

## Extent of Delay in Diagnosis in New Smear Positive Patients of Pulmonary Tuberculosis Attending Tertiary Care Hospital

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### ABSTRACT

**Background:** India is the highest tuberculosis (TB) burden country accounting for one-fifth of the global incidence. It is estimated that, annually, 1.9 million cases are from India and about 0.8 million are infectious, new smear, positive pulmonary TB cases. The present study was a cross-sectional study conducted in a tertiary care hospital to determine the extent of delay in diagnosis and initiating the treatment after diagnosis in new smear, positive pulmonary TB patients attending a tertiary care hospital of Haryana during a 1-year period.

**Methods:** A total of 204 patients were interviewed after being diagnosed as new sputum, positive TB (NSP-TB) by the treating doctor at the tertiary care hospital and re-interviewed at their home after initiation of anti-TB treatment. Chi-square test and analysis of variance (ANOVA) were used for statistical analysis.

**Results:** More than half of the study patients delayed their first consultation with a health care system. The mean and median patient delay was 32.97 and 16 days, respectively. Lack of awareness of the disease was the leading cause for the patient delay. The mean duration of delay at peripheral health care provider was 60.46 days. The mean and median delay at tertiary care hospital was 8.35 and 4 days, respectively. Most of the patients delayed for diagnosis as per revised national TB control program (RNTCP) guidelines. The mean total delay in diagnosis was 75.71 days.

**Conclusions:** There is an urgent need to scale up the information education communication activities to decrease the patient delay. Doctor at all level of health care need to be actively involved for subjecting the suspects to sputum examination at the earliest possible, as per RNTCP guidelines.

**Keywords:** Delay in diagnosis, new smear positive TB, patient delay, tertiary care hospital

### INTRODUCTION

It is estimated that 1.9 million cases of tuberculosis (TB) are diagnosed in India every year. Out of these, 0.8 million are infectious new sputum positive TB (NSP-TB) cases.<sup>[1]</sup> Revised

national TB control program (RNTCP) has consistently maintained the treatment success rate >85%, and NSP case detection rate close to the global target of 70%.<sup>[2]</sup> India continues to have the highest TB burden in the globe, accounting for one-fifth of the global incidence.<sup>[3]</sup> Studies suggest that, on an average, 3-4 months of work time is lost as a result of TB, resulting in an average potential loss of 20-30% of the annual household income. This leads to increased debt burden, particularly for the poor and marginalized sections of the population.<sup>[4]</sup> Left untreated, each person with active TB disease can infect an average of 10-15 people every year, and this continues the TB transmission as it is an airborne disease.<sup>[5]</sup> Government tertiary care hospitals play a crucial role in diagnosis of TB patients. In Haryana, 10-15% of the total TB cases are diagnosed in Government tertiary care hospital. With this background, the present study was conceived to study the extent of delay in diagnosis in NSP-TB patients attending tertiary care hospital in 1 year.

## METHODS

The present study was conducted in a government tertiary care hospital of Haryana. Baseline estimation of sample size was made from other similar studies,<sup>[6-8]</sup> which were available. Considering the monthly average number of NSP-TB patient attendance in the hospital, a total of 204 NSP-TB patients were enrolled in the study. All NSP-TB patients diagnosed in the Department of Tuberculosis and Respiratory Medicine on the visit day, i.e., every Monday, Tuesday, and Friday, were enrolled in the study. Data was collected by the principal investigator by interview technique. A pre-designed, pre-tested, semi-structured questionnaire was used for the interview. Before proceeding with the interview, the purpose of the study was fully explained and written informed consent was obtained from the study subject. The patients were interviewed after being diagnosed as NSP-TB by the treating doctor and referred to medical officer TB control (MOTC) for starting treatment or for referral to their respective directly observed treatment (DOT) centre. The extent and reasons for delay in diagnosis were assessed by interviewing the patients and reviewing the relevant documents, i.e., previous consultation documents,

outpatient department cards in the department of Tuberculosis and Respiratory Medicine. The extent and reasons for delay in initiation of treatment was assessed by contacting and interviewing the same patients in the community where they were residing. The information for delay in initiation of treatment was cross-checked from the records. The data thus collected were analyzed using Statistical Package for the Social Sciences (Windows version 16.0; SPSS Inc, Chicago, IL, United States) software. Statistical tests in the form of percentages and proportion, Chi-square test, and analysis of variance (ANOVA) were applied for drawing inferences and obtaining conclusions.

Following definitions were formulated in accordance to RNTCP guidelines<sup>[9,10]</sup> for analysis:

- Patient delay: Time interval between 14 days after the onset of symptoms to seeking advice from a health care provider considered as significant patient delay.
- Peripheral health care provider: Any private or government institution providing health care, i.e., private doctor, government doctor at peripheral health centre, community health centre, and district hospital.
- Peripheral health care provider delay: Time interval between first consultations with peripheral health care provider till attending tertiary care hospital.
- Tertiary care hospital delay: Time interval between 3 days after visit to the tertiary care hospital till diagnosis of the patient as NSP-TB.
- Total delay in diagnosis: Time interval between 14 days after onsets of symptom to diagnosis of the patient as NSP-TB considered as delay in diagnosis.
- Treatment Initiation delay: Time interval between 7 days after diagnosis as NSP-TB patient to initiation of anti-TB treatment at respective DOT center.

## RESULTS

A total of 204 patients were enrolled in the study, of which 144 (70.59%) were male and 60 (29.41%) were female. More than half, i.e., 122 (59.80%) patients were from 15-44 years age group. Forty two (20.58%) patients were smokers and 70 (34.31%) patients were both smoker and alcoholics. About 159 (77.94%) patients complained of cough with or without

expectoration, 135 (66.17%) of fever, 12 (5.88%) of chest pain, 9 (4.41%) of hemoptysis, 5 (2.45%) of breathlessness, and 5 (2.45%) of weight loss.

**Patient delay**

The mean patient delay was 32.97 days and the median patient delay was 16 days. Out of 204 patients, 104 (50.98%) patients delayed seeking any health care. Sociodemographic factors like age, sex, caste, literacy status, occupation, annual family income, area of residence, and distance of home from nearest health care facility of the patients had no significant association with the patient delay.\* The cause of delay in 65 (62.49%) patients was lack of awareness of the disease [Table 1]. Prior consultations before attending the tertiary care hospital were found in 159 patients, of these, 141 (70.09%) patients had their first consultation with private doctors, 17 (8.33%) attended public hospital for consultation, and 43 (21.07%) came to the tertiary care hospital directly. One patient had his first consultation with a traditional healer [Table 2].

**Delay at peripheral health care providers**

The mean and median duration of delay by peripheral health care providers was 60.46 and

39 days, respectively. Fifty two patients had more than 2 months delay at private clinics at the peripheral level [Table 2]. Total of 88 (43.13%) patients were advised to visit tertiary care hospital by their friends, family members, or relatives, 3 (1.47%) patients were referred by government doctor, and 17 (8.33%) patients by private doctor.

**Delay at tertiary care hospital level**

Delay in diagnosis (i.e., >3 days for diagnosis) at tertiary care hospital was found in 168 patients, of these, 59 (28.92%) patients had 1-4 days delay, 66 (32.35%) patients had 5-10 days delay, and 39 (21.07%) patients had delay of >10 days. The mean and median delay at tertiary care hospital was 8.35 and 4 days, respectively. Delay in referral from other department to the Department of Tuberculosis and Respiratory Medicine and the date for next consultation were the main reason for delay at the tertiary care hospital [Table 3]. The extent of delay at tertiary care hospital was not significantly associated with sociodemographic factors like age, sex, caste, literacy status, annual family income, and distance of home from the hospital.\*

**Total delay in diagnosis**

A total of 198 (97.03%) patients had delay in diagnosis [Table 4]. The mean and median total delay in diagnosis was found to be 75.71 and 43 days, respectively. Delay in diagnosis of >181 days was significantly associated with male sex and general caste.\* Delay in consultation with the health care provider was the main reason on the part of patients [Table 5]. Delay by the peripheral health care provider (government or private) was the main reason for the delay arising due to health system [Table 3]. The observed difference in mean total delay was statistically significant, *P* < 0.05.

\* Data not shown in this paper

**Table 1:** Reasons for patient delay in consulting health care provider (n=104)

Reasons for delay	No. of patient	% of patients
Lack of awareness of TB	65	62.49
Due to family member ignorance	16	15.38
Due to busy working schedule	14	13.46
Fear of loss of daily wages	13	12.5
T/T from chemist shop	14	13.46
T/T at home	7	6.73

TB=Tuberculosis

**Table 2:** Distribution of patients according to delay at peripheral health care provider (n=159)

Institution	Extent of delay			Total
	<30 days	31-60 days	>61 days	
Private doctor	58 (92.06)	37 (84.09)	46 (88.46)	141 (88.67)
PHI (Government)	5 (7.93)	6 (13.63)	6 (11.54)	17 (10.69)
Traditional healer	0	1 (2.27)	0	1 (0.62)
Total	63 (100)	44 (100)	52 (100)	159 (100)

Percentages written in parenthesis, PHI=Public Health Institution

**Table 3:** Reasons for delay in diagnosis (Health system part)

Reasons	Number of patients	Average delay mean±SD (days)
Treatment by peripheral health care providers without suspecting TB	161 (78.92)	60.64±66.34
Delay in advice for sputum examination	18 (8.82)	19±17.31
Delay in referral from other department at tertiary care hospital	58 (28.43)	14.65±12.71
Date for next consultation at tertiary care hospital	58 (28.43)	6.15±4.33
Repeat sputum examination was done for diagnosis	12 (5.88)	20.33±19.58
Advised for sputum examination to be carried out at nearest PHI	5 (2.45)	10.6±6.06

TB=Tuberculosis, PHI=Public Health Institution

### Treatment delay

After being diagnosed as NSP-TB by the doctor, the patients were referred to MO-TC for initiation of treatment. The MOTC then referred the patients to their respective DOT centre for initiation of the treatment. Out of 204 patients, treatment was initiated in 197 patients. One patient died within 2 days of diagnosis, one died after 44 days of diagnosis without initiation of treatment, another patient did not initiate treatment of his own wish, and 4 patients could not be traced out for follow-up. The mean delay in initiation of treatment after being diagnosed as NSP-TB in 197 patient was 4.37 days. Out of 197 patients, 28 (14.21%) patients had delay >7 days in treatment initiation at their respective DOT center. Fifteen patients were delayed for >7 days for treatment initiation due to non-compliance of the health workers [Table 6].

## DISCUSSION

Early diagnosis and prompt treatment of a disease is one of the most important strategies for a disease control program in terms of reduction of mortality and morbidity load as well as socio economic burden on the country. In the present study, half of the patients were delayed in seeking health care after appearance of symptoms. Mean patient delay was more than 1 months. Majority were delayed in seeking health care due to lack of awareness of

**Table 4:** Extent of total delay in diagnosis

Extent of delay	Number of patients	% of patients
1-30 days	49	24.01
31-60 days	59	28.92
61-90 days	41	20.09
91-180 days	34	16.66
>181 days	15	7.35
Total	198	97.03

**Table 5:** Reasons for delay in diagnosis (patients part)

Reasons	Number of patients	Average delay mean±SD (days)
Delay in consultation to health system	104 (50.98)	32.97±70.82
Delay in deposition of sputum sample	32 (15.68)	11.48±10.51
Delay in consultation by the patient after sputum examination	14 (6.86)	14.71±7.42

**Table 6:** Reasons for delay for more than 7 days for treatment initiation after diagnosis as NSP-TB (n=28)

Reasons for delay	Number of patients	% of patients
Delay in reporting at referred PHI	5	17.85
Non-availability of drugs at PHI	3	10.71
Non-compliance of health worker	15	53.57
Health worker was busy in pulse polio immunization	4	14.28
Due to rain health worker got delayed in arranging for the drug	1	3.57
Total	28	100

NSP-TB=New sputum, positive TB, PHI=Public Health Institution

TB. Extent of patient delay was not significantly associated with sociodemographic factor like age, sex, literacy status, area of residence, and distance of home from nearest health care facility. Similar results were obtained in a study by Pardeshi in India,<sup>[6]</sup> Rojpibulstit *et al.*, in Southern Thailand,<sup>[11]</sup> and Zerbini *et al.*, in four provinces of Argentina,<sup>[12]</sup> Nguyen *et al.*, in Vietnam,<sup>[13]</sup> which may be due to similarity in the study setting. Tamhane *et al.*,<sup>[14]</sup> Dhingra *et al.*,<sup>[7]</sup> and Yadav *et al.*, in India<sup>[8]</sup> also found lack of awareness as the main cause of delay in majority of patients. Delay in referral from different departments to the Department of Tuberculosis and Respiratory Medicine and delay

in the next consultation date are important reasons for delay at tertiary care hospitals. The mean total delay in diagnosis was found to be more than 2.5 months, and delay at the peripheral health care level contributed to greater portion of the total delay. Studies conducted elsewhere have reported longer patient delays; Demissie *et al.*,<sup>[15]</sup> in their study at 17 public health centres of Addis Ababa, Ethiopia found that the mean patient delay was 78.2 days and the median total delay was 64 days, and the main reason for the delay was lack of awareness. Lienhardt *et al.*,<sup>[16]</sup> found a median patient delay of 8.6 weeks (range 5-17 weeks). Delay for treatment was independent of sex, but was shorter in young TB patients. The median delay was 12 weeks and longer in rural than in urban areas and in those who did not attend school. Basnet *et al.*,<sup>[17]</sup> in Nepal found that the median patient delay was 50 days, the median health system delay was 18 days, and the median total delay was 60 days.

On the contrary, Leung *et al.*,<sup>[18]</sup> found mean patient delay of 26 days and 49 days of median total delay in diagnosis, age, employment status, and smoking status, and haemoptysis as a symptom were found to influence patient delay in their study conducted at Hong Kong. Lawn *et al.*,<sup>[19]</sup> in their study at Ghana, West Africa found that the median total delay in diagnosis was 4 months (mean = 7.7 months), and the total delay exceeded 6 months in 44% of patients. Total delay was strongly associated with rural residence.

The actual reasons for delay at the peripheral health care provider could not be ascertained in our study as peripheral health care providers were not interviewed. This study provides baseline information about delays in the diagnosis of TB. The long total delay of 2.5 months in the diagnosis of TB observed in this study can be reduced by, 1) increasing public awareness about chest symptoms of TB; 2) doctors working in different level of health care need to be reemphasized and actively involved for subjecting the suspects to sputum examination at the earliest possible, as per RNTCP guidelines; 3) to prevent the avoidable delay in diagnosis, the suspected patient should be allowed to attend the OPD on all days, instead of following a fixed OPD day pattern at the tertiary care hospital. The health workers at DOT centers should be more sensitized and they need to be supervised regularly by the respective medical officer for timely initiation of treatment among

diagnosed TB patients.

As this study has been conducted at a tertiary care hospital, the extent of delay and reasons thereof at peripheral level may differ. Interview of the peripheral health care provider was not possible due to resource constrains. A large scale study is required to comprehend the real situation at the peripheral level. In this study, avoidance of the recall bias in some patients was not possible.

## CONCLUSIONS

There is an urgent need to scale up the information education communication activities to decrease the patient delay. Doctor at all level of health care need to be actively involved for subjecting the suspects to sputum examination at the earliest possible, as per RNTCP guidelines.

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