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A Comparative Study of Lung Capacity and Body Mass Index between Physical Education and Non-Physical Education Students

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Abstract

The purpose of the study was to compare the lung capacity and body mass index between male physical education and non-physical education students. To achieve the objective of the study, twenty five (N=25) male physical education students and twenty five (N=25) male non-physical education students were selected randomly as subjects. The age of the subjects ranged between 20to 26 years. To determine the significant difference between the mean scores of male physical education and non-physical education students on lung capacity and body mass index (BMI), 't' test was employed with the help of SPSS software. The level of significance was set at 0.05. There was significant difference obtained on lung capacity between male physical education and non-physical education students. There were no significant differences obtained on body mass index (BMI) between male physical education and non-physical education students. The finding reveals that male physical education students have significantly better in lung capacity as compare to male non-physical education students.

Keywords: BMI, Lung Capacity, Physical Education and Non-Physical Education Students.

Introduction

Obesity is a major health issue all over the world. Obesity impacts on many areas of clinical medicine, including pulmonary medicine, where it is debated if obesity is linked to asthma, or whether the obesity, due to its effect of decreasing lung volumes and increasing airway resistance, cause symptoms that simply mimic asthma. It is important to understand the relationship between body mass index (BMI) and lung function to properly interpret PFTs. Several previous studies have reported that increased body weight decrease lung volumes, they included subjects with coexisting morbidities such as cardiovascular disease, or they were conducted with the subjects in the supine position. Obesity has relatively little effect on vital capacity (VC) or total lung capacity (TLC). However, functional residual capacity (FRC) and expiratory reserve volume (ERV) can be severely decreased as a result of the altered chest wall mechanics in obesity. Mild obesity decreases FRC and ERV in patients with cardiovascular disease, but more severe obesity is required to decrease FRC and ERV. It has been studied that decreasing body weight had the expected positive impact on the lung mechanics.

A high frequency of normal airway function has been observed in many obese patients with asthma receiving bronchodilators. Obesity increases risk for developing diabetes, gallstones, hypertension, heart disease, stroke and colon cancer. In any case, adults who are overweight in middle age face a poor quality of life as they age, with the quality declining the greater the weight. Chronic obstructive pulmonary disease (COPD) is characterized by dyspnoea, impaired exercise tolerance, and frequent weight loss and nutritional depletion. People with a higher body mass index (BMI) at the time of diagnosis of their COPD have been shown to have significantly longer survival than both underweight and normal weight people. This reduction in respiratory muscle strength, in combination with altered pulmonary mechanics may have an impact upon recovery in the postoperative period. High BMI measurements are linked to lowered VO2 max values. The role BMI plays in reducing VO2 max is related to changes in respiratory capacity and cardiovascular endurance. When BMI reaches 30, the minimum classification of obesity, the functional residual capacity of the lungs is reduced by 25%, and the expiratory reserve volume is reduced by over 50%. While these two lung functions measurements are not heavily involved in normal breathing, they do drastically limit the lungs capacity for achieving maximum work and will result in lowered VO2 max values. Increased BMI levels have also been associated with decreases in cardiovascular system capacity. High BMI results in decline in several measurements of cardiovascular functions that impair cardiovascular endurance.

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Methodology

To find out the lung capacity of male physical education and non-physical education students. To compare the body mass index (BMI) of male physical education and non-physical education students. Twenty-five male (N=25) physical education students and twenty-five (N=25) male non-physical education students from Annamalai University Campus were selected randomly as the subjects of this study. The age of the subjects were ranging between 20 to 26 years. In consultation with experts and considering tester's competency and even feasibility criterion in mind, especially of equipments reliability and time factor, the following physiological variables were selected for the study namely: lung capacity and body mass index. The lung capacity was measured by peak flow meter in L/minute and BMI was calculated by the following formula: BMI = weight in kilograms / (height in meters) ^{2}. In order to examine the hypothesis of the present study independent sample t-test were employed with the help of SPSS software to compare the mean scores of physical education and non-physical education students. Level of significance was set at .05. The comparison between physical education and non-physical education students for the selected variables: lung capacity and body mass index (BMI) were statistically analyzed using 't' test. The data pertaining to the same is presented in Table 1 and 2. The comparison of lung capacity between physical education and non-physical education male students is presented in table -1.

Table I. Comparison of Score on Lung Capacity between Physical Education (PE) and Non-Physical Education (NPE) Male Students

Variable	Group	N	Mean	S D	M D	S E	't' ratio
Lung Capacity	PE	25	334.40	65.70	66	17.202	3.837*
	NPE	25	268.40	55.50			

*Significant at .05 level
't'.05 (48) = 2.02

Table I pertaining to male physical education and non-physical education students on lung capacity would show that the first group i.e. physical education students had secured the mean and SD values of 334.40 and 65.70 respectively. On the other hand, non-physical education students had secured mean and SD values of 268.40 and 55.50. The t-value was found to be statistically significant as the value obtained was 3.837 whereas, the tabulated value was 2.02 which 48 degrees of freedom at .05 level of significant. Mean scores of lung capacity between male physical education and non-physical education students are depicted graphically in figure 1.

Figure I. The Graphical Representation of Mean Scores of Male Physical Education and Non-Physical Education Students on Lung Capacity

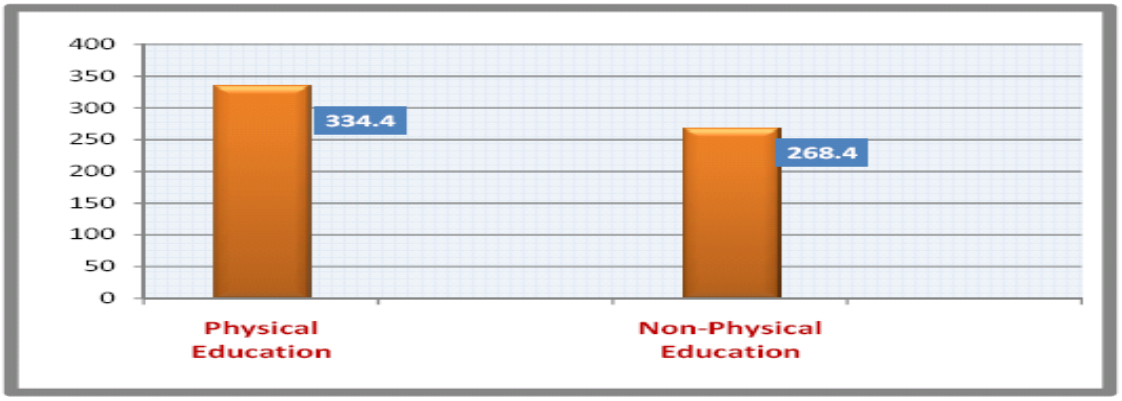


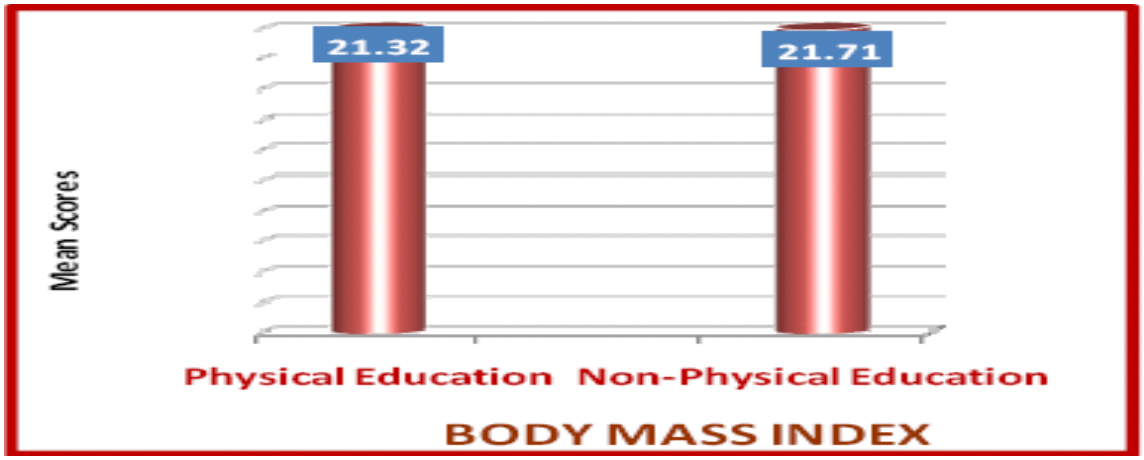
Table II. Comparison of Score on Body Mass Index (BMI) between Physical Education (PE) and Non-Physical Education (NPE) Male Students

Variable	Group	N	Mean	S D	M D	S E	't' ratio
BMI	PE	25	21.32	2.52	0.39	0.788	0.494
	NPE	25	21.71	3.02			

*Significant at .05 level
't'.05 (48) = 2.02

A glance at the results depicted in table 2 would show that with regard to male physical education and non-physical education students on the variable body mass index, the physical education group had obtained the mean scores and SD values of 21.32 and 2.52. As compared to their values, non- physical education group had obtained the mean and SD value of 21.71 and 3.02 respectively. The t-value was not found to be statistically significant as the value obtained was 0.494 where as, the tabulated value was 2.02 which 48 degrees of freedom at .05 level of significant.

Figure II. The Graphical Representation of Mean Scores of Male Physical Education and Non-Physical Education Students on Body Mass Index



Discussion of Findings

Statistical analysis of data revealed that there was significant difference obtained on lung capacity between male physical education and non-physical education students. There were no significant differences obtained on body mass index (BMI) between male physical education and non-physical education students. The probable reason could be that the subjects of physical education are more active, energetic and their physical fitness level differed from non-physical education students because of their participation in sports, regular conditioning and fitness activities.

Conclusions

1. Physical education students have significantly better score in lung capacity as compare to non-physical education students.
2. In case of BMI, no significant difference was observed between physical education and non-physical education students. Physical education students are better mean score in their BMI.

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