CORRELATION OF LUNG FUNCTION PARAMETERS IN OBESE AND NORMAL MALES WITH THEIR BODY MASS INDEX

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Abstract: Background and Objectives Obesity is now a day’s major worldwide problem and major cause of morbidity and mortality also obesity can cause respiratory symptoms, many obese people are referred for pulmonary function tests (PFTs). Our objective is to see whether lung function parameters shows any association with Body mass Index. Materials and Method: 198 healthy male subjects were studied and divided in obese (50) and non-obese (148) groups. Their body mass index is compared with their spirometric parameters. Results: In obese subjects FEV1/FVC has significant positive correlation with BMI and FEV1 has negative correlation with BMI. But in case of non obese individuals above mentioned parameters has no significant relationship with BMI. Conclusion: From the study it is concluded that Obesity has correlation with lung function parameters. Further large scale studies are required to establish these relationship.

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Introduction: Obesity is now a day’s major worldwide problem and major cause of morbidity and mortality also obesity can cause respiratory symptoms, many obese people are referred for pulmonary function tests (PFTs). It is well known that obesity causes decreases in lung volumes. The magnitude of increase in obesity is found to increase with asthma. A meta-analytical study of the effect of elevated BMI on asthma incidence determined that the likelihood of asthma was 1.51 times higher in subjects with a BMI ≥ 25 kg/m² compared to those of a normal weight (18.5-24.9 kg/m²). Many studies are also suggestive of an increased prevalence of obesity amongst adults with asthma, but do not adequately describe cause and effect relationship between obesity and asthma. Furthermore, surgical and diet-induced weight-loss have been reported to improve in lung function and symptoms in patients with asthmatic patients.

Methods: After taking local ethical committee permission Healthy male subjects, aged from 20 to 45 years were recruited randomly from the surroundings. In this study, 198 subjects were recruited for the study. They are arranged in two groups of obese (50 males with BMI 25 to 29.99 kg/m²) and non-obese (148 males with BMI 18 to 24.99 kg/m²). Depending on their BMI values, the subjects were classified into obese and non-obese groups accordingly as per WHO classification system. Obesity is classified as per BMI>= 25 Kg/m². The subjects with respiratory or any major systemic disease and smokers were excluded from study. Written informed consent from every patient was taken.

Anthropometry: Weight was measured nearest to 100 gms using a standardized electronic weighing machine, with the subjects standing. The height of the subjects were measured using a standard 1000-mm tape measure to the nearest centimetre. BMI was calculated body weight in kg/height in m². Range of BMI for selection of subjects is 25+/-7 Kg/m².

The study was done with use of electronic PFT machine helios 702 attached with computer. The standard procedure is followed in the subjects in...
the resting condition with adequate ventilation and standard room temperature. Datas of pulmonary function test were imported to excel sheet. And comparison is done between Body mass index and FEV1/FVC.

Standard spirometric measures included, forced vital capacity (FVC), forced expiratory volume in one second FEV1, the ratio of forced expiratory volume in one second to forced vital capacity (FEV1/FVC). Pulmonary function variables were recorded as a percentage of the normal value predicted on reported height and age.

Statistical Analysis

The data were expressed in mean±SD and they were analyzed by SPSS (Statistical Package for Social Sciences) statistical software. Differences were considered statistically significant when p < 0.05.

![Table 1](image)

Table 1 shows the values of BMI, FEV1 and FEV1/FVC comparison between obese and normal individuals.

![Table 2](image)

Table 2 shows correlation of BMI with spirometric values in obese and non-obese subjects.

Result:

On analysis of collected data when compared, it is found that in obese subjects FEV1/FVC has significant positive correlation with BMI and FEV1 has negative correlation with BMI which is quite significant. But in case of non-obese individuals above mentioned parameters has no significant relationship with BMI.

Discussion

Obesity is the most common metabolic disease in the world. However, the relationship between obesity and lung function is not fully understood. Some studies showing no effects and some other studies showing significant effects on comparing obesity and spirometric data. This discrepancy between studies could be explained by the wide variations may be because of difference in methods in these studies. In our study we found that there is a significant positive correlation of BMI with FEV1/FVC in obese male adults. In one study by Fukahori et al BMI was found to be positively correlated with forced expiratory volume in 1 second (FEV1)/forced vital capacity (FVC) in men and with maximum mid-expiratory flow (MMF) in all subjects. In a study done by Andrew et al suggestion of the predominance of a restrictive pulmonary function profile is offered by the lack of any significant effect of BMI on FEV1. But in our study BMI showed significant negative correlation with FEV1 in obese subjects. This finding...
Corroborates with the findings of few previous researchers\textsuperscript{14-15}. Gender and age are unchangeable risk factors for every chronic disease and COPD as well. These data, showing that BMI strongly positively correlates with both lung function parameters in men as per Ivana F et al\textsuperscript{16}. There was a significant difference in the FVC, FEV1 and the FEF25-75 values between the underweight, normal weight and the overweight subjects in study done by Umesh et al\textsuperscript{17}.

The compromised FVC, FEV1/FVC, and uncompromised expiratory flow rates together suggestive of the dominant effects of increasing BMI on chest wall restriction and/or diaphragmatic limitation. We have also allowed for the isolation of this effect by excluding the subjects with obstructive disease.

**Conclusion:**
From the study it is concluded that Obesity has correlation with lung function parameters. In obese individuals lung function are found to be reduced. Further large scale studies are required to establish these relationship.

No Conflict of Interest.

**References**
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