Harsukh Educational Charitable Society
International Journal of Community Health and Medical Research
Journal home page: www.ijchmr.com doi: 10.21276/ijchmr
Official Publication of "*Harsukh Educational Charitable Society*" [Regd.]
ISSN E: 2457-0117 **ISSN P:**2581-5040 **RNI No. -** PUNENG/2017/75049 **Index Copernicus value 2016 =** 52.13

Original Article

Comparative Evaluation of Forced Expiratory Flow during 25%-75% of Expiration in Middle Aged Obese and Non-Obese Females: An Observational Study

Sonam Bansal[1], Manish Agarwal[2], Kavita Yadav[3], Yogesh Yadav[4]

[1]MSc Medicine (Physiology) Student, Department of Physiology, Dr. S.N. Medical College, Jodhpur, Rajasthan, India. [2]Resident, Department of Pediatrics, SMS Medical College, Jaipur, Rajasthan, India. [3]PhD Scholar, Department of Physiology, SMS Medical College, Jaipur, Rajasthan, India. [4]Assistant Professor, Department of Pediatrics, SMS Medical College, Jaipur, Rajasthan, India.

ABSTRACT
Background: Over-weight and obesity are one of the five primary causes of death worldwide. In various respiratory pathologies, lung function are routinely measured, which includes commonly forced expiratory volume in the first second of expiration (FEV1) or peak expiratory flow rate (PEF). Hence; we planned the present study to assess and compare the Forced Expiratory Flow during 25%-75% of Expiration in Middle Aged Obese and Non-Obese Females. **Materials & methods:** The present study included evaluation of Forced Expiratory Flow during 25%-75% of Expiration in Middle Aged Obese and Non-Obese Females. A total of 60 female subjects were included in the present study. Among these 60 subjects, 30 were obese, while the remaining 30 were non-obese. Spirometer was used for assessment of pulmonary functions. Lung volumes, capacities, and Flow were directly evaluated through the procedures of Forced Vital Capacity (FVC). The FVC procedure done were allowed for the determination of Expiratory $Flow_{25\%-75\%}$($FEF_{25\%-75\%}$). All the results were recorded and were analyzed by SPSS software. **Results:** Mean $FEF_{25\%-75\%}$ of the subjects of the obese and non-obese group were 2.48 and 2.89 respectively. Significant results were obtained while comparing the mean $FEF_{25\%-75\%}$ in between the obese group and non-obese group (P- value < 0.05). **Conclusion:** Obesity is associated with reduction in the Forced Expiratory Flow during 25%-75%.

Key words: Females, Obese, Spirometer

Corresponding Author: Dr. Manish Agarwal, Resident, Department of Pediatrics, SMS Medical College, Jaipur, Rajasthan, India.

This article may be cited as: Bansal S,Agarwal M, Yadav K, Yadav Y. Comparative Evaluation of Forced Expiratory Flow during 25%-75% of Expiration in Middle Aged Obese and Non-Obese Females: An Observational Study HECS Int J Comm Health Med Res 2018; 4(3):46-49

INTRODUCTION

Over-weight and obesity are one of the five primary causes of death worldwide, as per latest WHO report, and in medium to high-income countries, these conditions are considered among the top three risk factors for mortality. On the other hand, the silent epidemic of overweight and obesity is spreading globally, and compared to 1980, the prevalence of obesity has more than doubled in the world.[1] Obesity and diabetes are responsible for an annual 2.8 million deaths among adults around the world. Moreover, in the United States, 5% to 10% of the health-related expenditure is spent on issues related to overweight and obesity. According to data available from the WHO, 61.9% of the over 20 yr old population in Americas and 54.8% of the population in Europe has a body mass index (BMI) ≥ 25. After the US and Europe, the highest prevalence of overweight and obesity is in the Eastern Mediterranean region.[2, 3] In various respiratory pathologies, lung function are routinely measured, which includes commonly forced expiratory volume in the first second of expiration (FEV1) or peak expiratory flow rate (PEF).[4, 5] Hence; we planned the present study to assess and compare the Forced Expiratory Flow during 25%-75% of Expiration in Middle Aged Obese and Non-Obese Females.

MATERIALS & METHODS

The present study was commenced in the department of human physiology of S.N. Medical College, Jodhpur, Rajasthan, India. It included evaluation of Forced Expiratory Flow during 25%-75% of Expiration in Middle Aged Obese and Non-Obese Females. Written consent was obtained from all the subjects after explaining in detail the entire research protocol. A total of 60 female subjects were included in the present study. Among these 60 subjects, 30 were obese, while the remaining 30 were non-obese. Inclusion criteria for the present study included:

- Subjects within the age group of 28 to 46 years,
- BMI of non-obese subjects less than 30 Kg/m^2
- BMI of obese subjects more than 30 Kg/m^2

- Subjects with negative history of any other systemic illness
- Subjects with negative history of any other respiratory pathology

Spirometer was used for assessment of pulmonary functions. Lung volumes, capacities, and Flow were directly evaluated through the procedures of Forced Vital Capacity (FVC). The FVC procedure done were allowed for the determination of Expiratory $Flow_{25\%-75\%}$($FEF_{25\%-75\%}$). All the results were recorded and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- Value of less than 0.05 was taken as significant.

RESULTS

We evaluated a total of 30 obese subjects and 30 non-obese subjects with mean age of 35.2 years and 36.7 years respectively. Mean BMI of the obese and non-obese subjects was 38.1 and 26.5 Kg/m^2 respectively. Mean weight of the subjects of the obese and the non-obese group was 53.5 kg and 79.1 kg respectively. Mean $FEF_{25\%-75\%}$ of the subjects of the obese and non-obese group were 2.48 and 2.89 respectively. Significant results were obtained while comparing the mean $FEF_{25\%-75\%}$ in between the obese group and non-obese group (P- value < 0.05).

Table 1: Demographic details

Parameter	Obese group	Non-obese group
Mean age (years)	35.2	36.7
Mean BMI (Kg/m^2)	38.1	26.5
Mean weight (Kg)	53.5	79.1

Table 2: Comparison of Flow rates of subjects of different groups

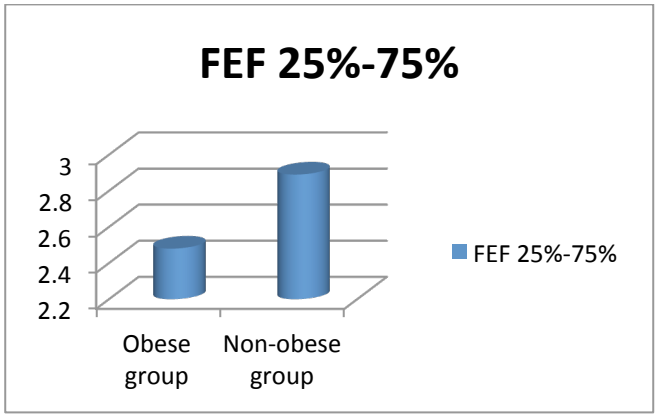
Parameter	Obese group	Non-obese group	P-value
$FEF_{25\%-75\%}$	2.48	2.89	0.02*

*: Significant

DISCUSSION

In the present study, mean $FEF_{25\%-75\%}$ of the subjects of the obese and non-obese group were 2.48 and 2.89 respectively. Significant results were obtained while comparing the mean $FEF_{25\%-75\%}$ in between the obese group and non-obese group (P- value < 0.05). determined if FEF25-75 is associated with increased childhood asthma severity and morbidity in the setting of a normal FEV1, and to determine if bronchodilator responsiveness (BDR) as defined by FEF25-75 identifies more childhood asthmatics than does BDR defined by FEV1. They concluded that a low FEF25-75 in the setting of a normal FEV1 is associated with increased asthma severity, systemic steroid use and asthma exacerbations in children.[6] Marseglia GL et al determine if there is a relationship between SAD, the outcome variable, and several allergic predictors in patients without asthma but with allergic rhinitis.

Graph 1: Flow rates of subjects of different groups



This study provided evidence that there is a relationship between SAD and allergic parameters such as nasal symptoms and eosinophils.[7] Banerjee J et al assessed the correlation between body mass index and lung functions parameters in non-asthmatics, diagnosed by spirometric values in males and females. Significant association was found between BMI and lung function parameters in obese female but not in obese male. Association was found between indices of spirometry and BMI in non-asthmatic obese group along with a gender disparity.[8] Ghabashi AE et al studied obesity in the asthmatic population and its possible correlation with spirometric variables. They reviewed the medical records of 200 patients who underwent spirometry and were followed up in a pulmonary clinic for asthma. A significant number of patients with normal FEV1 had impaired midflow rates that may reflect ongoing small airway inflammation.[9] Agondi RC et al determined whether obesity, age or a combination of the two are associated with worse spirometry parameters in patients with asthma. The spirometric values decreased significantly in proportion to the increase of BMI and age in patients with asthma, especially among young adults. There was no negative correlation between BMI and FEV(1) in the group ≥ 60 years of age, suggesting that perhaps the time of disease is a major factor in the loss of lung function than weight gain in the elderly.[10] Al Ghobain M studied the effect of obesity on spirometry tests among healthy non-smoking adults. They divided the subjects into two groups according to their BMI. The first group consisted of non-obese subjects with BMI of 18 to 24.9 kg/m2 and the second group consisted of obese subjects with BMI of 30 kg/m2 and above. Subjects underwent spirometry tests according to American thoracic society standards with measurement of the following values: the forced vital capacity (FVC), forced expiratory volume in one second (FEV1), peak expiratory flow rate (PEF) and forced mid-expiratory flow (FEF25-75). The total subjects were 294 with a mean age of 32 years. There were 178 males and 116 females subjects. We found no significant differences in FEV1 (p value = 0.686), FVC (p value = 0.733), FEV1/FVC Ratio (p value = 0.197) and FEF25-75 (p value = 0.693) between the obese and non-obese subjects. However, there was significantly difference in PEF between the two groups (p value < 0.020). Obesity does not have effect on the spirometry tests (except PEF) among health non-smoking adults.[11] Wang S et al examined the effects of body mass index on spirometric tests among adults in Xi'an city. Force expiratory volume in first second (FEV1), force vital capacity (FVC), FEV1/FVC, peak expiratory flow (PEF), and forced expiratory flow at 25-75% (FEF25-75) were measured by portable Spirometer. Lung function was analyzed according to Chinese

standard of general obesity.A total of 770 subjects were analyzed in this study, of whom 299 were males and 471 were females. FVC% (P=.037) decreased significantly in obese subjects than in nonobese subjects. FVC% (P=.02) declined significantly in overweight subjects than in normal subjects. For smoker, FEV1% (P=.03) and FVC% (P=.02) were lower notably in overweight subjects than in normal subjects. FEV1% (P=.0008), FVC% (P=.0004), and PEF% (P<.0001) were higher significantly in normal subjects than in underweight subjects.FVC notably decreased in obese people, not FEV1, FEV1/FVC, PEF, and FEF25-75. FEV1, FVC, and PEF were higher significantly in normal subjects than in underweight subjects.[12]

CONCLUSION

From the above results, the authors concluded that obesity is associated with reduction in the Forced Expiratory Flow during 25%-75%. However; further studies are recommended.

REFERENCES

1. Mathers C, Stevens C, Mascarenhas M. Global Health Risks: Mortality and burden of disease attributable to selected major risks. WHO. 2009; http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf
2. Giray Simsek H, Gunay T, Ucku R. Effects of social inequalities on coronary heart disease risk factors: a population-based, cross-sectional study in Izmir. Anadolu Kardiyol Derg. 2010; 10(3):193–201.
3. WHO. The global burden of disease: 2004 update. http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/. 2008.
4. The diagnosis and treatment of adult asthma. Wellington: New Zealand Guidelines Group; 2002. http://www.nzgg.org.nz/guidelines/0003/Summary.pdf. Accessed July 2, 2008.
5. GINA report, global strategy for asthma management and prevention [published 2007]. Global Initiative for Asthma Web site. http://www.ginasthma.org. Accessed July 2, 2008.
6. Rao DR, Gaffin JM, Baxi SN, Sheehan WJ, Hoffman EB, Phipatanakul W. The utility of forced expiratory flow between 25% and 75% of vital capacity in predicting childhood asthma morbidity and severity. The Journal of Asthma. 2012;49(6):586-592.
7. Marseglia GL1, Cirillo I, Vizzaccaro A, Klersy C, Tosca MA, La Rosa M, Marseglia A, Licari A, Leone M, Ciprandi G. Role of forced expiratory flow at 25-75% as an early marker of small airways impairment in subjects with allergic rhinitis. Allergy Asthma Proc. 2007 Jan-Feb;28(1):74-8.
8. Banerjee J, Roy A, Singhamahapatra A, Dey PK, Ghosal A, Das A. Association of Body Mass Index (BMI) with Lung Function Parameters in Non-asthmatics Identified by Spirometric Protocols. Journal of Clinical and Diagnostic Research : JCDR. 2014;8(2):12-14. doi:10.7860/JCDR/2014/7306.3993
9. Ghabashi AE1, Iqbal M. Obesity and its correlation with spirometric variables in patients with asthma. MedGenMed. 2006 Mar 1;8(1):58.
10. Agondi RC1, Bisaccioni C, Aun MV, Ribeiro MR, Kalil J, Giavina-Bianchi P. Spirometric values in elderly asthmatic patients are not influenced by obesity. Clin Exp Allergy. 2012 Aug;42(8):1183-9. doi: 10.1111/j.1365-2222.2011.03951.x.
11. Al Ghobain M. The effect of obesity on spirometry tests among healthy non-smoking adults. BMC Pulmonary Medicine. 2012;12:10. doi:10.1186/1471-2466-12-10.

Source of support: Nil **Conflict of interest:** None declared