

Original article:

Delays are still a challenge in Tuberculosis control - Cross-sectional study from South India

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Abstract:

Back ground: Delays are important challenges in tuberculosis control and a number of socio demographic and healthcare system factors are associated with them. The study objectives were to quantify delays and associated factors in healthcare seeking and treatment initiation in tuberculosis patients.

Methods and materials: The study was conducted in a Tuberculosis Unit (TU) in Tamil Nadu, India. Seventy eight individuals who had tuberculosis were interviewed. Delay in healthcare seeking was defined as more than 2 weeks (interval between onset of symptom to healthcare seeking) and delay in treatment initiation was defined as more than 1 week (interval between healthcare seeking to treatment initiation). Prevalence of delays was calculated. Odds ratios were calculated for plausible risk factors for delays and binary logistic regression was done.

Results: Median interval was 15 days (IQR: 7 to 30 days) for healthcare seeking and 4 days (IQR: 3 to 8 days) for treatment initiation. Prevalence of delay was 51.3% for healthcare seeking and 26.9% for treatment initiation. Lower educational status (adjusted OR- 4.506, p-value: 0.015) and rural residence (adjusted OR- 3.748, p-value: 0.013) were significantly associated with delay in healthcare seeking. Extra-pulmonary tuberculosis (adjusted OR- 5.620, p-value: 0.013) was significantly associated with delay in treatment initiation.

Conclusions: Delays were still a problem in tuberculosis control. Rural residence and lower educational status are barriers for healthcare seeking. Improvement of rural infrastructure may help to reduce delay in healthcare seeking. Capacity building in healthcare facilities to diagnose extra-pulmonary tuberculosis may address delay in treatment initiation.

Key-words: Delays in tuberculosis, Tuberculosis prevention and control, Organization and administration

Introduction:

Early detection of TB is emphasized in Revised National Tuberculosis Control Program.^[1] An untreated TB patient can infect 10 to 15 close

contacts in one year.^[2] Delays affecting TB control occur in two ways, patient delay and health care system delay,^[3] and factors influencing delays can be categorized into 'factors influencing health-seeking

behavior' and 'factors influencing the health system effectiveness'.^[4] Number of socio-demographic factors and healthcare system factors are associated with delays.^[5] The objectives of our study were to quantify delays in health care seeking and treatment initiation in patients diagnosed with tuberculosis and to study the factors affecting these delays.

Methodology

Study setting and study population: This was a cross sectional study conducted in March 2013 in a Tuberculosis Unit (TU) area, run by Community Health Department of a medical college in Tamil Nadu. The area has 21 peripheral health institutions (PHI). The study subjects were the newly diagnosed with tuberculosis patients with age 18 years and above.

Sample size and sampling technique: In a previous study it was found that 50.98% patients with tuberculosis experienced delay in healthcare seeking.^[6] Sample size of 96 was calculated using an α -error of 5% and a relative precision of 20%. Consecutive sampling was done from TU register from January 2012. Study was concluded with 78 participants due to time constraints.

Study tools and variables: Structured face to face interview was conducted with a peer reviewed and pilot tested questionnaire. The study variables included age, sex, location of residence (rural/urban), structure of house, education, history of tobacco smoking and alcohol use, type of TB, interval for healthcare seeking (days between onset of symptoms to first contact with the healthcare provider) and interval for treatment initiation (days between first contact with the healthcare provider and initiation of Anti Tuberculosis Therapy (ATT)). Delay in healthcare seeking was defined as more than 2 weeks interval based on Revised National Tuberculosis

Control Program (RNTCP) criterion for 'tuberculosis suspect'.^[1] Delay in treatment initiation was arbitrarily defined as more than 1 week.

Data entry and analysis: Data entry was done using epidata version 3.1 and data analysis was done using SPSS version 20.0. Median and inter quartile ranges (IQR) were calculated for the time intervals. Chi-square test was done for association between delays and other variables. Odds ratios were calculated and then binary logistic regression was done to determine independent risk factors.

Ethics: Voluntary written informed consent was taken from the participants. Privacy was ensured for interview and confidentiality is maintained.

Results

Characteristics of study participants: Out of 78 participants, 67 (85.9%) had pulmonary tuberculosis (Table 1). The study participants were predominantly males (65.4%), only 15 (19.2%) were elderly (age above 60 years), 42 (53.8%) were illiterate or had only primary education, 21 (26.9%) lived in temporary housing structures and 47 (60.3%) were from rural area (Table 1). History of smoking was reported by 34 (43.6%) and history of alcohol use was reported by 30 (38.5%) participants (Table 1).

Delay in health care seeking and associated factors:

Median interval for health care seeking was 15 days with IQR 7 to 30 days. The interval for healthcare seeking was within 2 weeks for 38 (48.7%), between 2 weeks to 1 month for 22 (28.2%), between 1 month to 3 month for 10 (12.8%) and more than 3 months for 8 (10.3%) participants. Delay in healthcare seeking (more than 2 weeks) was seen in 40 (51.3%, 95% CI- 41.0% to 62.6%) participants. The factors explored for association with this delay were age, sex, education, structure of house, residence locality

and history of smoking (Table 2). Rural residence (adjusted OR=3.748, 95% CI- 1.319 to 10.651; p-value: 0.013) and lower level of formal education (adjusted OR=4.506, 95% CI- 1.346 to 15.085; p-value: 0.015) were independently associated with delay in health care seeking (Table 2).

Delay in treatment initiation and associated factors:

Median interval for treatment initiation was 4 days with IQR 3 to 8 days. The interval for treatment initiation was within 3 days for 34 (43.6%), between

4 to 7 days for 23(29.5%), between 8 days to 1 month for 18 (23.1%) and more than 1 month for 3 (3.8%) participants. Delay in treatment initiation (more than 7 days) was seen for 21 (26.9%, 95% CI- 16.9% to 36.9%) participants. The factors explored for association with this delay were type of tuberculosis, age, sex, residence locality and history of alcohol use (Table 3). Extra-pulmonary TB (adjusted OR=5.620, 95% CI- 1.167 to 27.067; p-value: 0.031) was the only factor independently associated with delay in treatment initiation (Table 3).

Table 1. Characteristics of Study Participants

Characteristics (n=78)		Frequency	Percentage
Disease Category	Pulmonary	67	85.9%
	Extra-pulmonary	11	14.1%
Gender	Male	51	65.4%
	Female	27	34.6%
Age	<30 years	17	21.8%
	30 to 59 years	46	59.0%
	60 years and above	15	19.2%
Education	Illiterate	27	34.6%
	Primary school	15	19.2%
	Middle school	10	12.8%
	High school	15	19.2%
	Above high school	11	14.1%
Structure of house	Temporary	21	26.9%
	Mixed	18	23.1%
	Permanent	39	50.0%
Residence	Rural	47	60.3%
	Urban	31	39.7%
Smoking	Ever	34	43.6%
	Never	44	56.4%
Alcohol use	Ever	30	38.5%
	Never	48	61.5%

Table 2. Risk factors of delay in healthcare seeking.

Risk factors		Delay in healthcare seeking		Odds Ratio (95% CI)	p-value	Adjusted Odds ratio (95% CI)	p-value
		Delay	No delay				
Age (years)	60 and above	11(52.4%)	10(47.6%)	1.062 (0.390 to 2.891)	0.906	0.420 (0.122 to 1.439)	0.167
	Below 60	29(50.9%)	28(49.1%)				
Gender	Male	28 (54.9%)	23 (45.1%)	1.522 (0.595 to 3.889)	0.379	2.089 (0.721 to 6.054)	0.175
	Female	12 (14.4%)	15 (55.6%)				
Education	Up to middle school	31 (59.6%)	21 (40.4%)	2.788 (1.047 to 7.427)	0.037*	4.506 (1.346 to 15.085)	0.015*
	Above middle school	9 (34.6%)	17 (65.4%)				
Structure of house	Temporary/ Mixed	19 (48.7%)	20 (51.3%)	0.814 (0.335 to 1.981)	0.615	0.486 (0.167 to 1.418)	0.187
	Permanent	21 (53.8%)	18 (46.2%)				
History of Smoking	Present	18 (52.9%)	16 (47.1%)	1.125 (0.459 to 2.756)	0.797	0.575 (0.163 to 2.027)	0.389
	Absent	22 (50.0%)	22 (50.0%)				
Residence	Rural	29 (61.7%)	18 (38.3%)	2.929 (1.142 to 7.513)	0.023*	3.748 (1.319 to 10.651)	0.013*
	Urban	11 (35.5%)	20 (64.5%)				

Table 3. Risk factors of delay in treatment initiation

Risk factors		Delay in treatment initiation		Odds Ratio (95% CI)	p- valule	Adjusted Odds ratio (95% CI)	p- value
		Delay	No delay				
Disease type	Extra-Pulmonary	6 (54.5%)	5 (45.5%)	4.160 (1.113 to 15.550)	0.026*	5.620 (1.167 to 27.067)	0.031*
	Pulmonary	15 (22.4%)	52 (77.6%)				
Gender	Male	15 (29.4%)	36 (70.6%)	1.458 (0.491 to 4.333)	0.496	1.128 (0.209 to 6.082)	0.889
	Female	6 (22.2%)	21 (77.8%)				
Age (years)	60 and above	3(14.3%)	18(85.7%)	0.675 (0.246 to 1.851)	0.444	0.322 (0.077 to 1.347)	0.121
	Below 60	18(31.6%)	39(68.4%)				
History of alcohol use	Present	12 (40.0%)	18 (60.0%)	2.889 (1.032 to 8.084)	0.040*	3.822 (0.881 to 16.569)	0.073
	Absent	9 (18.8%)	39 (81.2%)				
Residence	Rural	13 (27.7%)	34 (72.3%)	1.099 (0.393 to 3.071)	0.857	1.355 (0.432 to 4.249)	0.602
	Urban	8 (25.8%)	23 (74.2%)				

Discussion

Median interval for healthcare seeking (patient delay) was 15 days (IQR 7 to 30 days). Median patient delay was 15 days in a study reported from Himachal Pradesh,^[7] and 16 days in a study reported from Haryana,^[6] which were very much similar to the result of this study. A study from Ethiopia also had a very similar result (median=15 days, IQR 15 to 21 days).^[8] However, a study from Nepal reported a longer median patient delay of 50 days.^[9]

Delay in health care seeking (more than 2 weeks) was seen in 51.3% (95% CI- 40.0% to 62.6%) participants. Our study identified rural residence and lower level of education as the factors associated with this delay. Basnet R et al from Nepal reported smoking more than 5 cigarettes per day to be significantly associated with patient delay.^[9] Santos MAPS et al from Brazil reported those who 'had given up' smoking had significantly longer patient delay.^[10] Females could have a longer delay in health seeking.^[11] Lower education status was shown to be significantly associated with patient delay by Lusignani LS et al.^[12] Sreeramareddy CT et al report that median patient delay was 34.1 days in rural area and 13.2days in urban area.^[13] Longer delay in rural area may be due to lack of infrastructure in healthcare and other sectors. Factors such as live stock ownership and co-morbidities,^[14] visiting a traditional healer first,^[15] and multiple care seeking^[16] were also reported to be associated with longer health seeking delay.

Median interval for treatment initiation was 4 days (IQR 3 to 8 days). Median health system delay reported by the study from Himachal Pradesh and Nepal were 13 days and 18 days respectively.^{[7][9]} Yimer S et al from Ethiopia reported a median health provider delay of 61 days (IQR 31-116).^[8] Belkina

TV et al reported median health system delay of 7days (IQR 1 to 32).^[17] Diagnostic delay (interval between reporting to health care facility and diagnosis) reported by various studies ranged from 4.0 to 54.5 days and treatment delay (interval between diagnoses to treatment initiation) ranged from 1 to 8 days in various studies.^[13]

Delay (more than 7 days) in treatment initiation after healthcare seeking was seen in 21 (26.9%, 95% CI- 16.9% to 36.9%) participants. Patient factors and healthcare system factors contribute to delay in treatment initiation. A number of factors were not explored in our study. High expenditure before diagnosis may be associated with health system delay.^[7] Travel time for return visit may be associated with health system delay.^[18] HIV positivity, TB stigma, history of antimicrobial prescription, labor migration and unemployment could be associated with health system delay.¹⁷ Negative sputum smear, female sex and unusual symptoms were associated with health system delays in another study.^[19] Extra-pulmonary disease was significantly associated with delay in treatment initiation in our study. This is consistent with results of 3 other studies as mentioned in a systematic review.^[5] Extra-pulmonary tuberculosis (EPTB) may mimic other diseases, doctors may be less experienced in diagnosing EPTB. EPTB needs invasive procedures like biopsy and radiological tests to diagnose.^[20] Facilities to diagnose extra-pulmonary TB are not available in a primary care setting. Because of these reasons, diagnosis of extra-pulmonary tuberculosis (EPTB) may be challenging.

Conclusion

Delays were still a problem in tuberculosis control. Rural residence is associated with healthcare seeking delay. Lower education status was a barrier in

healthcare seeking. Inter-sectoral co-ordination to improve infrastructure in rural area may help to reduce delay in healthcare seeking. Capacity building

in healthcare facilities to diagnose extra-pulmonary tuberculosis may address delay in treatment initiation.

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