

Effect of war on treatment of pulmonary tuberculosis, and evaluation of Directly-observed therapy in Baghdad

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Abstract

Background: Directly observed therapy-short course (DOTS) had been adopted by World Health Organization (WHO) as hopeful strategy for treatment of tuberculosis (TB) since early nineties. Iraqi health authorities started DOTS implementation since 2001 in Baghdad. Coverage expanded gradually till 100% in 2004. War and unstable security condition hit Iraq since March 2003.

Objective: The objective of this study was To evaluate the DOTS implementation program in Baghdad in different periods including 2 unstable periods for proper assessment of war and instability on treatment of TB.

Patients and methods: This study had been conducted in Baghdad during four different periods (before and during 2003 war, after war; without and with DOTS). Direct interview with patients, and follow up of their treatment were done.

Results: The results revealed that 78% of patients were in active age groups, 62% of them were males.

Surprisingly, direct observation was not achieved in those who were treated under DOTS in the whole periods. Patients treated under DOTS in the 1st and 4th periods showed much better sputum conversion rate after 2 month treatment (88.7 % in 1st and 86.5% in 4th periods` patients) than those treated under DOTS during war (45.9% or Non-DOTS 75.6%). A better cure rate also found in patients of both periods (64.9% in 1st and 63% in 4th period) than patients in other periods (11% in 2nd% and 43.6% in the 3rd one).

Conclusions: DOTS strategy played important role in improving registration and curing of TB cases in Baghdad. War and unstable security conditions got a destructive effect on treatment of TB patients regardless the followed strategy. Involvement of private medical sector and other governmental and nongovernmental organization can improve TB treatment outcome.

Key words: DOTS, TB, Baghdad

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Introduction

TB is a major cause of illness and death worldwide, especially in Asia and Africa. Globally, 9.2 million new cases and 1.7 million deaths from TB occurred in 2006⁽¹⁾

In Iraq 2886 smear positive cases were notified in 2006 (rate was 10 /100000), 60(2%) of them were died. Figure 1 shows number of notified TB cases reported in Iraq in years (2000-2007) according to type of the disease, and figure -2- shows that TB in 2007 affected mainly productive age group with male: female ratio 1.6:1⁽²⁾.

fig -1-TB cases notified in Iraq (2001-2007) according to type

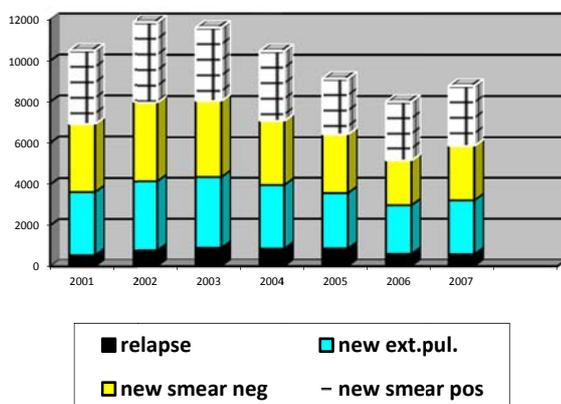
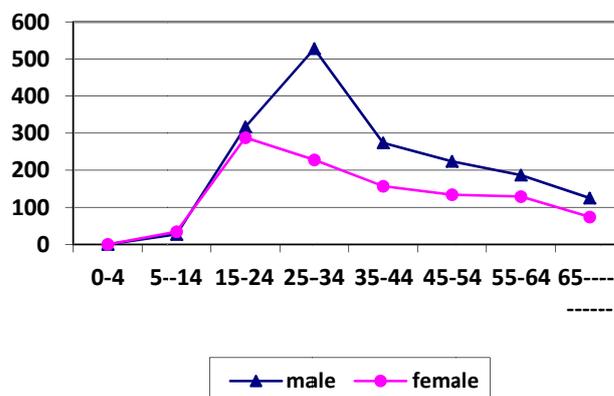


Figure -2- distribution of new sputum smear positive TB cases notified in Iraq in 2007 by age and gender



The WHO has proclaimed TB to be global public health emergency, and has called for the urgent development of effective control strategy to achieve a target of curing 85% of patients and globally 70% detection rate of new cases⁽³⁾. The other index for evaluation of treatment is the achievement of 85-95% of smear conversion rate from positive to negative smear at the end of 2nd months of treatment⁽⁴⁾.

The essential services needed to control TB, based on diagnosis and treatment of infectious cases and incorporating the essential management tools, were developed and packaged as the directly observed therapy-short course DOTS strategy in the early 1990s. DOTS has been promoted as a global strategy since the mid-1990s. The five major components of DOTS, as described by WHO, are:

1. Political commitment and resources TB control is a public health responsibility, and top down supports is crucial. This component must be the strongest link in the chain
2. Microscopy accurate diagnosis using sputum-smear microscopy among symptomatic patients is the first step in early detection of active TB infection. It sets the DOTS cure cycle in motion and protects others from infection.
3. Treatment standardized six to eight month regimens for all patients with active TB, with directly observed treatment for at least the first two months, is necessary. The success of this phase is contingent upon a sound, functional health-sector infrastructure and trained personnel.
4. Medicine Regular, uninterrupted supplies of the four to six most effective anti-TB drugs are essential. Full compliance with the drug regimen results in nine out of ten being cured.
5. Monitoring A standardized recording and reporting system allows assessment of each patient's treatment and progress. Rigorous overall record-keeping also act as early warning for emerging disease trends (such as MDR-TB)⁽⁵⁾.

The recommended basic treatment regimen for previously untreated patient with pulmonary TB have an initial phase lasting 2 months and a continuation phase usually lasting 4 or 6 months. During the initial phase, normally consisting of Isoniazid, Rifampicin, Pyrazinamide and ethambutol, the tubercle bacilli are killed rapidly. Infectious patients quickly become non-infectious (within approximately two weeks). Symptoms abate. Most patients with sputum-smear positive TB become smear negative within two months. During the continuation phase, fewer drugs are necessary but they must be given for a longer time (Isoniazid, Rifampicin)⁽⁶⁾.

The result of sputum smear examination should be recorded for all adult patients prior to the commencement of treatment. Priority is given to treatment of smear positive patients, as these are the most potent sources of infection in the community. Bacteriological follow up examinations in smear positive patients are the most important means of assessing progress. At the end of 2nd, 5th and 6th months or at least the last two months of treatment,

patients' sputum must be free from bacilli (sputum smear negative) before declaring him as cured⁽⁷⁾.

Iraq has implemented its national TB program (NTP) according to WHO guidelines since the late seventies. DOTS has been adopted as a pilot project in one district (Assader) in April 1998 in Baghdad, and in one district of each governorate. In 1st quarter 2000⁽⁸⁾, expansion to all part of Iraq in 2001 except in the 3 northern governorates –Duhok, Erbil and Sulaimania only after 2003.⁽⁹⁾

Two studies had been done in Iraq to evaluate DOTS strategy in Iraq, the 1st one was done by Samir A. Ameen to evaluate pilot project which had been carried on in Saddam city (Assader city) In April 1998. Treatment success rate of newly diagnosed pulmonary TB patients in this study was 82%, death rate 1.2%, treatment failure 4.4%, defaulter rate 6% and 6% of patients transfer their treatment out of the district. Sputum conversion rate after 2 months of treatment was 89.3%. The 2nd study was done by Hameed AL-Rajehy to evaluate DOTS strategy in Musiab city as a pilot project in Babel governorate in 2000. Hameed found that cure among patients treated under DOTS was 90% while it was only 26% among those whom were treated under conventional (Non-DOTS) method. These two studies concluded that DOTS strategy can give a good solution to TB problem in the studied communities regarding case detection, monitoring of treatment and insuring acceptable cure rates. Even though these studies pointed the lack of community participations in the program.⁽¹⁰⁾⁽¹¹⁾

In the first half of 2003, due to the war and subsequent widespread damage to governmental facilities, DOTS has been disruption throughout the country as well as other core public health services⁽⁹⁾. During war time, civilian population usually experiences a drop in caloric intake and starvation, distribution of housing diminution in availability of medical services. This what actually happened in Salvador during its 1980-92 civil war particularly among the 20% of the population (over one million) who were displaced (desplazados)⁽¹²⁾. During war in Angola 1998 it was found the TB situation was alarming in the town of Malang (420000 inhabitants, including refugees) and the government-run control program was functioning imperfectly. Laboratory examination of sputum was not anymore routinely performed. Patients came to hospital to pick their treatment once a fortnight during intensive phase and once a month during the continuation phase, and sometimes they had to buy Rifampicine in local market due to shortage; patients were often not recorded. Moreover, at least 50% of the 500 patients registered in hospital in 1997 were recorded as defaulters; only 4% of patients were recorded as having completed treatment.⁽¹³⁾ In Nicaragua, it was found that during the period of civil war (1984), the overall success rate improved by 39% after the introduction of sc chemotherapy, in spite of evidence of a deteriorating economy and escalation in civil war. A success ratio of 71% was achieved, so the authors estimated that as it could be expected, the best results

were obtained in the treatment of previously untreated patients with eight-month chemotherapy and in retreatment of relapses. The worst result was obtained in retreatment of defaulter.⁽¹⁴⁾

The objective of this study was to evaluate the DOTS implementation program in Baghdad in different periods including 2 unstable periods for proper assessment of war and instability on treatment of TB.

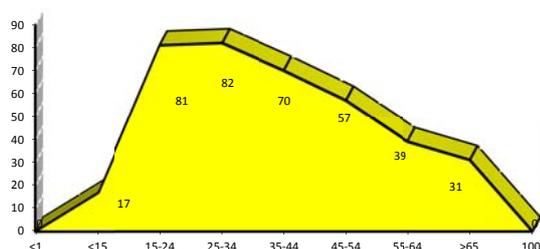
Patients and methods:

A prospective Cohort study was done in Baghdad, where 377 patients attended suffering from pulmonary tuberculosis. The diagnosis was confirmed by radiological & at least single isolation of acid fast bacilli from the sputum, provided that any of those patients has never had treatment for TB. Those patients were divided in to 4 groups:-

1. First group: 97 patients diagnosed during third quarter (July, August, September) of 2002 and completed 6 months treatment (before April 2003), i.e. before the last war on Iraq, DOTS was implemented in their treatment in PHCs under supervision of TB coordinators in Primary Health Care Secors (PHS).
2. Second group: 98 patients registered during first quarter (Jan., Feb. and March) 2003 and treated during the war period and DOTS was also supposed to be applied on them.
3. Third group: 78 patients registered during May 2003 (after war) and their treatment was applied in CRDI on monthly bases (old method) because of shortage in drugs and follow up tools.
4. The fourth group 104 patients registered during 4th quarter (Oct., Nov. and Dec) 2007 (after relative stability in the security conditions) and complete their treatment under direct supervision (DOTS).

Data regarding the name, age, sex, occupation, history of contact with active pulmonary TB, site of

figure 3 distribution of 377 positive sputum pulmonary TB cases according to age groups



out of 299 smear positive sputum pulmonary TB cases diagnosed and treated by DOTS method before, during and after war periods: none of those patients took his drugs in the PHC in front of the health staff, but every patient came to the PHC to receive drugs for 7-10 days and sometimes more even in 1st two months of treatment (intensive phase) during which patient must take his medicines daily in front of health worker.

treatment, regularity in attending Primary Health Care Centers (PHC), role of TB coordinator in follow up of defaulters Other related information had been collected through a direct interview with each patient at his first visit.

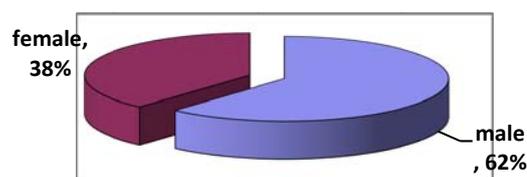
The outcomes assessment was done according to WHO standardized definitions of treatment outcome:-

1. Cure: - A patient who is smear negative at, or one month prior to, the completions of treatment and on at least one previous occasion.
 2. Treatment completed: - A patient who has completed treatment but without proof of cure.
 3. Died: - A patient who dies for any reason during the course of treatment.
 4. Treatment interrupted (default): - A patient whose treatment was interrupted for 2 months or more.
 5. Transfer out: - A patient who has been transferred to another reporting unit and for whom the treatment outcomes are not known.⁽⁷⁾
- The most common obstacles facing the DOTS implementation were defined through direct interview with chest physicians in CRDI (supervisors of DOTS implementation) TB coordinators in PHSS, health workers in PHCs and patients.
 - Statistical analysis: Chi-square (P value ≤ 0.05 was considered statistically significant), Relative Risk (RR > 1 means positive association) and Confidence Intervals (CI). Were calculated to find the association between results of variables in different groups of patients.⁽¹⁵⁾

Results

By simple look to fig-3- one can notice that 78% of cases involved in this study were found in the most productive age group (15- 54 yr), 62% of cases in this study were males (figure -4),

Figure-4- distribution of 377 TB cases by gender



Sixty seven percent of the patients didn't attend daily because the PHC was far away from their home, 54% said that this process interrupted their daily work, economic causes prevent 41% from coming every day, and all patients think that process is not necessary, but the most important point is that the condition in all PHCs is not prepared for that purpose because of crowded place and taking drug was not

performed in PHC because lack of water and shortage of syringes for injections. The members of the third group (100patient whom they were diagnosed during April 2003 and treated after war in the CRDI. (Non-DOTS) received their medication monthly following the direction of medical staff in CRDI.

In this study 17% of 1st and 18% 4th group patients attended private clinics for consultations while in the 2nd group(war group treated under DOTS) 33% and 29% of the 3rd group (after war but treated under Non-DOTS) attended private clinics before or during

periods of their treatment. All patients attended private clinics were also attending private pharmacies and/or dressers shops seeking for anti TB treatments but unfortunately they found part of treatments only and they were use these partial treatment at least for one week.

There were a significant differences in sputum conversion rate after 2, 5 and 6 months of treatment between patients treated under DOTS before war and those treated during or after war whether DOTS strategy used or not (P value= 0.00). Table, 1

Table -1-sputum conversion rate of 377 sputum positive pulmonary TB patients according to followed treatment strategy in relation to war condition .

Sputum conversion		DOTS before war 97 patients		DOTS during war 98 patients		Non DOTS after war 78 patients		DOTS after war 104 patients		P. value
		NO,	%	NO,	%	NO,	%	NO,	%	
After 2 m	negative	86	88.7	45	45.9	59	75.6	90	86.5	*0.00
	*positive	4	4.1	3	3.1	6	7.7	5	4.8	
	*not done	7	7.2	50	51.0	13	16.7	9	8.7	
After 5m	negative	85	87.6	39	39.8	44	56.4	87	83.7	0.00
	positive	3	3.1	4	4.1	5	6.4	4	3.8	
	not done	9	9.3	55	56.1	29	37.2	13	12.5	
After 6m	negative	63	64.9	19	19.4	34	43.6	66	63.5	0.00
	positive	3	3.1	4	4.1	3	3.8	3	2.9	
	not done	31	32.0	75	76.5	41	52.6	35	33.7	

*For purpose of calculation of Chi-square test (the positive and not done) considered as one group

Patients treated before war under DOTS got a better chance to be cure (64.9%) than those treated during war with DOTS (11%)(RR=2.97, CI=2.21-3.99) and those treated under Non-DOTS (43.6%)(RR=1.9,

CI=1.11-1.99) . But no significant difference was found between those who treated under DOTS before or after war (RR=1.03, CI=0.79-1.3). Tables 2 and 3.

Table -2-treatment outcome of 377 sputum positive pulmonary TB patients according to followed treatment strategy in relation to war condition

	DOTS before. War		DOTS during war		Non-DOTS after war		DOTS after war	
	no.	%	no.	%	no.	%	no.	%
Cure	63	64.9	10	11	34	43.6	66	63
Comp.tret	21	21.6	15	16	23	29.5	25	24
Died	4	4.1					3	2.9
Int.tret	4	4.1	64	69	18	23.1	4	3.8
Failure	3	3.1	2	2.2	3	3.8	4	3.8
Tran.out	2	2.1	2	2.2			2	1.9
Total	97	100	93	100	78	100	104	100

Table-3- Relationship between cure rate among patients treated under DOTS before war as a comparison group with other groups of patients treated during or after war with or without DOTS

Studied groups.	Cure	Not cure	RR and CI	Significances
DOTS before war (comparison gp.)	63	34		
DOTS during war	10	83	RR=2.97 CI=2.21-3.99	significant
Non-DOTS after war	34	44	RR=1.49 CI=1.11-1.99	significant
DOTS after war	66	38	RR=1.03 CI=0.76-1.3	Not significant

Interruption of treatment were found in About 4% of patients who are treated under DOTS before or after war while 69% of those who are treated during war under DOTS were defaulted from treatment which reflect the destructive effect of war on the program which push the managerial staff of National TB Program (NTP) in Iraq to stop the program temporarily and went back to the old system where patient came directly to RCDI to take their medicines, and in this case the defaulter rate came down to 23.1%. In fact we find that visits of TB coordinators and their health workers in the PHSs and PHCs to the defaulters' homes played a crucial role in reconnecting the defaulters to the program while this is not the case with RCDI group where there are no such visits. Table 2.

We find that 4% of DOTS group patients died before completing their anti-TB treatment in the 1st group, and 3% in the 4th group, but this is not known in the non DOTS group or DOTS groups treated under war condition again this is because of follow up of the health staff to the patients of the DOTS group under Stable security condition.

Discussion:

Distribution of patients by age and sex showed that 78% of them were between 15-54 years, an age group which is usually considered as the most productive age, these results are compatible with what had been found by Samir's study (70% of patients were between 15-44 years, 54% were males) (10), and are also compatible with the results of Hameed in his study for evaluation of pilot project in Musaib city 2002 where 81.2% found in age group 15-54 years, 64% of them were males (11). NTP in Iraq announced that 78.9% of new sputum smear positive TB cases were between 15-54 years, 61% of them were males (2) which is more or less similar to age and sex distribution of most regional countries declared by WHO (1). The socioeconomic burden of TB, on patients and his family, was very clear especially when patient in his productive age and had to increase his health expenditure in addition to loss of work days because of his illness. Regarding sex distribution, It is likely that smoking interfere with immunity to TB both generally, by damage to the body's anatomical defense and specifically by interfering with cellular mechanisms of defense⁽¹⁶⁾. In this study 40% of males and 6% of females were smokers which may explain higher rate of infection among males. On the other hand, female patients were mainly worried about the social consequences of the disease. Both in the family, and the community. In a study done in Vietnam in 2001, the researchers found that unmarried persons with TB or female children of parents with TB may face difficulties in getting

marriage even after years.⁽¹⁷⁾ so social stigma may lead to decrease detection rate of TB among female patients.

In this study surprisingly we didn't find any patient treated by DOTS strategy as the words of this strategy means!! Since no patient took any type of anti-TB drugs under direct observation of health workers in the PHCs on daily bases, which seems to be a complex process. The researcher found that 50% of patients complained from high crowding rate in PHCs, 40% didn't believe that daily attendance to PHCs was necessary and they couldn't pay cost of traveling, some patients attend private clinics, and dressers` shops` seeking for medical advice, and /or anti-TB drugs with absence of integration between private sectors and NTP program

In spite of mentioned difficulties this study found that in stable and secure condition DOTS application succeeded in achieving 88.7% and 86.5% sputum conversion rate in the 1st and 4th patients groups after 2 months of treatment, which looked like what had been found by Iraqi researchers (Samir 89.3%, and Hameed 90%), and near to what had been declared by NTP in Iraq 79 % during 2007, These results was nearly met the WHO requirement of achieving 85% sputum conversion rate after 2 months of chemotherapy. And success treatment rates were 86% in the 1st group and 87% in the 4th group which were also very close to results of previous local studies (82% in Samir's and 90% in Hameed's studies), and similar to results announced by Iraqi NTP in 2006 which was 85%. The success treatment rates in Jordan, Syria, and Iran in 2006 were 83%, 89%, and 83% respectively. This means that DOTS strategy in Iraq can achieve goals of controlling TB according to WHO requirements.

Third and fourth patients` groups whom they were treated under DOTS during war or non-DOTS after it gave bad results regarding sputum conversion rates (45.5%, 75.6%) table 1, and treatment success rates (26%, 73.1%), in addition to high defaulters rate in both groups (69%, 23.1%), table 2. This means that war and unstable security condition in Iraq got

destructive effect on DOTS program regarding follow up of defaulted TB patients by health personnel, interruption of monitoring system of the program and finally outcome of treatment can not be assured. This conclusion goes with Barr RG conclusion in 1994 that condition of war are associated with a rapid increase in morbidity and mortality from TB, which appears to result in increased transmission among populations most severely affected by war, which result in an increased morbidity and mortality for many years, underscoring the need for improved TB control in the post war period in countries that have been devastated by war⁽⁹⁾

Conclusion:

Although direct observation was not fully applied in treatment of TB cases in Baghdad the study concluded that:-

- 1- Treatment of TB patients under DOTS strategy in a stable security condition can improve registration, insure sputum conversion and treatment success, and contribute in decreasing infectivity of TB in Iraq.
- 2- War and/or conflicts situation had a destructive effect on anti TB program regardless the followed strategy.
- 3- Better health education about TB, through: patients` families, paramedical personnel, school teachers, nongovernmental organization, head of tribes and other concerned groups and involving them in the process of direct observations as local points can play an important role in increasing patients compliance.

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