

## Original Research Article

# Patient and health provider factors affecting diagnostic delays of pulmonary tuberculosis in Jabalpur district of Madhya Pradesh, India: a cross-sectional study

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## ABSTRACT

**Background:** Delay in diagnosis of pulmonary tuberculosis (PTB) causes patients to have more severe disease, more complications and lead to higher mortality with disease spread. The aim of the study was to estimate patient proportion having delayed diagnosis of PTB and to estimate patient' and health providers' delay and associated factors.

**Methods:** This cross sectional study was conducted on sample of 135 new sputum positive PTB patients from nine designated microscopy centres of Jabalpur district. Data collected on modified world health organization questionnaire. The criterion for defining delay was formulated keeping in mind the Revised TB Control Programme algorithm for diagnosis of PTB in PTB suspects. Mann Whitney U and Kruskal Wallis tests were used ( $\alpha=5\%$ ).

**Results:** Mean age was 33.87 (14.3) years. Males constituted 66.7%. Proportion of diagnostic delay was 87.4%. Median patient and health care personnel (HCP) interval were 39 days (IQR 22-75) and 34 days (IQR 12-79) respectively. Factors significantly associated with patient delay were poor knowledge about TB, smoking, symptoms perceived non serious, first action with symptom onset, and mode of transport patient used to reach the nearest public health facility. Stigma didn't affected patient interval. Factors significantly associated with health providers' delay were first consultations with; a non-formal HCP, private health facility, non-allopathic practitioner; consultation with multiple HCP's; living more than half an hour away from public health facility.

**Conclusions:** Unacceptable high delay in diagnosis, more from patient side. More attempts at increasing awareness are needed.

**Keywords:** Patient delay, Health provider delay, Diagnostic delay, TB

## INTRODUCTION

The estimated annual incidence of tuberculosis (TB) in India is 27 lakh.<sup>1</sup> It is estimated that an untreated smear positive pulmonary TB (PTB) patient infects 10-15 persons annually.<sup>2</sup> Many cases remain undiagnosed, this could be due to factors like patients delaying seeking

health care or failure of the health systems to timely diagnose patients.<sup>3</sup> Diagnostic delays of longer than two months can spread the disease to 25 domestic contacts.<sup>4</sup> Delayed diagnosis causes patients to have more severe disease, more complications and lead to higher mortality.<sup>5,6</sup> This study was planned to estimate the proportion of patients having delayed diagnosis and the

duration of patient and health system delays with associated factors in diagnosis of PTB.

## METHODS

Ethical clearance of the study was taken from institutional ethics committee, Government Medical College, Jabalpur. Permission was taken from district TB officer before proceeding. Patient privacy was maintained.

### Selection and description of participants

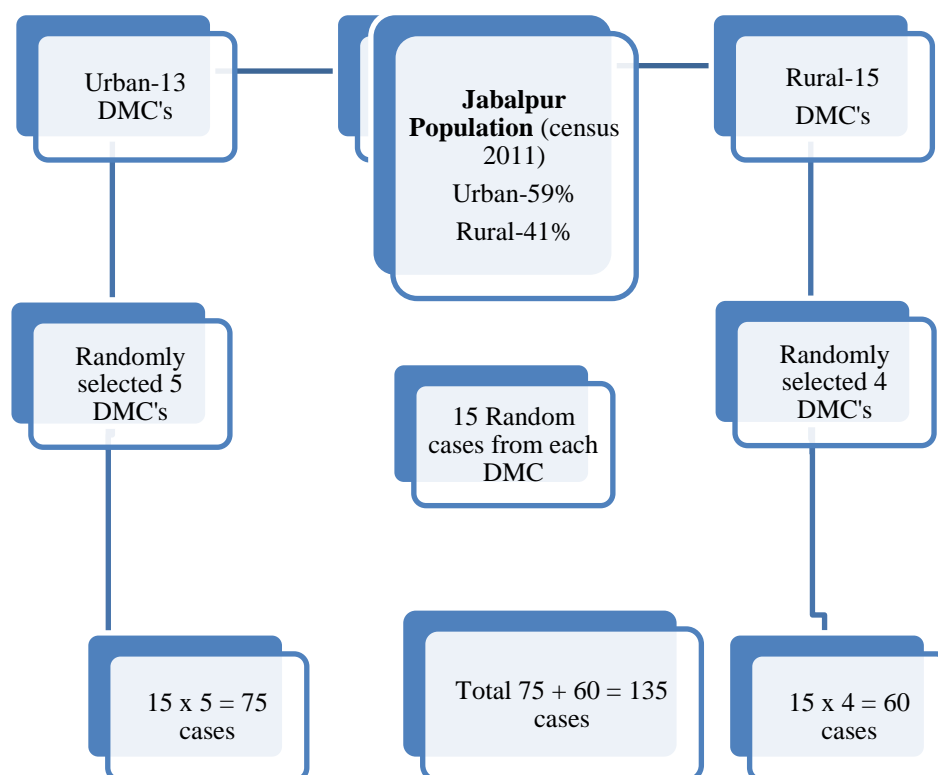
A community based, observational cross sectional study from November 2013 to October 2014 was carried out among recently diagnosed cases of new sputum smear positive PTB (Category I),  $\geq 15$  years of age from Revised National TB Control Program (RNTCP) setup Jabalpur district registered between January 2014 to June 2014.

### Sample size and sampling

The sample size was calculated by using the formula for determination of sample size for estimating proportions ( $Z^2PQ/d^2$ ).<sup>7</sup>

We conducted a pilot study (30 cases), in which the proportion of diagnostic delay was calculated to be 83% (P).

Taking 95% confidence level (Z for two sided test) and 8% relative precision, and adding 10% for non-responders, a sample size of 135 was finalized. These were selected by multistage random sampling technique from nine out of 28 designated microscopy centers (DMC's) of Jabalpur district according to population proportions in census 2011. Fifteen patients were selected from each DMC (Figure 1).



**Figure 1: Sampling flowchart.**

### Data collection tool and techniques

Data was collected on a standardized pre-designed and pre-tested study tool as used by WHO multi-country study from Eastern Mediterranean region in 2003-2004 after slight modifications according to local needs and health care system.<sup>8</sup> Details of patients were obtained from respective TB unit of DMCs with the help of TB health visitors and senior treatment supervisors (STS). At a pre-informed date, the shortlisted patients were asked to gather at the local DMC along with all their medical records of previous consultations. Face to face interviews were conducted and questionnaire was administered.

Preferably each patient was interviewed at the respective DMC itself because of stigma associated with the disease. Patients sometimes refrain visit of health workers at their homes. However, we visited the homes of those patients who could not come to the DMC. Data was collected on duration from the onset of suggestive symptoms to the first health-seeking action and diagnosis, the reasons for delay in seeking care, and the number and types of providers consulted. To help patients recall dates of health seeking encounters and duration of symptoms we used a locally adapted calendar having holidays and religious celebration days and reviewed medical prescriptions and other medical documents.

**What constitutes delay?**

No standard definition of delay is available in literature. The criterion for defining delay was formulated keeping in mind the RNTCP algorithm for diagnosis of PTB in PTB suspects.<sup>9</sup>

**Operational definitions***Symptoms suggestive of TB*

Cardinal symptoms described for TB like cough, fever (including evening rise in temperature), loss of weight, chest pain, hemoptysis.

*Diagnostic interval*

Number of days between the onset of symptoms suggestive of TB and initial TB diagnosis. After onset of symptoms suggestive of TB, those who required >40 days to get diagnosed were classified as having diagnostic delay.

*Patients' interval*

Interval in days between the onset of symptoms suggestive of TB and presentation to a health care

provider (HCP). An interval of  $\geq 21$  days was considered as having patient delay.

*HCP interval*

Interval (days) between the date of first consultation with a HCP and the first diagnosis of TB. An interval of >20 days was considered as having health provider's delay.

*HCP*

Any person practicing as a doctor consulted by patient about his/her sickness that prescribed something (whatever the form) for treatment. It includes formal and non-formal HCP (quacks).

*Formal HCP*

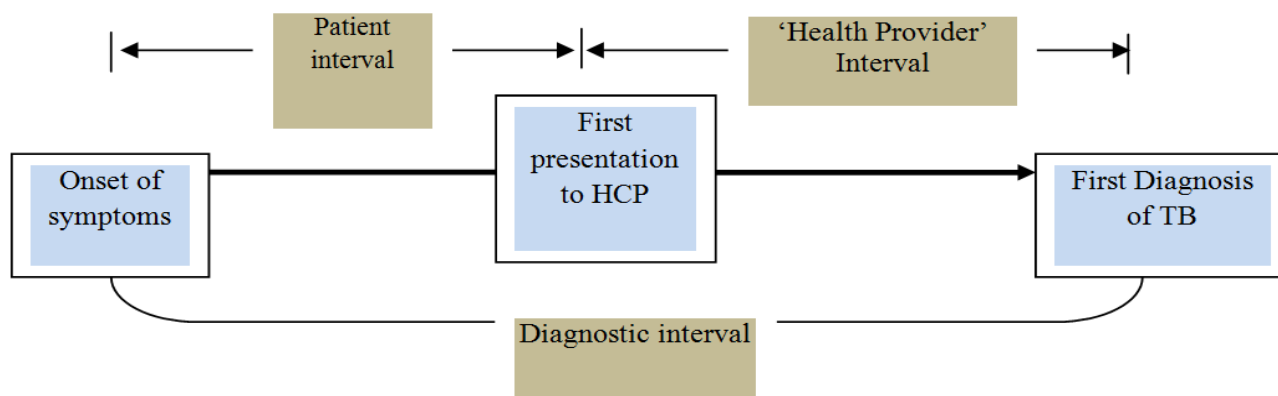
A qualified allopathic or AYUSH medical practitioner.

*Non-formal HCP*

A non-qualified person practicing medicine.

*Traditional healers*

Faith healers, Guniya, religious healers.



**Figure 2: Schematic diagram of various intervals identified in this study.**

**Statistical analysis**

Data was entered in and analyzed by MS Excel 2007 and SPSS 20.0 respectively. After looking at the distribution of data, medians were compared by Mann Whitney U test and Kruskal Wallis test and means were compared using t-test. Chi square test applied for comparing proportions. P value <0.05 was considered significant throughout taking two sided tests. Intervals were dichotomized into no delay/delay using definitions above. Responses to questions measuring knowledge were recorded on a three-point Likert scale (three-best and one-worst). These included knowledge about mode of spread of disease, its causes, curability, existence of vaccine and duration of treatment.

**RESULTS**

A total of 143 patients were approached, of which eight were excluded due to insufficient information leading to a total of 135 important cases. Response rate was 94.4%. Data of 135 individuals was included in the final analysis. Mean age of participants was 33.87 (14.3) years. Males constituted 66.7% (90/135), Hindus were 80% (108/135), Muslims were 18.5% (25/135) and Christians constituted 1.5% (2/135). Majority population (98/135, 72.6%) belong to low socio economic status (class IV, V) according to modified Prasad classification 2013. Patients from rural area were 44.4% (60/135). More socio-demographic characteristics of the study population are shown in Table 1.

Proportion of diagnostic delay was 87.4% (118/135).  
Median diagnostic interval was 94 days (IQR 58-175).

Median patient interval was 39 days (IQR 22-75) (Table 2).

**Table 1: Socio-demographic characteristics of study population.**

Characteristics	Number (n=135)	%
<b>Age (years)</b>		
15-24	45	33.3
25-34	33	24.4
35-44	23	17.0
45-54	17	12.6
55-64	12	8.9
>65	5	3.7
<b>Education (completed)</b>		
Graduate and higher	8	5.9
Higher secondary (11 <sup>th</sup> /12 <sup>th</sup> )	13	9.6
High school (9 <sup>th</sup> /10 <sup>th</sup> )	20	14.8
Middle school (6 <sup>th</sup> -8 <sup>th</sup> )	19	14.1
Primary (1 <sup>st</sup> -5 <sup>th</sup> )	37	27.4
Illiterate	38	28.2
<b>Marital status</b>		
Married	86	63.7
Single	42	31.1
Divorced/separated	4	3.0
Widowed	3	2.2
<b>Occupation</b>		
Technical/professional	2	1.5
Clerical/worker	95	70.4
Student	18	13.3
Unemployed/health worker	20	14.8

**Table 2: Duration of various delays.**

Type of interval (days) (n=135)	Mean (SD)	Median	Min-Max	IQR
<b>Patient interval</b>	77.5 (141.44)	39	0-1368	22-75
<b>Health provider interval</b>	73.20 (112.12)	34	0-725	12-79
<b>Diagnostic interval</b>	155.3 (185.51)	94	12-1457	58-175

**Table 3: Factors associated with patient delay.**

Factors	Number	Median patients interval (IQR) days	P value
<b>Age (in years)</b>			
15-24	45	32 (16.5-54)	0.143**
25-44	56	39 (23-89.5)	
>44	34	52 (26.75-98.25)	
<b>Sex</b>			
Male	90	42.50 (23-86.25)	0.155*
Female	45	31 (16-66)	
<b>Education</b>			
≤5 <sup>th</sup> standard	75	50 (26-91)	0.050*
>5 <sup>th</sup> standard	60	31.5 (21.25-56.25)	
<b>Occupation</b>			0.620**
Technical/professional	2	100.5 (20)	
Clerical/worker	95	39 (22-84)	
Student	18	32 (13.5-55.5)	
Unemployed/HW	20	48.5 (28-79.5)	

Continued.

Factors	Number	Median patients interval (IQR) days	P value
<b>Residence</b>			
Rural	60	42.5 (26.25-78.75)	0.162*
Urban	75	32 (20-71)	
<b>Religion</b>			
Hindu	108	40.5 (22.25-83.25)	0.289**
Muslim	25	31 (21-63)	
Christian	2	63.5 (57 )	
<b>Socio economic class<sup>#</sup></b>			
I	6	23 (10.75-110.5)	0.644**
II	10	29 (20-85.75)	
III	21	39 (22-63.5)	
IV	41	46 (26-90.5)	
V	57	38 (20-77.5)	
<b>Knowledge about TB</b>			
Low	95	46 (26-85)	0.003*
High	40	29 (11.75-52)	
<b>Smoking</b>			
Smokers (current and quitted)	55	46 (26-97)	0.048*
Non-smokers (never)	80	32 (16.25-66)	
<b>Alcoholic</b>			
Yes	52	44.5 (26.25-84)	0.154
No	83	32 (20-66)	
<b>Overcrowding</b>			
Present	95	39 (23-80)	0.663
Absent	40	37.5 (21.25-68.5)	
<b>Previous contact with TB pt</b>			
Yes	65	37 (22.5-80.5)	0.846*
No	70	44.5 (22-76.25)	
<b>First action</b>			
HCP	56	27 (13.25-51.75)	0.002**
Self-medication	29	47 (27.5-83)	
Pharmacy	29	49 (23-100.5)	
Faith healer (Guniya)	19	66 (37-120)	
Health worker	2	217.5 (51)	
<b>Chronic diseases</b>			
Present	15	28(13-138)	0.081*
Absent	120	39(22.25-74.5)	
<b>TB stigma</b>			
Low	68	39 (22-80.75)	0.872*
High	67	37 (23-66)	
<b>Satisfaction with care of government hospital</b>			0.453*
Unsatisfied	85	42 (25-71.5)	
Satisfied	50	31.5 (19.5-86.25)	
<b>Distance of nearest public health facility from home (km)</b>			0.415*
≤3	79	49 (22-80)	
>3	56	34 (21.5-63.75)	
<b>Time to reach the health centre</b>			
≤ ½ hour	63	44 (22-70)	0.475*
>½ hour	72	37 (26-84)	
<b>Mode of transport</b>			0.006**
Walk	31	51 (23-75)	
Private vehicle	37	26 (10.5-48)	
Public transport	67	47 (27-91)	

Continued.

Factors	Number	Median patients interval (IQR) days	P value
Thought symptoms non serious			
Yes	90	51.5 (27-98.25)	0.000*
No	45	26 (12.5-46.5)	
Fear of social isolation			
Yes	2	147 (143- )	0.050*
No	133	38 (22-72)	
Fear of what would be found on diagnosis			
Yes	4	98.5 (37-148)	0.137*
No	131	38 (22-73)	
Travelling problem			
Yes	9	42 (31.5-62)	0.445*
No	126	38.5 (21.75-80.25)	

#: Modified B. G. Prasad classification 2013, \*: Mann Whitney test, \*\*: Kruskal Wallis test.

**Table 4: Factors associated with health provider's delay.**

Factors	Number	Median health providers delay (IQR)	P value
<b>Age (in years)</b>			
15-24	45	28 (6.5-72.5)	0.506**
25-44	56	39 (12.5-83)	
>44	34	40.5 (16.25-71.25)	
<b>Sex</b>			
Male	90	34 (10.75-68.5)	0.490*
Female	45	34 (17.5-87.5)	
<b>Education</b>			
≤5 <sup>th</sup> standard	75	39 (16-80)	0.126*
>5 <sup>th</sup> standard	60	30 (7.25-67.5)	
<b>Occupation</b>			
Technical/professional	2	35 (19)	0.443**
Clerical/worker	95	39 (16-76)	
Student	18	18.5 (3.5-72.75)	
Unemployed/HW	20	31.5 (14-154.5)	
<b>Residence</b>			
Rural	60	40.5 (15-69.5)	0.398*
Urban	75	29 (11-80)	
<b>Religion</b>			
Hindu	108	33 (10-70)	0.183**
Muslim	25	38 (21-87.5)	
Others	2	12 (5)	
<b>Socio economic class</b>			
I	6	54.5 (26.5-83.75)	0.242**
II	10	32.5 (25-56.75)	
II	21	16 (3.5-84.5)	
IV	41	45 (19-93)	
V	57	28 (11-66.5)	
<b>Knowledge</b>			
Low	95	39 (16-81)	0.125*
High	40	21(8.5-68.5)	
<b>Smoking</b>			
Smokers	55	39 (12-63)	0.649*
Non smokers	80	33 (12.5-89.5)	
<b>Alcoholic</b>			
Yes	52	29 (9.25-68)	0.353*
No	83	35 (15-84)	

Continued.

Factors	Number	Median health providers delay (IQR)	P value
<b>Chronic diseases</b>			
Present	15	34 (15-85)	0.398*
Absent	120	33.5 (5.5-62.5)	
<b>TB stigma</b>			
Low	68	31.5 (12.5-77)	0.956*
High	67	34 (12-79)	
<b>Distance of nearest public health facility from home (km)</b>			
≤3	79	28 (9-70)	0.069*
>3	56	40.5 19.5-87.25)	
<b>Time to reach the health centre</b>			
≤½ hour	63	19 (5-70)	0.016*
>½ hour	72	40.5 (21.25-87.25)	
<b>Mode of transport</b>			
Walk	31	28 (19-58)	0.338**
Private vehicle	37	21 (10.5-60.5)	
Public transport	67	41 (12-92)	
<b>HCP first consulted</b>			
Formal	88	23 (5.5-68.5)	0.001*
Non-formal	47	53 (29-89)	
<b>Facility first consulted</b>			
Government	18	3 (1.75-17)	0.000*
Private	117	40 (18.5-84.5)	
<b>Specialty of formal HCP first consulted</b>			
Allopathic	79	19 (5-58)	0.022*
Non allopathic	9	70 (25.5-298)	
<b>Actions taken by HCP at diagnosis</b>			
Sputum only	18	24.5 (9.25-50.5)	0.649**
Chest X-ray only	26	25 (13.25-89.25)	
Sputum with chest X-ray	90	39.5 (14.25-80.25)	
others	1	58 (58-58)	
<b>Initial diagnosis made by</b>			
Government	100	34 (12.5-77.5)	0.936*
Private	35	34 (11-79)	
<b>Specialty of HCP who made initial diagnosis</b>			
Allopathic	131	34 (12-76)	0.645*
Non allopathic	4	50.5 (7.75-563.5)	
<b>Late reporting by lab technician (n=108)</b>			
No	87	34 (12-68)	0.978*
Yes	21	38 (6-82.5)	
<b>No. of HCP consulted before initial TB diagnosis</b>			
≤2	68	16 (3-32.75)	0.000*
>2	67	64 (38-158)	
<b>Expenses incurred before diagnosis</b>			
1-1000	66	17 (2.75-43.5)	0.000**
1001-2000	15	40 (20-61)	
>2000	54	61.5 (28-95.5)	

\*: Mann Whitney test, \*\*: Kruskal Wallis test.

Factors significantly associated with patient delay were having poor knowledge about TB ( $p=0.003$ ), smoking ( $p=0.048$ ), perception that symptoms were not serious ( $p=0.000$ ), the first action patient took on having suggestive symptoms ( $p=0.002$ ), and the mode of transport the patient used to reach the nearest public health facility ( $p=0.006$ ). Having education more than

fifth standard showed less patient delay (31 vs 50 days) ( $p=0.05$ ). Stigma didn't affected patient interval. Median HCP interval was 34 days (IQR 12-79) (Table 3).

Factors significantly associated with health providers' delay were initial consultations with; a non-formal HCP ( $p=0.001$ ), a private health facility ( $p=0.000$ ) and a non-



allopathic practitioner ( $p=0.022$ ); consultations with more than two HCP's ( $p=0.000$ ); living more than half an hour away from a public health facility ( $p=0.016$ ). Those residing more than three kilometers away from nearest public health facility had longer HCP interval (40.5 days vs 28 days), but the finding was not significant ( $p=0.069$ ) (Table 4).

## DISCUSSION

In our study 87% subjects had diagnostic delay. The study reported unacceptably long duration between the onset of symptoms and diagnosis. Median duration was 94 (IQR 58-175) days during which the diseased person kept transmitting infection in the community. The distribution of the study population by sex showed that the proportion of males exceeds that of the females (66.7% vs 33.3%) which is quite similar to the notification trend under RNTCP in India and also globally.<sup>10</sup> Delay in diagnosis can be due to patient factors or HCP factors.

### Patient's delay

The median patient interval in this study was 39 days which is much higher than as reported in a systematic review (SR) of 23 studies across India (18.4 days) and another SR from Sub Saharan Africa (28 days).<sup>11,12</sup> Seventy eight percent of the study population delayed in seeking care from a HCP in this study, compared to 29% in study by Tamhane et al (cutoff for delay=20 days) and Rajeswari et al having a cutoff of 30 days for patient delay.<sup>13,14</sup> This shorter patient interval is probably because of difference in definitions of patient delay; these studies have defined patient delay end point as consulting a HCP which included traditional healers, pharmacy shops also but in our study HCP didn't included pharmacy shops or traditional healers, only medical practitioners formal or informal were considered. Selvam et al in their study from Tamil Nadu and Dhanvij et al from central India reported median delay of 28 days and 47.2 days respectively.<sup>15,16</sup> The median patient delay in study by Ananthakrishnan et al was 7 days.<sup>17</sup> Delays were reported from other countries, which ranged from 22 days (Spain) to 120 days (Tanzania).<sup>18</sup> Patient delay was higher in males, older persons and Christians which is similar to findings by Paramasivam et al.<sup>19</sup> Patient delays can occur during the process of noticing symptoms, determining if one is ill, assessing the need for professional care, and overcoming social, personal, and physical barriers to obtaining that care.<sup>20,21</sup> In the present study, factors significantly associated with patient delay were having poor knowledge about TB, smoking, perception that symptoms were not serious, the first action patient took on having suggestive symptoms, and the mode of transport the patient used to reach the nearest public health facility. A SR from low middle income countries supports these findings.<sup>12</sup> Tobgay et al from Sikkim also had similar findings.<sup>22</sup> Hoa et al in Vietnam found that the most common reason for not taking action

was that the disease symptoms were not considered serious.<sup>23</sup> A larger patient delay in this study may also be because of difficult access to health care services, more so in rural areas which is similar to lower middle income countries.<sup>12</sup> Those utilizing private vehicles for transport to the nearest public health facility had significantly lower delay intervals ( $p=0.006$ ) suggesting inaccessibility again. Smokers often do not present themselves to the health facilities in the belief that their cough is due to smoking, the finding supported by Selvam and WHO study.<sup>8,15</sup> At the onset of suggestive symptoms consulting a non-formal HCP or traditional healer/faith healer and doing self-medication proved major reasons for such delay. Studies from Nepal and Gambia supports the same.<sup>24,25</sup> Jobby et al found that 16.5% of patients tried a home remedy before proper care seeking in the form of cough syrup, antibiotics and other over the counter drugs.<sup>26</sup>

Those educated less than fifth grade and the technical persons showed more patient delay, although findings were not statistically significant. However, a study from south Ethiopia documented that being illiterate, a house wife and a farmer were associated with longer patients' delay.<sup>27</sup> Social stigma was not associated with patient delay in this study in contrast to other studies.<sup>28-30</sup> Those who had chronic diseases like diabetes, hypertension, etc had less patient delay probably because of frequent consultation because of other illnesses, however, this was statistically not significant ( $p=0.081$ ). This finding was contrary to that of Paramasivam et al.<sup>19</sup>

### Health provider's delay

In our study median health providers' interval was 34 days with an IQR of 12-79 days compared to 28 days in a SR from Sub Saharan countries in Africa.<sup>12</sup> The same interval referred to as 'diagnostic delay' in a SR of 23 Indian studies was 31 days, IQR 24.5-35.4 days.<sup>11</sup> More than 63% of study population in this study experienced Health provider's delay. Factors significantly associated with health providers' delay were first consultation with; a non-formal HCP, a private health facility, a non-allopathic practitioner; consultations with more than two HCP's; living more than half an hour away from a public health facility. Majority of the patients initially consulted a nearby practitioner practicing in the locality (many a times non-formal/quack) probably because of lesser fee and easy accessibility leading to significant delay in reaching a proper diagnosis. About 35% of the patients in this study visited a non-formal HCP as their first medical provider which included quacks. Consulting a non-allopathic practitioner as first action also turned out to be a significant risk factor in this study, similar to findings by Tamhane et al.<sup>13</sup> Jagadish et al found that the major reason for health system delay was initially consulting an Ayurvedic medicine practitioner and General practitioner, however, not all studies support this finding.<sup>31</sup> A Mumbai study reported that TB management practices of non-



allopaths did not differ significantly than that of allopaths.<sup>32</sup>

In addition to confirming the findings of past studies that private practitioners are consulted earlier than government health services, this study revealed that patients who do so experienced a significantly longer health provider delay.<sup>32,33</sup> In this study median HCP's interval, when the patient first consulted a government facility was only 3 days as compared to 40 days when the patient first consulted a private health facility (Mann Whitney U test,  $p=0.000$ ). Similar finding was observed in study by Rajeswari et al, Tobgay et al, Hooi et al and a SR from LMIC.<sup>12,14,22,34</sup>

In this study, 25% of the subjects were diagnosed by private medical practitioners and were significantly delayed compared to those directly diagnosed in government facilities. The patients are required to purchase expensive drugs from shops which might lead to non compliance among the patients and ultimately can result in the emergence of drug resistance. Many studies have revealed that patients tend to be under private care for a considerable length of time before TB is diagnosed and patients are referred to the government TB services when they are unable to bear expenses. A study at Sao Paulo city where TB care largely takes place in the public sector, revealed that in about 20% cases the diagnosis was first made in the private sector and the mean delay in diagnosis was 12.5 weeks.<sup>35</sup> A Kenyan study revealed that 90% of TB suspects attended private health care facility yet 65% had neither a chest radiograph taken nor their sputum examined.<sup>36</sup> A study of TB patients and practitioners in private clinics in India showed median delay in diagnosis of about 2 to 3 weeks among urban and rural patients after they sought help at private clinics.<sup>37</sup> About 33% of the urban patients and 36% of the rural patients had not been diagnosed even after 4 weeks of seeking help. Longer provider delay when first consultation is with private practitioners is supported by numerous studies.<sup>12,38</sup> Reasons for this finding need to be further investigated.

This behavior also increased patient's expenditure (Median expense Rs. 200 vs. 1500 for private) ( $p=0.000$ ). Thus, patients' costs could be appreciably reduced by curtailing health provider's delays, as has been demonstrated in a public-private partnership against TB in Hyderabad, South India.<sup>39</sup> Similar finding was reported by Rajeswari et al and SR.<sup>12,14</sup>

Visiting several HCPs was significantly associated with longer delay similar to finding in SR. Those who first consulted a private health provider had to visit more number of doctors for final diagnosis as compared to those who initially consulted a government facility (1.5 vs 2.92,  $p=0.000$ ). The majority of the patients were not satisfied with consultation from one HCP. WHO's study and that by Rajeswari revealed similar findings.<sup>8,14</sup> Consulting multiple HCPs may reflect dissatisfaction

with services failure to address the problem, or maybe related to patient characteristics (e.g., not returning after initial consultation).<sup>40</sup> These couldn't be distinguished in this study. Socioeconomic status may contribute towards delay, as patients who consulted private healthcare providers have to pay more and therefore finally reach the RNTCP if unable to bear expenses, however, we didn't get a statistically significant finding.

Residing more than half an hour away from a public health facility had significant association with providers delay ( $p=0.016$ ) similar to study by WHO in seven countries of eastern Mediterranean and many other countries.<sup>8</sup> A Mumbai study stated that travelling to health centre >15 min away was problematic significantly for females.<sup>13</sup> All cases in the sample were reported in less than three days.

## CONCLUSION

There was significant delay in diagnosis. Patient factors contributed more. Delayed consultation among chest symptomatic patients is a major challenge. The main factors associated with the patients' delay were related to the unawareness and ignorance about the symptoms and its consequences, related behaviors (self-treatment, faith healers), and lower access to medical providers (public health facilities). The major factors associated with the health provider's delay were seeking initial care from a private health facility or a non-formal HCP, consultations with more than two HCP's and living far from the public health facility. Focus on early case detection is required rather than mere achieving 70% new case detection and thus, reduce transmission of TB in the community.

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