WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.421
Volume 8, Issue 3, 1538-1544 Research Article ISSN 2278 – 4357

CLINICAL PROFILE OF OBESE INDIVIDUALS WITH SPECIAL REFERENCE TO PULMONARY FUNCTIONTEST

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Article Received on
16 Jan. 2019,

Revised on 05 Feb. 2019,
Accepted on 26 Feb. 2019

DOI: 10.20959/wjpps20193-13366

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ABSTRACT

Background: Overweight and obesity is defined as a chronic medical condition characterized by excessive accumulation of fat in various part of human body that causes a generalized increase in body mass. Obesity is one of the significant global health risk factor and has been associated with an increased incidence of cardiovascular diseases, hypertension, increased risk of coronary artery disease, diabetes mellitus, dyslipidemia, cerebral stroke, osteoarthritis, gall stones, polycystic ovarian disease and cancerous condition like Carcinoma endometrium, Carcinoma breast, Carcinoma prostate, and Carcinoma of colon with increased morbidity and a reduction in overall quality of life **Objective:** The aim of present study was to study the clinical profile, the pulmonary function test in obese individuals. **Material and Method:** The study group, comprised100 obese individuals, aged between 18 -60years. They were subjected to Pulmonary function test, and compare with control groups, were significantly modulated, statistically by using student's test. **Result:** significantly decreased Pulmonary function test and were found to be significantly increased among overweight and obese individuals (P-.000). **Conclusion:** We concluded that regular physical activity, good eating habits and high intake of diet rich in fiber and non-starchy foods have been recommended as preventive factors against overweight and obesity.

KEYWORDS: Overweight, obese, Pulmonary Function Test.

INTRODUCTION

The health hazards associated with obesity were well known to ancient Greek physician Hippocrates who stated that sudden death is more common in natural fat than in lean [1]

Ancient clinical observation suggest that obesity was already recognized in association with diabetes and sudden death, although the significance of morbidity and excess mortality conferred by overweight and obesity has been appreciated much more recently. Fatty liver, a feature of human obesity was identified by Ludwig in 1980 as a significant co-morbidity which leads to progressive liver disease. Also associated respiratory problems obesity Hypoventilation was described long ago. In 1998 WHO gave International classification and global epidemic of obesity and in 2007 Sjostrom found that Bariatric surgery prolongs life.[1]

Pulmonary function in obese subjects with normal FEV1/FVC was carried out and observed that there is reductions in FEV 1 and FVC. Both FEV 1 and FVC were similarly reduced, the FEV1 to FVC ratio was normal and static lung volumes were reduced.[2]

A study on "Effects of obesity and fat distribution on ventilatory function," was carried out, to examine the effects of overall obesity and fat distribution on ventilatory function found that Body fat distribution has independent effects on ventilatory function after adjustment for overall obesity in men, the FEV1 to FVC ratio decreases with increasing BMI in overweight and obese individuals.[3,4,5,]

A study on "Pulmonary Function and Abdominal Adiposity in the General Population," was carried out as the association between pulmonary function and obesity parameters. Adiposity markers were negatively associated with FVC percent predicted in women. In men, all overall and abdominal adiposity markers were inversely associated with FEV1 percent predicted and FVC percent predicted concluded that abdominal adiposity is a better predictor of pulmonary function than weight or BMI.[6]

A study on "Waist circumference is associated with pulmonary function in normal weight, overweight and obese subject was carried out conducted in a rural community and found WC was negatively associated with forced vital capacity and forced expiratory volume in 1s, and the associations were consistent across sex, age and BMI categories. On average, 1 cm increase in WC was associated with a 13-mL reduction in forced vital capacity and an 11 mL reduction in forced expiratory volume in 1 s. BMI was positively associated with forced vital capacity and forced expiratory volume in 1 s in normal weight individuals. WC was associated with pulmonary function in normal weight, overweight and obese subjects.[7]

A study on "The impact of obesity on pulmonary function in adult women," was found that the obese group show no significant differences between forced expiratory volume in one second and forced vital capacity, However the obese group presented a greater inspiratory reserve volume a lower expiratory reserve volume and a maximal voluntary ventilation than the non-obese group. Alterations in the components of the vital capacity suggest damage to the chest mechanics caused by obesity probably due to a reduction of the maximal voluntary ventilation.[8]

A study on "Longitudinal association of body mass index with lung function to quantify age-related changes in lung function was carried out observed that the participants who have lower BMI than baseline showed increase in FEV1, FVC as compared to higher BMI participants who showed decreases in FEV1 and FVC. FEV1/FVC increased with increasing BMI. Weight gain was also associated with lung function. Those who gained the most weight show largest decrease in FVC but FEV1 decreased with increasing weight gain in all participants, with maximum decline in obese individuals who gained the most weight during the study.[9]

Now WHO has developed, "Global Action Plan" for prevention and control of non-communicable diseases 2013-2020 which aims to achieve 25% relative reduction in premature mortality from non-communicable diseases by 2025 and a halt in rise of global obesity. The implementation plan to guide countries in taking action to implement the recommendations of the Commission was welcomed by the World Health Assembly in 2017.[10]

The aim of our study is to assess the lung function and its changes as compared to non obese apparently normal individuals, which can be prevented at an early stage in overweight and obese persons and hence we can reduce the global burden of diseases in obese and subsequent co-morbid conditions in our society

MATERIAL AND METHOD

Study group were selected from overweight and obese individuals with body mass index BMI more than 24.9 Kg/m^2, attending the Medicine Outpatient, Department of our institution. The study comprised of 100 individuals. Physically fit, obese and overweight persons, aged 18 to 60 year, of both sexes, comprised 55 male and 45 female subjects, presenting with minor ailments like cough, cold and body ache etc were screened and selected from general

population after anthropometric measurements. Careful detailed history was taken and thorough clinical examination with routine investigation was done.

Anthropometric Measurements Like

Weight

Height

Body Mass Index

Waist circumference

Hip circumference

Waist Hip ratio

Pulse and Blood Pressure were determined.

Study group underwent pulmonary function test. by computerised spirometer "Spiroexcel PC Based Pulmonary Function Test, (Medicaids)" in Department of Physiology. The study protocol was explained to the subjects and written consent obtained. Approval by ethical committee of S.S. Medical College, Rewa, M. P., was obtained. All the volunteers were clinically examined to rule out any systemic diseases. All subjects were non-alcoholic and non-smokers.

Spirometry

The various parameters measured are as follows:

1. Forced expiratory volume in 1 second (FEV1)
2. Forced vital capacity (FVC)
3. FEV1/FVC ratio
4. Peak expiratory flow (PEF)
5. Maximum voluntary ventilation (MVV)
6. Mid forced expiratory flow

Statistics

The data was analyzed statistically by using statistical software Graph Pad in Stat vs. 3.10 and MS Excell (2003). Statistical analysis of Forced expiratory volume in 1 second (FEV1), Forced vital capacity (FVC), FEV1/FVC ratio, Peak expiratory flow (PEF), Maximum voluntary ventilation (MVV) and Mid forced expiratory flow were done using student't test and $p < 0.01$ was considered as significant.

RESULTS

In study group (Table No. 1),

1. In Overweight subjects -results showed that the values of **Mean Forced Expiratory Volume in one second** were significantly changed ($p < 0.0056$) as compared to normal subjects likewise in obese subjects the results showed that the values of **Mean Forced Expiratory Volume** in one second were more significantly changed ($p < 0.0009$) as compared to normal subjects

2. In Overweight subjects -results showed that the values of **Mean Forced Vital Capacity** were significantly changed ($p < 0.0199$) as compared to normal subjects likewise in obese subjects the results showed that the values of **Mean Forced Vital Capacity** were more significantly changed ($p < 0.0054$) as compared to normal subjects

3. In Overweight subjects-results showed that the values of **Mean FEV 1 / FVC Ratio** were significantly changed ($p < 0.086$) as compared to normal subjects likewise in obese subjects the results showed that the values of **Mean FEV 1 / FVC Ratio** were more significantly changed ($p < 0.0122$) as compared to normal subjects

In study group (Table No. 2),

1. In Overweight subjects-results showed that the values of **Mean Maximum Voluntary Ventilation** were significantly changed ($p < 0.849$) as compared to normal subjects likewise in obese subjects the results showed that the values of **Mean Maximum Voluntary Ventilation** were more significantly changed ($p < 0.347$) as compared to normal subjects

2. In Overweight subjects-results showed that the values of **Mean Peak Expiratory Flow Rate** were significantly changed ($p < 0.024$) as compared to normal subjects likewise in obese subjects the results showed that the values of **Mean Peak Expiratory Flow Rate** were more significantly changed ($p < 0.0008$) as compared to normal subjects.

3. In Overweight subjects -results showed that the values of **Mean Mid forced Expiratory Flow.** were significantly changed ($p < 0.011$) as compared to normal subjects likewise in obese subjects the results showed that the values of **Mean Mid forced Expiratory Flow** were more significantly changed ($p < 0.0005$) as compared to normal subjects.

Table No 01: Showing Mean Forced Expiratory Volume in one second, Mean Forced Vital Capacity in Normal, Overweight and Obese subjects.

Parameters	Normal (n=33)	Overweight (n=33)		Obese (n=34)	
		Mean Value S. D.	P Value	Mean Value S. D.	P Value
Mean Forced Expiratory Volume in one second	1.93 ± 0.60	1.54 ± 0.50	0.0056	1.42 ± 0.60	0.0009
Mean Forced Vital Capacity	2.31± 0.70	1.91 ± 0.66	<0.0199	1.80 ± 0.75	0.0054
Mean FEV 1 / FVC Ratio	84.03 ± 8.67	80.46 ± 8.00	0.086	79.29 ± 6.21	0.0122

Table No 02: Showing Mean Maximum Voluntary Ventilation, Mean Peak Expiratory Flow Rate and Mean Mid forced Expiratory Flow in Normal, Overweight and Obese subjects.

Parameters	Normal (n=33)	Overweight (n=33)		Obese (n=34)	
		Mean Value S. D.	P Value	Mean Value S. D.	P Value
Mean Maximum Voluntary Ventilation	40.14 ± 21.68	38.99 ± 26.94	0.849	35.45 ± 18.82	0.347
Mean Peak Expiratory Flow Rate	3.60 ± 1.39	2.91 ± 1.01	0.024	2.50 ± 1.16	0.0008
Mean Mid forced Expiratory Flow	2.51 ± 1.07	1.90 ± 0.81	0.011	1.68 ± 0.75	0.0005

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