KNOWLEDGE OF TUBERCULOUS PATIENTS ON DISEASE AND THEIR TREATMENT OUTCOME OF DOTS PROGRAM WITH EMPHASIS ON WHO STRATEGY IN KIRKUK–IRAQ

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ABSTRACT

Background

Tuberculosis has got high priority within the health sector as a major public health problem and directly observed therapy short course (DOTS) strategy has been planned to be implemented widely to control the disease and its management.

Objectives

To assess knowledge of the patients' on various aspects of tuberculosis and show the six mutually exclusive outcome of treatment regimen under directly observed therapy short course (DOTS).

Patients and Methods

A prospective case follow up study has been carried out on 110 patients attending consultation clinic for Chest and Respiratory Diseases in Kirkuk, for the period from the 1st of April to 31st of December 2009.Tuberculous patients were followed up for the next six months period under DOTS program including two phases.

Results

Regarding knowledge of patients about routes of transmission and risk factors, there was statistically significant difference between different educational levels ($P<0.05$), the highest percentage being among secondary school level patients (28.6%).Occupation had a significant effect on patients' knowledge on treatment regimen , in high score knowledge group (4-6) among students was 100%which was statistically significant. The outcome of treatment regimen was 99.1% treatment success (cure and completed treatment); 0.9% had relapsed and no unfavorable outcome was noticed.

Conclusion

Overall knowledge of patients was low regarding routes of transmission, risk factors and treatment regimen.

***Keywords*:** *Tuberculosis, DOTS, WHO, Kirkuk.*

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INTRODUCTION

Tuberculosis is a disease that causes millions of deaths, it infects one third of the world population and profoundly damages households and country economies. It is a major health and social challenge [1].

In March 2000, the Amsterdam Declaration to stop TB called accelerated expansion of control measures for TB to increase political commitment and financial resources to reach targets for global TB control. About 95% of TB cases and 99% of deaths occur in developing countries and 75% are in economically most productive age group (15-54 years) and an average of 3-4 months of work time are lost if an adult has TB [2]. Tuberculosis has got high priority within the health sector as it is a major public health problem and kills more people than HIV, STD, malaria and tropical diseases [3].

Iraq has a high burden of TB and ranks 44th worldwide among countries with a high TB burden and 7th among Eastern Mediterranean Regional office (EMRO) region [4]. Good progress has been made to reach the world Health assembly targets set in 2000 for case detection and treatment success under Direct Observational Treatment Short strategy (DOTS), the international recommended strategy for TB control adopted by all member states in 1990s [5].

The aim of the study is to asses patients' knowledge on TB regarding routes of transmission, risk factors and treatment regimen according to sociodemographic characteristics, and to assess the outcome of DOTS (six months treatment) of those patients according to WHO components.

PATIENTS AND METHODS

A prospective case cohort study was approved by ethic committee at College of Medicine/Sulaimani University and included all of the patients 110 tuberculous patients (47 males and 63 females) who attended the Consultation Clinic for Chest and Respiratory Diseases in Kirkuk city, for the period from 1st of April 2009 to 31st of December 2009. Their ages were ranging from 8 years up to 85 years .The whole study started in the 1st of January 2009 ended in the 1st of may 2010.

Kirkuk governorate geographically is divided to 5 districts namely, Kirkuk, Dibis, Dakok, Hawija 1 and Hawija 2. The study population was those patients who were managed in 17 Primary Health Care Centers (PHCC) belonging to Kirkuk Governorate.

The pulmonary tuberculosis was diagnosed by chest X-ray and 3 samples of direct sputum examination using Ziehl-Neelson stain with high index of suspicion. Extra pulmonary tuberculous patients were mainly referred cases like ascites, lymphadenitis, meningitis and vertebral TB.

All cases were managed by DOTS and followed up along two phases of treatment; the initial intensive phase during which the patient was directly observed in PHCC by a trained health provider for two months followed by four months of second phase (continuation phase).

A questionnaire form was filled for each patient; it includes three different types of information sociodemographic characteristics, the criteria of evaluation and monitoring per WHO definition, the knowledge and awareness of the patient about the disease).

Knowledge of the patients about the disease was divided into three aspects to strengthen the study validity; the first aspect was source of infection being food and drink, air or blood which had been given 3 scores and the correct answer being air as source of infection. The second aspect to be assessed was risk factors that had been given 9 scores (crowding, obesity, smoking, alcoholism, chronic diseases, humidity, nutrition, immune suppressant drugs and time of communicability). The third aspect was knowledge of the patients on the drugs and their fallow up, which was given 6 scores according to the questions. They were assessed for the treatment regimen being two types of medications, the duration of treatment being 6 months and two phases of the treatment, the method of drug administration being early morning prior to breakfast, side effect of drugs being irritant to stomach, causing jaundice, gout and hypersensitivity reactions as well as time of sputum examination at the 2nd month of treatment initiation and the result of defaulter as relapse and chronicity [6].

Methods of evaluation and Monitoring of DOTS programme

The monitoring and evaluation were performed according to WHO proposal round 6.The proposal included two levels of assessment, the first level is as the resources and activities in the consultant clinic for chest and respiratory disease including component, evaluating the knowledge of health

care providers at different levels; staff and health care. The important steps in the component to be assessed were:

1-Planning of the strategy and policy.

2-Identification of persons with active TB.

3-Identification and managing persons infected with TB.

4-Providing laboratory and diagnostic services.

5-Collecting and analyzing data.

6-Providing education to the care provider and to the patients (case and latent TB infections).

The second level the component which was assessed in PHC on the same policy. Another very critical and principal point was added to strengthen the evaluation process that was the patients' knowledge regarding specific points in relation to routes of transmission, risk factors, and treatment regimen. All these information was arranged in a special questionnaire form and filled by direct face to face interview with patients included in the study.

Analysis of treatment outcome was used according to WHO criteria [7]. This cohort (longitudinal) analysis was used as a key management tool for evaluating the effectiveness of National TB program (NTP). Treatment outcome was recorded according to the follow up of DOTS program at the end of continuous 6 months chemotherapy as follows: Cure, Treatment completed, Treatment failure, Death, Defaulter and Transfer out. The treatment success was evaluated by the sum of patients who had been cured and those who had completed treatment. Patient's adherence to treatment was monitored according to supervisory check list applied by National TB Control Program (NTCP) which was composed of four components on which the current study has depended for monitoring and evaluation. These components were performed according to Global Fund/Round 6/Iraq TB Proposal. All patients received treatment as DOTS but actual DOTS was practiced only at first day of initiating the intensive phase.

Exclusion criteria

1-Suspected cases who improved by two weeks of broad spectrum antibiotics.

2-Transferred cases outside the city centre.

3-Displaced patients with irregular and poor adherence to drugs.

Statistical analysis

Statistical analysis was carried out using (SPSS version 15). Chi-square was used to examine the difference between groups. The interpretation of the results was done through the measurement of P value with statistically significant effect when P value is less than 0.05 [8].

RESULTS

Out of 110 patients 63 (57.3%) were female and 47 (42.7%) were male. Table 1 shows the knowledge of TB patients on route of transmission and risk factors. In females, the knowledge score group 1-4 and 5-8 was 96.8% and 3.2% while in males was 93.6% and 6.4% respectively. No significant difference was found between gender regarding knowledge scores.

Table 2, the highest frequency of 1-4 score group was among employed (100%), regarding 5-8 score group, the highest frequency was among students (33.3%). Statistical analysis did not show significant difference among groups.

Table 1. Knowledge of patients about route of transmission and risk factors according to gender*.

Gender		Knowledge score	
		1-4	5-8
Female	Count	61	2
	(%)	96.8	3.2
Male	Count	44	3
	(%)	93.6	6.4
Total	Count	105	5
	(%)	95.5	4.5

***χ2=0.639 , D.F =1 and P>0.05.**

Table 2. Knowledge of patients about route of transmission and risk factors according to occupation*

Occupation		Knowledge score	
		1-4	5-8
Employed	Count	14	0
	%	100.0	0.0
Unemployed	Count	27	2
	%	93.1	6.9
Student	Count	2	1
	%	66.7	33.3
Housewife	Count	62	2
	%	96.9	3.1
Total	Count	105	5
	%	95.5	4.5

*$\chi 2=7.064$, D.F =3 and P>0.05.

Table 3 shows the knowledge of patients about routes of transmission and risk factors according to education. Regarding the knowledge score group 1-4, the highest frequency was among university level (100%).While the knowledge score group 5-8, showed the highest frequency among the secondary school level (28.6%). Statistically there was significant difference between groups (P< 0.05).

Table 4, indicates the knowledge of patients with history of contact about route of transmission. Among those had positive history, 86 (96.6%) had knowledge score of 1-4 and those with negative history, 2 (9.5%) got knowledge score of 5-8.Chi-square analysis did not show significant difference between groups.

Table 3. Knowledge of patients about route of transmission and risk factors according to education.*

Education		Knowledge score	
		1-4	5-8
Illiterate	Count	70	2
	(%)	97.2	2.8
Primary	Count	27	1
	(%)	96.4	3.6
Secondary	Count	5	2
	(%)	71.4	28.6
University	Count	3	0
	(%)	100.0	0.0
Total	Count	105	5
	%	95.5	4.5

*$\chi 2=10.036$, D.F =3 and P< 0.05.

Table 4.Knowledge of patients with history of contact about route of transmission and risk factors.*

History of contact		Knowledge score	
		1-4	5-8
No.	Count	86	3
	(%)	96.6	3.4
Yes	Count	19	2
	(%)	90.5	9.5
Total	Count	105	5
	(%)	95.5	4.5

*$\chi 2=1.483$, D.F =1 and P>0.05

Table 5 shows the knowledge of TB patients about treatment regimen according to gender. Gender difference about treatment regimen was as followed: out of 63 females 40 (63.5%) had knowledge score 1-3,. The male patients showed that 30 (63.8%) had 1-3 score. No significant difference was found between two groups.

Table 6 shows the knowledge of the patients about treatment regimen according to occupation. It was found that in 4-6 knowledge score group, the highest frequency was 3 (100%) among students and the lowest frequency was 10 (15.6%) among housewives. Statistical analysis showed significant difference between groups.

Table 5. Knowledge of patients about treatment regimen according to gender.*

Gender		Knowledge scores		
		0.00	1-3	4-6
Female	Count	12	40	11
	(%)	19.0	63.5	17.5
Male	Count	6	30	11
	(%)	12.8	63.8	23.4
Total	Count	18	70	22
	(%)	16.4	63.6	20.0

***χ2=1.125, D.F =1 and P>0.05.**

Table 6. Knowledge of patients about treatment regimen according to occupation.*

Occupation		Knowledge scores		
		0.00	**1-3**	**4-6**
Employed	Count	0	10	4
	(%)	0.0	71.4	28.6
Unemployed	Count	6	18	5
	(%)	20.7	62.1	17.2
Student	Count	0	0	3
	(%)	0	0.0	100.0
Housewife	Count	12	42	10
	(%)	18.8	65.6	15.6
Total	Count	18	70	22
	(%)	16.4	63.6	20.0

***χ2=16.267, D.F =6 and P< 0.05.**

Table 7 shows the knowledge of patients according to education. In 4-6 knowledge score group, the highest percentage was among university level 2 (66.7%). In 1-3 group, the highest percentage was among the primary level 19 (67.9%). Regarding zero score group, the highest score was among primary level 5 (17.9%). No significant difference was found between different groups.

Table 8 indicates the treatment outcome at the end of DOTS regimen. The rate of cure was 41 (37.3%), completed treatment 68 (61.8%) and the relapse rate was 1 (0.9%).

Table 7. Knowledge of patients about treatment regimen according to education.*

Education		Knowledge scores		
		00	1-3	4-6
Illiterate	Count	12	47	13
	(%)	16.7%	65.3%	18.1%
Primary	Count	5	19	4
	(%)	17.9%	67.9%	14.3%
Secondary	Count	1	3	3
	(%)	14.3%	42.9%	42.9%
University	Count	0	1	2
	(%)	0%	33.3%	66.7%
Total	Count	18	70	22
	(%)	16.4%	63.6%	20.0%

***χ^2=7.257, D.F =6 and P>0.05.**

Table 8. Treatment outcome at the end of DOTS regimen.

Treatment outcome*	Number	Percent
Cured	41	37.3
Completed treatment	68	61.8
Relapse	1	0.9
Total	110	100

***Treatment outcome indicators according to WHO criteria are (cure, complete treatment, death, defaulter, failure, transfer out and relapse).**

Table 9 shows the knowledge of patients about routes of transmission and risk factors and its relation with treatment outcome. In 1-4 knowledge score group, 37 (35.2%) cured. Among 5-8 Knowledge score group, 4 (80.0%) cured. No significant difference was seen between two groups.

Table 10 shows the knowledge of TB patients about treatment regimen and its relation with treatment outcome. Among 1-3 knowledge score group, 28 (40.0%) cured. In 4-6 knowledge score group, 11 (50,0%) cured. Statistically no significant difference between groups.

Table 9. Knowledge of patients about routes of transmission and risk factors and its relation with treatment outcome.*

Knowledge score group		Treatment outcome		
		Cured	Completed Treatment	Relapse
1-4	Count	37	67	1
	(%)	35.2	63.8	1.0
5-8	Count	4	1	0
	(%)	80.0	20.0	0.0
Total	Count	41	68	1
	(%)	37.3	61.8	0.9

***χ2=4.095, D.F =2 and P>0.05.**

Table 10. Knowledge of patients about treatment regimen and its relation with treatment outcome.*

Knowledge score group		Treatment outcome		
		Cured	Completed Treatment	Relapse
1-3	Count	28	41	1
	%	40.0	58.6	1.4
4-6	Count	11	11	0
	%	50.0	50.0	0.0
Total	Count	39	52	1
	%	42.4	56.5	1.1

***χ2=0.927, D.F =2 and P>0.05.**

DISCUSSION

Concerning knowledge of patients about routes of transmission and risk factors, in 1-4 knowledge score, both sexes had almost similar frequency of knowledge; while in 5-8 knowledge score the frequencies were not representative because of small sample size. Jackson reported that patients recently infected with TB had complex believes about the disease transmission and causation which do not mirror those of health professional [6].

Among 110 patients, in 1-4 knowledge score group, all patients with their different occupation had considerably low level of information about route of transmission and risk factors of tuberculosis. In 5-8 knowledge score, the number of patients was few so it cannot be representative of the studied population.

The relation of education and route of transmissions and risk factors, in 1-4 knowledge score the percentage was 100% in university level, illiterate 97.2%, primary 94% and secondary 71.4%. Although the number of university level patients were low 3. It seems that the knowledge of different educational level were

not so high as the percentages in 5-8 knowledge score group were low.

In a study in Gambia, which estimated the risk factors for pulmonary TB, it showed that trained and educated professional workers (school teachers, nurses, doctors and pharmacist) had significantly lower risk to develop TB [9].

Regarding history of contact with tuberculous patients. In 1-4 score the percentage was (96.6%) among those who had negative history of contact, while (90.5%) had history of contact. In high score knowledge (5-8), those with positive history of contact had higher knowledge 2 out of 21 (9.5%) than those with no history of contact 3 out of 86 (3.4%). This illustrate that those who had history of contact were more aware about risk factors and mode of transmissions.

The knowledge of patients about treatment regimen in relation to gender showed identical percentage in 1-3 knowledge score group, while it was higher among males (23.4%) than females (17.5%). This finding was in agreement with that reported in a study done in Omdurman, Sudan, which showed that male (38.7%) had better knowledge score than female (31.4%) [10].

The highest frequency of knowledge score 1-3 was among employed (71.2%), while the frequency of knowledge 4-6 was among students (100%). In exploring the knowledge of patients according to education level, the highest frequency in 4-6 score was among university level (66.7%) followed by secondary (42.9%), illiterate (18.1%) and primary (14.3%). In a study done in South India , to explore the effect of risk factor for non adherence which may affect treatment outcome, it was shown that the risk factors associated with non adherence were illiteracy (39.0%), difficulty to access health facility (57.0%) and nongovernmental DOTS center 43.0%) [11].

At the end of short course treatment, a cohort analysis was applied to show the outcome of DOTS [12]. According to WHO and NTP-Iraq; the most important two indicators to program success are the cure rate and completed treatment rate (sum of these two indicators reflects the success rate of DOTS outcome). Completion of anti TB treatment is the far most priority of TB control program [13]. Interrupted or incomplete treatment increases the risk of treatment failure, relapse of disease and acquisition of drug resistance TB [14]. Cure percentage was 37.3%, completed treatment was 61.8% and the success was 99.1%. The unfavorable outcomes of DOTS are (failure, defaulter, death and transfer) which were zero in the current study.

In Iraq, Mohan showed the treatment failure was 2 % [15]. while in a study done in Islamic Republic of Iran was 9% at the end of second month and 1.7% at the beginning of fifth month [16]. Niazi and Al-Delaimi, reported that the cure rate for patients treated at home were significantly better than control (83.7%) versus 68.6% [17]. In Saudi Arabia, the cure rate was increased from 24.4% to 36.2% and the default rate was decreased from 15 to 1.2% after implementation of National Tuberculosis Control Programme [18].

In a sub regional meeting on TB in Syrian Arab Republic/ Damascus, it was declared that the cure rate of TB by implementation and expansion of DOTS strategy among the countries of Near East was highest in Cyprus (96%) followed by Syria (91%), Jordon 79%), Iraq (63%) and the lowest in Lebanon (37%) respectively. While treatment success rate was also highest in Cyprus (96%) followed by Syria (91%), Lebanon (80%), Jordon (79%) and the lowest in Iraq (77%) respectively [19].

In India a cohort study was done to show the treatment outcome in patients placed under DOTS. The cure rate after completion of treatment (Intensive and continuous phase) was 91.0% and 73.3% for categories 1 and 11 patients respectively [20].

Monitoring the outcome of treatment is essential to evaluate the program intervention. Recommendations for evaluation treatment outcome has been issued by WHO in European region for the international union against tuberculosis and lung diseases using an agreed set of six possible and mutually exclusive outcomes in high incidence countries [21].

In Brazil, Vieira and Ribeiro reported a lower number non compliant patient treated by DOTS than those treated by self administration treatment (SAT), which may be related to the more intimate, frequent and humanized contact between patients and the health care staff resulting in a stronger bond between patients, families and the health care facility leading to more favorable treatment outcomes [22].

Relapse is regarded as one of the conflicts and obstacles facing the progress of TB treatment in DOTS program; the relapse percentage in this

study was 0.9%. The percentage of treatment success in this study was higher than that reported in a study done in North Ethiopia which showed that patients treated in TB clubs had better treatment completion (68.7%) than out of club group (46.8%) regarding smear positive cases [(23)]. It was also higher than a study done in Thailand comparing three types of DOTS (health care workers, family and self administered treatment) which showed the highest percentage among health care workers DOTS (93.0%) followed by family (89.0%) and self administered (69.0%) respectively [(24)].

Knowledge of patients about route of transmission and risk factors and its influence on treatment outcome showed that the higher score 5-8 had higher cure percentage (80.0%) than 1-4 score (35.2%). While in completed treatment among 1-4 score, it was (63.8%) and 5-8 score was (20.0%). The success percentage of 1-4 score group was (99.0%), while in 5-8 score was (100.0%). There was only one relapse case in 1-4 score with no cases in 5-8 score. The result is not in agreement with that reported by Hoa, in Vietnam, who found that knowledge of new pulmonary TB patients about the disease and its treatment was generally high reflecting that their patients have received information from health staff and television [(25)]. This indicates that the patients of this study requires targeted educational interventions.

Regarding the knowledge of patients about treatment regimen and its relation with treatment outcome, it was found that highest percentage of cure was 50.0% and the success percentage was 100% among 4-6 score group. This finding indicates that higher knowledge of TB patients about treatment regimen have better patients adherence to treatment.

It was concluded that; about route of transmission and risk factors no significant difference was found between gender regarding high knowledge scores. Knowledge of different educational level was not so high. The highest knowledge score was among patient who had history of contact .Knowledge of patients about treatment regimen was highest among students. The overall patients' knowledge about routes of transmission, risk factors and treatment regimen was low.

Success as short term treatment outcome was high, relapse was low and no unfavorable outcome was reported.

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