INTRODUCTION

Obesity is characterized by excess deposition of fat. This is a serious issue involving the people of both developing as well as developed countries of the world[ 1]. The problem is recognized internationally[2] because of its increasing incidence and its association with cardiovascular diseases[3], Stroke, Type2 Diabetes[4], Hypertension, Cancers[5], Osteoarthritis[6]. Respiratory problems including Asthma[7], Depression [8] as well as reduction in the ability to perform physical activities [9]. Further, incidence of obesity is not confined to any particular age group or socioeconomic class but is found in people of all ages and socioeconomic classes mainly because of sedentary life style and excess energy intake. Moreover, obesity is found to increase the chances of respiratory symptoms, like breathlessness particularly during exercise [10] and recognized as an important risk factor in the development of respiratory diseases like obstructive sleep apnoea (OSA) [11] and obesity hypoventilation syndrome (OHS) [12]. Wheezing and bronchial hyper-responsiveness [13] often associated with asthma are increasingly observed in overweight and obese individuals. Recently, Steele et al [14] reported an inverse relation of lung function with obesity and body fat in young adults. Obesity induced deterioration in lung function is demonstrated by measuring lung volume and capacities (spirometry). However, many researchers for this purpose used measurement of PEFR because of its simplicity, convenience and cost-effective advantage [15]. Decrease in PEFR indicates a restrictive pulmonary defect because of mechanical limitation to the chest expansion due to accumulation of excess fat that interferes with movement of chest and descent of diaphragm[16]. PEFR is influenced by many factors such as age, sex, posture, obesity, environmental and racial factors [17]. The present study was undertaken to assesses and correlate the obesity and pulmonary functional status in obese and non-obese male and female subjects. Pulmonary functional status was assessed by recording peak expiratory flow rate...
PEFR was selected because it is widely accepted as a reliable parameter of pulmonary functions and is simple to perform as a bed-side test. Hadorn introduced PEFR in 1942 and it was accepted as a parameter of pulmonary function test (PFT) in 1949 [18,19,20]. The truncal fat may compress the thoracic cavity and restrict the diaphragmatic movement resulting in reduced vertical diameter of the thoracic cavity [21]. These changes may reduce the compliance of the lungs and the thoracic cavity and increase the load on the respiratory muscles. This may end up with the reduction in lung volumes and flow rates, especially PEFR [22].

Material and Methods:

Subjects and Study Area:
The place of a study was done tertiary health care centre, in India for the period of 6 months. Study was performed on 80 subjects age group 20-30 years, categorised as normal weight BMI =18.5 - 24.99 kg/m2 and overweight BMI =25-29.99 kg/m2. There were 40 normal weight BMI (Group A) and 40 overweight BMI (Group B). The normal PEFR value for healthy young subjects [aged 20-30 years] is 280 -400 L/min.20

Selection of Subjects:
All were healthy subjects without any medical illness like cardio-respiratory and neurological diseases or endocrinal and allergic disorders and none of them were on medication for any ailments. Subjects with the habit of smoking and alcohol consumption were also not included in the study.21 Ethical clearance was obtained from the Institutional Ethical Committee and informed consent was obtained from all the subjects after explaining the procedure thoroughly and giving the assurance that they could withdraw from the study whenever they wanted.

Peak Exploratory Flow Rate Procedure
Using Wright’s peak flow meter PEFR was evaluated. The subjects were instructed to take maximum inspiration and blow into the mouthpiece as rapidly, forcefully and completely as possible. They were trained well to blow into the instrument maintaining a tight sealing between the lips and mouthpiece of the peak flow meter. Standing height was recorded without shoes, with light clothes on a wall by measuring tape. Weight was recorded without shoes and with light clothes on a weighing machine. Body mass index was calculated a BMI=weight in kg / height in m2. Statistical analysis was done by t test. P< 0.05 is considered significant.

Results:

Table 1: The mean values of BMI and PEFR of two different groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>A. Normal (Mean ± SD)</th>
<th>B. Obese (Mean ± SD)</th>
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<tbody>
<tr>
<td>BMI (kg/m2)</td>
<td>22.74 ± 1.11</td>
<td>29.71 ± 1.12*</td>
</tr>
<tr>
<td>PEFR (L/min)</td>
<td>376 ± 108.8</td>
<td>315 ± 41.4*</td>
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Values indicate Mean ± SD, *P<0.05.

Statistical analysis shows that there is significant correlation between normal PEFR and BMI. [p<0.05]. So there is some negative relation between BMI especially abdominal obesity causes decrease in PEFR. Here normal mean BMI IS 22.74 ± 1.11 kg/m2 and mean PEFR IS 376 ± 108.8 L/min, overweight mean BMI IS 29.71 ± 1.12 kg/m2 and mean PEFR 315 ± 41.4 L/min.

Discussion:
Our study shows that increase BMI decrease PEFR values. Obesity is a condition in which a person has excess body weight relative to other people of the same gender and height. Respiratory problems are associated with obesity and these occur when the added weight of the chest wall squeezes the lungs and causes restricted breathing. It is generally accepted that increased body mass loading of the respiratory apparatus (chest and lungs) plays a role in the development of respiratory failure by causing either an insurmountable load to the respiratory muscle or significant ventilation perfusion.
inequalities. A study by Saxena et al suggests that obesity itself and especially the pattern of body fat distribution have independent effects on PEFR. [23] You chen et al showed that abdominal fat is negatively and consistently associated with pulmonary function. [24] N.K. Mungreiphy et al found PEFR to be maximum among subjects with normal BMI, followed by overweight and obese. [25] Jones et al also found that the reduction in PEFR is proportional to the increase in BMI.[26]. So our study is an attempt to bring awareness about variation of lung function with increase BMI. The information may help to acknowledge the pulmonary health risks that crop up with increasing body mass index and fat accumulation. So our study is an attempt to bring awareness about the variation of lung function with increase eBMI. The information may help to acknowledge the pulmonary health risk that crop up with increasing Body Mass Index and fat accumulation.

**Conclusion:**

BMI affects PEFR. Increase in BMI decreases PEFR. Early identification of risk individuals prior to the onset of disease is imperative in our developing country. Future study with larger sample size to compare pulmonary function relation with the obesity will give more insight into effect of obesity on pulmonary function.

**References:**


25. NK. Mungreify, Meenal Dhall, Renu Tyagi, Kiran Saluga, Ankit Kumar Eyhnicity, obesity and health pattern among Indian population, yr 2012, volume 3, issue 1, pg 52-59.