Nat. Volatiles & Essent. Oils, 2021; 8(5): 1428 - 1433

NVEO
Natural Volatiles & Essential Oils

Effect Of Smoking On Young Adult Smokers & Non-Smokers From A Rural Area Of Central India

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Abstract

Introduction : Cigarette smoking is associated with cancer, respiratory diseases, and cardiovascular diseases. WHO has projected COPD i.e. Chronic Obstructive Pulmonary Disease as the third leading cause of death by the year 2030. Amongst them smoking is found to be a major risk factor in its causation . The study is designed to understand the effects of smoking on lung functions and to compare the effects with age and sex matched non smokers. **Material & Methods:** Sample size was 100 smokers and non-smokers. Values of Pulmonary Functions (Forced Vital Capacity, Forced Expiratory Volume1, Ratio of Forced Expiratory Volume1 and Forced Vital Capacity, Peak Expiratory Flow Rate and Forced Expiratory Flow 25%-75%) were obtained by a spirometer (RMS Medspirror Helio lung function test, Recorders and Medicare system (P) Model 401) . **Results:** A significant decrease in all pulmonary functions was observed (p value less than 0.05) in smokers when the same were compared to pulmonary functions of non smokers. FEV1 was the most significantly affected lung function suggesting obstructive disorder.

Obstructive respiratory impairment was the most common observation in the selected population of smokers & non smokers. **Conclusion:** Current study demonstrate smoking as the possible cause of obstructive impairment in pulmonary functions in smokers

Key Words: Pulmonary Functions, Rural , smokers, Non smokers

Introduction

The WHO report was published in 2015 on the global tobacco epidemic. As per the report the largest preventable risk factor for non communicable diseases is use of tobacco. It is responsible for more than adiposity in both high income countries as well as globally (1)

Cigarette smoking is associated with cancer, respiratory diseases, and cardiovascular diseases. WHO has projected COPD i.e. Chronic Obstructive Pulmonary Disease as the third leading cause of death by the year 2030. Amongst them smoking is found to be a major risk factor in its causation (2) . About the 4.9 million deaths reported each year due to smoking across the globe . (3)

The smoke of tobacco inhalation increases airway resistance. Presumably this could be due to stimulation of sub mucosal irritant receptors . some more effects of prolonged smoking are

- Impaired ciliary movements
-Mucosal glands undergo hypertrophy and hyperplasia
-Impaired functions of macrophages in alveoli
-secretion of proteolytic enzymes by polymorphs

As a result smokers have deranged pulmonary functions and greater COPD mortality rate due to decline in pulmonary functions , to be more precise, decline in FEV1and the reduced ratio of

FEV1/FVC . Burning of tobacco leads to development of number of processes that leads to generation of many compounds present in tobacco itself or sometimes it leads to formation of certain new compounds . The smoke due to cigarette burning is composed of a fine aerosol having a particle size capable of getting deposited predominantly in the airways and alveolar surface of lung . (4) The same particles of smoke dust also leads to irritation of the epithelium of the bronchi disturbing the function of respiratory airways.

Hence assessment of pulmonary functions is a useful measure for the assessment of respiratory impairment .

For the diagnosis and therapeutic purposes expiratory flow rate studies serves important functions. A differential diagnosis between COPD and restrictive lung disorders is also being done by studying FVC and FEV1.

Taking cognisance of the effects of smoking this study was designed to study the effects in smokers.

Aim: To understand the effects of smoking on pulmonary functions and to compare the effects with age and sex matched non smokers.

Objectives:

1. To study the effects of smoking on pulmonary functions
2. To compare the pulmonary function values of smokers with non-smokers.
3. To understand the type of respiratory impairment obstructive, restrictive or both .
4. To create awareness in the society about the health hazards of smoking

Methodology

The study was carried out at Datta Meghe Medical College Nagpur The subjects for this study were selected from the medicine OPD of & by personal contacts. 100 patients were selected for the study . 42 smokers and 44 non smokers turned up for the study.

Inclusion criteria

- Males
- Age 18 -40 years
- Smokers with minimum daily consumption of 5 cigarettes for more than 1 year
- Age and sex matched non smokers

Exclusion Criteria

- Females
- Passive smokers
- Known cases of COPD
- Age more than 40 years
- History of any respiratory disease
- willingness to quit
- Persons working in textile or some such industry where already lungs are affected by dust or similar substances

Demographic data of the participants was recorded comprising of age,sex , weight, height and a history of smoking in terms of duration(number of years) and number of cigarettes per day . The subjects were briefed in detail about the study and an informed written consent was obtained . A thorough general examination of the subjects including height, weight, vitals and a thorough

systemic examination was done to rule out any other medical problems to avoid confounding result.

Tool

Expiratory flow volume values were recorded using a spirometer (RMS Medspirror Helios 401 lung function test).

Model : Recorders and Medicare system (P) Model 401) .

All the subjects were briefed about the procedure along with a demonstration .The subjects were asked to take deep inspiration from atmospheric air and then to expire as forcefully and as fast as he can inside the spirometer. Values obtained were

- Forced Vital Capacity
- Forced Expiratory Volume1
- Ratio of FEV_1/FVC
- Peak Expiratory Flow Rate
- Forced Expiratory Flow 25-75%,

Statistical Analysis

The data is expressed as mean ±SD , standard error of difference between two means, z value and p value . p value less than 0.05 is taken as significant .

Observation & Results

A total of 86 male participants, 42 smokers and 44 non-smokers matched for age, height, weight participated in this study.

The values of various pulmonary function tests in smokers were compared with the controlgroup i.e. non smokers group. Through this study we tried to study the pulmonary function among smoker and non- smoker population in a rural area in Central India.

The study was a case-control study between 42smokers (subjects) and 44 non-smokers (control) aged 18-40 .

The observation and results are presented in tables

The history of smoking is depicted in Table 1

The statistical data as shown in table 2 shows significant decrease in pulmonary functions (p value less than 0.05) in smokers as compared to nonsmokers .

Reduction in FVC suggests restrictive lung disease whereas reduced FEV1, PEFR and FEV1/FVC is considered as obstructive lung disease.

In this study rural smokers showed a significant decrease in FEV1 and FEV1/FVC as compared to other lung volumes .

FEV1 was the most significantly affected lung function suggesting obstructive disorder .

55 subjects from both the groups (smokers and non smokers) had no respiratory disorder (normal pulmonary functions) But 23 had respiratory impairment out of which 22 were smokers and only 1 nonsmoker (Table 3)

Discussion

In both urban and rural India smoking is a common habit. The smoking leads to many respiratory diseases like chronic bronchitis, bronchial carcinoma and emphysema. India is a country where

majority of population lives in villages and they are linked to each other through a common occupation , agriculture, the pulmonary functions are bound to vary in smokers as compared to non smokers. Pulmonary function tests has become a routinely used clinical investigation to assess respiratory functions.. Even they have become a routine part of health check up in public health screening . Decline in all the parameters of pulmonary functions is seen with the increase in the number of cigarettes per day as well as the duration of smoking . it clearly indicates severity of COPD increases with duration in terms of years of smoking and number of cigarettes smoked per day (4).

In a study conducted in four different parts of India the prevalence of COPD was seen as 4.1% with male to female ratio of 1.56:1 and a smoker to non smoker ration of 2.65:1. (5)

Mhase and Reddy also reported reduced FEV1 ,PEFR and FEF 25-75% in smokers as against non smokers (6)

In a study carried out in active and passive smokers against non smokers reults showed lower lung functions in both groups of smokers & nonsmokers (7)

In our study 33% smokers had obstructive impairment, 14% % restrictive an5% had both obstrucyive and restrictive pattern (mixed) pattern . In non smokers group 98% had normal pulmonary functions . These findings are similar to a study conducted in rural area of Gujrat (8)

Same findings of decline in pulmonary functions (FVC,FEV!,FEV1/FVC ratio, PEFR and FEF 25-75%) that were statistically significant were reported by mistry et al (4).

Similar findings of impairment of lung functions were reported in 3 more studies by Dhand et al ,Malo et al , Pandya et al (9,10,11).

In the present study 86 subjects participated. Amongst them 55 had no respiratory disorder (normal pulmonary functions) But 23 had respiratory impairment out of which 22 were smokers and only 1 nonsmoker.

Using the same findings awareness in the rural area against smoking was created by organizing meetings, showing video films depicting the effects of smoking on health.

Conclusion :

It can be concluded that obstructive respiratory impairment was the most common observation in the selected population of smokers and non smokers.

Limitation:

The study involved a small sample size and did not include passive smokers.

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Tables

Table 1 : History of Smoking in smokers

Number of smokers	Number of cigarettes per day	Number of years of smoking
21	5	10
10	7-8	7
09	10 -15	8
02	more than 15	5

Table 2 : Pulmonary functions in Smokers & Non Smokers

Sr. No.	Pulmonary function test		smokers	Non Smokers	P Value
1	FVC(L)	Mean	2.17	3.2	0.5882
		S.D.	±1.02	±1.10	
2	FEV1(L)	Mean	1.8	2.6	0.00001
		S.D.	±2.0	±0.72	
3	FEV1/FVC(%)	Mean	71.45	82.56	0.00004
		S.D.	±21.40	±11.20	
4	FEF25-75(L/S)	Mean	1.92	2.9	0.08
		S.D.	±2.1	±1.6	
5	PEFR(L/S)	Mean	4.18	5.9	0.04963
		S.D.	±2.8	± 2.1	

Table 3 Pattern of respiratory impairment in Smokers and Non smokers

PFT pattern	Smokers number (%)	Non smokers Number (%)	Total number (%)
Normal	12 (27.%)	43 (98%)	55 (64%)
Obstructive	14 (33.%)	1 (0%)	15 (17%)
Restrictive	6 (14%)	0 (2%)	6 (7%)
Mixed	2 (5%)	0 (0%)	2 (2%)
Total	42	44	86

Table 4 : Comparative study of lung function tests

Sr. No.	Pulmonary function test		Non-smokers	Smokers	P Value
1	FVC (L)	Mean	3.1	1.96	P<0.05
		S.D.			
2	FEF 25-75 (L/S)	Mean	2.4	1.82	P<0.05
		S.D.			
3	PEFR (L/S)	Mean	5.93	3.4	P<0.05
		S.D.	1.92		
4	FEV1 (L)	Mean	2.6	1.20	P<0.05
		S.D.	0.51	0.39	
5	FEV_1/FVC (%)	Mean	82.56	71.45	P<0.05
		S.D.	9.35	14.28	