A study of the effect of smoking on pulmonary function tests in AL - Kindy teaching hospital, Baghdad

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ABSTRACT

Background: In Iraq smoking is a common habit in both the urban and rural areas. There are many respiratory diseases like chronic bronchitis, bronchial carcinoma and emphysema which are related to chronic tobacco smoking.
Objectives: To study the effect of tobacco smoking on the respiratory system, to establish a correlation between chronic tobacco smoking and its effects on the parameters which were studied and to create awareness in tobacco smokers about the effects of tobacco on their health
Method: In this study 100 male subjects, 50 chronic smokers and 50 non- smokers were assessed for their pulmonary function tests by using a computerized spirometer.

Results: Almost all their respiratory parameters were significantly reduced. In the present study obstructive lung dysfunction was the commonest finding in smoker
Key words: Smoking, pulmonary function tests (P.F.T) urban and rural population.

The World health organization 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]. The classification criteria as suggested by WHO (1998) was [2]:
Smoker; Someone who, at the time of the study, smoked any tobacco products either daily or occasionally. *Non-smoker*; Someone who, at the time of the study, did not smoke at all. Ex-smoker; someone who was formerly a daily or occasional smoker, but currently does not smoke at all.
Tobacco smoking is a well recognized risk factor for the development of coronary heart diseases, angina pectoris and sudden cardiac death [3]. Besides the direct consequences of smoking on smokers, passive smoking by non-smokers who are exposed to tobacco smoke also has shown an increased risk of respiratory and cardio vascular problems in children [4].There is approximately a 50 % increase in the smoking rates in the low-income countries [5].

In Iraq, smoking is a common habit in both the urban and rural areas in the form of cigarettes, pipes, cigar, etc [6]. Cigarette smoking has an extensive effect on the respiratory function and it has been clearly implicated in the etiology of respiratory diseases like chronic bronchitis, emphysema and bronchial carcinoma [7] After the inhalation of cigarette smoke, nicotine is quickly distributed to the brain and it can affect the central nervous system instantaneously [8].

Nicotine affects the cardiovascular system first by stimulating and then paralyzing all the autonomic ganglia and so, at first, there is cardiac slowing, followed by the acceleration of the heart rate [9]. Tobacco smoke contains about 4000 chemicals out of which 60 are known carcinogens which can lead to lung cancer [10]. The known

chemical constitutes of tobacco smoke include Acetone, Ammonia, Arsenic, Butane, Cadmium, Carbon monoxide, Hydrogen Cyanide, Methane, Toluene, Naphthalene and Vinyl chloride. The smoke of cigarettes is acidic (PH 5.3) and nicotine is relatively ionized and insoluble in the lipids. Only a desired amount of nicotine is absorbed if it is taken in to the lungs where there is an enormous surface area for lower lipid solubility. Cigarette smokers, therefore, have a high rate of death due to lung cancer [11].

Method. The present cross sectional study was conducted Al Kindy teaching hospital, respiratory unit from April 2010 to June 2010. The study population included 100 male subjects who were aged 30-60 years. It comprised of 50 smokers and 50 smokers and 50 non- smokers. Females were not included in this study considering low prevalence of smoking and not reporting .Tobacco smoking and not reporting by the females of their smoking habits.

Individuals with a history of cigarette smoking, daily for at least one year, were considered as smokers and they were selected voluntarily . Smokers with a smoking history of less than six months and ex-smokers with a history of any major illness in the past were excluded from the study.

The selection criteria for the control group were 50 healthy non smokers males age almost same at that of experimental group with no history of smoking of any type. It was ensured that none of them had any significant present or past history of sicknesses, particularly those of the respiratory system.

The materials which were used in this study were a computerized spirometer, a weighing machine and a measuring tape. 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 best three readings were recorded and interpreted

The obtained data was tabulated statistically and analyzed by using various standard statistical methods. In our study, almost all the smokers were deep inhalers. Deep inhaler means that they drew in the cigarettes with prolonged inspiration and exhaled through the mouth or the nose. Others are considered as 'Puffers' on calculating the mean and the standard deviation in the smoker and non-smokers Table1.

Results. The physical parameters of the smokers and the non- smokers are shown in table 1. The age range of the subjects was 3060 years, with a mean age of 49.25 years in the smokers and a mean age of 49.10 in the non- smokers. There was no significant difference in the mean of the other physical parameters like height, weight, body mass index and body surface area in the smokers and non-smokers.

Table 1: Physical characteristics of smoker and non-smokers.

Variables	Smokers Mean ±2 S.D.*	Non-Smokers Mean ±2 S.D.*
Age (Year)	49.25 ± 10.08	49.10 ±10.50
Height (M)	1.66 ± 0.10	1.67 ± 0.11
Weight (Kg.)	68.4 ± 8.4	67.4 ± 11.2
Body Mass index (BMI)	24.50 ± 3.10	23.10 ± 3.37
Body surface area (m2)	1.71 ± 0.02	1.73 ± 0.10

The mean values of all the pulmonary function tests were significantly reduced in the smokers as compared to the nonsmokers. The impaired PFT in the smokers was found to be statistically significant, on applying the unpaired (t) test of significance, table2.

Table 2: Pulmonary function test among smokers and non-smokers.

Significance P Value*	non-Smokers Mean ± 2 S.D.	Smokers Mean ± 2 S.D.	Pulmonary Function test
0.3240 (S)	3.10 ± 1.09	2.97 ± 1.04	FVC
0.000694 (HS)	2.84 ± 0.80	2.40 ± 1.11	FEV1
0.003605 (HS)	87.45 ± 10.40	82.90 ± 21.80	FEV1/FVC
0.000031 (HS)	5.80 ± 3.42	4.29 ± 3.46	PEFR
0.00190 (HS)	2.60 ± 1.70	2.11 ± 2.11	FEF
0.00002 (HS)	100.6 ± 32.66	82.1 ± 40.20	MVV

P < 0.001 highly significant.

In our study, 36.0 % were obstructive changes which were the most common, followed by the restrictive (8.0%) and the mixed (4.0%) changes. 98%

non-smokers had normal PFT results, table3.

Table 3: Interpretation of PFT results in smokers and non-smokers.

Total No. (%)	Non-smokers No. (%)	Smokers No. (%)	PFT Result
19 (19.0)	1 (20)	18 (36.0)	Obstructive
4 (4.0)	0 (0.0)	4 (8.0)	Restrictive
2 (2.0)	0 (0.0)	2 (4.0)	Mixed
75 (75.0)	49 (98.0)	26	Normal
100	50	50	Total

Discussion. There was no significant difference in the mean physical parameters like age, height, weight, body mass index and body surface area, association between the smokers and the non-smokers (p<0.001) and this was similar to the observations on the impairment of the lung function in smokers, as was reported by Dhand et al [12] Gosavi et al [13] and Pandya et al [14]. Malo [15], Angelo [16] and Indian workers like Mahajan et al [17] and Gupta et al [18] observed that there was no change in the FVC of the smokers and the non-smokers.

In the present study, out of a total of 100 study subjects, 75 had normal lung functions and 25 had impaired lung functions, out of which 24 were smokers and only one was a non-smoker. The smokers had an 18 times more risk of having impaired pulmonary functions as compared to the non-smokers. A fall in the FVC indicated restrictive lung changes and a fall in the FEV, the PEFR and others indicated obstructive lung diseases.

In the present study, obstructive lung dysfunction was the commonest finding in both the smokers and the non-smokers (2%). Cigarette smoking has extensive effects on the respiratory functions and it has been clearly implicated in the etiology of a number of respiratory diseases, particularly chronic bronchitis, emphysema and bronchial carcinoma. Beedi contains an unrefined form of tobacco as compared to the cigarettes.

Smoking may directly induce an arterial endothelial injury and increased platelet consumption may reflect the adherence or the deposition of these cells, to damage site was suggested by Hind C.R. [19].

In conclusion, tobacco smoking, in the form of cigarettes, has a deleterious effect on the health, mainly on the pulmonary functions. In this study, cigarette smoking was found to lead to the reduction of almost all the pulmonary function parameters and obstructive impairment was the commonest finding. Hence, the risk of respiratory mortality or morbidity is high with chronic tobacco smoking.

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