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A COMPARATIVE STUDY OF PULMONARY FUNCTION TESTS BETWEEN SMOKERS AND SMOKING QUITTERS.

Physiology

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ABSTRACT

Introduction: Smoking leads to development of cancers, cardiovascular, respiratory diseases including COPD. it poses a health challenge in reducing morbidity and mortality in developing countries like India. Spirometry in Smokers may show reduction in lung function parameters. Cessation of smoking leads to decrease in rate of decline in pulmonary functions to almost the same level of nonsmokers. **Material And Methods:** A cross-sectional study was conducted on 50 smokers, 50 Quitters and 50 Nonsmokers total 150 healthy asymptomatic male subjects. Spirometry by Spiroexcel was Conducted according to American Thoracic society guidelines after enrolling the subject based on inclusion and exclusion criteria and collected data was analysed with using appropriate statistical methods. **Results:** Smokers and Nonsmokers were not much different in mean age and other physical parameters. Pulmonary function parameters like FVC, and FEV1 were significantly less in Smokers as compared to Nonsmokers and after cessation of smoking. Lung function parameters in Quitters were not significantly different from Nonsmokers. **Conclusion:** All the lung function test parameters show a significant decline in asymptomatic Smokers as compared to Nonsmokers and Quitters. After cessation of smoking there was not any significant difference in lung functions between Quitters and Nonsmokers. Therefore, by conducting spirometry, especially in smokers, cases may be detected at early stage and by quitting smoking the decline in lung functions &subsequent morbidity may be lessened.

KEYWORDS

INTRODUCTION:

According to the reports published by World Health Organisation (WHO) tobacco smoking killed 100 million people worldwide in the 20th century and that it could kill one billion people around the world in the 21st century also (1). In India smoking is a common habit prevalent in both urban and rural areas irrespective of mode of smoking. Tobacco has remained as one of the most important predisposing factors responsible for so many respiratory and cardiovascular diseases. Smoking leads to rapid decline in pulmonary function tests (PFTs). Smoking is the single most significant risk factor contributing to the development of COPD (2).Chronic Obstructive Pulmonary Diseases (COPD) recognised as oneof the most important causes of morbidity and mortality in chronic tobacco smokers. Smoking affect small airways are less than 2mm in diameter and leads to decline in Forced vital capacity (FVC) and Forced Expiratory Volume in the First Second (FEV1) the two most important lung function test parameters (2)

On an average, cigarette smokers have a high annual rate of decline in FEV1 of about 50 ml, which is nearly double the average value of 30 ml annually present in non-smokers (3). Smokers who quit smoking reduce their risk of developing and dying from tobacco-related diseases and progression to COPD s Approximately 70 percent of smokers say that they want to quit, and over 50 percent of Smokers report that they tried to quit in the past year. Quitting smoking early may help reduce the effects of smoking on decline of lung functions and may reduce the morbidity and mortality associated with Smoking. Being unexpensive, non-invasive and reproducible and cause minimum discomfort to the subjects, pulmonary function testing is a routine test for assessing Pulmonary functions. Spirometric values vary according to age, height, sex, and body size. Thus, cigarette smoking has extensive effects on respiratory function, which can be detected with pulmonary function test. The aim of the study was to compare the pulmonary function among smokers and non-smokers and Quitters.

MATERIALAND METHODS

A cross sectional study was conducted in the department of Physiology of Anugrah Narayan Magadh Medical College,Gaya Jee from December 2023 to June 2024. A total of 150 male subjects were included in the study including 50 smokers, 50 Nonsmokers and 50 quitters who visited or working in the institution. A pretested semi-structured questionnaire was used to gather information regarding smoking habits, occupation, medical history etc. The individuals were enrolled in the study as per the following inclusion & exclusion criteria.

Inclusion Criteria:

1. Non-smoker: According to definition non-smoker is a person who does not smoke tobacco.
2. Smoker: They are persons who are engaged in the inhalation and exhalation of fumes of burning tobacco from cigarette. Every smoker must have been smoking at least one cigarette a day for one year.
3. Quitter: Former smoker who has not smoked at least for last six months
4. Age 18-40 years.

Exclusion Criteria:

1. Those suffering from respiratory or cardio-vascular diseases like bronchial asthma, pulmonary tuberculosis, Pleurisy, chronic obstructive airway disease.
2. The person who have history of cough with sputum, haemoptysis or are ill
3. The person with occupational history of working in mills and factories or other places where lungs are affected by dust or fumes
4. those with a history of hospitalization with chronic ailment like Corona.

Spiroexcel Computerised Spirometer was used for evaluating the respiratory functions. The subjects were asked to sit comfortably on a chair. The complete procedure was explained and the subjects were instructed to breathe in fully by deep inspiration with their nostrils closed, to seal their lips around the sterile mouthpiece of the spirometer and to forcefully expire air out. The three consecutive readings were recorded and best of the three was used for the study.

The ethical clearance was obtained from the institutional ethical committee and data was collected& the results were analysed with using appropriate statistical methods.

RESULTS:

There was significant decline in FVC and FEV1 in Smokers in comparison to Nonsmokers.

Table1 Comparison In FVC And FEV1 Between Smokers And Nonsmokers

Pulmonary functions	Smokers (N)= 50	Non smokers (N)= 50	P value	Inference
FVC	2.75+-.52	3.08+-.50	<0.05	Significant

FEV1	2.22+-40	2.82+-40	<0.001	Highly Singnificant

The FVC and FEV1 parameters of pulmonary function showed significant difference between Smokers and Quitters. They were significantly high in case of Quitters.

Table2 Comparison In FVC And FEV1 Between Smokers And Quitters

Test	Smokers (N)= 50	Quitters (N)=50	pValue	Inference
FVC	2.72+-0.40	3.05+-0.42	<0.05	Significant
FEV1	2.30+-0.41	2.43+-0.41	<0.05	Significant

There was no significant difference in FVC and FEV1 between Non smokers and Quitters.

Table 3 Comparison Of FVC And FEV1 In Non-smokers And Quitters (Males)

Pulmonary Function	Quitters (N)= 50	Non Smokers (N) = 100	P Value	Inference
FVC	3.12+-0.43	3.02+-0.51	<.05	Not significant
FEV1	2.51+-0.40	2.50+-0.41	<.05	Not significant

DISCUSSION:

The results in the study show that there was significant decrease in pulmonary function(FVC and FEV1) in Smokers as compared to Nonsmokers. It is consistent with the findings, Bano et al (3) (4), (5), (6) and similar studies . FVC and FEV1 did not show any significant difference between quitter and Nonsmokers. Brchfiel et al (7) published similar findings rate of decline of FEV1 after 2years of smoking cessation was similar to Nonsmokers. Further FVC and FEV1 were significantly lower in smokers as compared to quitters. It shows the benefits of cessation of smoking as has been found in other studies like Aldo Pezzuto et al (8) who reported significant increase in FEV1after3 months of cessation of cigarette smoking. Similarly, Peter Lee et al (9) also showed significant decline in smokers as compared to Quitters. Finding in our study is consistent with these previous studies. It has been shown in many studies that performing pulmonary tests helps in quitting smoking especially in persons with advancing age and these tests show obstruction (10), (11).7. 8. 9. 10. 11. C M Brchfiel et al. Effects of smoking and smoking cessation on longitudinal decline in Pulmonary Function Am J Respir Crit Care Med. 1995 Jun; 151(6):1778-85 Aldo Pezutto et al Short-term benefits of smoking cessation along with Glycopirronium on lung function and respiratory symptoms in mild COPD patients: a retrospective study J. Breathing Reserve 2018 Aug 6;12(4): 046007 Peter N Lee, John s fry Systemic review of the evidence relating FEV1 decline to give up smokingBMC Med 2010 Dec 14;8:84 Banu Salepci et al: the effect of Pulmonary function testing on the success of smoking cessation Respiratory Care August 2016, 61 (8) 1073 - 1080 Joshua Sil Tobacco cessation and Prevention smoking and Health Volume 149 issue 4 supplement, A591, April 01, 2016.

CONCLUSION:

Smoking leads to decline in FVC and FEV1. Cessation of smoking leads to improvement in lung functions and it may be not much different FVC and FEV1 in Nonsmokers. Quitting smoking may help in improvement of Pulmonary function and may reduce the sharper decline in FVC and FEV1 in Smokers and thus may help abetting the complications of morbidity and mortality associated with smoking. Showing Lung Function tests result to smokers helps in smoking cessation.

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