To Study Variation of FEV1/FVC, with Respect to BMI (Body Mass Index) in Healthy Young Individuals in the Department of Physiology, Gauhati Medical College

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Abstract: *Background: Spirometry is indispensable in the diagnosis & monitoring of airway obstruction. Lung volumes & ventilatory flows vary with age, stature, gender, ethnicity. BMI or Quetelet Index is an attempt to quantify tissue mass in an individual.* __Methods:__ *A total of 100 healthy individuals between 18-25 years were selected for the study. Non- smoker & not having chronic respiratory illnesses. After signing the written consent, height, weight were found out by Stadiometer & digital weighing machine respectively. FEV1& FVC were found out using a Helios RMS Medspiror electronic digital spirometer keeping room temperature at 24°C in the Department of Physiology, Gauhati Medical College ,Guwahati, Assam, India & BMI calculated by standard formulae , readings were analysed for statistical significance. For statistical analysis the value of the lung function parameters were presented as Mean±standard deviation. Analysis of variance (ANOVA) using Statistical Package for Social Sciences (SPSS) version 20 was employed for comparing the parameters and P-value<0.05 was considered as significant.* __Results:__ *FEV1/FVC ratio in respect of BMI was analyzed .The test result revealed a non significant' p 'value of 0.544 (p>0.05), & no variability in respect of correlation between BMI & FEV1/FVC ratio, which suggested that BMI & FEV1/FVC ratio are independent of each other (as per this study).* __Conclusions:__ *Our study showed that, there was no alteration in lung function with the increase/decrease of BMI. However, on analysis it was found that in obese /overweight individuals the ratio was decreased with rise of BMI implying both the variables might have some negative correlation but here individuals taken were normal individuals so the outcome was normal.*

Keywords: FEV1, FVC, Medspiror electronic spirometer, Stadiometer.

1. Introduction

Spirometry is indispensable in the diagnosis and monitoring of airway obstruction, useful to exclude a restrictive ventilatory syndrome[1] (i.e. on the basis of normal FVC) & valuable in assessing the effect of bronchodilator drugs, pre operative fitness assessment and in monitoring normal & abnormal lung development. Lung volumes and ventilatory flows vary with age, stature, gender, ethnic group[2]. Therefore measurement needs to be compared with a reference value. It is essential that such reference values have been derived from subjects with no conditions that adversely affect the respiratory system.

Forced Expiratory volume in first second (FEV1) is defined as the fraction of vital capacity expired in the specified time .This is an index of airflow rate. It is one of the most useful tests to detect generalised airway obstruction. It is a relatively insensitive indicator of small airway obstruction. FVC is the total volume expired forcefully with greatest force and speed after a maximal inspiration. Body mass index or Quetelet index[3] is the ratio of weight and height of an individual. The BMI is an attempt to quantify the amount of tissue mass (muscle, fat, bone) in an individual and then categorize that person as normal, underweight, overweight, obese based on that value. Since FEV1/FVC ratio is dependent on height, gender, age so variations are out to be detected and their significance assessed. The primary objective of the study is to detect those young individuals

early who are having compensatory lung function result which maybe due to rapid urbanization & migration from villages & towns to big cities for higher studies & job necessity, so that early therapy can be started and such persons lead a disease free life in future.

2. Methods

The study was conducted in the Department of Physiology, Gauhati Medical College, Guwahati, Assam, India for a duration of 2 months. After obtaining clearance from the institutional ethical committee, the study was done. Hundred (100) individuals were selected between 18-25 years of age of any gender & they were selected by simplified random sampling from Guwahati city. Study was performed after obtaining full consent from them and a consent form was filled & signed by them before being a part of the study. Individuals who were healthy, non smoker were a part of the study with only exclusion criteria being age less than 18 years & above 25 years as well as emotionally unstable individuals & those with a prior history of asthma. Room temperature was maintained optimally at 24 degree Celsius. A " p" value of <0.05 was considered significant with 95% confounding factor.

3. Result

FEV1/FVC ratio in respect of BMI was analyzed for 100 persons in the age group as mentioned above. The test result

revealed a non significant' p 'value of 0.544 (p>0.05), & no variability in respect of correlation between BMI & FEV1/FVC ratio, which suggested that BMI & FEV1/FVC ratio are independent of each other (as per this study).
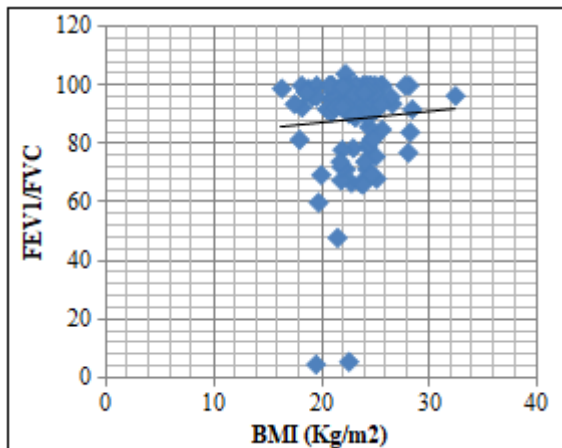

Figure 1: Scatter Diagram of correlation between BMI and FEV1/FVC ratio showing a non-significant (*p>0.05*) positive correlation with *'r'* value 0.0613

	BMI	FEV1/FVC
BMI	1	
FEV1/FVC	0.061365	1

4. Conclusion

Our study showed that, there was no alteration in lung function with the increase/ decrease of BMI. However, on analysis it was found that, in obese /overweight individuals the ratio was decreased with rise of BMI implying both the variables might have some negative correlation but here individuals taken were normal individuals so the outcome was normal.

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