



A COMPARATIVE STUDY OF PULMONARY FUNCTION BETWEEN SMOKERS AND NON-SMOKERS IN RURAL POPULATION OF ATARIA, SITAPUR, LUCKNOW, UTTAR PRADESH

Physiology

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ABSTRACT

AIMS AND OBJECTIVE:-To study the differences in pulmonary function test values in smokers and non-smokers and their variation from other reported values for smokers by other studies and to study the influence of smoking on pulmonary function.

METHODS AND MATERIAL:-The study population includes 100 subjects. 50 subjects comprised smoker group and 50 subjects for non-smoker group and was carried out in the department of physiology, Hind institute of medical sciences and Hospital, Mau, Ataria, Sitapur, Lucknow by using computerized spirometer.

RESULT:-The observed value of pulmonary functions in mean± standard deviation, FVC was 3.17 ± 1.05 litres, FEV1 was 2.63 ± 0.97 litres, FEV1% was 84.22 ± 27.22 , PEFR was 7.7 ± 1.89 litres/minute, and FEF25-75% was 4.26 ± 0.89 litres. The observed value of pulmonary functions in rural smoker population in mean± standard deviation, FVC was 2.46 ± 0.75 litres, FEV1 was 2.31 ± 0.92 litres, FEV1% was 84.00 ± 22.62 , PEFR was 5.65 ± 2.18 litres/minute, and FEF2575% was 3.23 ± 1.27 litres.

CONCLUSION:- There was significant decrease in pulmonary function in the rural smoker population in comparison to the non-smoker population.

KEYWORDS

Pulmonary function test, smokers, non-smoker, Spirometer.

INTRODUCTION

The World Health Organization (WHO) reported that tobacco smoking killed 100 million people worldwide in the 20th century and warned that it could kill one billion people around the world in the 21st century also. (1). 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 test. (PFTs)(2). Chronic obstructive Pulmonary Disease (COPD) has been recognized as one of the most important causes of morbidity and mortality in chronic tobacco smokers worldwide (3). Tobacco is the biggest external cause of non-communicable disease and is responsible for more deaths than adiposity, both in high income countries and globally (4). Tobacco smoking is an intentionally invited Health hazards. The U.N Health agency reports that about 4.9 million people die each year across the globe due to cigarette smoking (5). The overall death rate for male smokers is 70% greater than that for male non-smokers. In United States 4.40,000 premature deaths are attributed to tobacco smoking trends are reversed, the figure expected to rise to 10 million deaths per year by 2020 or early 2030.(6) with 70% of those death occurring in developing countries. Tobacco contains number of substances which may exert some effects upon body. During burning of tobacco in cigarettes, various processes such as pyrolysis, Prosynthesis, Distillation, sublimation, hydrogenation, oxidation, decarboxylation, dehydration result in generation more than 4000 identifiable compounds present in tobacco itself or new compound generated thereof. The smoke is composed of fine aerosol with a particle size distribution predominantly in the range to deposit in the airways and alveolar surface of lung and vapour phase. They include particles of smoke dust which disturb the function of respiratory airways. Tars which exert an irritant effect upon bronchial epithelium (tar is the aggregate of particular matter after subtracting nicotine and moisture) and nicotine which increases heart rate and elevate systolic blood pressure. The tobacco smoke inhalation causes an immediate rise in the airway resistant which persists for at least an hour. This is due to vagally mediated smooth muscle constriction presumably by way of stimulating sub mucosal irritant receptors. Experimental studies have shown that prolonged cigarette smoking impairs ciliary movements, inhibition of function of alveolar macrophages, leads to hypertrophy and hyperplasia of mucus secreting glands. It is probable that smoke also inhibits antiproteases and causes polymorphonuclear leucocytes to release proteolytic enzymes acutely. Cigarette smoking is by far the most important risk factor for COPD.(7)

MATERIAL AND METHODS.

The study was carried out in the department of physiology, Hind institute of medical sciences and Hospital, Mau, Ataria, Sitapur,

Lucknow. The study population includes 100 subjects. 50 subjects comprised smoker group and 50 subjects for non-smoker group. The test was done between 11:00 a.m. to 04:00 p.m. to avoid diurnal variation. The subjects selected for present study were recruited from medical outpatient department at our institution. Prior consent was obtained from ethical committee. Informed consent was taken from the study participants before performing the pulmonary function tests. For this study computerized spirometer, RMS Helios 701 with a flow range of ± 14 litres per second with overall accuracy of $\pm 1\%$ using standard 3 litres calibration syringe was used.

SELECTION CRITERIA

- 1) Non Smokers: - According to definition non-smoker is a person who does not smoke tobacco (8). A passive smoker refers to exposure to tobacco consumption products from smoking of others (9).
- 2) Cigarette Smokers:- They are persons who are engaged in the inhalation and exhalation of fumes of burning tobacco in cigarettes. By definition cigarette smokers are the person who inhale, exhale and burn or carry any lightened cigarette. Every smoker must have been smoked at least five cigarettes a day for a period of more than 10 years and subjects who did not smoke at all were included in non-smokers group.

Exclusion Criteria:-

1. Asthma and COPD Patients.
2. Chronic infections such as TB or other infections of lungs.
3. Recent MI less than one month old.
4. Subjects with respiratory symptoms such as cough.
5. Presence of an acute disease process that might interfere with test performance (e.g. Nausea, Vomiting etc.).
6. Subject has not performed vigorous exercise within half an hour.
7. Subject has not smoked within an hour.
8. Subject has not consumed alcohol within four hours.
9. Females were not included in this study.
10. The person who worked in textile mills or other places where lungs are affected by dust or fumes.
11. The person who were morbid or full-fledged picture of cor pulmonale on clinical examination.

A detailed history and general examination was done to rule out exclusion criteria before performing pulmonary function test. Each person was allowed to rest for about two minutes before the actual test. The details of the test were explained and demonstrated to each of them. All the measurements were recorded with the subject in standing position and wearing nose clips (10).

AIMS AND OBJECTIVE.

1. To study the differences in pulmonary function test values in smokers and non-smokers and their variation from other reported values for smokers by other studies.
2. To study the influence of smoking on pulmonary function.

STATISTICAL ANALYSIS.

The data is expressed in mean \pm S.D. Standard error of difference between two means z value and p value. Comparison between the two groups was done using the z test taking p value < 0.05 as significant.

RESULT.

The observed value of pulmonary functions in mean \pm standard deviation, FVC was 3.17 ± 1.05 litres, FEV1 was 2.63 ± 0.97 litres, FEV1% was 84.22 ± 27.22 , PEFR was 7.7 ± 1.89 litres/minute, and FEF25-75% was 4.26 ± 0.89 litres. The observed value of pulmonary functions in rural smoker population in mean \pm standard deviation, FVC was 2.46 ± 0.75 litres, FEV1 was 2.31 ± 0.92 litres, FEV1% was 84.00 ± 22.62 , PEFR was 5.65 ± 2.18 litres/minute, and FEF25-75% was 3.23 ± 1.27 litres.

CONCLUSION

Pulmonary function test were markedly lower with increasing age in smokers compare to that in non-smokers. There is decline in all parameters of pulmonary function tests when there is an increase in number of cigarettes smoked per day as well as increase duration of smoking. This suggests that severity of COPD directly proportional to number of cigarettes smoked per day and duration of smoking. Finally it may be concluded that smoking causes definite pulmonary function impairments specially the obstructive type.

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