Association between lifestyle factors and pulmonary tuberculosis in Erbil

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Abstract

Background and objectives: The majority of individuals in a population do not develop tuberculosis, due either to lack of exposure or due to individual characteristics that limit development of the disease after exposure. Evidences suggested that there is an association between lifestyle variables and tuberculosis.The main objective of this study was to study the association between lifestyle characteristics and pulmonary tuberculosis.

Methods: A case-control study was carried out in Erbil city during the period May 10, to December 28, 2009. A convenient sample of 150 cases of TB attending the Consultation Clinic for Chest and Respiratory Diseases was included in the study. A sex and age matched, 150 patients were included in the study as a control group. The control group was taken from patient of the Medical Wards of both Rizgary and Hawler Teaching Hospitals who were free from chest infections and lung cancer. Cases and controls were interviewed using a questionnaire designed by the researchers.

Results: : Around one quarter (24%) of the cases were smokers compared with 14.7 % among the controls. Significant difference of nutritional status between both groups was detected. Controls eat more food and of better quality than cases. No significant association between alcohol drinking, practicing of sports/ exercise and TB was detected.

Conclusion: TB was found to be associated with low nutritional status and smoking.
Key words: pulmonary tuberculosis, lifestyle, age and gender.

Introduction

Tuberculosis (TB) is a disease caused by the bacteria *Mycobacterium tuberculosis*[1]. It is an infectious disease that can damage a person's lungs, but can also cause damage to other parts of the body[2]. TB has reached epidemic levels in many parts of the world[1]. It is the second most important cause of adult death worldwide, after HIV/ AIDS. Roughly 9.2 million new TB cases and 1.7 million TB-related deaths were reported in 2006[2]. During 2008 there were 9280 of TB cases notified by the Iraqi national tuberculosis programs [3]. TB usually spread between family members, close friends and people who work together. Anyone can get tuberculosis, but certain factors can weaken body immune system and increase risk of TB infection, some of these factors are lifestyle aspects. In public health, "lifestyle" generally means a pattern of individual practices and personal behavioral choices that are related to elevated or reduced health risk. In United States thirty-eight percent of deaths in 1990 were attributed to tobacco, diet inactivity, and alcohol [4]. Malnutrition

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means failure to achieve nutrients (carbohydrates, proteins, lipids, vitamins and minerals) which can impair physical or mental health. It may result from consuming too little food or shortage or imbalance of nutrients[5].The malnutrition associated with poverty or poor diet puts human at risk of TB[6]. The association between TB and malnutrition is well recognized (through a study finding conducted by Cegielski and McMurray in year 2004) because nutritional status determines the normal health and functioning of all systems in the body, including the immune system which is responsible for host resistance to various infectious diseases. Because cell-mediated immunity is the key host defense against TB, malnutrition is therefore considered an important risk factor for the development of TB[7]. A study conducted in Indonesia found that TB patients had a poor nutritional status [8]. Smoking or exposure to smoke is a risk factor for development of TB. A Meta analysis study conducted in Michigan USA depended on reviewing the epidemiological evidences related to association between smoking and tuberculosis. By reviewing articles involved thirty-four studies taken together from different countries related to the subject of "smoking or tobacco and TB" evidence of all these studies indicates that smoking (both current and former, passive and active) is associated with: risk of being infected with *M. tuberculosis*, risk of developing TB, risk of developing more severe TB, and risk of dying of TB[9]. Alcohol and substance abuse, and other debilitating conditions are also risk factors for TB. It has been evident for decades that there is a strong association between alcohol use and risk of TB. Prevalence of alcohol use disorders among TB patients have ranged from 10% to 50% in studies carried out in Australia, Canada, Russia, Switzerland, and the USA[10]. Since TB is a community health problem in Iraq (including Kurdistan region) owing to its high incidence and dangerous consequences, the researchers were interested in conducting a study in Erbil due to lack of previous studies in the region. The study aims at studying the association between lifestyle variables (smoking, alcohol, sports/exercises, and nutritional pattern) and pulmonary TB.

Methods

A case-control study was carried out in the Consultation Clinic for Chest and Respiratory Diseases (CCCRD), and both Rizgary and Hawler Teaching Hospitals in Erbil city, Iraq. A convenient method of sampling was used to collect both the cases and controls. Adults patients who were under the WHO DOTS (directly observed treatment short course) program attending the CCCRD during the study period for the purpose of follow up and receiving treatment were included in the study. New cases confirmed by sputum examination and chest X ray were also included in the study. Prisoners were excluded from the study. Accordingly, 150 patients were included in the study as cases. Regarding the control group, another 150 patients were taken, age and gender matched. Adult patients not affected with pulmonary TB or other pulmonary diseases who were admitted to the medical wards of Rizgary and Hawler teaching hospitals were included as a control group.Cases and controls were interviewed by one of the researchers using a questionnaire designed by the investigators. The questionnaire involved the following variables:-
1. Nutritional status of patient was assessed by number of servings taken per week of the, meat (including red meet, chicken, and fish), milk and dairy products (including cheese, yogurt), egg, vegetables, and fruits
2. Smoking is inhalation, chewing, or sniffing of tobacco or tobacco- related products[11]. In this study smokers were classified into three categories: mild smoker (smoke <10 cigarettes/day), moderate (smoke 10-19 cigarettes/ day), and heavy smoker (smoke 20 and more cigarettes/ day)[12].
3. Alcohol drinking refers to use of alcoholic beverages (ethyl alcohol, or

ethanol), it is considered normal social behavior. For most people it is a way of relaxing and enjoying the effects of alcohol[13]. In this study alcohol drinking was divided into three categories: daily drinking, drinking 2-3 times/ week, and the third category were drinking on occasions.

4. Sport consists of normal physical activity or skill carried out under a publicly agreed set of rules, and with a recreational purpose: for competition, for self-enjoyment, to attain e"xcellence, for the development of skill, or some combination of these[14]. Exercise practicing activities in this study was defined as practicing sports/ exercise (like walking, jogging, and swimming) 30 minuets or more / day.

Statistical analysis: Data were analyzed using the Statistical Package for Social Sciences (SPSS version 15). The Chi-Square test used for study association between TB and lifestyle variables (such as smoking, alcohol, practicing exercise and nutritional pattern). A "P" value of ≤ 0.05 was considered as statistically significant.

Results

The mean age (±SD) of cases was 47.3 ± 20.1 years ranging from 15-91 years, while the mean age of control group was 47.8 ± 19.3 years ranging from 15-89 years, the differences between both means was not significant (P=.996). The male to female ratio was 1.05:1 in both cases and controls (sex matched).

Table (1) indicates that the highest percentage of TB cases (52.0%) was among the age group of 50 years and above. No significant differences between cases and controls were detected (age matched).

Table (2) shows that around one quarter (24%) of cases were smokers compared with only 14.7% of control group (P=0.041). The table shows only 2.7% of controls were alcohol drinker compared with 6.7% among cases (P=0.101). No significant differences observed between the two groups regarding practicing sports activities (P=0.867).

Table 1: Distribution of cases and controls by age.

Age groups/ year	Groups		P
	Case No. (%)	Control No. (%)	
<20	13(8.7)	11(7.3)	
20-29	29(19.3)	28(18.7)	
30-39	16(10.7)	16(10.7)	
40-49	14(9.3)	17(11.3)	0.996
50-59	25(16.7)	25(16.7)	
60-69	29(19.3)	27(18.0)	
70+	24(16.0)	26(17.3)	
Total	150(100)	150(100)	

Table 2: Distribution of cases and controls by lifestyle variables.

Variables	Case N= 150 No. (%)	Control N= 150 No. (%)	p
Smoking			
Smoker Nonsmoker	36 (24.0) 114(76.0)	22(14.7) 128(85.3)	0.041
Number of cigarettes smoked per day			
<10 10-19 20 +	0.0 (0.0) 4(11.1%) 32(88.9%)	3(13.6%) 2(9.1%) 17(77.3%)	0.075
Alcohol			
Drinker Non-drinker	10(6.7) 140(93.3)	4(2.7) 146(97.3)	0.101
Pattern of drinking			
Daily 2-3 times/ week On occasion	5(50.0%) 3(30.0%) 2(20.0%)	1(25.0%) 2(50.0%) 1(25.0%)	0.680
Practicing Sports/ exercise			
Practicing Non practicing	20 (13.3) 130 (86.7)	21 (14.0) 129 (86.0)	0.867

Table (3) Shows that 96.6% of controls group eats meat ≥1 servings / week compared with 72.0% among cases (P=0.001). The table shows that 99.4% of controls group eats milk and dairy products ≥1servings/ week compared with 94% among cases (P=0.008). Around of half (46.0%) of cases do not eat eggs compared with only 14.7% among control group (P=0.001). Regarding plants products, (Table 3) shows that 90.0% of controls group eats vegetables ≥4 servings per week compared with 48% among cases (P=0.001). Around of one third (29.3%) of cases do not eats fruits compared with only 2.7% among control groups (P=0.001).

Table 3: Distribution of case and controls according to eating style

Variables	Case N=150 No (%)	Control N=150 No (%)	p
Meat servings/ week			
<1	42 (28.0%)	5 (3.3%)	
1-2	93 (62.0%)	89(59.3%)	0.001
3+	15 (10.0%)	56(37.3%)	
Milk and dairy products servings/ weekly	No (%)	No. (%)	
<1	9 (6.0%)	1(0.7%)	
1-3	107(71.3%)	100(66.7%)	0.008
4-6	27 (18.0%)	31(20.7%)	
7+	7 (4.7%)	18 (12.0%)	
No. of eggs eating/ weekly			
<1	69(46.0%)	22(14.7%)	
1-2	70(46.7%)	101(67.3%)	0.001
3+	11(7.3%)	27(18.0%)	
Vegetables servings/week			
<1	9(6.0%)	0(0%)	
1-3	69(46.0%)	15(10.0%)	0.001
4-6	48(32.0%)	64(42.7%)	
7+	24(16.0%)	71(47.3%	
Fruits serving/ week			
<1	44(29.3%)	4(2.7%)	
1-3	82(54.7%)	87(58.0%)	0.001
4-6	20(13.3%)	45(30.0%)	
7+	4(2.7%)	14(9.3%)	

Discussion

Results of present study indicated that more than half of TB patients (52.0%) were among age group of 50 years and above and male to female ratio was 1.05:1 in both cases and controls (age and gender matched). This result in contrast with previous retrospective study conducted in South India in year 2009 included 446 pulmonary TB patients taken by screening of medical records for pulmonary TB patients, results indicated that the large proportion (65%-68% of TB cases) were in the young and productive age group (15-45 years), and ratio of male to female 2:1[15] . The association of both age and gender with TB could not be established in the present study because the authors had chosen a control group that is age and sex matched with the cases. Table 2 shows significant differences between cases and controls regarding smoking. This result agrees with result of previous case-control study conducted in India in year 2008 included 153 cases and 160 controls, results indicated that tobacco smoking is associated with pulmonary TB[16]. Smoking is major risk factor for chest infection because it leads to decrease in pulmonary host defences against mycobacterium TB hence more chance for to development of pulmonary TB[17 18]. There is no statistically significant difference between both groups regarding alcohol drinking, in contrast with previous result of case-control study conducted in South India in year 2009 included 2709 pulmonary TB cases, and control (4253 persons). Results demon-strated an increased incidence of pulmo-nary TB among those who were drinking alcohol, and smoking[19]. It was estimated that around 8% of young people in Iraq (10 -30 years old) were alcohol drinkers [20]. The differences may be related to differences between the age groups, the size of samples and subjects of researches. The risk of active tuberculosis is substantially elevated in people who drink more than 40 g alcohol per day, and/or have an alcohol

use disorder[10]. There was no significant difference between both groups regarding practicing the sport/exercise activities. This result agrees with previous result of case-control study conducted in Liverpool England in the year 2001 which indicated no statistically significant differences between both groups regarding sports/exercises practice[21]. It was estimated that around 12.5% of Iraqi young people (10-30years old) practice sports activities[20]. Results showed that controls group eats more food of better quality than cases; this agrees with the result of case-control study conducted in South Africa in year 2009 involved 84 TB patients, age and gender matched with 84 controls. Results indicated significant differences between both groups regarding number of time eating chicken and red meat[22]. The Liverpool study indicated that the cases less likely than controls in eating dairy products and vegetables[21]. The difference between both groups in the present study regarding eating of main foods is related to socio-economic differences between cases and controls[23]. The inadequate nutrition means deficiency of protein, calories, vitamins and minerals that affects body immune system activates against TB infection[24]. The study concluded that TB is associated with smoking and poor nutritional status.

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