The effect of cigarette smoking on the clinical outcome of pulmonary tuberculosis in Iraq

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ABSTRACT

Background: Tobacco smoking and tuberculosis (TB) are two major public health problems; Associations between smoking and tuberculosis including death from tuberculosis have been reported , A reduction in smoking could be expected to have a significant impact on TB incidence and prevalence .

Objectives: to assess the effect of smoking on tuberculosis.

Methods: This study was conducted from June 2011 to June 2012 in 200 patients, adult (aged 17 years and more), newly diagnosed patients of pulmonary tuberculosis, at the chest and Respiratory Disease Specialized Center in Baghdad. Demographic data, presenting symptoms, data on smoking, and recurrence of disease were compared. Information on smoking status, tobacco smoking was collected from patients using a specialized questionnaire.

Smoking categories were grouped into ever for current / past smokers) and never.

Results: A total of 200 patients with pulmonary tuberculosis, including 116 smokers and 84 non-smokers, were evaluated. The smokers were higher than non-smokers. Smokers were mostly male (p=0.001) there was statistically difference (P value = 0.05) for the duration of smoking, and for the number of cigarettes per day (p < 0.001). Regarding the symptoms of TB, there was statistically difference in occurrence of hemoptysis (P value 0.034) but there was no statistically difference between smokers and non-smokers in relapse rate.

Conclusion: We conclude that smoking may increase the risk of pulmonary TB in men. The risk increase with increasing the duration of smoking and the number of cigarettes smoked. Hemoptysis significantly different with regard to the patients' smoking status.

Keywords: smoking, tobacco, tuberculosis.

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Globally, TB and smoking are simultaneously increasing, both of which could damage the lungs, and interact at an immunologic and cellular level [1].

Studies investigating the association between smoking and TB have been published since 1918 [2]. Smokers had very high TB mortality, as much as nine times than those who had never smoked, but once they quit , the risk reduced substantially [3] .

There is some evidence that suggests that active smoking is a risk factor for progressing from latent tuberculosis infection to reactivation and TB mortality [4]. Passive smoking was also found to constitute a risk factor for pulmonary tuberculosis; tobacco control could become one of the key pillars of TB control [5].

Thomas investigated predictors of recurrence among TB patients in South India and showed that a higher relapse rate was independently associated with smoking [6].

The association of smoking with pulmonary tuberculosis might be explained by a reduced specific immunity and possibly enhanced non-specific inflammatory response [7].

Smoking has been associated with change in pulmonary macrophages [8] and lymphocytes [9], which play a major role in cellular immunity. It has been noted that in some countries the differences in TB disease rate by sex begin to be seen in age when young men start smoking [10].

However, not all studies yielded positive associations between smoking and TB. For example, in Chengdu, Szechuan Province, China, a positive association was identified, but only in association with alcohol consumption [11], while, in a case-control study carried out in Malawi, no association at all was identified [12]. The aim of this study was to assess the effect of smoking on tuberculosis.

Method. This study included 200 patients, was conducted from May 2011 to May 2012 in newly diagnosed patients of pulmonary tuberculosis, at the chest and Respiratory Disease Specialized Center in Iraq.

Demographic data taken include, presenting symptoms, smoking history, history of previous TB were obtained from the patients. AFB smear microscopy and or mycobacterial culture of sputum, or bronchial wash (for Patients could not produce sputum) used as diagnostic a method for pulmonary tuberculosis. The following data on tobacco smoking were collected from the patients at the time of the interview; smoking status, Age at which smoking started, Duration of smoking, Number of cigarette smoked / day. Smoking categories were grouped into ever (for current / past smokers) and never. A never smoker was defined as one who had never smoked as many as one cigarette a day. Current smoker was defined as a person who smoked daily or occasionally. Past smokers were defined as persons who had quit smoking (at any time) before visiting the center . Smoking habit was categorized; mild with 1 - 10, moderate 11 - 20 , and heavy > 20 cigarettes smoked per day . Patients with hookah smoking and those with smear negative for AFB were excluded from the study.

Statistical analysis was performed with the SPSS 19 (statistical package for social sciences) and also

Microsoft Excel 2010. Descriptive statistics were processed upon the nature of the character. For categorical data count and percentage were used.
Data analysis was done using paired sample chi-square test for non-categorical data. The P - value of ≤ 0.05 was used as the level of significance.

Results. In total, newly diagnosed smear-positive pulmonary tuberculosis patients (n = 200), were involved in the study. 116 patients were smokers with mean age 42.25 ±13.70 and 84 were non-smokers with mean age 37.01 ±17.51. The smokers were higher than non-smokers as shown in figure 1.

Table 1 shows the basic characteristics of the patients, the gender type was 68 females only 10 were smokers and 58 were non-smokers , while the male group 132 male 106 were smokers and 26 were non-smokers, there was a statistical difference in two groups (P value was 0.001). When the patients divided according to age into two groups (< 60 years and ≥ 60 years) there was no statistically difference in the two groups.

In table 2, The smokers was classified on the basis of smoking duration into following two groups : < 10 years and ≥ 10 years , there was statically difference (P value 0.001) in the two groups .

The table 3, showed the association between relapse of tuberculosis and smoking, in which there is no statistically difference between smokers and non-smokers (P value > 0.05).

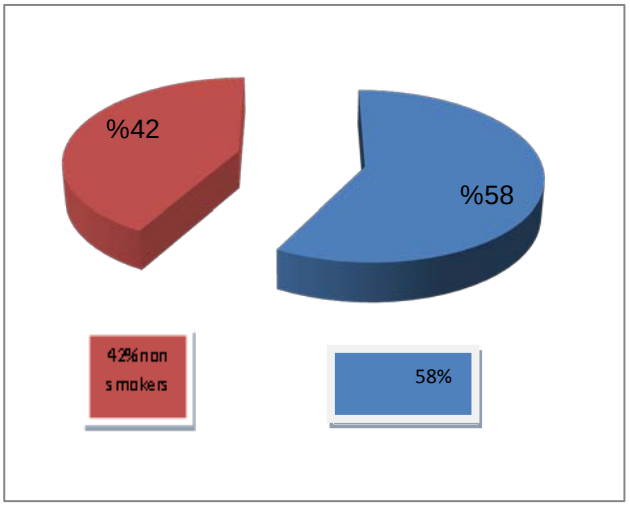

Figure1 : Distribution of TB patients according to smoking habit.

Table 1 : Basic characteristics of the patients.

		Smoking habit				P value
		No		*Yes*		
		Count	*%*	*Count*	*%*	
Gender type	*Female*	58	69.05	10	8.62	0.001
	Male	26	30.95	106	91.38	
	Total	84	100.0	116	100.00	
Age groups	*< 60 years*	70	83.33	100	86.21	0.574
	≥ 60 years	14	16.67	16	13.79	
	Total	84	100.0	116	100.0	

Table 2 : Association between Duration of smoking and tuberculosis.

	Count	%	P value
< 10 years	13	11.21	0.001
≥ 10 years	103	88.79	
Total	116	100.00	

Table 3: Association between relapse of tuberculosis and smoking.

Relapse	Smoking habit				P value
	No		Yes		
	Count	*%*	*Count*	*%*	
No	69	82.14	89	76.72	0.337
Yes	15	17.86	27	13.28	
Total	84	100.00	116	100.00	

Table 4 : Number of cigarettes smoked per day.

	Count	Percentage	P value
< 10 cigarette	6	5.17	< 0.001
10 - 20 cigarette	19	16.38	
>20 cigarette	91	78.38	
Total	116	100.00	

Table 5 : Relationship between symptoms of TB and smoking.

		Smoking habit				P value
		No		Yes		
		Count	%	Count	%	
Cough	N	5	5.95	3	2.59	0.231
	Y	79	94.05	113	97.41	
	Total	84	100.00	116	100.00	
Sputum	N	13	15.48	11	9.48	0.198
	Y	71	84.52	105	90.52	
	Total	84	100.00	116	100.00	
Hemoptysis	N	57	67.86	59	50.86	0.034
	Y	27	32.14	57	49.14	
	Total	84	100.00	116	100.00	
Fever	N	10	11.90	14	12.07	0.972
	Y	74	88.10	102	87.93	
	Total	84	100.00	116	100.00	
Anorexia	N	9	10.71	14	12.07	0.767
	Y	75	89.29	102	87.93	
	Total	84	100.00	116	100.00	
Night sweating	N	10	`11.90	8	6.90	0.222
	Y	74	88.10	108	93.10	
	Total	84	100.00	116	100.00	

Table 4, represents the dose-response relationship between smoking and tuberculosis. Smokers were categorized as mild (1 - 10 / day), moderate (11 - 20 / day) and heavy (> 20 / day) smokers on the basis of mean number of cigarette smoked per day . The association was statistically significant (P < 0.001).

Table 5, shows the relationship between symptoms of TB and smoking , in which there was statistically difference in hemoptysis (P value 0.034) between smokers and non-smokers , fever , anorexia and night sweating there were no statistically difference between the two groups (P value > 0.05).

Discussion. In this study the incidence of smoking was higher in tuberculosis patients, this was in agreement with the results of Slama et al and Jianming et al [4, 13] that showed the association between tobacco smoking on the proved . This is may be due to the effect of smoking on the structural and immunological host defenses, smoke exposure has been well documented as increasing the risk of infections , including tuberculosis (TB) [14, 15] .

About gender distribution this study found that tuberculosis are significantly higher in male than in the female this was in agreement with that of Roya [16], who concluded that smoking may increase the risk of pulmonary TB in men, and of Bothamley [7] who mentioned higher tuberculosis in men when compared with women.

When the patients divided into two groups according to the age (<60 years and > 60 years) there were no statistically difference in the two groups, this was in disagreement with that of Wang [17] who mentioned that TB patients who had ever smoked were significantly older (P - 0.001), this due small number of patients in this study (only 30 of the 200 patients are ≥ 60 years). In this study duration of smoking was found to be more significantly associated with the pulmonary tuberculosis, this result was in agreement with that of Prasad [18] who showed significantly association with the pulmonary tuberculosis in patients who smoked for ≥ 10 years than those smoked for < 10 years .

The incidence of relapse of tuberculosis in this study is higher in smokers (23.28 %) than non-smokers (18.86 %), but this difference is not statistically significant. Joann et al [19] result establish that smoking is associated with relapse of tuberculosis even after adjustment for the socioeconomic variables

In this study there is significant relation with higher number of cigarettes smoked per day (mainly was more than 20), this indicate that whenever the number of the cigarettes increase, the effect on the body will increase. This result was in agreement with that of Kolappan et al and Alcaide et al [20, 10] who found a dose response relationship between the numbers of cigarettes smoked daily and active pulmonary tuberculosis.

With regard to clinical manifestation, in this study hemoptysis was greater in smokers than in the other groups, Leung et al [21] investigated 851 TB patients notified in 1996 in Hong Kong and found that ever smoked were more likely to have cough, dyspnea. Majid et al [22] showed that, sputum expectoration and weight loss were greater in ever smokers than in the other groups.

Potential limitations of this study. Firstly, smoking status was based on the patient's self-report rather than the detection results of nicotine levels. Secondly, the type of tobacco smoked is not known, as the type of tobacco smoked may differ, which could lead to different exposure to, and uptake of, various chemical substances and elements such as Iron [23] Thirdly, history of passive smoking is not known, the association between passive exposure to tobacco and TB was shown by a case-control study in Estonia [24].

We conclude that the result of this study showed that smokers have greater risks for TB disease in men. There is a strong need to carry out similar studies in Iraqi women with a larger number. The risk of TB increase with increasing the duration of smoking and the number of cigarettes smoked. Hemoptysis significantly different with regard to the patients' smoking status.

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