

## Studying the Factors Associated With Relapse Of Pulmonary Tuberculosis in Baghdad

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### Summary:

**Background:** Relapse is defined as recurrent tuberculosis at any time after completion of treatment and apparent cure. Recurrence of tuberculosis may occur as a result of relapsed infection due to the same Mycobacterium tuberculosis strain, or due to exogenous reinfection with a new strain.

**Objective:** To study the factors associated with relapse of pulmonary tuberculosis.

**Methods:** A cross-sectional study had been done in the chest and respiratory diseases teaching specialized center in Baghdad during the period from the 1st of January 2010 to the 30th of July 2011. A total of 58 patients with relapsed pulmonary tuberculosis were included in this study. For each patient, the following variables were collected: age, gender, marital status, regularity of treatment, diabetes mellitus, smoking, alcohol intake and imprisonment have been studied.

**Results:** Mean age for all relapsed cases was 47.4 years. 53 patients (91.4%) of relapse cases were married. There were only 30 patients (51.7%) of relapse cases regular on treatment. It was 15 patients (25.9%) who contributed to about one fourth (25.9%) of relapsed cases who were diabetic. There were 28 patients (48.3%) of relapsed cases who were smokers. 17 patients (29.3%) of them were prisoners. Finally 13 patients (22.4%) of relapsed cases had a history of alcoholic intake.

**Conclusions:** Recurrence of tuberculosis was more common in male, married, diabetic, prisoners, and history of alcohol patients and patients presenting at least one of the risk factors can benefit from the implementation of a post-treatment surveillance system for early detection of recurrence.

**Keywords:** PTB : Pulmonary Tuberculosis.

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### Introduction:

Relapse is defined as recurrent tuberculosis at any time after completion of treatment and apparent cure<sup>(1)</sup>. Recurrence of tuberculosis may occur either as a result of relapsed infection due to the same M. tuberculosis strain, or due to exogenous reinfection with a new strain<sup>(2)</sup>. In settings with high incidence of tuberculosis, exogenous reinfection is more likely to account for recurrent disease than in settings with low rates of tuberculosis, where recurrent disease is more likely due to relapse<sup>(2,3,4)</sup>. Most relapses occur within the first 6 to 12 months following completion of therapy. Among patients treated with rifamycin-containing regimens using DOT, relapses generally occur with susceptible organisms. For other patients, the risk of acquired drug resistance is substantial. If initial drug susceptibility testing was not performed and the patient fails or relapses with a rifamycin-containing regimen given by DOT, there is a high likelihood that the organisms were resistant from the outset<sup>(5)</sup>. Tuberculosis is a disease of great antiquity.

What were almost certainly tuberculous lesions have been found in the vertebrae of neolithic man in Europe and on

Egyptian mummies dating possibly from as early as 3700 BC<sup>(6)</sup>. Koch first described the tubercle bacillus now known as Mycobacterium tuberculosis in 1882<sup>(7)</sup>. There is general agreement that TB first appeared as a human disease in East Central Africa and that it travelled with early peoples as they migrated into Asia Minor and across the globe. In classical Greece, Hippocrates, Plato, and Aretaeus described TB, and the word phthisis for pulmonary TB is Greek. 'Phthisis makes its attacks chiefly between the age of eighteen and thirty-five', Hippocrates wrote<sup>(4)</sup>. As tuberculosis has been a curable disease since the principles of chemotherapy were established almost 40 years ago<sup>(8,9)</sup>. Treatment of tuberculosis Treatment regimens based on different TB diagnostic categories. The diagnostic categories are: (1) Category I – New smear-positive patients; new smear-negative pulmonary TB (PTB) with extensive parenchymal involvement; severe concomitant HIV disease or severe forms of extra pulmonary TB; Category II – Previously treated sputum smear-positive PTB: relapse; treatment after interruption; failures; Category III – New smear-negative PTB (other than in Cat I) and less severe forms of extra pulmonary TB.

Category IV – Chronic cases (still sputum-positive after

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supervised re-treatment) and MDRTB Objective To study the factor(s) associated with relapse of pulmonary tuberculosis in Iraqi patients after full course of anti tuberculous drugs.

**Patients and method:**

Across sectional study had been done in the chest and respiratory diseases teaching specialized center in Baghdad during the period from 1<sup>st</sup> of January 2010 to the 30<sup>th</sup> of July 2011.

A total 58 patient s with treated pulmonary tuberculosis were studied for relapse, all were recruited from outpatient department.

Inclusive criteria were :-First time relapsed.Completed first line regimen follows DOTs program.

-A cases diagnosis by psitive Ziel Neilsen staining of sputum showing acid-fast bacilli for more than one times, with signs and symptoms of active pulmonary tuberculosis, and radiological finding supported the diagnosis ..For each; Age, gender, marital status, regularity of treatment(from patient history only), diabetes mellitus(from patient history only), alcoholic intake and prison had been studied.

Statistical Analysis:

Statistical Package for Social Sciences version 18 (SPSS 18) was used for data input and analysis. Discrete variables presented as numbers and percentages. Continuous variables presented as mean and standard deviation (SD). Chi square test for goodness of fit used to test the significance of observed distribution. Chi square test for independence used to test the significance of association between two discrete variables. T test used to test the significance of difference in mean between two independent samples. P value used for all tests was asymptotic and all tests were two sided. Findings with P value less than 0.05 considered significant.

**Results:**

The study sample composed of 58 relapse cases of pulmonary tuberculosis Mean age for all relapsed cases was 47.4 ± 14 year, and for males 46.1 ± 14.4 year and for females 51.8 ± 11.8 year. There was no significant difference in mean age between males and females (P > 0.05, table 1).It was significant to find more than half the cases (55.2%) aged 41- 60 year (P < 0.05, table 2, figure 1).

with 45 (77.6%) males and 13 (21.4%) females where males were significantly statically predominant among relapse cases (P < 0.05, table 2, figure 2). Male to Female ratio is 3.5: 1.A(91.4)% of relapse cases was married (P < 0.05, table 2). .There was only (51.7)% of relapse cases regular on treatment (P>0.05, table 2).

. It was (25.9%) contribute to about one forth (25.9%) of relapsed cases was diabetic. (P<0.05, table 2). There was(48.3) %of relapsed cases was smokers (P > 0.05, table 2).

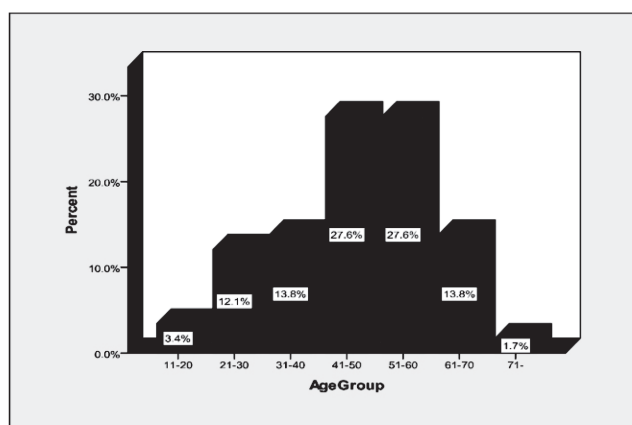
**Table 1: Mean age of relapse PTB cases.**

Gender	N	Age (year)			P value
		Range	Mean	SD	
Total No,	58	19-75	47.4	14.0	---
Male	45	19-75	46.1	14.4	0.192
Female	13	25-70	51.8	11.8	

N; number .SD; standard deviation.

**Table 2: Demographic and clinical characteristics of relapse PTB cases.**

Variables	Number = 58	100.0%	P value
<b>Age Group (year)</b>			
11-20	2	3.4	
21-30	7	12.1	
31-40	8	13.8	
41-50	16	27.6	0.000
51-60	16	27.6	
61-70	8	13.8	
≥ 71	1	1.7	
<b>Gender</b>			
Male	45	77.6	0.000
Female	13	22.4	
Married	53	91.4	0.000
<b>Treatment Regularity</b>			
Irregular	30	51.7	0.793
Regular	28	48.3	
Diabetes	15	25.9	0.000
Smoking	28	48.3	0.793
Prisoner	17	29.3	0.002
History of Alcohol in take	13	22.4	0.000



**Figure1: Distribution of relapse PTB cases according to age.**

History of prison significantly present in 29.3% of cases ( $P < 0.05$ , table 2).

History of ingesting alcohol was statically to be find in 22.4% of cases ( $P < 0.05$ , table 2) Concerning gender difference in relapse cases: It is statically to find the majority of males (51.1%) aged 40-60 years while females aged  $> 60$  year ( $P < 0.05$ , table 2, figure 3). There is no statically association between marital status and gender among relapse cases ( $P > 0.05$ , table 2). There is no statically significant association between treatment regularity and gender among relapse cases ( $P > 0.05$ , table 2).

Diabetes is statically significtaly associated with females than males in relapse cases ( $P < 0.05$ , table 3) There is no significant association between prison and gender among relapse cases ( $P > 0.05$ , table 3). Statically alcohol ingestion is significantly associated with male gender among relapse cases ( $P > 0.05$ , table 3).

**Table 3: Distribution of study sample according to gender and to demographic and clinical characteristics.**

Variables	Male		Female		Total		
	N=45	100.0%	N=13	100.0%	N=58	100.0%	
Age Group (year)							
< 40	16	35.6	0	0.0	16	27.6	
40-60	23	51.1	0	0.0	23	39.7	0.000
> 60	6	13.3	13	100.0	19	32.8	
Married	40	88.9	13	100.0	53	91.4	0.209
Treatment Regularity							
Irregular	23	51.1	7	53.8	30	51.7	0.862
Regular	22	48.9	6	46.2	28	48.3	
Diabetes	8	17.8	7	53.8	15	25.9	0.009
Smoking	28	62.2	0	0.0	28	48.3	0.000
Prison	15	33.3	2	15.4	17	29.3	0.210
Alcohol	13	28.9	0	0.0	13	22.4	0.028

**Discussion:**

In this study , the statistical analysis had been shown that the mean age for all relapsed cases was  $47.4 \pm 14$  year, and for males  $46.1 \pm 14.4$  year and for females  $51.8 \pm 11.8$  year. There was no significant difference in mean age between males and females ( $P > 0.05$ , table 1). The association noted between age and recurrent disease had been observed in other studies. which found more than half of the cases (55.2%) aged 41- 60 year are relapse. ( $P < 0.05$ ). With 45 (77.6%) males and 13 (21.4%)

females where males were significantly predominant among relapse cases ( $P < 0.05$ )(31). We found Male to Female ratio is 3.5:1. While the association between male sex and relapse has been reported in only one published clinical trial (30). Two other studies showed no significant association between sex and relapse(23,24). We found also that the vast majority of relapse cases were married ( $P < 0.05$ , table 2). Other shows the married cases had higher percent of relapse.(25) In our result we found There was no significant influence of treatment regularity on relapse ( $P > 0.05$ , table 2).

Alcohol ingestion is significantly associated with male gender among relapse cases ( $P > 0.05$ , table 3). Other study shows that non adherence is a strong risk factor for recurrence of tuberculosis. Also they found significant association between alcoholism and relapse of pulmonary tuberculosis ( $p: 0.05$ ), suggesting that the effect of alcoholism could have been mediated through no adherence. It is possible that the deleterious effect of alcoholism could interfere with the absorption and metabolism of the drugs(26).. on examination was significant to find diabetic cases contribute to about one forth (25.9%) of cases ( $P < 0.05$ , table 2). Other showed that relapse was significantly associated with conditions predisposing to active tuberculosis, among which diabetes mellitus was the most common(27). History of prison significantly present in 29.3% of cases ( $P < 0.05$ , table 2). While other obtained no significant effect of prison incarceration on relapsing(28). There was no significant influence of smoking on having relapse ( $P > 0.05$ , table 2). In other there is a significant effect of smoking on the pulmonary tuberculosis relapsing(29). Also second study show there is a significant influence of smoking on having relapse(30).

**Conclusions :**

Recurrence of tuberculosis was more common in in the male, married, diabetic, prisoners, and alcoholic patients and Patients presenting at least one of these risk factors can benefit from the implementation of a post-treatment surveillance system for early detection of recurrence .We advice to early detection and good control of diabetic control. Also with good education and follow up of prisons for early detection of pulmonary tuberculosis and treatment. Also there is advice for alcoholic abstinence

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