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**Original Research Article**

# To determine the status of ventilatory functions of the people effect of lung function test engaged in different physical activities

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**Abstract**

**Background & Methods:** The aim of the study is to determine the status of ventilatory functions of the people effect of lung function test engaged in different physical activities. The idea behind choosing these physical activities was that in each group the types of movement performed were variable and body posture is also quite different. It was ensured that subjects chosen were regularly engaged in that particular activity. Pulmonary function tests were also carried out on age matched control groups.

**Results:** Group A have mean inspiratory vital capacity 3.86±0.56 liters, mean inspiratory reserve volume is 1.84±0.638 liters, mean expiratory reserve volume is 1.33±0.56 liters, and mean tidal volume is 0.86±0.37 liters. Group B have mean inspiratory vital capacity 3.69±0.42 liters, mean inspiratory reserve volume is 1.74±0.33 liters, mean expiratory reserve volume is 1.22±0.30 liters, and mean tidal volume is 0.82±0.39 liters. Group C have mean inspiratory vital capacity 4.47±0.49 liters, mean inspiratory reserve volume is 2.20±0.46 liters, mean expiratory reserve volume is 1.67±0.31 liters, and mean tidal volume is 0.77±0.27 liters. Group D have mean inspiratory vital capacity 3.46±0.27 liters, mean inspiratory reserve volume is 1.6±0.33 liters, mean expiratory reserve volume is 1.32±0.35 liters, and mean tidal volume is 0.66±0.16 liters.

**Conclusion:** On the basis of this study it can be concluded that physical activities have beneficial effect on lung function parameters. It is different for different activities. It is noted that swimming and Workout at home are more strenuous than exercising in the gymnasium. The activity of swimming has shown to have a greater impact on Lung function as compared to persons practicing in the Workout at home. Persons practicing in the gymnasium have shown to have lesser effect on lung function as compared to the above two groups.

**Keywords:** ventilator, lung, physical & activities.
**Study Design:** Observational Study.

## 1. Introduction

In 4000-250 B.C., there was a strong demand for fitness for military purposes. People during that era linked fitness with one's performance in the military[1]. Activities like hunting, marching, riding and javelin throwing have been developed to meet the need for physically fit soldiers. The Persian Empire and Spartans are good examples of empires that make use of fitness for this purpose[2]. Spartans required fitness for men to be good soldiers and for women to bear children who are fit to serve the state. Because of this, Sparta actually became one of the most physically fit societies in history[3].

Anaerobic exercise is an important adjunct to aerobic exercise because it helps build muscle, raising basal metabolism, and causing the body to burn more calories even when at rest. A

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major health benefit of weight lifting and other weight bearing exercises is that they not only strengthen bone a primary benefit for the elderly but also In fact many health clubs and senior citizens organization teach weight lifting to senior citizens to help them strengthen muscles and build bone to help prevent or reverse osteoporosis[4].

Exercise increases flow of blood to various organs there by delivering more nutrients thus improving their functioning. Special attention is being given to vital organs of the body like heart brain and lungs, to know the effect of exercise on these organs[5]. The effect of exercise on these organs when they are put to endurance tests has been a subject of discussion in the past. Irrefutable evidence now exists to show that regular physical activity slows the rate of decline of most of the physiological parameters that we associate with health and fitness –viz muscle strength, aerobic capacity, reaction time and joint flexibility[6].

## 2. Material and Methods

Present study was conducted at Gandhi Medical College, Secunderabad for 01 Year, 50 cases in each group. Assessment of the socioeconomic status is an inherent part of various community based, and many hospital based studies, which seek to study the effect of socioeconomic status on different physiological states. Although a variety of methods of classifying the population by socioeconomic status have been proposed, the most widely used for urban populations.

The idea behind choosing these physical activities was that in each group the types of movement performed were variable and body posture is also quite different. It was ensured that subjects chosen were regularly engaged in that particular activity. Pulmonary function tests were also carried out on age matched control groups. These cases were compared with healthy medical students, which acted as controls. After explaining the aims and objectives of the study an interview schedule was developed.

## 3. Result

**Table No. 1: Comparison of Four Groups in Age Height and BSA**

| | Age (In years) | | Height (In cms) | | BSA (In $m^2$) | |
|---|---|---|---|---|---|---|
| **Group** | **Mean** | **S.D** | **Mean** | **S.D** | **Mean** | **S.D** |
| A (Workout at home) | 21.77 | 2. 70 | 173.56 | 7.19 | 12.83 | 0.14 |
| B (Gymnasium) | 22.5 | 3.39 | 173.47 | 5.78 | 1.79 | 0.10 |
| C (Swimming) | 22.29 | 3.33 | 177.59 | 5.69 | 1.80 | 0.12 |
| D (not routinely engaged in any specific exercise) | 2.4 | 3.20 | 170.9 | 6.09 | 1.68 | 0.13 |

Shows persons engaged in Workout at home (Group A) have, mean age of 21.77 ±2.7 years, mean height is 173.55±7.19 cms and mean BSA is 1.83±0.14$m^2$. Persons engaged in gymnasium (Group B) have, mean age of 22.5±3.39 years, mean height is 173.46±5.78 cms, and BSA is 1.79±0.103$m^2$

Persons engaged in swimming (Group C) have, mean age 22.29±3.33 years, mean height is

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177.59±5.69 cms, mean BSA is 1.80±0.12 $m^2$ and their mean calorie intake is 2239.62±557.14 In control (group D), mean age, is 22.4 ±3.20 years, mean height is 170.9±6.09 cms, mean BSA is 1.68±0.135 $m^2$ and their mean calorie intake is 2218.33±467.63.

**Table No. 2: Comparison of Four Groups in Variables of Spirometry**

| | Inspiratory vital capacity in litres | | Inspiratory reserve volume in litres | | Expiratory reserve volume in litres | | Tidal volume in litres | |
|---|---|---|---|---|---|---|---|---|
| **Group** | **Mean** | **S.D** | **Mean** | **S.D** | **Mean** | **S.D** | **Mean** | **S.D** |
| A | 3.86 | 0.56 | 1.84 | 0.63 | 1.33 | 0.56 | 0.86 | 0.37 |
| B | 3.69 | 0.42 | 1.74 | 0.39 | 1.22 | 0.30 | 0.82 | 0.39 |
| C | 4.47 | 0.49 | 2.20 | 0.46 | 1.67 | 0.31 | 0.77 | 0.27 |
| D | 3.46 | 0.27 | 1.6 | 0.33 | 1.32 | 0.35 | 0.69 | 0.16 |

Group A have mean inspiratory vital capacity 3.86±0.56 liters, mean inspiratory reserve volume is 1.84±0.638 liters, mean expiratory reserve volume is 1.33±0.56 liters, and mean tidal volume is 0.86±0.37 liters. Group B have mean inspiratory vital capacity 3.69±0.42 liters, mean inspiratory reserve volume is 1.74±0.33 liters, mean expiratory reserve volume is 1.22±0.30 liters, and mean tidal volume is 0.82±0.39 liters. Group C have mean inspiratory vital capacity 4.47±0.49 liters, mean inspiratory reserve volume is 2.20±0.46 liters, mean expiratory reserve volume is 1.67±0.31 liters, and mean tidal volume is 0.77±0.27 liters. Group D have mean inspiratory vital capacity 3.46±0.27 liters, mean inspiratory reserve volume is 1.6±0.33 liters, mean expiratory reserve volume is 1.32±0.35 liters, and mean tidal volume is 0.66±0.16 liters.

**Table No. 3: Comparison of variables of Flow volume between different groups**

| | Forced Vital Capacity | | Forced expiratory Volume in 0.5 Sec | | Forced Expiratory Volume in 1 Sec | | FEV1/Vital Capacity | |
|---|---|---|---|---|---|---|---|---|
| | **Mean Diff.** | **Sig.** | **Mean Diff.** | **Sig.** | **Mean Diff.** | **Sig.** | **Mean Diff.** | **Sig.** |
| A-B | 0.26 | 0.07 | 0.01 | 0.99 | 0.15 | 0.35 | 1.34 | 0.84 |
| A-C | 0.62* | 0.11 | 0.45* | 0 | 0.69* | 0 | 3.59 | 0.15 |
| A-D | 0.35* | 0.00 | 0.01 | 0.99 | 0.16 | 0.32 | 4.97* | 0.01 |
| B-C | 0.89* | 0 | 0.46* | 0 | 0.84* | 0 | 2.24 | 0.52 |
| B-D | 0.08 | 0.84 | 0.00 | 1 | .005 | 1 | 3.63 | 0.11 |
| C-D | 0.98* | 0 | 0.46* | 0 | 0.85* | 0 | 1.38 | 0.83 |

* The mean difference is significant at the .05 levels

## 4. Discussion

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Other studies comparing respiratory function among men engaged in various sports found that sportsmen have higher levels of function than sedentary people. Among the various groups of participants, swimmers had the maximum lung function in this cross sectional study[7]. In another cross sectional study, male and female swimmers (n = 459) had larger FEV1 values than both land based athletes and sedentary controls. In addition, elite male swimmers had superior FEV1 values when compared with male non-elite swimmers (p,0.05); however, when years of swimming training were controlled for by analysis of covariance, the difference in FEV1 between the two groups was no longer evident[8]. This suggests that years of swimming training and/or the earlier the age at which training begins may have a significant influence on subsequent FEV1 values and swimming performance. Malkia and Impivaara8 showed in a cross sectional study that physical activity may relate to spirometric values in persons with and without bronchial asthma.

Although MTT has strong associations with respiratory functions, the associations of these functions and potential risk factors were different. Because of the cross sectional nature of the study, the genetic component as a major determinant of the superior respiratory function in persons with a higher level of physical activity should be considered[9].

Comprehensive pulmonary rehabilitation significantly improved exercise performance and symptoms for patients with moderate to severe chronic obstructive pulmonary disease.Exercise is an important component of pulmonary rehabilitation and may be associated with both physiological and psychological benefits for patients with chronic lung disease[10]. Although respiratory rehabilitation programmes offer improvement in quality of life and some physiological measures, improvements in FEV1 levels have not been reported consistently. There are no reports of long term change in rates of decline in FEV1 in different exercise groups[11].

However FVC, $FEV_1$, IRV and ERV are higher in those performing exercises in the Workout at home as compared to those who practicing in gymnasium. This difference is statistically non-significant[12].

## 5. Conclusion

On the basis of this study it can be concluded that physical activities have beneficial effect on lung function parameters. It is different for different activities. It is noted that swimming and Workout at home are more strenuous than exercising in the gymnasium. The activity of swimming has shown to have a greater impact on Lung function as compared to persons practicing in the Workout at home. Persons practicing in the gymnasium have shown to have lesser effect on lung function as compared to the above two groups.

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