

ABSTRACT

Introduction

Smoking is a serious public health problem and a major cause of many preventable diseases and premature deaths. 'Smoking is injurious to Health' is written in almost all the tobacco products. Despite this, tobacco smoking is widely prevalent in developed as well as developing countries. Cigarette smoke contains more than 3000 compounds proved to be toxic and carcinogenic. Smoking affects almost all parts of respiratory system causing inflammation, goblet cell metaplasia, squamous metaplasia, mucus plugging of small airways and destruction of alveoli. These changes in airways are responsible for pathophysiological effects and causes major respiratory diseases like asthma, COPD, etc. Pulmonary Function Test is relatively simple, non invasive method for measuring the flow and volume of air from full lung inflation as a function of time using forced manoeuvres. The common parameters measured in PFT are PEFV and MVV.

Aims and objectives:

This study is aimed to find out the following in rural population of Kanyakumari district, Tamilnadu.

1. To study the effects of tobacco smoking on pulmonary function tests.
2. To determine the effects of tobacco smoking on small airway function
3. To know whether there is any statistically significant difference in small airways function as measured by spirometry among asymptomatic smokers and non-smokers.

Materials and methods

The study was done in Department of Physiology, SMIMS. 100 male subjects of age group 20-40 years who were asymptomatic smokers; who smoke more than 5 cigarettes per day for more than 1 year were included in Group I. Group II had 100 male subjects of same age group who were non-smokers. Pulmonary function test was performed using computerized spirometer. The actual and predicted values of forced vital capacity (FVC), forced expiratory volume in 1 second (FEV_1); Ratio of FEV_1/FVC , Forced expiratory flow or maximum mid expiratory flow rate $FEF_{(25-75\%)}$ and Peak expiratory flow rate (PEFR) were calculated. Statistical analysis of two groups were done by unpaired 't' test and multiple groups were done by one way ANOVA and p value less than 0.05 was considered statistically significant.

Result:

In smoker group the actual value of FVC, FEV_1 , ratio of FEV_1/FVC , $FEF_{(25-75\%)}$ and PEFR were reduced compared to non smoker group. There were also reduction in lung function parameter as the duration of smoking increased. The study also showed a decrease in lung function parameters as the number of cigarettes smoked per day.

Discussion:

The significant decrease in $FEF_{(25-75\%)}$ and PEFR suggest that upper airways as well as smaller airways are affected in smoker. The airways also become hyper responsive and bronchoconstriction and airway resistance occurs. Characteristic pathophysiological changes occurring in smoking are inflammation, squamous metaplasia, goblet cell changes and structural changes of alveoli. These changes are

responsible for physical alterations in respiratory disease like asthma, COPD etc. The effect of smoking on lung tissue depends on extend of smoke exposure to the lung; both in form of duration of smoking and the number of cigarettes smoked. This may be done to accumulation of inflammatory exudates, increased production of mucus, changes in surface tension and altered smooth muse.

Conclusion:

The study showed decrease in actual values of FVC, FEV, ration of FEV_1/FVC , $FEF_{(25-75\%)}$ and PEFr in smokers compared to non smokers. The decrease in the values was proportionate with increase in the number of years smoked and duration of smoking. This showed a clear dose response relationship. This it was found that both upper larger and smaller airways get affected due to tobacco smoke exposure. Regular spirometry screening was suggested to smokers to evaluate their pulmonary functions. Health education on hazards of smoking and banning of smoking in public places has to be encouraged.

Key words: Smoker, Non-smoker, Pulmonary function test.