groups on the basis of age. 1st group having age between 21-25 years and 2nd group having age between 25-30 years. Participants were subjected to exercise test, all participants ran 2 miles (3.2 Km). Pre and post exercise lung function test were recorded.
Results: Differences of these variables were compared. Pre and post exercise Vital parameters FVC, FEV1 and FEV1/FVC during pre exercise were 3.33±0, 3.09± and 0.931±0 respectively and in post exercise 3.82±0, 3.653±0 and 0.959±0 respectively. P-value was 0.001 which is highly significant.
Conclusion: The present study proved that post exercise respiratory values were raised.
Keywords: Exercise, Lung Function, Respiratory Values

INTRODUCTION

Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons including strengthening muscles and the cardiovascular system, honing athletic skills, weight loss or maintenance, as well as for the purpose of enjoyment[1].

Lung or Pulmonary function test(s) (LFT) measure the functioning of the lungs and are widely used in our clinical setting, providing valuable diagnostic as well as prognostic information[2]. The LFT is generally a non invasive test and has the advantages of being simple to perform which give highly reproducible results although; more invasive techniques are also available[3]. The lung disease diagnosis is incomplete in most setting without LFTs e.g. in asthma, restrictive lung diseases and obstructive lung diseases. It also helps assessment of shortness of breath arising due to various causes[2].

Significance of LFTs cannot be over-looked among other uses are the determinations of the extent of lung injury, damage or dysfunction. It is also employed for monitoring the effectiveness of therapeutic interventions, as part of preoperative assessment and even during.

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MATERIAL AND METHOD

This study was carried out in the department of Physiology at Baqai Medical College and at its affiliated Fatima Hospital at Baqai Medical University. The Study included 100 healthy male individuals between the ages of 21 to 30 years, who have no known Co-morbid. All individuals with even a remote suspicion of any illness especially of cardiopulmonary, hepato-renal or metabolic in origin were excluded on the basis of detailed history. All participants were briefed about the exercise along with the significance of this research procedure and written consent was obtained from each one of them prior to study. Demographic data including Age, weight and height was recorded. Pre and post exercise vital parameters, FVC, FEV1 were recorded by a small hand held spirometer. All participants ran 2 miles (3.2km) by road side and completed the exercise with in thirty minutes, test was conducted in the morning.

RESULTS

One Hundred Subjects with mean age 25.36±2.376, with Mean Weight in kg 62.59±11.426 & Mean Height in cm 169.21±5.172, were divided into two age groups, 21-25 years (n=50 with mean age 23.4±1.39) and 26-30 years (n=50 with mean age 27.32±1.28) (Table 1). Mean height in cms, for the Age group 21-25 years, was 169.64±5.46 and mean height in cms, in the other group 26-30 years (n=50), was 168.78±4.88. Mean weight in kg, for the Age group 21-25 years, was 63.04±10.29 and mean weight in kg, for the age group 26-30 years, was 62.14±12.54.

Vital parameters (IN L/min) FVC, FEVI and FEVI/FVC ratio according to pre and post exercise in two age groups: Age groups were measured in hundred subjects. The pre exercise mean value of FVC was 3.33±0.474, while the mean value of FEVI was 3.09±0.467 and the mean value of FEVI/FVC ratio was 0.931±0.100. In post Exercise the mean value of FVC was 3.82±0.489, the mean value of FEVI was 3.653±0.467 and the mean value of FEVI/FVC ratio was 0.959±0.085. By applying t-test we got the p-value of 0.001 which was highly significant. (Table 2)

It is the common practice for the results of lung function tests to be interpreted in relation to reference values, and in terms of whether or not they are considered to be within normal range [6]. There are not many studies in Asia that provide reference values [7, 8]. The values of present study has been compared with available reference values below.

Table 1: Number of subjects according to age groups with height and weight

Age (years)	Frequency	Age	Height	Weight
21-25	50(50%	23.4±1.39	169.64±5.46	63.04±10.29
26-30	50(50%)	27.32±1.28	168.78±4.88	62.14±12.54
Total	100	25.36±2.37	169.21±5.17	62.59±11.42

Table 2: Vital parameters (IN L/min) FVC, FEVI AND FEVI / FVC ratio in subjects according to pre and post exercise (n=100)

Variables	FVC L/min Mean±SD	FEVI L/min Mean±SD	FEVI / FVC L/min Mean±SD	FEVI / FVC %
Pre Exercise	3.33±0.474	3.09±0.467	0.931±0.100	93.1
Post Exercise P value	3.82±0.489 0.001*	3.653±0.467 0.001*	0.959±0.085 0.001*	95.9

*p-value is highly significant

Table 3: Pre exercise vital parameters in relation to reference values.

Year	Subject	FVC	FEV1	FEV1/FVC
Present study 2013	100	3.33	3.09	93.1
Tjandra H 2006	107	2.52	2.55	92.2
Hassan SH 2007	53	1.81	1.21	66.4
Saleh M 2009	182	3.1	3	96.7

DISCUSSION

The Physiological response of exercise is dependent on the intensity, duration and frequency of the exercise as well as the environmental condition[11]. The exercise related study was carried at Baqai Medical University Hospital Gadap, Karachi, 100 normal adult male Subjects were selected .The age of subjects ranged from 21 to 30 years with mean age 25.36±2.37 years. Their heights were between 168.78±4.88 to 169.64±5.46cms with average height 169.21±5.17cms. The subjects weighed 62.4±12.54 to 63.04±10.29 with mean weight 62.59±11.42kg.

The present study was carried to assess lung function tests in 100 healthy adult males, pre-exercise values of FVC, FEV1, FEV1/FVC ratios were found as 3.33±0.47 L/min, 3.09±46 L/min and 93.1% L/min respectively and are in accordance with values given[7,8,9,10]. Post exercise values of FVC, FEV1, FEV1/FVC ratios were 3.82±0.4 L/min, 3.65±0.46 L/min and 95.9% respectively. P value was 0.001 which is highly significant. Post exercise reference values were not available so, cannot be compared. Comparison between pre and post exercise values of lung function test show that post exercise values were increased significantly.

CONCLUSION

In this study pre and post exercise, values of Lung Function Tests were recorded. The respiratory values observed are in accordance with different studies. The post exercise variables were significantly raised when compared with pre exercise variables. This suggests that during exercise the work capacity is increased.

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