International Journal of Community Medicine and Public Health
Ulaganeethi R et al. Int J Community Med Public Health. 2020 Jun;7(6):2266-2270
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20202483

Original Research Article

Pre-treatment lost to follow up among presumptive tuberculosis patients in a tertiary care centre, South India

Revathi Ulaganeethi[1]*, Divya Nair[2], Gomathi Ramaswamy[3], Shivangi Choubey[4], Saka Vinod Kumar[5], Gautam Roy[1]

[1]Department of Preventive and Social Medicine, [5]Department of Pulmonary Medicine, JIPMER, Puducherry, India
[2]INCLEN Trust International, New Delhi, India
[3]NCEAR-A, AIIMS, New Delhi, India
[4]SANGATH, Bhopal, Madhya Pradesh, India

Received: 11 March 2020
Revised: 19 April 2020
Accepted: 21 April 2020

***Correspondence:**
Dr. Revathi Ulaganeethi,
E-mail: urevathibds@gmail.com

ABSTRACT

Background: At tertiary care centres, presumptive tuberculosis (TB) patients who come from far off places and are more likely to drop out during diagnosis or before treatment initiation. We aimed to describe the proportion lost during diagnosis or before treatment and also assessed the reasons for the loss to follow up.
Methods: We did a hospital based descriptive study, reviewing laboratory register and referral register to assess the status of submission of second sputum and referral letter, respectively, for patients visiting a designated microscopy centre at a teaching hospital. Reasons for lost to follow up were assessed through telephonic interviews.
Results: Out of a total 2025 presumptive TB patients, 315 (15.6%, 95% CI 14.0-17.2) did not provide a second sputum sample. 'Symptoms had reduced or subsided' (30%), 'not aware that second sample needs to be given' (23%) and 'visited other hospital' (14%) were the common reasons reported for the same. A total of 270 (13.3%) patients were sputum smear positive; of them 92 (34.1% CI 28.4-40.1) did not collect referral letter. Among those who were referred, 66% were referred within a week. Deaths, 'busy in routine work' and treatment at other government hospitals were the common reasons reported for not collecting referral letter.
Conclusions: One out of seven patients did not submit a second sputum sample and one third of sputum smear positive TB patients did not collect the referral letter. Follow up mechanisms needs to be strengthened in the national program to reduce this pre-treatment lost to follow up.

Keywords: Diagnostic drop out, Diagnostic default, Spot-spot sample, Designated microscopy centre

INTRODUCTION

Tuberculosis (TB) remains a major global health problem and one of the leading causes of death from an infectious disease worldwide. In 2017, there were an estimated 10 million new (incident) TB cases worldwide and an estimated 1.6 million deaths occurred due to TB. In 2017, India contributed about a quarter of world's incident TB cases with an estimated 2.8 million cases.[1]

In India, under the revised national tuberculosis control program (RNTCP), TB diagnostic services are provided through a network of designated microscopy centers (DMCs). Treatment services are provided free of charge through directly observed treatment short-course (DOTS) centers.[2] As per the RNTCP guidelines, diagnosis of pulmonary TB is based on the microscopic examination of two sputum samples - one spot and one early morning (EM) - of presumptive TB patients.[3] At the time of report

collection, patients diagnosed to have TB are given a referral letter for starting treatment at a public health facility nearest to their place of residence.[4]

Even before the initiation of TB treatment, there are multiple points in the TB care cascade where drop outs can occur, viz., provision of second sputum sample, collection of sputum result, collection of referral letter, reaching the public health facility for initiation of treatment. Drop outs at any of these stages translate into continuing transmission of TB in the community by these undiagnosed and/or untreated cases. The submission of EM sample followed by the collection of referral letter require an additional visit to the hospital and is likely to be a stage for potential drop outs in the diagnostic cascade, especially in tertiary care centers where patients may be coming from far off places to seek treatment.[5] There is limited literature documenting the extent of drop out at these points and the associated reasons. We aimed to assess the proportion failing to provide second sputum sample and to collect the referral letter as well as the associated factors and reasons for these failure among the presumptive TB patients presenting at a tertiary care center in south India.

METHODS

As per RNTCP guidelines, presumptive pulmonary TB is defined as "a person with any of the symptoms and signs suggestive of TB including cough >2 weeks, significant weight loss, haemoptysis or any abnormality in chest radiograph." A spot sputum sample is collected from each patient at the DMC. The patients are then given a sputum container to collect an early morning sample which the patient submits to the DMC on the next day.

We conducted a hospital based descriptive study among presumptive TB patients attending the DMC in a tertiary care hospital in south India. Assuming the proportion of presumptive TB cases who fail to provide the second sputum sample as 7.4%,[6] an alpha error of 5% (95% confidence level) and an absolute precision of 2%, a total of 658 presumptive TB patients were required. For assessing the proportion who fail to collect the referral letter, 289 smear positive patients needed as expecting 25% of smear positive TB patients did not collect the referral letter with and alpha error of 5% and 95% of confidence.[7] However, all the presumptive TB patients visiting the DMC between April and August, 2016 were included in the study

Independent variables like age, gender, residence, contact number and sputum smear results were extracted from the laboratory register maintained under the national program. Patients, who did not submit the second sputum (EM) sample, were contacted over phone and the reasons for not providing the second sample were enquired. To minimize recall bias, patients who gave the spot sample during the months of July and August 2016 were included for finding out the reasons. Similarly, the referral status (after collecting the results) was extracted from the referral register and those who did not receive the referral letter were contacted over phone to ascertain the reasons. We tried to contact the participant over phone thrice. If they could not be contacted even after three calls, it was recorded as a non-response. For the purpose of this study, presumptive TB patients who did not submit second sputum sample within seven days were considered as 'failure to submit second sample' and people did not collect referral letter within 30 days from the date of submission of second sputum sample was considered as 'failure to collect the referral letter'. The study proposal was reviewed and approved by Scientific Advisory Committee and Institute Ethics Committee of Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry.

Data were entered into EpiData Manager software (EpiData Association, Odense, Denmark) and analysis was performed in Stata version 12.0. Failure to provide second sputum sample and collect referral letter were summarized as proportion with 95% confidence interval. Association of socio-demographic variables with failure to provide second sputum and failure to collect the referral letter was assessed using chi-square test and a p value of less than 0.05 was considered as statistically significant. Reasons for failure were expressed as percentages.

RESULTS

A total of 2025 presumptive TB patients had reported to the DMC during the study period; 70% were men and the mean age was 45 (SD 18) years. Of total, 6.4% were children and 16% were above 65 years of age.

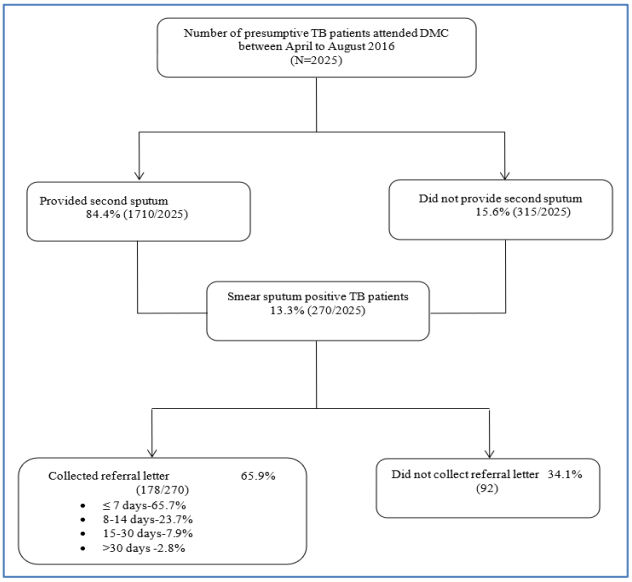

Figure 1: The status of second sputum submission and receiving referral letter after diagnosis among presumptive tuberculosis patients in a tertiary care centre, Puducherry, 2016.

More than 70% of patients were from three adjoining districts (Puducherry, Villupuram and Cuddalore). Of the 2025, 315 presumptive TB patients 15.6% (95% CI: 14.0-17.2%) did not provide second sputum sample (Figure 1).

Factors associated with not providing second sputum sample is shown in (Table 1). Factors associated with 'not collecting referral letter' is shown in (Table 2).

Table 1: Factors associated with not providing second sputum sample among presumptive tuberculosis patients attending a designated microscopy centre at a tertiary care centre, Puducherry, 2016.

Variable	Second sputum sample		PR (95% CI)	P value
	Not given	Given		
	N (%)	N (%)		
Age category (in years)				
Total	315 (15.6)	1710 (84.4)	-	-
≤14	8 (6.2)	121 (93.8)	0.35 (0.17-0.75)	0.05
15-24	28 (17.5)	132 (82.5)	1	
25-34	46 (19.8)	186 (80.2)	1.1 (0.7-1.7)	
35-44	54 (15.7)	290 (84.3)	0.9 (0.59-1.4)	
45-54	65 (15.1)	365 (84.9)	0.86 (0.58-1.3)	
55-64	61 (15.4)	335 (84.6)	0.88 (0.59-1.3)	
≥65	52 (15.7)	280 (84.3)	0.89 (0.59-1.3)	
Gender				
Male	216 (15.4)	1191 (84.6)	1	0.7
Female	99 (16.0)	519 (84.0)	1.0 (0.84-1.3)	
Residence				
Puducherry	41 (12.3)	292 (87.7)	1	0.07
Tamil Nadu and other states	274 (16.2)	1418 (83.8)	1.3 (0.97-1.8)	
Smear result of first sample				
Negative	221 (12.5)	1548 (87.5)	1	<0.001*
1+	20 (48.8)	21 (51.2)	3.9 (2.8-5.5)	
2+	24 (40.7)	35 (59.3)	3.3 (2.3-4.5)	
3+	42 (33.3)	84 (66.7)	2.7 (2.0-3.5)	
Scanty	8 (26.7)	22 (73.7)	2.1 (01.2-3.9)	

*P values are statistically significant, #Age missing for 2 presumptive TB participants. PR - Prevalence ratio, CI - Confidence interval.

Table 2: Association of socio-demographic variables with referral status among sputum smear positive tuberculosis patients diagnosed at designated microscopy centre at a tertiary care centre, Puducherry, 2016.

Variable	Referral letter		PR (95% CI)	P value
	Not collected	Collected		
	N (%)	N (%)		
Age category (years)				
15-24	7 (31.8)	15 (93.8)	1.2 (0.5-2.6)	0.8
25-34	10 (27.0)	27 (82.5)	1	
35-44	19 (31.7)	41 (80.2)	1.2 (0.6-2.2)	
45-54	22 (35.5)	40 (84.3)	1.3 (0.7-2.5)	
55-64	20 (40.0)	32 (84.9)	1.4 (0.8-2.7)	
≥ 65	14 (34.2)	21 (84.6)	1.5 (0.8-2.9)	
Gender				
Male	85 (37.6)	141 (62.4)	2.3 (1.2-4.8)	0.01*
Female	7 (15.9)	37 (84.1)	1	
Residence				
Puducherry	6 (20.7)	23 (79.3)	1	0.12
Tamil Nadu and other states	86 (35.7)	155 (64.3)	1.7 (0.8-3.6)	
Status of second sputum				
Provided	45 (25.6)	131 (74.4)	1	<0.001*
Not provided	47 (50.0)	47 (50.0)	2.0 (1.4-2.7)	

*P value are statistically significant.

About half of the patients (49%) who had sputum smear grading of 1+ in the first sputum sample and one third of the patients (33%) with grading of 3+ positive in the first sample, had not provided the second sputum sample. There was a statistically significant association (p≤0.001) between the result of the first sample and failure to provide second sample. Of 164 presumptive TB patients who did not provide second sputum sample during the months of July and August, reasons could be ascertained from 70 patients because of the problems in mobile numbers. 'reduction in symptoms' (30%), 'unaware that a second sample needs to be given' (23%) and 'visited other hospital' (14%) were the common reasons reported. Five of the patients (7%) had died before they could provide a second sample.

A total of 270 out of the 2025 (13.3%) patients were sputum smear positive; of them 92 (34.1%, 95% CI 28.4-40.1) did not collect the referral letter (Figure 1). Of 178 patients who got referral letter, 66% were referred within a week, 23% and 11% were referred within 8-14 days and after 2 weeks, respectively. Very few referrals took place beyond 14 days of diagnosis (Figure 2).

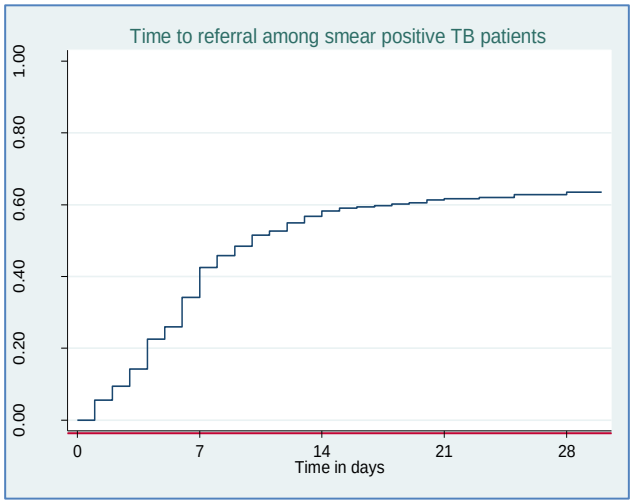

Figure 2: Kaplan Meier curve depicting the time to referral among smear positive patients diagnosed at designated microscopy centre at a tertiary care centre, Puducherry, 2016.

Gender was associated with collection of referral letter; 38% men and 16% women did not collect referral letter (p=0.006). Among patients who did not provide second sputum sample, 50% did not collect the referral letter (p<0.001).

Because of the problems in mobile numbers, out of 92 smear positives, we could reach only 39 patients for assessing the reasons for not collecting the referral letter. Of them, nine patients (23%) had died, nine (23%) cited 'busy in routine work', seven (18%) started treatment at a different government health facility and five (13%) felt long distance to health facility to collect results.

DISCUSSION

Our study showed that about 16% of presumptive TB patients did not provide a second sputum sample as required under the programme. Also, more than one third of smear positive pulmonary TB patients did not collect the referral letter in this setting.

Very few studies reported the proportion of presumptive TB patients who had not submitted the second sputum sample for diagnosis. Studies from district hospitals of the states of Uttarakhand and Chhattisgarh in India reported this proportion as ranging from 6 to 8%, which is lower than seen in the present study.[6-9] Reasons for such a high loss to follow up in the present study need to be investigated. One of the major reasons for this could be that this particular DMC caters to a large population, many of whom come from long distance to seek care. A study conducted at another tertiary medical college hospital in Puducherry reported findings similar to our study in that 21.5% patients did not provide the second sample.[10]

In the current study, nearly 30% of the patients who failed to provide second sputum were smear positive in their spot sample and they were not turned back for submission of second sputum. A study from Uttarakhand showed nearly 17.7% of the defaulters were smear positive in their first sample.[6] Steps to be taken to reduce this proportion then we could be able to control the spread in the community.

Nearly 50% of the patient's mobile numbers were missing or wrong. A study done in Chennai reported that 35% of patient's mobile numbers were ineligible at DMC. By improving quality of patients contact information, we could reduce the pre-treatment loss to follow up.[11] Close to one-fourth of the patients were unaware about the need for a second sample. So, patients should be adequately informed about the number of samples to be provided and the correct technique of sputum collection.

Recognising the difficulty of presumptive TB patients providing a second sputum on subsequent day, now the RNTCP guidelines allow the collection of two spot samples one hour apart from patients coming from longer distance. Ensuring the collection of two spot samples will decrease diagnostic dropouts and increase the yield of TB cases. The staff manning the DMC need to be cognisant of this recommendation and identify patients who would be better served by collection of two spot samples.

In this study, one third of smear positive patients did not collect referral letter. A record based study from Puducherry in 2013 showed that treatment could not be initiated in 25% of all the smear positive TB cases diagnosed at four selected medical colleges as the patients had not collected the sputum smear results or referral letter.[7] The proportion of TB patients who could not be initiated on treatment varied from 8.3% to 16% in Vietnam, Pakistan and South Africa.[12-14] A study done in

Myanmar showed that 8% of bacteriologically confirmed TB patients were not started on treatment and reported as loss to follow up before treatment and among those who initiated on treatment nearly 95% of them started within seven days. But the current study showed 66% of the participants collected referral within seven days.[15] In the present study, the proportion of people who did not collect referral letter is alarmingly high, especially when it is borne in mind the consequences of untreated sputum smear positive TB patients who would continue to spread the disease. Regarding reasons for not collecting results, about 23% died before they could collect the referral letter. If the patients diagnosed with TB, can be informed about their diagnosis by mobile voice calls and this could reduce the delay in initiation of treatment. With the introduction of case-based web-based system (NIKSHAY) to monitor status related to screening, diagnosis, treatment and follow-up of TB patients, those patients who did not receive referral letter can be tracked and initiated on treatment.

The study was conducted in an actual programmatic setting using routinely collected data and hence reflects the situation in the field. Prospective data collection would have introduced bias as laboratory technicians would have emphasized more on submission of second sputum sample and collection of results. Exploring the reasons for not submitting a second sputum sample and for not collecting referral letter will help in improving performance of the national TB program by addressing these gaps. This study was conducted in a single centre and generalizability of the findings is limited. Mobile numbers of about 50% of eligible participants were not available in the registers and therefore these participants could not be contacted for the purpose of this study.

CONCLUSION

One out of seven presumptive TB patients did not submit second sputum sample and one third of sputum smear positive TB patients did not collect results. This adds to the burden of pre-treatment lost to follow up.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee, JIPMER, Puducherry

REFERENCES

1. World Health Organisation. Global Health TB Report. World Health Organisation; 2018: 277.
2. World Health Organisation. End TB Strategy. World Health Organisation; 2015.
3. Mase SR, Ramsay A, Ng V, Henry M, Hopewell PC, Cunningham J, et al. Yield of serial sputum specimen examinations in the diagnosis of pulmonary tuberculosis: a systematic review. Int J Tuberc Lung Dis. 2007;11(5):485-95.
4. Central TB Division. Technical and operational guidelines for tuberculosis control in India. Directorate of Health Services, Ministry of Health and Family Welfare; 2016: 276.
5. Subbaraman R, Nathavitharana RR, Satyanarayana S, Pai M, Thomas BE, Chadha VK, et al. The Tuberculosis Cascade of Care in India's Public Sector: A Systematic Review and Meta-analysis. PLoS Med. 2016;13(10):1002149.
6. Rawat J, Biswas D, Sindhwani G, Kesharwani V, Masih V, Chauhan BS. Diagnostic defaulters: an overlooked aspect in the Indian Revised National Tuberculosis Control Program. J Infect Dev Ctries. 2012;6(1):20-2.
7. Ramachandran D, Purty AJ, Singh Z, Soundappan G, Anandan V. Initial default among tuberculosis patients diagnosed in selected medical colleges of Puducherry: issues and possible interventions. Int J Med Sci Public Heal. 2015;4(7):957-60.
8. Mehra D, Kaushik RM, Kaushik R, Rawat J, Kakkar R. Initial default among sputum-positive pulmonary TB patients at a referral hospital in Uttarakhand, India. Trans R Soc Trop Med Hyg. 2013;107(9):558-65.
9. Nayak P, Kumar AMV, Claassens M, Enarson DA, Satyanarayana S, Kundu D, et al. Comparing same day sputum microscopy with conventional sputum microscopy for the diagnosis of tuberculosis Chhattisgarh, India. PLoS One. 2013;8(9):74964.
10. Chauhan R, Purty A, Samuel A, Singh Z. Incremental yield of second sputum smear examination for diagnosis of tuberculosis patients at a tertiary care teaching hospital in Puducherry, India. J Med Soc. 2016;30(2):89-93.
11. Thomas B, Subbaraman R, Sellappan S, Suresh C, Lavanya J, Lincy S, et al. Pretreatment loss to follow-up of tuberculosis patients in Chennai, India: A cohort study with implications for health systems strengthening. BMC Infect Dis. 2018;18(1):142.
12. Rao NA, Anwer T, Saleem M. Magnitude of initial default in pulmonary tuberculosis. J Pak Med Assoc. 2009;59(4):223-5.
13. Buu TN, Lonnroth K, Quy HT. Initial defaulting in the National Tuberculosis Programme in Ho Chi Minh City, Vietnam: a survey of extent, reasons and alternative actions taken following default. Int J Tuberc Lung Dis. 2003;7(8):735-41.
14. Rao N, Anwer T, Arain I, Ara I. To evaluate primary default among smear positive pulmonary tuberculosis patients at three chest clinics of Ojha Institute of Chest Diseases, Karachi, Pakistan. Eur Respir J. 2011;38(55):4372.
15. Htwe KK, Kyaw NTT, Kumar AMV, Kyaw KWY, Oo MM, Thwin T, et al. Pre-treatment loss to follow-up and treatment delay among bacteriologically-confirmed tuberculosis patients diagnosed in Mandalay Region, Myanmar. Trop Med Health. 2019;47(1):30.

Cite this article as: Ulaganeethi R, Nair D, Ramaswamy G, Choubey S, Kumar SV, Roy G. Pre-treatment lost to follow up among presumptive tuberculosis patients in a tertiary care centre, South India. Int J Community Med Public Health 2020;7:2266-70.