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Original

Time Delay and Associated Factors in Diagnosis and Treatment of Pulmonary Tuberculosis in Markazi Province

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Abstract

Introduction: Delay in the diagnosis of tuberculosis increases the risk of death and enhances the transmission of disease in the community. This study aims to determine the patient and health service delay and factors affecting it in tuberculosis diagnosis.

Materials & Methods: A cross-sectional survey that included all the public health centers was conducted in Markazi province from March 2009 till June 2011. Patients were interviewed after diagnosis by using a structured questionnaire.

Results: One hundred and sixty-six patients aged between 9 and 87 (median; 66) years were included in the study. They comprised 87 (52.4%) females and 79 (47.6%) males. The median and mean of patient delay was 35 and 62 days, respectively; the median and mean of health system diagnosis delay was 34 and 53 days, respectively; the median and mean of health system treatment delay was 5 and 6 days, respectively; The median and mean of total delays were 86 and 121 days, respectively for all patients. The main determinants of delay were non education, poor economic, private sector, female gender and age≥55.

Conclusion: The results of this review suggest that there is a need for revising case-finding strategies and reduction of infectious cases for better control of tuberculosis.

***Keywords*:** Delayed Diagnosis; Diagnosis; Tuberculosis, Pulmonary/diagnosis; Tuberculosis, Pulmonary/therapy

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Introduction

One of the main objectives of tuberculosis control programs is to reduce tuberculosis transmission in the community through early detection of smear-positive cases and rapid administration of a full course of treatment [1]. It is estimated that about one-third of the world's population is infected with mycobacterium tuberculosis [2]. Among the communicable diseases, TB is the second leading cause of death worldwide, killing nearly two million people each year [3]. Early diagnosis of the disease and prompt initiation of treatment are essential for an effective tuberculosis control program. Delay in the diagnosis may worsen the disease, increase the risk of death and enhance tuberculosis transmission in the community.

In developing countries, emphasis is laid on passive case finding which is based on diagnosis of infectious cases of tuberculosis mainly through direct microscopic evaluation of sputum specimens obtained from persons who refer to

health facilities [2]. Passive case finding is known to be influenced by such factors as patient motivation, the degree of diagnostic suspicion by health workers and the quality of laboratory facilities. The directly observed treatment with short course (DOTS) strategy of the national TB control programs emphasizes passive case finding which could result in a delayed diagnosis [4]. These delays may be attributed to both patients and health care system. The patients may delay in seeking help or the health care system may delay in suspecting and investigating for TB.

Recent studies have shown that health-care seeking behavior of respiratory patients is inadequate [5] and health services-related factors have led to sub-optimal utilization of diagnostic processes [6]. TB control programs of the high TB burden countries need universal coverage of DOTS strategy, political commitment and increased case detection rate [7]. Various studies have reported the delays in diagnosis of tuberculosis in different groups of populations. It is not clear if active case finding would improve the efficacy of the current global DOTS strategy [8]. It is important to identify such delays in order to undertake measures to make the TB control programs more effective.

The purpose of this study was to investigate patients delay, health system diagnosis delay, health system treatment delay, and total delay (patient delay and health system delay) and analysis of factors associated with total delay in new smear positive pulmonary tuberculosis patients.

Materials & Methods

The study was conducted in Markazi province of Iran, with 1.4 million populations [9] from March 2009 to June 2011. In Iran DOTS was introduced in 1996. There are 10 District health centers in central province and all of them are involved in the diagnosis and treatment of tuberculosis patients, and majority of tuberculosis patients are diagnosed and treated in these centers. Diagnosis and treatment of tuberculosis is free of charge in the governmental health sectors. A cross-sectional survey was conducted in all of the public health centers to describe the patient and health service delay in the diagnosis and treatment of pulmonary tuberculosis patients. New smear positive pulmonary tuberculosis patients diagnosed from March 2009 till June 2011 were interviewed using a structured questionnaire. All of the questions were close-ended and the questionnaire included socio-

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demographic details, major presenting symptoms and their duration, and the date of first health care visit. If the patient had weakness for over a year, but was seeking medical advice for a cough of one month, the latter was taken as the duration of illness. The first major pulmonary symptoms asked were presence of cough for more than two weeks, sputum production, chest pain and haemoptysis. Close-ended questions about patient's knowledge of tuberculosis symptoms, transmission and treatment were also included in the questionnaire. The tuberculosis health workers performed the interview when the diagnosis was made. The questionnaire used was pretested before use and regular supervision of the interviewers was conducted throughout the study period. Duration of symptoms and the date of diagnosis were also counter-checked from the records besides the patients' interview.

The standard procedures recommended by the National TB Control program in the diagnosis of pulmonary tuberculosis are to collect and examine three sputum specimens from self-presenting symptomatic patients in two consecutive days. Pulmonary smear positivity is confirmed when there are at least 2 acid fast bacilli (AFB) positive smear results or when one sputum specimen is positive for AFB in addition to either radiographic abnormalities compatible with active pulmonary TB or a positive culture [10]. One hundred and sixty-six new smear positive pulmonary cases were diagnosed and enrolled in the study.

All Data analysis was performed using SPSS for Windows version 11 (SPSS 10.01 Inc, Chicago, Ill) and Epi-Info 2000 (CDC, Atlanta, Ga). $P<0.05$ was considered to be statistically significant for interpretation of the results. Logistic regression analysis and adjusted odds ratio was performed to find out the independent risk factors. The interval between the onset of symptoms and the first contact with a health system was defined as patient delay while the interval from the time of visit to diagnosis was defined as health system diagnosis delay, treatment delay was the time interval from diagnosis until treatment was started; total delay was the time from the onset of symptoms until treatment was commenced and consisted these three components.

Results

One hundred and sixty-six patients aged between 9 and 87 (median 66) years were included in the study. They comprised 87 (52.4%) females and 79 (47.6%) males The median of age was 67 and 79 years for males and females, respectively. The first symptom of tuberculosis experienced by patients included cough (102 patients, 61.5%), night sweats (7 patients, 4.2%), weight loss (11patients, 6.6%), fever (8 patients, 4.8%) and haemoptysis (38 patients, 22.9%). Seventy-three patients (44%) came from rural and 93 (56%) from urban areas.

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Table 1. Descriptive statistics of different types of delay in new smear positive pulmonary tuberculosis patients.

Type of Delay	Mean (Days)	Median (Days)	Range
Patient delay	62	35	(8-518)
health care system delay	59	41	(7-447)
diagnosis delay	53	34	(11-432)
Treatment delay	6	5	(0-34)
Total Delay	121	86	(10-537)

Table 2) Multiple logistic regression analysis of factors associated with total delay.

	No.	Percent	Adjusted OR	95%C.I	P-value
Age					0.0385
<55y	63	38	1		
≥55	103	62	1.97	1.04 – 3.72	
Gender					0.0124
Male	79	47.6	1		
Female	87	52.4	2.27	1.22 – 4.24	
Nationality					0.8526
Iranian	129	77.7	1		
Non Iranian	37	22.3	1.11	0.53-2.31	
Chest x ray					1.0000
Compatible	156	94	1		
Incompatible	10	6	1/25	0.34-4.62	
Exp. to Tb patients					0.4180
Yes	30	18.1	1		
No	136	81.9	1.49	0.68-3.30	
Residence					0.2138
Urban	93	56	1		
Rural	73	44	0.67	0.36-1.25	
Education					0.0091
Educated	86	51.8	1		
Not Educated	80	48.2	2.33	1.21-4.50	
Economic status					0.0013
Moderate & Good	124	74.7	1		
poor	42	25.3	3.53	1.60-7.79	
Source					0.0178
Governmental	71	42.8	1		
Private	95	57.2	2.21	1.18 – 4.14	

One hundred and twenty nine patients (77.7%) were Iranian and others (22.3%) were non-Iranian. Eighty subjects (48.2%) were illiterate, 82 subjects (49.4%) had passed primary and secondary school and 4 (2.4%) of them had university education. According to the report of central bank of Iran, economic status of 42 (25.3%), 103 (62%), and 21 (12.7%) patients was poor (monthly income below $400), moderate (monthly

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income between $400 and $800) and good (monthly income over $800), respectively. Thirty patients (18%) had a history of exposure to tuberculosis patients; 156 patients (94%) had a chest X-ray suggestive of tuberculosis. Ninety-five patients (57.2%) referred to private sector while 71 (42.8%) referred to governmental sector. (Table1&2)

Discussion

According to the results of other studies, patient delay varied from 4.9 days in Gambia [11] to 162 days in Tanzania [12] and from 7 days in Italy [13] and Taiwan [14] to 34.5 days in UK [15]. Health care system delay ranged from the shortest of 2 days in China [16] to a longest of 87 days in Pakistan [17] and from 7.2 days in Japan [18] to a longest of 36 days in Italy [19]. Total delay ranged from a shortest of 42 days in Japan(20to 82 days in African countries [20]. In Iran in the study of Masjedi and colleagues in 1995 patient delay before consulting a physician was 12.5 days and physician delay was 93 days [21] In the study of Nasehi and coworkers in 2003 median total delay was 92 days. Medians of Patient delay and Health care system delay were 20 and 46 days, respectively [22]. the study of Mirsaeidi and coworkers in 2003 the mean patient delay time was 15 days with a median of 13 days. The mean physician delay time was 93 days with a median of 75 days. The mean total delay was 108 days with a median of 96 days [23].

In our study the median patient delay was 35 days and the median health care system delay (health system diagnosis delay and health system treatment delay) was 41 days (mean 59 days, range: 7- 447days) and the median total delay was 86 days.

Conclusion

Review of literature on delays in diagnosis of tuberculosis showed that there is a considerable time delay between the onset of symptoms of pulmonary tuberculosis to diagnosis and treatment. Although in studies of Masjedi and colleagues in 1995, Nasehi and coworkers in 2003, Mirsaeidi and coworkers in 2003 in Iran the median of health care system delay was significantly longer than patient delay, but in our study the median patient delay was 35 days and median health care system delay (health system diagnosis delay and health system treatment delay) was 41 days. The delays are important in transmission of tuberculosis and TB prevention and control strategies. It has been reported that the global DOTS strategy for TB has improved the overall treatment success rate. However, rapid geographic coverage by DOTS has not resulted in improved case finding [24]. There are further reports that current case detection rates are low and there is a need for developing new case finding strategies to reach the targets under global DOTS strategy [25]. A study from India has reported that improving the case finding methods may save 10 times more patients than by the DOTS [26]. The time delays to diagnosis identified by this review confirm these suggestions. A recent analysis of TB transmission dynamics and delay has stressed that time delays to diagnosis are the most important obstacles to the control of the TB epidemic [27].

From our study it is clear that both patient and the health system are to blame, as both patient and health care system delays were longer than acceptable limits. The risk factors for delay identified in this study should be the subject of future interventions to reduce

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the delay in delivery of treatment to patients with tuberculosis and hence transmission of the disease in the community.

As the delay in the treatment of patients with tuberculosis is attributed to both the patient and the health system, for patient component it is necessary to put more emphasis on increasing awareness of the community about tuberculosis symptoms; and for health system delay it is necessary to put more efforts into creating effective collaboration between the National Tuberculosis Control Program and the private sector. Sputum must be examined in all patients with prolonged productive cough. Training and retraining of health care providers about tuberculosis at regular intervals should be instituted. The various significant determinants of delay identified in the present study should be incorporated into routine surveillance reports. This would allow monitoring of the effectiveness of the interventions and control measures in reducing the duration of the delay, hence reducing the transmission and burden of tuberculosis in the community. In view of these conclusions, detection, follow-up, and treatment of tuberculosis among people especially females and among the poor economic condition should be improved by integrating the tuberculosis program into other existing health services at all levels and increasing community awareness through health education, and increase public awareness about the symptoms of tuberculosis, educate both public and private physicians about the need to maintain a high index of suspicion of tuberculosis and rapidly perform appropriate tests.

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