

A cross sectional study to estimate delay in diagnosis and treatment of tuberculosis (TB) among patients attending urban health centre in an urban slum area

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Background: RNTCP (Revised National Tuberculosis Control Program) is an application in India of the (World Health Organisation) WHO recommended (Directly Observed Treatment Short Course) DOTS strategy. **Objectives:** To determine average delay on part of patient and health system in diagnosis of tuberculosis, treatment delay in starting DOTS and total delay. **Methodology:** A cross-sectional descriptive study of 464 tuberculosis patients was conducted in an urban health center (UHC) of an urban slum area of Mumbai. Patients registered under RNTCP during 1 year i.e. from 1st January to 31st December 2016 were interviewed regarding their complaints and reporting to a health care facility (time taken and type-private or government), time taken for diagnosis and starting treatment. **Results:** Among 464 patients, mean patient's delay, health system delay and total delay were 21.09 days (median 15), 14.41 days (median 6) and 35.50 days (median 21) respectively. Almost 60% of total delay was constituted from patient's delay. **Conclusion:** Patient delay was significantly more among sputum negative pulmonary TB patients than sputum positive patients. Health system delay to diagnose TB was more if private practitioners were approached first.

Keywords: Tuberculosis, Patients delay, Health system delay, Total delay

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Introduction

Most of the estimated number of incident cases in 2016 occurred in the WHO South-East Asia region (45%), the WHO African Region (25%) and the WHO Western Pacific Region (17%); smaller proportions of cases occurred in the WHO Eastern Mediterranean Region (7%), the WHO European Region (3%) and the WHO Region of the Americas (3%).

Ten countries accounted for 76% of the total gap between TB incidence and reported cases; the top three were India (25%), Indonesia (16%) and Nigeria (8%). An estimated 10.4 million people fell ill with TB in 2016: 90% were adults, 65% were male, 10% were people living with HIV (74% in Africa) and 56% were in five countries: India, Indonesia, China, the Philippines and Pakistan.

Ten countries accounted for 75% of the incidence-treatment enrolment gap for drug-resistant TB; India and China accounted for 39% of the global gap [1]. Any delay in diagnosis and consequently treatment of TB patients not only increases infectivity in the community but may also lead to more advanced disease state which may result in more complication and expose them to higher risk of death.

Identifying delays in diagnosis and treatment occur and the factors related to specific types of delays can help tuberculosis control programs and medical care providers to target case-finding, diagnostic and treatment efforts appropriately [2].

The private sector in India is very large, and it is believed that more than half of all TB patients are cared for in the private sector [3]. This study is an attempt to identify various delays under RNTCP, in an urban slum area of Mumbai.

Methodology

Study design and study area: A cross-sectional descriptive study of 464 tuberculosis patients was conducted in an urban health centre (UHC) of a slum area of Mumbai. There were however a large number of Private Practitioners (PP's), Nursing homes, quacks and traditional healers in this slum area apart from the health post providing health services.

Study duration: During one year i.e. from 1st January to 31st December 2016.

Study population: Patients registered under RNTCP in the DOTS centre of the urban health centre (UHC), in an urban slum area of Mumbai.

Inclusion criteria: All patients who were diagnosed as TB and registered under RNTCP under the health post provided they were willing to participate in the study.

Exclusion criteria: Those patients who were not willing to participate in the study.

Sampling technique and sample size: Universal sampling method was used with sample size of 464.

Study tool and Data collection: Initial interview were taken for rapport building. After obtaining informed consent, patients were interviewed in detail with a pretested and semi-structured questionnaire in the RNTCP OPD within seven days of their registration, regarding their complaints and reporting to a health care facility (time taken and type-private or government), time taken for diagnosis and starting treatment.

Thus patient, health system, treatment and total delay were calculated.

Operational Definitions

01. **Case (New):** A patient who has never had treatment for tuberculosis or who has taken anti-tuberculosis drugs for less than one month [4].
02. **Case (pulmonary), Smear positive TB:** A patient with at least two initial sputum smear examinations (direct smear microscopy) AFB+; or one sputum examination AFB+ and radiographic abnormalities consistent with active pulmonary tuberculosis as determined by a clinician; or one sputum specimen AFB+ and culture positive for M. Tuberculosis [4].
03. **Case (pulmonary), smear negative:** A patient with pulmonary tuberculosis not meeting the above criteria for smear-positive disease. Diagnostic criteria should include: at least three sputum smear examinations negative for AFB; and radiographic abnormalities consistent with active pulmonary tuberculosis; and no response to a course of broad-spectrum antibiotics; and a decision by a clinician to treat with a full course of antituberculosis chemo-therapy; or positive culture but negative AFB sputum examinations [4].

- 04. **Patient delay-** Time interval between onset of symptom and presentation to a health care provider [2].
- 05. **Health system delay-** This is defined as time interval between the date of health-seeking behavior at a health care provider and the initiation of anti-tuberculosis treatment [2].
- 06. **Treatment delay-** This is defined as the duration in days between TB diagnosis and first treatment initiation [2].
- 07. **Total delay-** This is defined as the sum of patient and healthcare system delay [2].

Ethical consideration: Permission from the Institutional Ethics Committee was obtained prior to the start of the study. A written informed consent was obtained from each of the study participants prior to their interview.

Statistical analysis: Data were entered in Microsoft Excel sheet and statistical analysis was done using SPSS (Statistical Package for Social Sciences) version 23.0. Frequency distributions were calculated for all the variables. Patient delay, health system delay, treatment delay and total delay were calculated using mean and median. One-way ANOVA was used for statistical analysis.

Results

Table 1 shows that, among 464 diagnosed TB patients, 421 (90.73%) have pulmonary TB and 43 (9.26%) have extra pulmonary TB. Among 421 pulmonary TB cases, 316 (75%) patients had sputum positive TB; 105 (25%) had sputum negative TB.

Table-1: Socio-demographic status of the patients-

Variables	Category	No. of patients	Percentage (%)
Age	10-20 yrs	130	28
	21-30 yrs	174	38
	31-40 yrs	65	14
	41-50 yrs	44	9
	51-70 yrs	51	11
Gender	Male	277	59.6
	Female	187	40.3
Education	Illiterate	94	20.3
	Primary education	188	40.6
	Secondary education	138	29.7
	Graduation	44	9.4
Employment	Unskilled	160	34.4
	Housewife	102	21.9

	Semi-skilled	94	20.3
	students	80	17.2
	Skilled	28	6.3
Per capita income	<500	113	24.2
	500-1999	314	67.7
	2000-4999	37	8.1

Regarding the first health care facility visited for the complaints, 319 (68.8%) patients approached private practitioners, 94 (20.3%) approached the UHC and 51 (10.9%) of them approached govt. tertiary care hospitals (medical colleges).

Regarding the chief complaints among the 464 patients, 365 (78.6%) of patients had fever, cough and loss of appetite; 56 (12.1%) had haemoptysis, chest pain, and breathlessness, 15 (3.1%) suffered from abdominal pain, vomiting, diarrhoea, 29 (6.3%) had swelling in neck.

Table 2 reveals types of delays and length of delay. Mean patient delay, health system delay; treatment (DOTS) delay and total delay were 21.09 days (median 15 days), 14.41 days (median 6 days), 2.84 days (median 3.19 days), 35.50 days (median 21 days), respectively.

Table-2: Various delays and length of delay.

Type of delay	Mean (days)	Standard Deviation (days)	Median (days)
Patient Delay	21.09	19.65	15
Health-system delay	14.41	17.26	6
Delay in starting DOTS	2.84	3.19	3.19
Total delay	35.50	23.077	21

Table 3 depicts frequency distribution of number of days with respect to patient delay and health system delay.

Maximum patients (62.5%) had patient delay of 1-17 days and 78.1% of patients had health system delay of 1-15 days.

Table-3: Patient and Health System Delays.

Patient delay			Health system delay		
Number of days	Number of patients	Percentage (%)	Number of days	Frequency	Percentage (%)
1-15	290	62.5	1-15	363	78.1
15-30	88	18.8	15-30	28	6.2
30-45	21	4.7	30-45	45	9.4
45-60	65	14.1	45-60	28	6.2
Total	464	100.0	Total	464	100.0

On applying ANOVA test, females had significantly more (p=0.024) total delay than males.

On applying ANOVA test, patient delay ($p=0.001$) and total delay ($p=0.033$) were found to be significantly more in sputum positive patients than sputum negative patients.

Table 4 depicts frequency distribution of number of days with respect to total delay and treatment delay. Total delay in 39.1% of patients was 1-25 days, 35.9% of patients was 25-50 days and in 25% of patients it was 50-75 days. Similarly, treatment (DOTS) delay in 90.6% of patients was 1-5 days and in 4.7% of patients was 5-10 and 10-15 days.

Table-4: Total delay and treatment delay.

Total delay			Treatment delay		
Number of Days	Number of patients	Percentage (%)	Number of Days	Number of patients	Percentage (%)
1-25	167	35.9	1-5	420	90.6
25-50	181	39.1	5-10	22	4.7
50-75	116	25.0	10-15	22	4.7
Total	464	100.0	Total	464	100.0

Table 5 reveals a statistically significant difference observed between the health care system first approached and health system delay ($p=0.007$) and total delay ($p=0.019$).

Table-5: Comparison between various delays and health system approached first by the patients

Health care system visited first		Patient delay	Health system delay	Total delay	Treatment delay
Private practitioners	Median	21.57	14.59	42.02	3.11
Tertiary care hospital	Median	20.10	8.14	29.98	3.00
Urban health center	Median	10.62	8.80	19.5	2.10
p value		0.243	0.007	0.019	0.609

A wide range of factors like ignorance (39.4%), not utilizing health care due to domestic responsibilities (19.8%), inadequate knowledge about the disease (18.6%), fear or history of stigma (11.4%), and female gender (10.6%), were found to be responsible for the patient delay.

In the present study, among 464 TB patients, 277 (59.6%) were males and 187 (40.3%) females. According to NFHS-4, the prevalence of TB is higher among women (389 per lac) than among men (220 per lac) [5]. In a study conducted in Lagos, Nigeria, 141 patients were recruited. The mean age was 29.5 ± 11.0 years, 89 (63%) were males and 52 (37%) were females [6].

Discussion

Delay with respect to gender: In the study conducted in Bangladesh, women in comparison with men had significantly longer mean patient delay (51.9 vs.48.7days) [7]. In contrast in the study conducted in Tamil Nadu, men postponed seeking health care for longer period than women [8]. In another cross-sectional study of Malasia, gender was associated significantly with patient delay. Females appeared to have longer delay [9].

The mean total delay to TB diagnosis was 13.3 weeks (95% CI;11.5,15.1) for women and 11.4 weeks (95% CI;10.6,12.2) for men, including a patient's delay of 7.9 weeks (95% CI;6.5,9.3) and 7.6 weeks (95%;6.9,8.3), respectively. Women do not receive a diagnosis of TB by doctors or other health care provider's as quickly as men once they seek health care [10].

Patient delay, health system delay, total delay and treatment delay: The study conducted in Tamil Nadu on pulmonary (new sputum positive) tuberculosis patients depicted that the median patient, health system and total delay were 20, 23 and 60 days respectively [9].

The study conducted in Amhara region of Ethiopia on pulmonary tuberculosis (new sputum positive) showed that the median total delay was 80 days. The median health-seeking period and health providers' delays were 15 and 61 days, respectively [11].

In a study done in Argentina among smear positive pulmonary TB patients, the mean diagnostic delays were as follows: mean total delay 92.1 days (median 62.0); mean patient delay 58.8 days (median 31); mean health service delay 32.6 days (median 12.5). The mean treatment delay was 0.9 days (median) [12].

The findings of a cross-sectional study performed in Tanzania on pulmonary tuberculosis (new sputum positive) revealed a mean patient's delay of 162 days, while mean total delay was 185 days, with nearly 90% of this being patient's delay. The mean health system delay was 23 days [13].

The findings of a study performed in 10 DOTS districts of Ethiopia revealed that the overall median patient delay was 30 days (mean = 60 days). 53% [95% Confidence Intervals (CI) (50%, 56%)] of patients had delayed their first consultation for ≥ 30 days [14].

The magnitude of patient delay was 165(52.4%) and median of patient delay was 30 days within range of 3 to 270 days [15]. Study conducted in Ethiopia shows, the median patient delay was 60 days and mean 78.2 days [16].

In a study conducted in Lagos, Nigeria, the median patient delay was eight weeks; median doctor delay was one-week, median treatment delay was one week, and the median total delay was 10 weeks. Doctor delay was observed in 19 (13%) patients.

Patient delay was the most frequent type of delay observed and was the major contributor to the overall total delay [7].

The median delay from the onset of cough to first visit to the clinic was 60 days with a range of 3-180 days. The prevalence of prolonged patient delay was 63 (61.8%). Reasons given by respondents with prolonged delay included health facility too far 22.2%, lack of awareness of DOTs service on time 12.7%, and domestic work prevented coming on time 9.5%. Majority (52.4%) did not give any specific reason [17].

Delay with respect to sputum positive and sputum negative: Study at Ethiopia showed health service delay was (median 6 days; mean 9.5 days) significantly lower in smear positives compared to smear negatives [16].

In the cross-sectional study conducted in Taiwan, sputum negative smear TB patients had a longer health system delay [18].

Delay with respect to health facility visited first: The study conducted in Tamil Nadu, the patient delay was greater if the patient had initially consulted a government dispensary and the total delay resulted largely from a long patient delay when government providers were consulted first and a long health system delay when private providers were consulted first [9].

In the study conducted in Kampala, patients often presented to private clinics (36.8%), drug shops or pharmacies (39.4%) more commonly than government health units (14%) as initial contacts [19].

In the study conducted in Ethiopia, patients first visiting a health post/clinic, or a private medical provider experienced longer health system delay compared to those who visited government health centres or hospitals [11].

In the study conducted in North west Ethiopia, prior to patient's first consultation at a public health facility, patients received treatment from a variety of informal sources: The Orthodox Church, where they were treated with holy water (24%); private practitioners (13%); rural drug vendors (7%); and traditional healers (3%). The delay was higher for patients who used informal treatment (median 31 days) than those who did not (15 days) [15].

Illiterate (AOR=6.18, 95% CI:1.34, 28.43), extra pulmonary tuberculosis (AOR=10.12, 95% CI:3.07, 33.37), living greater than a distance of 10 km from TB service in health facilities (AOR=3.55, 95% CI:1.17, 10.80), prior visited with holy water (AOR=10.55, 95% CI:3.99, 27.89), with traditional healer (AOR=4.29, 95% CI:1.13, 16.37) and with private drug store/pharmacy (AOR=6.81, 95% CI:2.47, 18.78) were determinants of patients delay for first consultation in health facilities [16].

Study done at Lagos, Nigeria, 104 (74%) patients consulted with various types of hospitals as the first place for seeking help while 37 (26%) went to other places such as chemists and prayer houses. More patients went to private hospitals than any other type of facility.

Prior to presentation at the chest clinic, 19 (14%) patients did not go to any hospital at all while 98 (70%) visited one hospital and 24 (17%) visited between two to four hospitals. Ninety (64%) patients were referred to the chest clinic by doctors, 22 (16%) came by themselves and 29 (21%) were brought by friends and relatives [6].

The strength of this study was that it identifies the gaps in the implementation of RNTCP which could be improved and taken into account by the policy makers or further research. The findings are from an urban slum area which are the hubs of tuberculosis.

The limitations were, this study doesn't deal with the cause of patient delay & health system delay. Reasons for approaching a particular health facility were not asked.

Conclusion

The mean patient delay was found to be 21 days, mean health system delay was 14 days, mean total delay 35 days and treatment delay was of 2.8 days.

Total delay was significantly more among female patients as compared to male patients.

Patient delay was significantly more among sputum negative pulmonary TB patients than sputum positive patients.

Health system delay to diagnose TB was more if private practitioners were approached first by the patients. Only 11% (35) pulmonary TB patients were advised sputum examination as the first investigation by private general practitioners.

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