SJSM Science

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Chronic obstructive pulmonary disease (COPD) is progressive, but preventable and treatable disease state characterized by airflow limitation that is not fully reversible and that affects more women than men. It is the fourth leading cause of death in the United States. While the other 3 leading causes of death are in decline, the death rate for COPD continues to rise and is expected that by 2030, COPD will become the third leading cause of death. The condition is greatly underdiagnosed. Proper assessment of pulmonary function is therefore crucial.

Forced expiratory volume in one second (FEV1) is by far the most frequently used for assessing airway status. It depends on several variables: age, gender, height…But what about weight and body mass index?

Forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC): dependence on age, body mass index and gender among healthy students

Forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC) dependence on Age, Body mass index and Gender among healthy students

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Introduction

According to the American Lung Association (ALA), approximately more than 35 million Americans acquire different forms of lung disease, which unfortunately is responsible for more than 349,000 deaths.

Studies showed strong association between obesity and increased risk of developing early asthma among women. Studies also indicated gender differences in pulmonary functions during exercise: females generally have reduced FEV1. Women with COPD have a faster progression of the disease and additionally suffer the depression, anxiety, and generally reported lower quality of life than males. A strong correlation between BMI and pulmonary function has been found as well.

This study was designed to help further understanding of the various factors affecting pulmonary functions. By establishing a relationship between body mass index (BMI) and pulmonary function expressed as forced expiratory volume in 1 second (FEV1), gender variations, and the impact of muscle mass in healthy people, the conclusion can be implemented in various pulmonary diseases.

The goal of our study was to explore the relationship between BMI and FEV_1 and gender, weight, muscle mass, BMI, visceral fat and age.

Null hypothesis (H_0): No correlation between FVC/FEV_1 and gender, weight, muscle mass, BMI, visceral fat and age

Alternative hypothesis (H_1): There is a correlation between FVC/FEV_1 and gender, weight, muscle mass, BMI, visceral fat and age.

Material and Methods

Participants (63 student volunteers (30 males and 33 females) from SJSM) signed the consent to participate in the study. FEV_1 and FVC were determined using the spirometer, BMI was calculated and body fat was measured using the standardized protocols.

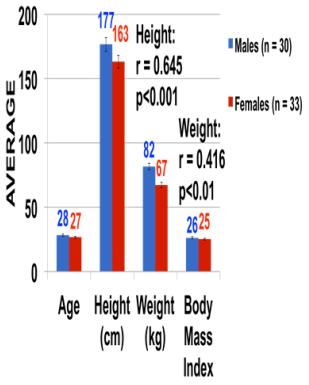
Conclusion

We explored the relationship between BMI, FEV_1, gender, weight, muscle mass, BMI, visceral fat, and age. We used a spirometer, BMI scale, and SJSM students to conduct our research. 63 students (30 male, 33 female) breathed into the spirometer, and were weighed, and data was collected such as BMI, height, and body fat. We rejected the null hypotheses that there was no correlation between FVC/FEV_1, gender weight, muscle mass, BMI, visceral fat and age. Because there was in fact correlations. Men are significantly taller than women. Below were some findings we found in the study:

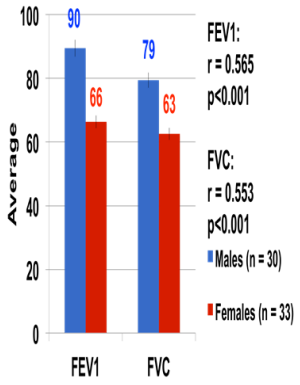
- Males have higher FEV_1 and FVC compared to females,
- Muscle mass and visceral fat was higher in males,
- The body fat in females was higher than males,
- The more muscle mass the higher the FEV_1 The higher the body fat the lower the FEV_1,
- The higher the FVC value, the higher the FEV_1 value,
- The higher the body fat, the lower the FVC.

Results

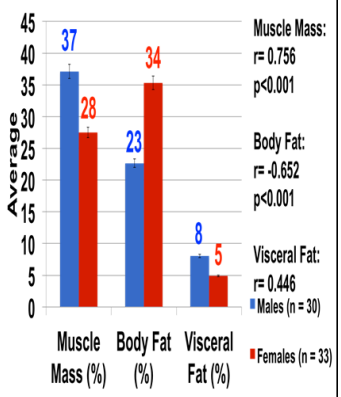
Average age, height, weight, BMI



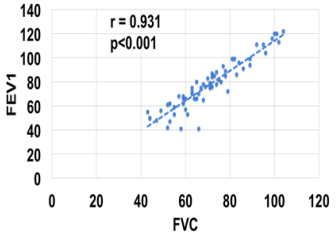
Higher average FEV1 and FVC in males as compared to females



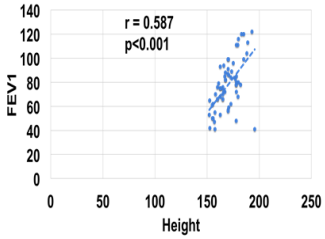
Average muscle mass, body fat, and visceral fat percentage



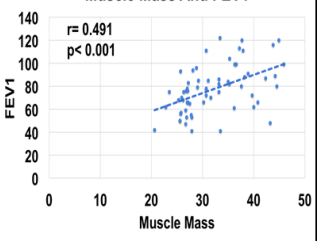
Positive Correlation Between FVC And FEV1



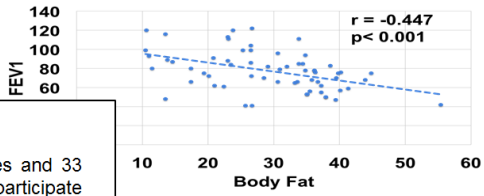
Positive Correlation Between Height And FEV1



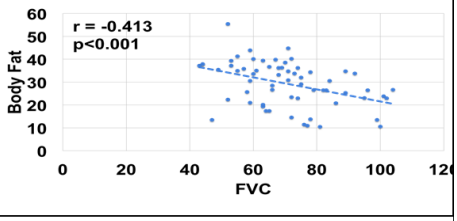
Positive Correlation Between Muscle Mass And FEV1



Negative Correlation Between Body Fat And FEV1



Negative Correlation Between Body Fat And FVC



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