Original Article

Evaluation of the treatment after default rates in a Tuberculosis Dispensary in 10 years period and the effect of directly observed treatment

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Abstract. We aimed to evaluate that defaulting from tuberculosis (TB) treatment rates and patient characteristics in our dispensary in 10 years period.

The files of patients with treatment after default between 1997 and 2006 were retrospectively analysed. Statistical analyses were made using SPSS package programme.

Between 1997 and 2006 a total of 3142 patients undergoing treatment, 67 (2.13%) had defaulting from treatment. Treatment after default rates with respect to years were 3.2% in 1997, 2.8% in 1998, 3.0% in 1999, 3.0% in 2000, 2.9% in 2001, 3.4% in 2002, 1.4% in 2003, 1.0% in 2004, 0.5% in 2005 and 1.3% in 2006. The mean period for treatment after default was 2.4±1.6 months. When patients were grouped into two with respect to treatment periods (1997-2001 and 2002-2006); age, gender, marital status, education status, the number of household contacts, the mean treatment after default months, the type of the disease, demonstrated no statistically significant difference. The first group had greater mean of the treatment after default rate than the second group ($p<0.001$)

It was found out that treatment after default rates in our dispensary in 10 years period is less than 5% which is targeted by World Health Organization (WHO). No differences about social and clinical characteristics of cases were detected. However, decline in treatment after default rates was found to be statistically significant with application of directly observed treatment (DOT). Close monitoring of patients and to be sensitive for their needs, may contribute to decrease the default rates from TB treatment.

Key words: Tuberculosis, treatment, patient compliance

1. Introduction

Tuberculosis (TB) is a major cause of illness and death worldwide. The World Health Organization (WHO) declared TB a global emergency in recognition of the growing importance of TB as a public health problem. About one-third of the world's population is infected with *Mycobacterium tuberculosis*. Globally 9.2 million new cases and 1.7 million deaths from TB occurred in 2006. Population growth has boosted these numbers compared with those reported by the WHO for previous years (1,2).

Tuberculosis treatment outcomes are reported according to internationally accepted definitions. These include cure, treatment completion, treatment failure, death, default and transfer- out. Specific criteria are defined for cure, treatment failure and death. A defaulter is defined as a patient whose treatment was interrupted for 2 months or more (3-7).

Defaulting from treatment remains a challenge for most tuberculosis control programmes. A major contributor to both treatment failure and the rise of multidrug-resistant TB is inadequate

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and incomplete treatment. Reasons for non-adherence are complex and multifaceted involving more than patients' personal characteristics and attitudes. Factors such as the chronic nature of the disease, the socio-cultural context and poverty, and interacting with physicians, nurses, and other health care workers, all affect access to and adherence to treatment (8,9). While structural factors such as interruptions in drug supply play a role, patient default or drop-out from TB treatment is one of the most important reasons for non-adherence to treatment. Also it may increase the risk of relapse, death, may prolong infectiousness and increase the cost of treatment (7,10-13).

Tuberculosis is a public health problem. It is necessary to know incidence and associated factors to non-compliance for performance interventions. In this study we aimed to describe default rates associated with patient characteristics in a 10 year period between 1997-2006 in our dispensary.

2. Methods and materials

Setting

Umraniye is a rapidly urbanizing region of Istanbul with a continuously growing population. It has a surface area of 153 km^2 and a population of 501.260, according to the count in 2007. The Umraniye Tuberculosis Dispensary was founded in 1996 and a total 3142 patients with TB have been treated for 10 years.

Procedures

The types of the patients were defined as "new", "had previous treatment" and "relapsed". When a patient had never had treatment for TB or had taken antituberculosis drugs for less than 1 month, was considered new patient. Relapsed patient was described who previously treated for TB had been declared cured or treatment completed, and was diagnosed with bacteriologically positive (smear or culture) tuberculosis. Treatment after default (a patient who had failed to take medication for more than 2 consecutive months after the date of the last application during the course of treatment) and treatment after failure (a patient who was started on a re-treatment regimen after having failed previous treatment) patients were grouped under the heading of "had previous treatment".

The demographic points of all patients with treatment after default in 10 years period were enlisted. The age, sex, marital status, educational status, presence of social security, employment status, the type of the patients and the type of the disease (pulmonary or extra-pulmonary) were scanned. Treatment after default rates with respect to years and the mean period for treatment after default were determined.

Because of directly observed treatment (DOT) was started in 2002 among selected cases (relapsed disease, presence of previous treatment failure or default), patients were grouped into two with respect to treatment periods (1997-2001, 2002-2006) and patients characteristics in groups were compared statistically.

Statistical analysis

The analyses of the data were performed using the SPSS version 11.0 (Statistical Package for the Social Scienses, SPSS Inc., Chicago, IL, USA). The descriptive statistical data of the demographic and clinical variables were expressed as frequency, percentage, mean value and standard deviation (SD). The Pearson Chi-Square test was used for the categorical variables and the frequency analyses. The Mann Whitney-U Test was used for variables without normal distribution. The t-Test was used for compare the means of two groups. For the statistical analyses, a p value of <0.05 was considered significant.

Ethical aspect

Due to the fact that all data analyses were retrospective and there was no possibility that any individual could be identified, the paper neither included a consent form nor an approval from the ethical committee.

3. Results

Of 3142 patients undergoing treatment, 67 (2.13%) had treatment after default. Among these, 53 (79.1%) were male and 14 (20.9%) were female. The ages of patients were between 2 and 76 (mean age: 32.6 ± 13.9).

The number of married patients was 40 (59.7%), 42 (62.7%) cases had a job and 26 (38.8%) of them had social security. The mean number of household contacts was 4.6 ± 2.5. While 36 (53.7%) of them was graduated from primary school, 9 (13.4%) cases had no education.

The number of new cases was 41 (61.2%). (The distributions of patients according to the type of cases have been presented in Figure 1). Fifty-eight cases (86.6%) had pulmonary tuberculosis and 46 (68.7%) had positive smears in sputum. Treatment after default rates with respect to years have been presented in Figure 2. In 10 years period decline in treatment after default rates was found to be statistically significant ($p<0.001$).

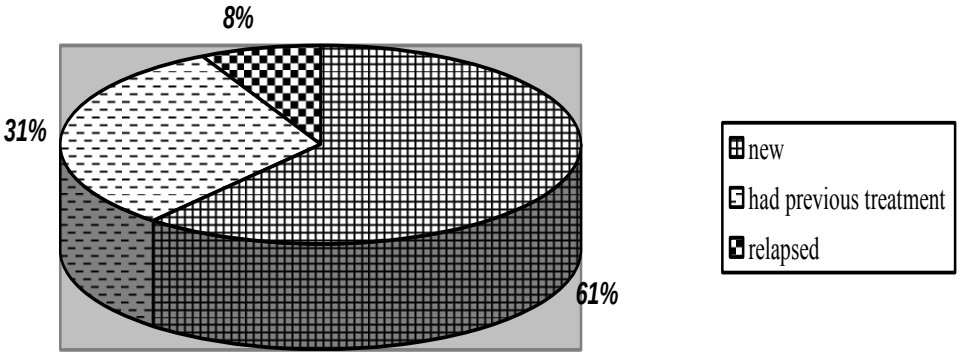

Fig. 1. Distribution of patients according to the type of cases.

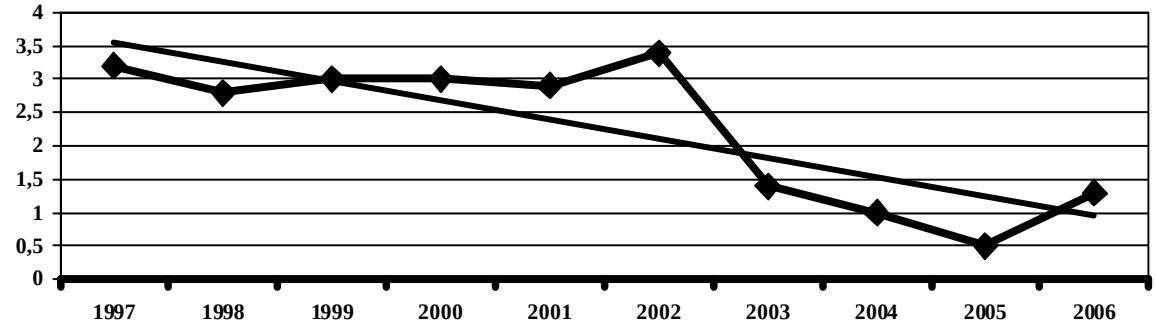

Fig. 2. Treatment after default rates with respect to years.

The mean period for defaulting from treatment after starting the TB therapy was determined as 2.4 ± 1.6 months.

When patients were grouped into two with respect to treatment periods (1997-2001, 2002-2006); age, gender, the number of household contacts, the mean treatment after default time, marital status, having social security, the types of the disease, demonstrated no statistically significant difference (Table 1). On the other hand, the first group had greater mean of the treatment after default rate than the second group (2.9 vs 1.5). This was statistically significant ($p<0.001$).

In following years, in these 67 cases with treatment after default, 17 (25.3%) were available for follow-up and 12 (17.9%) of them completed the tuberculosis treatment under DOT, 2 (3.0%) patients had treatment failure, 2 (3.0%) cases died and 1 (1.5%) of them was transferred out.

4. Discussion

TB is a highly prevalent disease in the poorest regions of the world and a reemerging problem in the developed countries. Worldwide, TB treatment after default has been estimated at between 1% and 20% (14).

One of the biggest challenges to TB control is the length and complexity of TB treatment. Because curing TB requires the ingestion of multiple anti-microbial agents for at least 6 months, patients frequently stop taking their medications early or do not take the full dose of medications regularly (15). Directly observed treatment, short course (DOTS) is the internationally recommended control strategy for TB. This strategy includes the delivery of a standard short course of drugs, lasting 6 month for new patients and 8 month for retreatment patients, to individuals diagnosed with TB. The rate of default in patients put on DOTS was calculated to be 11.6% in 1367 new tuberculosis cases, in a 30 month period in Ethiopia (16), and 23% in 774 cases in Nigeria (17). During this first year of DOTS implementation with sub-optimal performance in India, default rate among 295 new smear-positive patients was 17% (18). Several studies reveal default rates between 4.6% and 29.8% (6,13,19-22). In some of these studies DOTS was applied.

In our dispensary, a total of 3142 TB patients were registered for treatment between 1997-2006 and 67 were defaulters (2.13%). When categorised with respect to years, the rates varied

Table 1. Differences about social and clinical characteristics of cases with respect to treatment periods

Patient characteristics		1997-2001	2002-2006	P value
Age	(mean±SD)	34.2±12.4	30.8±14.4	0.41
Gender	n (%)			
Male		35 (81.4)	18 (75)	0.54
Female		8 (18.6)	6 (25)	
Marrital status	n (%)			
Married		27 (62.8)	13 (54.2)	0.60
Single		16 (37.2)	11 (45.8)	
Social security	n (%)			
Having social security		14 (32.6)	12 (50.0)	0.19
Having no social security		29 (67.4)	12 (50.0)	
The types of the disease	n (%)			
Pulmonary		38 (88.4)	20 (83.3)	0.71
Extra-pulmonary		5 (11.6)	4 (16.7)	
The number of household contacts	(mean±SD)	4.8±2.2	4.0±2.8	0.34
The time of defaulting from treatment	(mean±SD)	2.1±1.5	2.6±1.8	0.85

Statistical measures given as mean value±standard deviation (SD), frequency and percentage.

between 0.2% and 3.4%. DOT was started in 2002 among selected cases, all patients were put on DOT starting from 1 June 2006. The application of DOT starting from 2002 is thought to be a contributing factor for the enhanced completion of treatment. Similarly several studies reveal the role of DOTS in increases in the compliance rates (10,15,23,24).

According to Daniel et al, male gender is an important determinant for defaulting from treatment and 79.1% of our cases were male (17). Defaulting rates are reported to be higher in male patients in several studies (18,20,25,26), whereas others reveal no correlation between gender and adherence to treatment (21,27).

In a meta-analysis it is stated that personal characteristics play the major role in compliance to treatment. Nevertheless, adherence to treatment is influenced by a wide range of factors such as cultural status, extent of the disease, drug side effects, availability of health care facilities (9). Personal factors include gender, alcohol consumption, feeling better soon after the initiation of the treatment, previous treatment history, intravenous drug use, lack of family support (10,12,13,18,21,28,29). The major socio-economical factors leading to non-compliance include homelessness, unemployment, migration, distance from the residence to the clinic, rural residence and lack of transport facilities to get to the clinic (4,10,12,13,19,21,30). Treatment related problems are drug side effects, multi-drug resistance and irregular treatment (4,16,20) as well as lack of knowledge on the benefits of completing the course, poor communication between health care workers (8,16,19,21,28,30). Besides drug supply, adherence promotion strategies such as providing food and transport lead to improvement in compliance rates. Our patients received money support for food, clothing, transportation, coal and rent. The treatment is carefully supervised by trained and experienced health care staff. These incentives seem to enhance treatment compliance.

Of our patients 59.7% were married and the mean number of household contacts was 4.6 ± 2.5; 62.7% were currently employed and 38.8% had health insurance. In terms of educational attainment, 36 cases were primary school graduates and 9 had no education. The study population consisted of 61.2% new cases, 31.3% previously treated cases and 7.5% relapsed cases. Of 58 (86.6%) cases with pulmonary tuberculosis, 46 (68.7%) were smear positive. Jakubowiak et al reported that default was linked to smear positivity, without statistical significance as a result of multivariate analysis (13). However, according to data from Uganda and Nigeria history of previous anti-tuberculosis treatment and smear positivity were not significantly associated with default from treatment (17,26).

Our study population was categorised into two groups with respect to years as 1997-2001, 2002-2006. No significant differences existed in terms of age, the number of household contacts, the median treatment default months, gender, marital status, education status, the type of the disease between these two groups. In a systematic review carried out to assess the timing

of default from TB treatment, feeling markedly better after the first or second month of treatment was reported to be a major factor for non-compliance (11). In a study including 1367 new TB cases, defaulting was highest (81%) during the continuation phase of treatment (16). The factors contributing to high rates of defaulting were found to be length and complexity of the treatment, difficulty of using many drugs and feeling better after the second month of the treatment (11). In an analysis of 44 patients, researchers found that default occured in the continuation phase in 70% of the cases (l). The risk of default has been reported to be two times higher in intensive phase in HIV (+) cases, whereas in HIV (-) patients default was more likely to occur in continuation phase (78.1%) (17). In our study, consistent with literature data, the mean period for treatment default was found to be as 2.4 ± 1.6 months.

In conclusion, it was found out that treatment after default rates in our dispensary in ten years period is less than 5% which is targetted by WHO (31). No differences about social and clinical characteristics of cases were detected in years. On the other hand, decline in treatment after default rates was found to be statistically significant with application of DOT. Close monitoring of patients and to be sensitive for their needs, may contribute to decrease the default rates from TB treatment.

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