

## **Evaluation of DOTS Strategy in Tuberculosis Treatment in Kirkuk Governorate**

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### **Abstract**

More than 2 billion people, equal to one third of the world's population, are infected with tuberculosis (TB) bacilli, the microbes that cause TB. One in 10 people infected with TB bacilli will become sick with active TB in their lifetime.

To assess treatment outcome and to evaluate the compliance of our patients registered for anti-TB treatment at Kirkuk Center of Tuberculosis Treatment.

A one year prospective cohort study of tuberculosis patients (n=100) registered for anti-TB treatment at Kirkuk center of tuberculosis treatment according to the World Health Organization guidelines.

Among study participants, 100 patients (100%) were sputum smear positive, the 100 study participant (100%) were tested for HIV. There was no TB-HIV co-infection .Among the 100 study participants, 90(90%) had successful treatment outcome (90 cured). The overall death, default, were 3(3%), 7 (7%) respectively. There was no treatment failure. Active pulmonary tuberculosis was predominant at age group (21-30) year, 31(31%) patients. Also there was a significant association between the residence and tuberculosis, 77 (77%) patients were living in urban area.

Treatment outcome of the patients who registered in Direct Observation Treatment, Short course therapy (DOTS) was successful.

**Keywords:** DOTS; Tuberculosis; HIV.

## تقييم كفاءة استراتيجية العلاج قصير الامد تحت الاشراف المباشر لعلاج التدرن في محافظة كركوك

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### الملخص

أكثر من ملياري شخص ، أي ما يعادل ثلث سكان العالم ، مصابون بعصيات السل ، ( وهي ميكروبات تسبب مرض السل). يصاب واحد من كل 10 أشخاص مصاب بعصيات السل بمرض السل النشط في حياتهم.

تقييم نتائج العلاج و مدى التزام مرضانا المسجلين في علاج مرض السل في مركز كركوك للتدرن . دراسة لمجموعة بأثر مستقبلي لمدة سنة واحدة للمصابين بمرض السل (عددهم = 100) وكلهم مسجلين لعلاج مرض السل في مركز كركوك للتدرن وفقاً لمبادئ منظمة الصحة العالمية

عددالمشاركين في الدراسة ،كان 100 مريض أكدت الفحوصات المجهرية لعينات القشع لديهم نتائج إيجابية ، كل المرضى وعددهم 100 مريض(100 %) تم فحصهم للكشف عن اصابتهم بفيروس نقص المناعة البشرية. النتائج كانت سلبية.لم يكن هناك أي عدوى مترافقة مع مرض السل. كانت نسبة النجاح للعلاج (90%) حيث اكتسب (90) مريض الشفاء ، وكان إجمالي الوفاة ، وحالات الانقطاع عن العلاج 3 (3%) ، 7 (7%) على التوالي. لم يكن هناك أي فشل في العلاج. كان السل الرئوي السائد في الفئة العمرية (21-30) عامًا ، 31 مريضًا (31%) ، كما كان هناك ارتباط كبير بين منطقة الاستيطان والسل ،حيث اظهرت الدراسة أن 77 مريضًا (77%) كانوا يعيشون في المنطقة الحضرية. نتيجة العلاج للمرضى المسجلين في البرنامج العلاجي المباشر قصير الامد كان ناجحاً.

الكلمات الدالة: العلاج المباشر قصير الامد ،التدرن، فيروس نقص المناعة البشري.

## 1. Introduction

More than 2 billion people, equal to one third of the world's population, are infected with tuberculosis (TB) bacilli, the microbes that cause TB. One in 10 people infected with TB bacilli will become sick with active TB in their lifetime [1]. Infection begins when aerosolized droplets containing viable organisms are inhaled by a person susceptible of the disease. On 24 March 1882, the German doctor Robert Koch communicated to the Berlin Society of Physiology that he had discovered the microorganism responsible for the deadly pulmonary tuberculosis, named Tuberkelvirus in his seminal publication made 2 weeks later [2]. Iraq is considered to be a middle burden country with TB, and occupies rank 108 globally and 7 in Eastern Mediterranean region among countries with TB burden size. According to WHO report, the estimated incidence of TB in Iraq is 45/100000 population (i.e. estimated total new TB cases is around 15000 per year), while the prevalence is 74/100000 and the mortality is 3/100000 [3]. In response to this catastrophe, the World Health Organization (WHO) global tuberculosis program in 1993 declared tuberculosis a global emergency and began promoting a management strategy called directly observed therapy short course (DOTS). By 2005, 187 countries had started implementing DOTS with 4.9 million cases of tuberculosis being treated using DOTS in that year alone [8]. DOTS has 5 key components as identified by WHO:

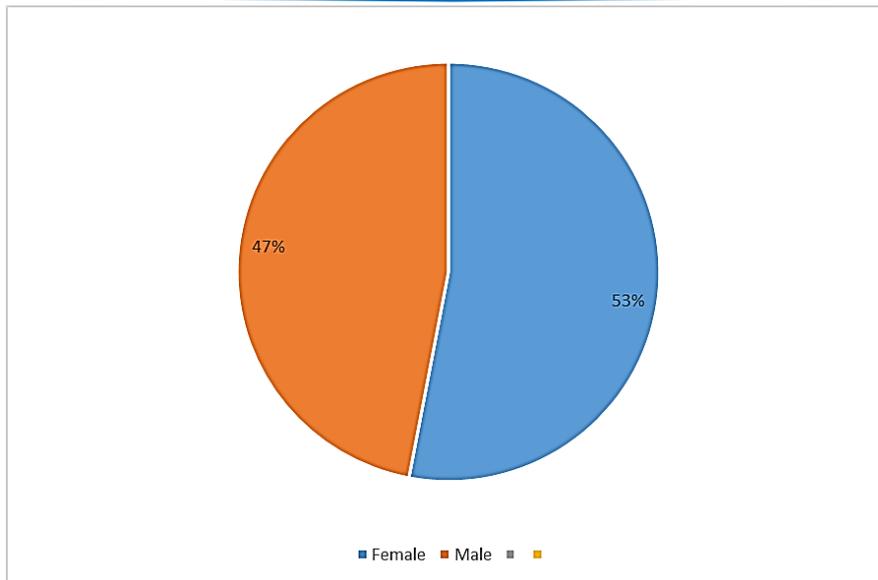
- Government commitment to sustained tuberculosis control activities.
- Case detection by sputum smear microscopy among symptomatic patients.
- Standardized treatment regimen of 6 to 8 months for at least all confirmed sputum smear positive cases, with DOTS for at least the initial 2 months.
- A regular, uninterrupted supply of all essential anti-tuberculosis drugs.
- A standardized recording and reporting system that allows assessment of treatment.
- Under the DOTS strategy, anti-tuberculosis medications are swallowed by patients under the supervision of a health worker (DOT) thereby ensuring that proper medications are given at proper intervals and at the right doses. Also, DOTS increases the accuracy of diagnosis of tuberculosis by advocating sputum smear microscopy thereby reducing the spread of tuberculosis [9].

## 2. Patients and Method:

The study was carried on patients attending the outpatient clinic in Kirkuk General Hospital and Kirkuk center of tuberculosis treatment. The information were collected for one year. One hundred cases were selected all of them were proved to have new and active pulmonary tuberculosis according to their positive sputum smear results. A questionnaire form was used for this purpose covered the following variables (age, sex, residence, date, social status, family size, education, family history of tuberculosis, chief complaint, past medical history like Diabetes ,steroid treatment, gastrectomy, smoking, alcohol). Physical examination / Laboratory tests (sputum, and HIV serological test) &Radiological examination of the chest were done for all the patients. This prospective study included patients treated for six months, which was divided into **Initial phase** for two months daily visits with quad ripple drugs (isoniazid, rifampicin, ethambutol, pyrazinamide) and **Continuous phase** for four months with one visit weak/month to receive only (isoniazid and rifampicin). The patients were assessed at the end of initial phase and at the end of continuous phase by performing direct microscopic sputum smear examination for monitoring positive results into negative.

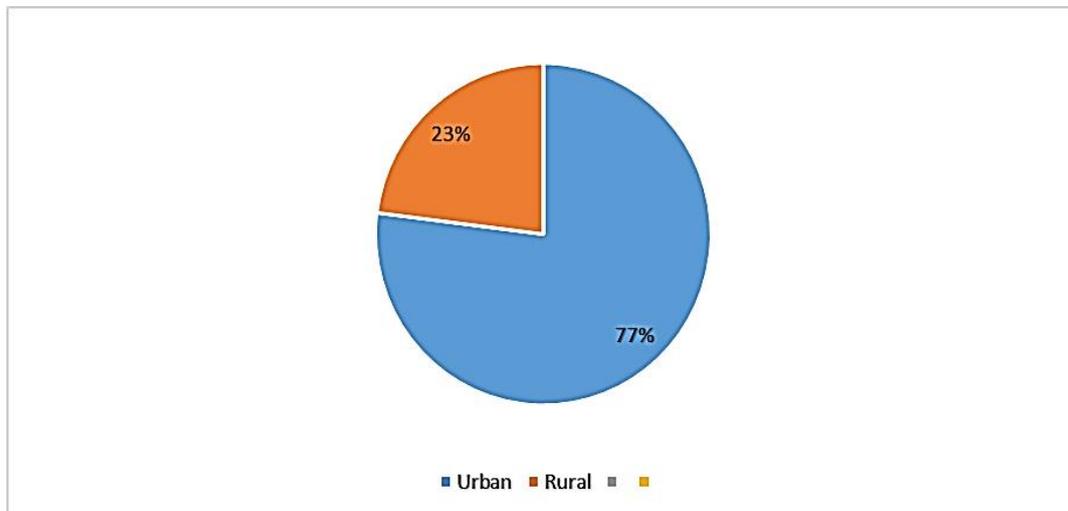
## 3. Results:

**3.1 Epidemiological results:** Among 100 participants (47%) were female and (53%) were male, most of them (74%) were in adolescent & adult age group. The mean age, standard deviation of ( $38 \pm 6$ ) years were included in the study. Active pulmonary tuberculosis was predominant in the age group (21-30)year which included 31 patients(31%). The second more involved group was (41-50)year which was consisted of 17 patients (17%)while 14 patients (14%)were in the age group (31-40)year, so (74%) were in the adolescent and adult age groups. No significant difference in gender was seen in the age groups in the study except in the age group (10-20)year where 8 patients were male and 4 others were female. The female male ratio was (1.1:1) as illustrated in **Fig. 1**



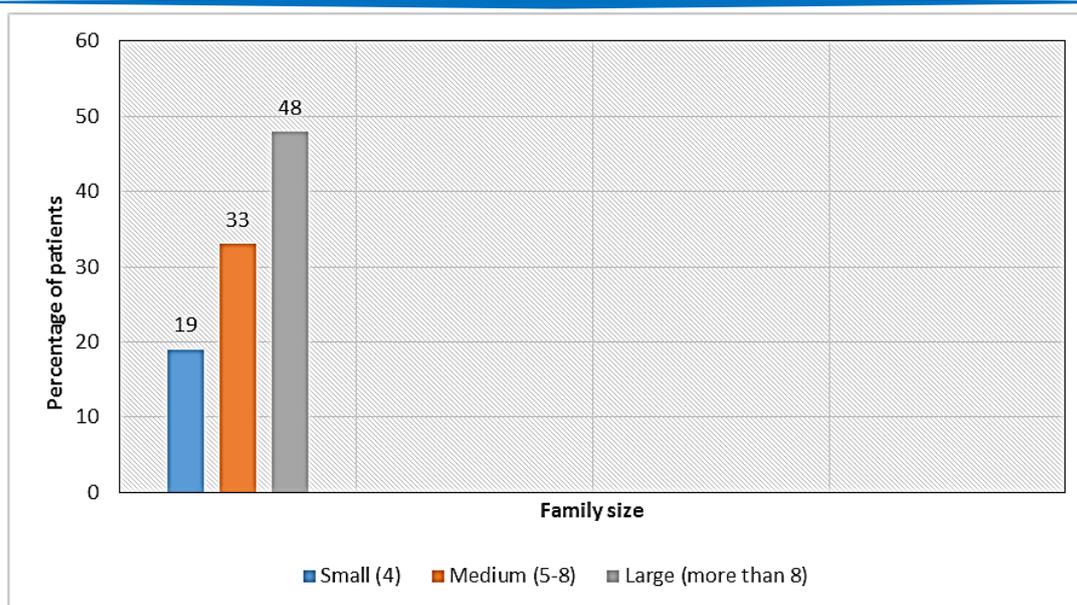
**Fig. 1:** Female and male ratio of active pulmonary tuberculosis.

Regarding the residency tuberculosis predominantly affected urban areas (77%) compared to (23%) in rural areas as shown in Fig. 2



**Fig. 2:** Frequency distribution of patients according to their residence.

Aggravating factors: In this study overcrowding is an important aggravating factor for pulmonary tuberculosis infection as presented in Fig. 3.



**Fig.3:** Frequency distribution of patients according to their family size.

**3.2 Clinical results:** Among (100) patients all of them were newly diagnosed with active pulmonary tuberculosis as illustrated in Table 1. Of them 90 patients (90%) was compliant to treatment and adhered to the DOTS strategy for 6 months while 10 of them (10%) withdrawn from the study because 3 patients (3%) died and the remaining 7 patients (7%) were non-compliant. The 90 patients who adhered to the study all of them performed direct sputum smear examination at the end of the Initial phase which was after two months from the treatment beginning showed cure from tuberculosis according to the conversion of their positive sputum smear results into negative which is the cornerstone of the response to anti-tuberculosis treatment.

**Table 1:** Cure rate of active pulmonary tuberculosis.

Active pulmonary tuberculosis		Sputum smear examination at the end of 2 months		Sputum smear examination at the end of treatment		Status		
New cases	Relapse	Negative (%)	Positive (%)	Negative (%)	Positive (%)	Died (%)	Cured (%)	Default (%)
100	-----	90	-----	90	-----	3	90	7

#### **4. Discussion:**

Epidemiological view: (Directly Observed Treatment, Short course chemotherapy). Unlike some major breakthrough in health care DOTS is not the direct outcome of basic or clinical research, but of subsequent operational research. The DOTS strategy makes it possible to carry out case finding chemotherapy and patient monitoring effectively without hospital care. The six months course of treatment limits further transmission of the tuberculosis bacillus by making each case noninfectious usually within the first two –four weeks of treatment. it is an approach that can be used anywhere. The most important outcome is to stop drug resistant strain development as a consequence of repeated ineffective treatment. [6]. Conolly –M et all [7] mentioned that tuberculosis is the leading cause of death in women worldwide because of socioeconomic and cultural factors leading to barriers in accessing health care because of the stigma associated tuberculosis. In this study 3 patients died and all of them were female and this agree with the study above. Janssen et al [ 8] study showed tuberculosis incidence is higher in the age group 65y old in developed countries. In this study tuberculosis incidence is higher in patients under 65y old and this may be due to the impact of the stressful life in a wars-torn country on the body immunity. Pio-A et al [9] study showed that the prevalence of HIV/AIDS infection was negligible in Bangladesh, China, Nepal, and Peru .In this study the prevalence of HIV/AIDS is not founded. Bhatti –N et al [10] study showed that the socioeconomic factors are predominantly responsible for the increase of incidence of tuberculosis in England and Wales and the national rise of tuberculosis affects only the poorest areas and there was a strong association with overcrowding that is why Tuberculosis is more common in urban area like we found in our study as (77%) of the patients were from urban area (taking into the consideration that TB is an airborne disease). Also in our study (84%) of patients are from low and medium socioeconomic class and in family size more than 8 members. Espinal –MA et al [11] shows that there is persistently low prevalence of multiple drug resistant tuberculosis in Chile and Benin. In this study no case of drug resistant was documented, the explanation is absence of HIV/AIDS infection and the good compliance. Clinical view: Netto et al [12] had cohort analysis of treatment outcomes in DOTS & Non-Dots programs all over the world .The 181 out of 212 countries. DOTS achieved cure rate 78% vs. 45% Non-DOTS strategy. In our study the cure rate is 90% which agree with the study mentioned previously.

## 5. Conclusion:

DOTS can produce cure rate up to (90%) even in the poorest countries, it does not require neither hospitalization nor isolation. It can prevent development of drug resistance which is fatal and up to 100 times costs more. Case detection by direct sputum smear microscopic examination is accurate, simple and reliable and DOTS recording and monitoring system follows each patient through the entire course of treatment to ensure cure.

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