

## Tuberculosis in Babylon Governorate– Iraq (Three years before & Three years after 2003)

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### Abstract

**Background:** Tuberculosis (Tb) is a common infectious disease caused by *Mycobacterium tuberculosis* complex, occasionally by *Mycobacterium bovis & africanum* (tubercle bacilli), it is a major public health problem in Babylon & it seems to be of a high prevalence at the last decade.

**Aim:** Study the TB infection according to some demographic points in Babylon governorate during the years (2000-2001) & (2006-2007).

**Patients & Methods:** 2536 patients were involved in this study (1400 males 55.2% & 1136 females 44.8%). All of them were registered by a retrospective study at the Tuberculosis & chest clinic at Babylon during the years ( 2000 , 2001 , 2006 , 2007 ) , the number of patient in each year was ( 633 , 653 , 634 & 616 ) respectively . Six demographic parameters for each patient were studied (age, sex, area, site of infection, sputum examination & month distribution of infection).

**Results :** the current study shows that there is no relationship statistically between Tb infection during these years (  $p > 0.05$  ) , but there is a significant relation between Tb & areas ( increases number of cases at the center of Babylon ) (  $p < 0.01$  ) , it also shows that there is a high significant relation between the disease & the age of the patient ( increase in younger age groups 16 – 30 years old ) (  $p < 0.001$  ) .

**Conclusions:** tuberculosis still a major public health problem in Babylon governorate, the distribution of infection was nearly the same during the years of the study (three years before & after 2003), Tb affects the younger age groups commonly & the distribution of disease was concentrated at the center.

### الخلاصة

**المقدمة :** يعتبر مرض التدرن من الامراض الانتقالية الأكثر شيوعا في العراق . يسبب المرض بكتيريا عسوية تدعى ( مايكو بكتيريا ) ويعتبر المرض من أهم مشاكل الصحة العامة في محافظة بابل .

**هدف الدراسة :** تهدف هذه الدراسة الأسترجاعية لمعرفة حالات الإصابة بالتدرن من خلال دراسة بعض المتغيرات لكل مريض على مدى السنوات ( 2000 – 2001 و 2006 – 2007 )

**المرضى وطرق العمل** تم اختيار 2536 مريض لأجراء الدراسة ( 1400 ذكر 55.2 % و 1136 انثى 44.8 % ) كان هذا العدد يمثل كل المراجعين المسجلين في سجلات العيادة الاستشارية للأمراض الصدرية والتدرن خلال السنوات ( 2000, 2001 , 2006, 2007 ) كان عدد المراجعين في كل سنة هو ( 633 , 653 , 634 , 616 ) وعلى التوالي . تم اختيار ستة متغيرات لكل حالة ( العمر , الجنس , منطقة السكن , موضع الإصابة , فحص البلغم , وقت الإصابة بالأشهر ) .

**النتائج :** أظهرت الدراسة عدم وجود علاقة أحصائية بين حالات الإصابة بالتدرن في محافظة بابل وتلك السنين (  $P > 0.05$  ) لكنها أظهرت وجود علاقة أحصائية بين توزيع حالات الإصابة بالتدرن ومناطق المحافظة حيث كانت الأصابات أكثر في مركز المحافظة (  $P < 0.01$  ) كما أظهرت الدراسة وجود فروقات معنوية عالية بين الإصابة بهذا المرض والعمر حيث لوحظ أن الأصابات كانت أعلى في الفئة العمرية ( 16 - 30 سنة ) (  $P < 0.001$  ) .

**الاستنتاجات:** لازال مرض التدرن يشكل مشكلة صحية واجتماعية في محافظة بابل . كان توزيع نتائج الاصابة بالمرض خلال سنين الدراسة متجانسا ولوحظ ان الاصابة تركزت في فئات عمرية شابة وفي مركز المحافظة .

## Introduction

Tuberculosis (Tb) is a common and often deadly infectious disease caused by mycobacteria, mainly *Mycobacterium tuberculosis*.<sup>(1)</sup>

Tuberculosis usually attacks the lungs (as pulmonary Tb ) but can also affect the central nervous system ,the lymphatic system ,the circulatory system , the genitourinary system , the gastrointestinal system , bones, joints, and even the skin (extra pulmonary)<sup>(2)</sup> . Other mycobacteria such as *Mycobacterium bovis*, *Mycobacterium africanum*, *Mycobacterium canetti*, and *Mycobacterium microti* also cause tuberculosis ,but these species are less common .The classic symptoms of pulmonary tuberculosis are a chronic cough with blood-tinged sputum .Fever, night sweats and weight loss<sup>(3)</sup>

Infection of other organs causes a wide range of symptoms. The diagnosis relies on radiology (commonly chest X-rays), a tuberculin skin test, blood tests, as well as microscopic examination and microbiological culture of body fluids<sup>(4)</sup>

Tuberculosis treatment is difficult and requires long courses of multiple antibiotics .Contacts are also screened and treated when they need treatment; Antibiotic resistance is a growing problem in (extensively) multi-drug -resistant tuberculosis. Prevention relies on screening programs and vaccination, usually with *Bacillus Calmette- Guerin* (BCG vaccine).<sup>(5)</sup>

Asymptomatic, Latent infection is most common. About one in ten of these latent infections progress to active disease which if left untreated will kill more than half its progress to active disease, which, if left untreated,

will kills more than half of it's victims .In 2004 mortality and morbidity statistics include (14.6 million) chronic active cases, 1.6 million deaths, mostly in developing countries<sup>(6)</sup> . 8.9 millions, in addition are new cases.

A rising number of people in the developed world are contracting tuberculosis because their immune systems are compromised by immunosuppressive drugs & substance abuse, or AIDS also due to other causes. The distribution of tuberculosis is not uniform across the globe with about 80%of the population in many Asian and African countries testing positive in tuberculin tests while only 5-10 % of the US population testing positive<sup>(7)</sup> It is estimated that the US has 25,000 new cases of tuberculosis each year, 40% of which occur in immigrants from countries where tuberculosis is endemic<sup>(8)</sup>

Transmission occurs when people suffering from an active pulmonary TB. cough ,sneeze, speak or spit ,they expel infectious aerosol droplets 0.5-5 um in diameter .single sneeze can release up to 40.000 droplets<sup>(9)</sup>, each one of these droplet may transmit disease, since the infectious dose of Tb is very low and the inhalation of just single bacterium can cause new infection<sup>(10)</sup>. Person with active but untreated Tb can infect 10-15 other people per year<sup>(11)</sup>, so chain of transmission can be broken by isolating patients with active disease and starting effective anti-TB therapy . After two weeks such treated people with non resistant active TB generally cease to contagious (negative sputum for acid fast bacilli). If some one does become infected, it will take at least 21 day or 3-4 weeks, before the newly infected person can transmit the

disease to others <sup>(2)</sup> Tb can also be transmitted by eating meat infected with *Mycobacterium bovis*.

Tb is diagnosed by the clinical features, Chest X-ray, Sputum examination, Tuberculin skin test, Blood tests .Microscopically examination & microbiological culture of body fluids <sup>(12)</sup>. The World Health Organization (WHO) estimates that 1.72 billion people (one third of the world's population have latent infection with mycobacterium tuberculosis <sup>(13)</sup>. (15-20 millions) people have active disease and 3 millions deaths occur each year from Tb (95%in the developing world) . One hundred year ago in the united kingdom , more than 30,000 dead each year from Tb same as lung cancer at present time ,but decline from 1900 onwards because of improvement in nutrition ,educational and social factors <sup>(4)</sup> . In last years the ratio of infection increased especially in inner city areas due to misusing drugs, alcohol and infection with HIV (human immunodeficiency virus). <sup>(14)</sup> The prevention of Tb takes two parallel approaches:

- 1). Prevent those with high risk groups for Tb (this include people in contacts with those under treatment). <sup>(15)</sup> Children are vaccinated to protect them from Tb infection, no vaccine for adults available till now. <sup>(16)</sup> In Iraq the Bacillus Calmette Guerin (BCG) vaccine given at first week of life.
- 2). WHO declared Tb a global health emergency in 1993 & the stop Tb partnership developed as (Global plan to stop Tb), that aim to save 14 millions lives between 2006 & 2015. <sup>(17)</sup>

Several new vaccines being developed like:

- 1) Recombinant tuberculosis vaccine (rBCG30) used in U.S.A in 2004.

- 2). ( DNA Tb Vaccine) give with conventional chemotherapy can accelerate the disappearance of bacteria as well as protect reagents from infection in mice , it may take 4-5 years until it could be available for human . <sup>(18)</sup>
- 3). Avery promising Tb vaccine (M VA 85A).

## Materials & Methods

A retrospective study has been done at the Tuberculosis & Chest Clinic at Babylon governorate. 2536 patients were involved in this study (1400 males (55.2%) & 1136 females (44.8%)). All of them had been registered during the years (2000 , 2001 , 2006 , 2007 ) ,the number of patients in each year was ( 633, 653 , 634 & 616 ) respectively . Six demographic data have been studied for each patient.

These data collected include:

- (1) Age of the patient.
- (2) Sex.
- (3) Geographical area.
- (4) Site of infection (pulmonary or extra pulmonary).
- (5) Sputum examination (positive or negative sputum for acid – fast bacilli).
- (6) Time of getting disease (month distribution of infection during the year).

### Statistical Analysis

Chi square was applied to analyze the data collected statistically.

## Results

Six parameters for each patient were studied (age, sex, area , site of infection , sputum examination & month distribution of recording cases) . Regarding the age, the study shows that there is no significant relation between age groups & the years ( $p > 0.05$ ), but there is a highly significant

relation between the age groups (Tb infection increased at younger age group (16 – 30 years old) during all years). ( $p < 0.001$ ) (Table 1).

Sex distribution shows no relationship with years ( $p > 0.05$ ), but there is a high significant relation between males & females (Tb infection more common in males) ( $p < 0.01$ ). (Table 2). Area distribution of Tb infection were estimated by dividing Babylon Governorate into three areas {center , north & south} , the study shows an increase of Tb cases at the center (1220 48.1 % , while at the north the no. of cases was (858 33.8 %) & in the south the no. was (458 18.1 %) and this is significant statistically ( $p < 0.01$ ), but there is no any relation ship between areas & years ( $p . 0.05$ ). (Table 3). Regarding the site of Tb infection (pulmonary or extra pulmonary) , the study shows that there is (1763 case) 69.5 % suffer from pulmonary Tb while only (773

case) suffer from the extra pulmonary type (high significant relation  $p < 0,001$ ) (Table 4).

Sputum examination has been done for all the patients (sputum for acid fast bacilli AFB) , the study shows that there is (1006 case 57.1 %) from the pulmonary type have positive sputum for AFB , while (757 case 42.9% ) have negative sputum for this test & this is a highly significant relation ( $p < 0.001$ ). (Table 5).

Regarding the time distribution of Tb infection (month of recording Tb cases), the study shows an increment of Tb cases at May & April months (294 & 260 case respectively) & this is significant ( $p < 0.01$ ). (Figure 1).

The current study shows that there is no. significant relation between Tb infection & the years of study ( no difference before & after the invasion of Iraq at year 2003 ), ( $p > 0.05$  ).

Table 1. Distribution of Tb cases in the years according to age groups.

Age (year)	Total No. of Cases	Year 2000 No. %	Year 2001 No. %	Year 2006 No. %	Year 2007 No. %
0 - 15	170	40 (6.3)	46 (7.0)	42 (6.6)	42 (6.8)
16 - 30	641	228 (36.0)	218 (42.6)	213 (33.6)	222 (36.0)
31 - 45	747	195 (30.8)	182 (28.5)	197 (31.1)	169 (27.4)
45 ≥	678	170 (26.9)	143 (21.9)	182 (28.7)	183 (29.7)
Total	2535	633 (24.9)	653 (25.8)	634 (25.0)	616 (24.3)

Table 2. Distribution of Tb cases in years according to sex.

Year	Total No. of Cases	Male No. %	Female No. %
2000	633	301 (47.6)	322 (52.4)
2001	653	368 (56.4)	285 (43.6)
2006	634	403 (63.6)	231 (36.4)
2007	616	328 (53.2)	288 (46.8)
Total	2536	1400 (55.2)	1136 (44.8)

Table 3. Distribution of Tb cases in years according to geographical area.

Year	Total No. of Cases	South* No. %	North** No. %	Center No. %
2000	633	121 (19.1)	202 (31.9)	310 (49.0)
2001	653	122 (18.7)	239 (36.6)	292 (44.7)
2006	634	124 (19.6)	200 (31.5)	310 (48.9)
2007	616	91 (14.8)	217 (35.2)	308 (50.0)
Total	2536	458 (18.1)	858 (33.8)	1220 (48.1)

\*Al-Hashimeya sector.

\*\*Al-Mahaweel & Al-Musayab sector.

Table 4. Distribution of Tb cases in years according to the site of infection.

Year	Total No. of Cases	Extra Pulmonary No. %	Pulmonary No. %
2000	633	200 (31.6)	433 (63.4)
2001	653	188 (28.8)	465 (71.2)
2006	634	193 (30.0)	441 (70.0)
2007	616	192 (31.2)	424 (68.8)
Total	2536	773 (30.5)	1763 (69.5)

Table 5. Distribution of pulmonary Tb cases according to sputum examination for acid fast bacteria.

Year	Total no. of cases	Negative %	Positive %
2000	433	178 41.1	255 58.9
2001	465	201 43.2	264 56.8
2006	441	199 45.1	242 54.9
2007	424	179 42.2	245 57.8
Total	1763	757 42.9	1006 57.1

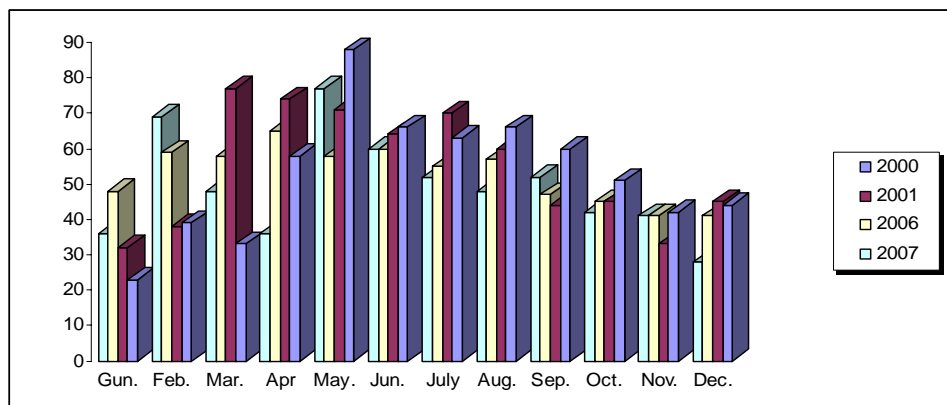


Figure 1. Distribution of Tb cases during the months of each year.

## Discussion & Conclusion

The current study shows that there is no significant changes in the numbers of patient during the years of the study (Three years before & three years after 2003) , this will give an impression that Tb infection still a major public health problem in Babylon governorate . Most of the cases are recorded at the center of the city & this attributed to the over crowding, the expansion of families & increase no. of pollutant (like vehicles, old factories ....), although these causes are available in another area of Babylon but with less effect. Tb infection shows predilection toward males & this is supported by this study & this may be due to the involvement of males in dangerous jobs, increase

the habit of smoking among them & lack of awareness.

It looks that Tb infection is more common in younger age groups (16 – 30 years old) & this may be due to the same explanations above , The current study confirm that 2/3 of Tb cases are pulmonary while only 1/3 are extra pulmonary. The study also shows that there is an increase of Tb infection (disease) cases during May & April months & this attributed to different points like improvement of the environment in general, increase the activity of peoples & over crowding & during these months the allergic disorders will increase due to different plant allergens & this will cause sneezing & coughing which may lead to spread of Tb infection. Some points

should be considered to control Tb infection in general :

- (1) Early identification & treatment of patients with Tuberculosis
- (2) Sputum positive cases should be considered as potentially infectious until they have completed two weeks of treatment (sputum is negative for acid fast bacilli).
- (3) The family of the patient will already have been exposed to the risk of infection , so that segregation of the patient from contact with his or her family at the time of diagnosis is not useful (but education of other members of the family about the disease & protection from it is necessary) & most patients can be treated as an out patient , while patient who need admission to hospital (Tb with heart problems , renal diseases. diabetic with uncontrolled blood sugar), should be isolated in a single room.
- (4) Tracing of contacts with active Tb patients.
- (5) Drug abuse (especially corticosteroids) should be restricted & the current study not includes the reactivated cases.
- (6) Smoking should be prevented in general places, closed buildings, schools & colleges. (about 1/3 of the cases were smokers) .
- (7) Local governorate of Babylon should motivate programs of control of tuberculosis.

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