pISSN 2394-6032 | eISSN 2394-6040

# **Research Article**

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20160907

# Patient and health system delays in diagnosis and treatment of tuberculosis patients in an urban tuberculosis unit of south India

Sumana M.<sup>1</sup>\*, Sreelatha C. Y.<sup>1</sup>, Renuka M.<sup>2</sup>, Ishwaraprasad G. D.<sup>3</sup>

Received: 15 March 2016 Accepted: 21 March 2016

# \*Correspondence:

Dr. Sumana M.,

E-mail: sumana\_prasad@yahoo.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

# **ABSTRACT**

**Background:** Early diagnosis and prompt initiation of treatment is an essential component of revised National Tuberculosis Control Programme. Any type of delay (patient delay, health system delay) may worsen the disease, increase the risk of death and enhance disease transmission in the community. The study intended to know the extent of patient delay and health system delay in diagnosis and treatment of tuberculosis (TB) patients and to assess factors associated with patient and health system delay.

**Methods:** A cross sectional study on 217 new smear positive tuberculosis patients aged above 15 years who were registered between Nov-2008 to Sept-2009 for DOTS under RNTCP in Mysore tuberculosis unit was included in the study. Interview was conducted using pre tested semi structured questionnaire within 2 months of diagnosis to minimize recall bias.

**Results:** The median delay among 217 participants was 27 days due to patient delay, 17 days due to health system and 49 days in total delay respectively. The delay in seeking care was more than one month in 39% patients. In 44% of patients there was more than 15 days delay in the diagnosis by the health care providers. In 10% of patients treatment was not initiated within 7 days of diagnosis.

**Conclusions:** More specific and effective health education to the general public on seeking of appropriate medial consultation through proper channel is likely to decrease patient delay. Continuing medical education for private practitioners is needed to encourage vigilance for TB and earlier use of diagnostic tests.

Keywords: Tuberculosis, Patient delay, Health system delay

#### INTRODUCTION

Tuberculosis (TB) has challenged mankind since ages and unfortunately it remains as a global public health challenge even today, despite enormous advances in medicine and rapid expansion of health system.

It is among the top ten causes of global mortality and is the single largest killer of young and adult population in the world. Globally every year 9.2 million new cases and 1.7 million deaths occur due to TB. India accounts for one-fifth of the global TB incident cases. Each year, over 1.9 million people in India develop TB, of whom around 0.87 million are infectious cases. It is estimated that annually around 3,25,000 Indians die due to TB.<sup>2</sup>

Each year nearly one million adults develop infectious or smear positive tuberculosis in India, and a single person with infectious TB could infect 10-15 others in a year and over 20 during the natural history of the disease until death.<sup>3</sup> Therefore, any delay in diagnosing and curing these patients due to various reasons, causes spread of

<sup>&</sup>lt;sup>1</sup>Department of Community Medicine, Hassan institute of medical sciences, Karnataka, India

<sup>&</sup>lt;sup>2</sup>Department of Community Medicine, JSS Medical College, Mysore, India

<sup>&</sup>lt;sup>3</sup>Department of Surgery, Hassan Institute of Medical Sciences, Karnataka, India

infection in community. It also increases the patient expenditure and risk of mortality and morbidity.

Tuberculosis diagnosis can be delayed when patients postpone seeking health care until much after the onset of symptoms (patient delay) or when the health care provider takes more time than required to diagnose (diagnostic delay) and to start treatment (treatment delay) in tuberculosis. Diagnostic and treatment delay combined constitutes health system delay.

Patient delay can be attributed to health care seeking behaviour of TB patients who are quite often found to "shop around" seeking relief at various health facilities under various health system, before they are actually diagnosed and put on appropriate treatment.<sup>4</sup> This Health care seeking behaviour is a central issue in all kinds of morbidity, since the duration of symptoms increases the probability of severe morbidity and harmful squeal.

It typically includes mental debate about the significance and seriousness of the symptoms, knowledge about the disease, lay consultation, decisions about action including self-medication and contact with health professionals.

On the other hand diagnosis and treatment are often uncoordinated and Inconsistent because many patients initially receive care through large number of private health sectors, pharmacies often sell anti tuberculosis drugs over the counters and in these places TB notification is not strictly enforced.

WHO recommended DOTS relies upon the passive method of screening chest symptomatics, who seek care at health facilities on their own. Hence this study is proposed for the better understanding of their health care seeking behaviour and to identify any barriers for timely diagnosis and treatment and also to quantify the loses in time and money incurred by them during the process.

Factors which contribute to patient and health system delays are numerous, and it is important to identify and address these factors by devising strategies through the programme.

Therefore, the present study was undertaken to study health care seeking behaviour of tuberculosis patients, to know the extent and determinants of patient, diagnosis and treatment delay among tuberculosis patients.

# **METHODS**

# Study area

Areas under Mysore Tuberculosis Unit (TU) i.e. Mysore (urban).

Mysore urban TU has a population of 7,57,722 spread over 128.42 sq km. The literacy rate is 84.38% with a sex ratio of 967 females per 1000 males. Majority of the population are Hindus (76.76%). A total of 251 private

practitioners are practicing in Mysore urban. Under Mysore tuberculosis unit there are 5 DMCs and about 120 DOTS centers.

# Type of study

It is a community based cross sectional study which was conducted during November 2008 to September 2009.

## Study subjects

New sputum smear positive tuberculosis cases aged  $\geq 15$  registered under Mysore tuberculosis unit during the study period.

#### Inclusion criteria

- Registered new sputum smear positive Tuberculosis patients
- Aged ≥ 15 years
- In Intensive phase of DOTS treatment
- Residing in Mysore urban for last 6 months

### Exclusion criteria

Serious and terminal ill patients

#### Estimation of sample size

It was observed from earlier two Indian studies by R. Rajeshwari et al<sup>3</sup> and Jerard M selvam<sup>6</sup> that 29% and 35% of patients delayed seeking care for >1 month respectively.

Assuming for the present study delay rate of 32% (average of 29% and 35%) at 95% confidence level and 20% error, the sample size required was 209.

## Sampling procedures

All registered smear positive tuberculosis patients were contacted until the required sample size.

# Method of data collection

After reviewing previous studies related to this field, a semi-structured questionnaire was designed keeping in mind the objectives and variables of the study.

Approval of J.S.S Medical College Ethical committee was obtained. Permission was obtained from the District Tuberculosis Officer (DTO), Mysore to carry out this study.

Pilot study was conducted over a two week period with 10 patients. Based on the pilot study experience, the questionnaire was modified.

# Case contact and interview

New sputum smear positive pulmonary tuberculosis patients registered under Mysore tuberculosis unit and residing in Mysore city for at least previous six months and in intensive phase of treatment were included in the study.

Already the Mysore urban was divided into 6 divisions. Each looked after by one Tuberculosis Health Visitor (TB HV). To ensure study subjects are uniformly selected form all the areas, minimum of one visit was planned to each part of the city every fortnight.

All the patients were contacted in their intensive phase of treatment. 72% of the patients were contacted within 30 days of initiating treatment and those who were not contacted within 30 days were contacted within 60 days of initiating TB treatment. Patients were interviewed as early as possible from the time of starting of Anti-Tuberculosis treatment to minimize the recall bias. The interview took 60 to 75 minutes to complete. Section 2 of the proforma was completed using information available from the TB register or the TB treatment card.

# Information was sought from patients on

- a) Socio-economic and demographic background.
- b) *Health seeking behavior:* Onset of symptoms, timing and sequence of consultation, and cost involved with the various providers.
- c) Reasons for preferring the health facility, reasons for patient delay, if any.
- d) Knowledge about disease causation, symptoms, diagnosis, treatment and prevention.

All information especially date of visit to health facilities, costs incurred was cross checked wherever possible by verifying patient's prescription slips, hospital discharge summary, bills etc.

In case where the patients could not recollect the expenditure on different categories, approximate expenditure was considered. If required other household members were encouraged to assist the patient to recall information, but they were not allowed to do so when knowledge questions were asked.

### Variables of the study

# Dependent variables

- Health care seeking behaviour (First contact to government or private health care provider)
- Patient delay
- Diagnostic delay
- Treatment delay
- Total delay
- Direct cost

# Independent variables

- Demographic and socio-economic factors
- Smoking and alcohol use

• Health care seeking behaviour of the patients

### **Definitions**

Health care provider

A professional medical practitioner licensed to treat illness and acting within the scope of license. These include doctors, health officers, nurses, while traditional health providers are excluded.

- a. Government health facility: A unit delivering health services where the service provider is a government health sector.
- b. *Private health facility*: A unit delivering health services where the staff delivering the service is employed by an organization that is not part of government.

# Delays

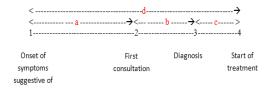


Figure 1: Types of delays among TB patients.

a. Patient delay (a)

Time interval between appearance of symptoms suggestive of pulmonary tuberculosis and first contact with a health care provider.

b. Health system delay (b+c)

It includes both diagnosis and treatment delay.

- 1. Diagnosis delay (b): Time interval between first contact with the health care provider and confirmation of diagnosis.
- 2. Treatment delay (c): Time interval between confirmation of diagnosis and initiation of antituberculosis treatment.
- c. Total delay (d): Total delay is the sum total of patient and Health system delay.

# Acceptable delays

To dichotomize the data into two depending on presence or absence of delay, cut of points for acceptable delay was fixed based upon the literature review and consultation with WHO TB consultant, DTO and Physicians in the area.

Most of the previous studies have taken patient delay as 30 days. 3,7,8

After discussing with WHO TB consultant, DTO, specialist physicians, acceptable diagnosis delay was fixed at 15 days.

RNTCP states the health facility is responsible to ensure that all diagnosed smear positive patients are traced and put on treatment within 7 days of diagnosis. So acceptable treatment delay was taken as 7 days.

Hence, acceptable patient delay was 30 days. Acceptable health system delay was 22 days (Acceptable diagnosis delay = 15 days, Acceptable treatment delay = 7 days)

### Statistical analysis

Data thus obtained was coded and entered into Microsoft excel spreadsheet. This was analyzed using Epi Info 2002 version 04 and statistical package for social sciences (SPSS)-version 13. Patient delay was dichotomized using a cut-off value of 30 days diagnosis delay cut off 15 days and treatment delay cut off of 7 days.

#### **RESULTS**

Around 69.1% patients were from economically productive age group between 15-44 years of age. 27% were illiterates. Males constituted 70.5% of the study subjects. 64% were from lower and upper middle class. 63% of subjects were married (Table 1).

The contact history of TB was present in 31.4% of the males and 50% of the females. History of smoking and alcohol use was present in 32.7% and 33.6% of the subjects respectively (Table 2).

Cough was present universally in all patients. Cough (65.4%) and fever (27.2%) were the predominate symptoms that motivated them to seek care.

The heath seeking pattern indicated that the initial action taken by the patients was either direct purchasing of drugs from a medical store (35%) or consulting a Health care provider (47.9%). Allopathy was the first choice in 96% of patients.

Majority (60%) of the subjects consulted a private practitioner in close proximity to their residence. 18 (8.3%) of the study subjects consulted the TB centre in the first instance.

Family (40.1%) motivated to seek care at a particular type of health facility.

30.9% of the subjects first approached Government Health Provider. The main reasons given for approaching Government Provider first were economical (47.7%) followed by proximity to residence (13.4%).

69% of patients first approached a Private Health Provider. The main reasons given by patients included proximity of health facility (22.6%), provider being followed in family for all health ailments (22.6%), famous in the locality (20.6%).

Table 1: Socio demographic profile and delayed care seeking.

		Patient delay			
Factors	No.	Present No. (%)	Absent No. (%)	Chi-square	p-value
Gender					
Male	153	63 (41.2)	90 (58.8)	0.9	>0.05
Female	64	22 (34.4)	42 (65.6)		
Age group					
15-24	47	16 (34)	31 (66)		
25-44	103	44 (42.7)	59 (57.3)	1.2	>0.05
45-59	40	15 (37.5)	25 (62.5)		
>60	27	10 (37)	17 (63)		
Education					
Illiterate	59	49 (83.1)	10 (16.9)	75	< 0.05
Up to PUC	117	35 (29.9)	82 (70.1)	13	<0.03
Above PUC	41	1 (2.4)	40 (97.6)		
H/o TB in family/					
friends/neighbourhood				22.1	<0.05
Yes	80	15 (18.8)	65 (81.3)	22.1	< 0.05
No	137	70 (51.1)	67 (48.9)		

Table 2: Factors influencing patient delay.

H/o Smoking					
Present	118	64 (54.2)	54 (45.8)	4.7	< 0.05
Absent	99	31 (31.3)	68 (68.7)		
Distance to first health facility					
≤2 Km	130	33 (25.4)	97 (74.6)	25.8	< 0.05
>2 Km	87	53 (59.8)	35 (40.2)		
h/o visit to faith healers					
Present	82	52 (63.4)	30 (36.6)	32.5	< 0.05
Absent	135	33 (24.4)	102 (75.6)		
First action					
Home remedy	37	25 (67.6)	12 (32.4)	8.9	< 0.05
OTCD*	76	40 (52.6)	36 (47.4)		
Consulted	104	33 (31.7)	71 (68.3)		

Main reason cited by patients for finally approaching TB centre for DOTS were economical reasons (28.6%), referred by government doctor (22.1%), private practitioners (15.2%), private hospitals (8.3%).

A mean of 2.5 (range 1 to 8) health care providers were consulted before the patient was diagnosed and the Mean number of overall consultations per patient was 5.6 (range 1 to 18 visits).

Married people had approached government faculties more than unmarried (35.8% vs 22.5% p<0.05). Smokers (45% vs 39% p<0.05) and alcohol users (39.7% vs 26.4% p<0.05) had approached government facilities.

The total delay i.e., the time period from the onset of symptoms to initiation of treatment was a mean of 57 days (Median 49 days). Patient delay i.e, the time period which the patient took from the onset of symptoms to seeking advice form a health care provider contributed to maximum of this delay i.e. mean of 34 days (Median 27 days). The health care component i.e. the time from seeking health care to diagnosis was a mean of 19 days (median 14 days) and initiation of treatment following diagnosis was 3.8 days (median 3 days) (Table 3).

39.2% patients had delayed seeking care for more than a month. Diagnosis delay (>15 days to diagnose) was seen in 43.8% and treatment delay (>7 days to initiate treatment) was seen in 10.1% of the subjects (Table 4).

The total and health system delay was more among women than men (Figure 4).

Factors like lower educational status, unemployment and unskilled occupation, no history of TB in family/friends/neighborhood, smoking, alcohol use, distance more than 2 km to health facility, use of over the counter drugs and visit to faith healers showed significant association with patient delay.

After multivariate analysis the significant risk factors independently associated with Patient delay were, illiteracy status (AOR 17.0, CI 5.8-49.8), history of TB contact (AOR 0.20, CI 0.07-0.51), alcohol use (AOR 4.7, CI 1.22-18.53), history of self-medication (AOR 3.21, CI 1.36-7.58), history of visit to faith healers (AOR 3.55, CI 1.5-8.42), distance to health facility >2 km from residence (AOR 4.24, CI 1.83-9.8).

Factors like illiteracy (46 days vs 21 days), smoking (30 vs 22 days), history of alcohol use (84 vs 22 days), use of over counter drugs (34.5 vs 10 days), visit to faith healers (40 days Vs 22 days) had longer median days of patient delay.

Table 3: Days of delay among study subjects.

Number of days of delay						
	Patient	Diagnosis	Treatment			
	delay	delay	delay			
Mean (SD)	34.15 (23.7)	19.15 (20.1)	3.77 (3.6)			
Median	27.00	14.00	3.00			
Range	2-150	0-120	0-27			

Table 4: Distribution of patients according to type of patient and health system delay.

Delays	Male No (%) N=153 (70.5)	Female No (%) N=31 (29.5)	Total No (%) N=217 (100)
Patient delay	63 (41.2)	22 (34.2)	85 (39.2)
Diagnostic delay	61 (39.9)	34 (53.1)	95 (43.8)
Treatment delay	14 (9.2)	8 (12.5)	22 (10.1)
Health system delay	48 (31.4)	31 (48.4)	79 (36.4)
Total delay	66 (43.1)	29 (45.3)	95 (43.8)

Self-reported main reasons given by patients for patient delay were "busy with work and domestic problems (23.5%), "ordinary cough, did not take seriously" (20.0%), "cough due to smoking" (14.1%), "self-medication" (11.8%) (Table 5).

The significant determinants to diagnosis delay included visit to private health facility, history of alcohol use, cough not being the presenting symptom, history of chronic medical illness, more number of health facility visited and total number of overall consultations (Table 6).

In multivariate analysis, the significant risk factors independently associated with diagnosis delay were, history of alcohol use (AOR 3.54, 1.13-11.0), consulting two health facility (AOR 12.5, 3.61-32.4), consulting three health facility (AOR 30.0, CI 7.43-121.7).

Table 5: Self-reported reasons for patient delay.

Self-reported reasons for patient delay	Total (N= 87) No. (%)
Pre occupied with work & domestic problems	20 (9.3)
Ordinary cough, symptom not severe, did not take seriously	17 (7.8)
Smokers cough	12 (5.5)
Symptoms came down with self- medication	10 (4.6)
Dependence on alcohol and drugs	9 (4.1)
Family neglect behaviour	9 (4.1)
Depression	5 (2.3)
Occupation induced cough	3 (1.4)
Financial difficulties	3 (1.4)
Multiple reasons	3 (1.4)
No reasons	2 (0.9)

Table 6: Factors associated with diagnosis delay.

Factors	No	Diagnosis delay	Diagnosis delay		n volvo	
	No.	Present no. (%)	Absent no. (%)	Chi-square	p-value	
Chronic medical illness						
Yes	62	34 (54.8)	28 (45.2)	4.31	< 0.05	
No	155	61 (39.4)	94 (60.6)	4.31	<0.03	
Alcohol use						
Yes	99	65 (65.7)	34 (34.3)	6.5	< 0.05	
No	118	57 (48.3)	61 (51.7)	0.3	<0.03	
First Provider						
Government	67	10 (14.9)	57 (85.1)	32.7	< 0.05	
Private	150	85 (56.7)	65 (43.3)	32.1	<0.03	
Presenting symptom						
Cough	142	50 (35.2)	92 (64.8)			
Fever	59	35 (59.3)	24 (40.7)	22.1	< 0.05	
Other symptoms	16	6 (37.5)	10 (62.5)			

Table 7: Factors associated with treatment delay.

Factors	No.	Treatment delay		Chi-	<i>p</i> -
ractors	INU.	Present no. (%)	Absent no. (%)	square	value
Treatment started in the same facility where					
diagnosed					
Yes	142	1 (0.7)	141 (99.3)	40.1	< 0.05
No	75	21 (28)	54 (72)	40.1	<0.03
Distance of DMC					
<5 Km	156	13 (8.3)	143 (91.7)	0.2	>0.05
≥5 Km	61	9 (14.8)	52 (85.2)		

Factors like first contact with private provider (18 days vs. 3 days), cough not being presenting symptom (19 days vs. 10 days), visit to  $\geq$ 3 health facility (27 days CVs 2 days) were associated with longer duration of diagnosis delay.

Socio-demographic factors did not have any significant association with treatment delay. However, if patients were not started treatment in the same facility where they were diagnosed then there was statistically significant treatment delay.

Patient incurred a total median cost of Rs.900 (range 0 to 5430). Median consultation fees, investigation fees, medicine costs, transportation were Rs. 100, Rs. 150, Rs. 470, and Rs. 100 respectively. Patients who consulted a private provider incurred higher median costs as compared to patients who consulted Government provider (Rs. 1432 vs 712, p<0.0000).

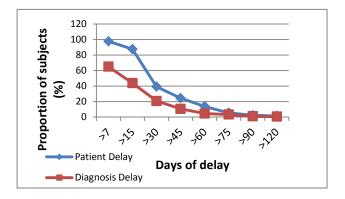


Figure 2: Line diagram showing the proportion of patients according to types and days of delay.

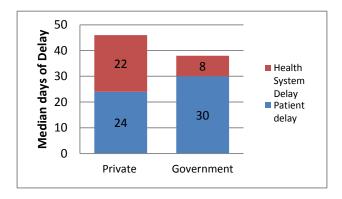


Figure 3: Patient and health system delays by type of provider consulted first among the study subjects.

Medical expenditure incurred to subjects who had delayed seeking care was significantly more as compared to early seekers (Rs. 1400 vs Rs. 1083; p<0.05).

However, if health care providers delayed diagnosing they incurred highly significant costs as compared to subjects who were diagnosed early (Rs. 1676 Vs Rs. 847, p<0.000).

About 34% of the patients spent up to Rs. 500, 23.5% patients spent Rs. 1001 to 2000 and almost 2% of patients had to spend more than Rs. 4000.

Majority of the subjects knew how disease spreads (76%), symptoms of the disease (72.8%). Sputum smear microscopy was reported as the method of diagnosis for TB by 70%, 89.4% accurately mentioned 6 months as the duration of treatment they had to take, 62% knew before diagnosis that treatment for TB was free in Government

set up 79% mentioned covering the face while coughing as the method of prevention of spread of TB.

47% subjects had answered more than six questions correctly out of 10 questions. 53% answered less than six questions correctly.

Tuberculosis health visitors (29%), doctors (19.4%) and DOTS providers (17.1%) were important source of information regarding tuberculosis among study subjects.

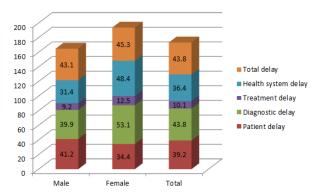


Figure 4: Gender wise distribution of different types of delay.

#### DISCUSSION

DOTS has proven beyond doubt has an effective strategy but if the patients reach the health facility late there will be delayed diagnosis and treatment. 39% of the patients took more than 30 days to reach the centre. Comparable proportion of study subjects had delayed seeking care for more than a month (Patient Delay) in studies done by Jerard M et al<sup>6</sup> (35%), Rajeshwari R et al<sup>3</sup> (29%), Yimer S et al<sup>9</sup> (40%), Pronyk PM et al<sup>10</sup> (42%).

On the other hand studies done by Chakraborthy et al<sup>4</sup> at Tamil Nadu (96%), Odusanya O (2004) at Nigeria et al<sup>7</sup> (83%), Meaza Demissic et al<sup>11</sup> at Ethiopia (58%). Lienhardt C et al<sup>12</sup> at Gambia (75%) have reported a higher proportion of patient delay. This could be because of the higher literacy rate in our study group.

Various factors influence this behavior of seeking care such as type of symptoms, socio-economic status, type of family, literacy rate, history of smoking, distance of health facility from residence etc. Females showed a marginally higher proportion of health system delay and total delay. Our finding is consistent with the findings of studies done in Nepal by Yamasaki-nakagawa M et al, <sup>13</sup> Tamil Nadu by Balasubramania R <sup>14</sup> et al, Ghana by Lawn SD et al, <sup>15</sup> Vietnam by Long et al. <sup>16</sup>

Longer delay among smokers could be because of subjects attributing smoking as the cause for cough. Generally heavy alcohol drinkers have neglect health behaviour, as an extension of that they do not seek timely medical help. Our findings were consistent with the findings of Rajeshwari R et al and Pronyk P M who also found significant association of patient delay with alcoholism. The study by Van der Werf, in Ukraine also revealed longer patient delay in alcoholics. If Jerard M et al found that Patient Delay was significantly associated with smoking.

In our study we could not find any significant association between socio-economic status and patient delay, although study subjects belonging to low socio-economic status had delayed more than middle socioeconomic status patient. The marital status and religion had no significant association for the patient delay. The type of family, total family members in the household or H/o chronic medical illness did not show significant association with patient delay. Severity of the disease as assessed by grading of the smear also did not show association.

History of over the counter drug use showed a significant association with patient delay. 52.6% of subjects with H/o OTCD use had patient delay. False sense of improved symptoms could be the reason for delaying seeking medical care.

Cough was the most common symptom which prompted the patients to seek health care (65%). Fever was the next main reason for the patients to seek health care.

In a study conducted by Soloniponi et al, <sup>18</sup> 61% patients with cough and 16% with fever consulted a health care provider. Cough was reported as the predominant symptom for consultation by 62.9% patients in study done by Liam CK et al. <sup>19</sup>

Males showed marginally higher proportion of patient delay than females; however women have experienced longer delays in diagnosis and initiation of treatment from the health care providers.

Out of total 85 patients who were asked the reasons why they reached the health centre late, 20 (23.5%) mentioned that they were pre-occupied with work or domestic problems. 17 (20.0%) felt that the cough was ordinary cough. 12 (14.1%) believed their cough was due to their smoking habit. 10 (11.8%) said symptoms come down with self-medication. More or less similar findings were observed in study done by Goel et al in Udupi. In the study done by Tobago et al, 16% said they did not have enough time due to office work or domestic work. 8.7% relied on their family and delay was due to family neglect. Rajeshwari et al observed that 13% reported domestic pre-occupation.

Our study showed that Health care providers had taken more than 15 days to diagnose (diagnosis delay) in 43.8% of patients. Similar finding was observed in studies done at Sikkim (49%).<sup>21</sup> Median diagnosis delay was also

longer if patients had first contacted private provider (14 days Vs 3 days).

Study conducted by Rajeshwari R et al,<sup>3</sup> Selvam JR et al,<sup>6</sup> showed that health system delay was significantly longer if patients first conducted private practitioner as compared to a government provider. First seeking a private practitioner was a clear risk factor for diagnostic delay in studies done in Ghana,<sup>15</sup> Nepal,<sup>22</sup> Australia,<sup>8</sup> Nigeria,<sup>24</sup> Botswana.<sup>24</sup>

Treatment delay is occurring in a situation when the disease is diagnosed in one facility and treatment is started in another facility. It takes time for the patients to know the whereabouts of the treatment facility and to develop confidence to get the treatment started in the 'new' health facility.

To conclude more specific and effective health education to the general public on tuberculosis and seeking of appropriate medial consultation through proper channel are likely to decrease patient delay. Continuing medical education for private practitioners is needed to encourage vigilance for TB and earlier use of diagnostic tests in patients who have symptoms of tuberculosis. Starting treatment in the centre which has diagnosed becomes important.

#### **ACKNOWLEDGEMENTS**

We would like to thank all my study subjects, all the staff of District Tuberculosis Centre, ICMR for financial assistance.

Funding: ICMR financial assistance
Conflict of interest: None declared
Ethical appropriate The attack years

Ethical approval: The study was approved by the

Institutional Ethics Committee

# REFERENCES

- WHO. Global TB report 2009. Epidemiology, strategy, financing. Geneva, World Health Organization. Report No. WHO/ HTM/TB/ 2009.411.
- 2. TB India 2009, RNTCP status report. I am stopping TB. Central TB Division. DGHS, Ministry of health and family welfare. Nirman bhavan. New Delhi.
- Rajeshwari R, Chandrashekar V, Suhadev M, Sivasubramaniam S, Sudha G, Renu G. Factors associated with patient and health system delays in the diagnosis of tuberculosis in South India. Int J Tuberc lung Dis. 2002;6(9):789-95.
- Chakraborty AK, Krishnamurthy MS, Shashidhara AN, Juvekar S. Missed opportunities for diagnosis of pulmonary tuberculosis: a study among rural patients seeking relief of their own under the tuberculosis programme in India. Ind J Tub. 2001;48:181-91.

- 5. Sudha G, Nirupa C, Rajasakthivel Sivasubramanian S, Sundaram V, Bhatt S et al. Factors influencing the care-seeking behavior of chest symptomatic: a community-based study involving rural and urban population in Tamil Nadu, South India. Trop Med Intern 2003;8(4):336-41.
- 6. Selvam Jerard M, Wares F, Perumal M, Gopi PG, Sudha G, Chandrasekaran V, Santha T. Health-seeking behavior of new smear-positive TB patients under a DOTS programme in Tamil Nadu, India, 2003. Int J Tuberc lung Dis. 2007;11(2):161-7.
- Odusanya OO, Babafemi JO. Patterns of delays amongst pulmonary tuberculosis patients in Lagos. Nigera. BMC Pub Health. 2004;4:18.
- 8. Pirkis JE, Speed BR, Yung AP, Dunt DR, MacIntyre CR, Plant AJ. Time to initiation of anti-tuberculosis treatment. Tuberc Lung Dis. 1996; 77: 401-6.
- 9. Yimer S, Bjune G, Alene G. Diagnostic and treatment delay among pulmonary tuberculosis patients in Ethiopia: a cross sectional study. BMC Infect Dis. 2005;12(5):112.
- Pronyk PM, Makhubele MB, Hargreaves JR, Tollman SM, Hausler HP. Assessing health seeking behaviour among tuberculosis patients in rural South Africa. Int J Tuberc lung Dis 2001;6(7):619-6.
- 11. Demissie M, Lindtjon B, Berhane Y. Patient and health service delay in the diagnosis of pulmonary tuberculosis in Ethiopia. BMC Pub Health. 2002;2:23.
- 12. Lienhardt C, Rowley J, Manneh K, Lahai G, Needham D, Milligan P et al. Factors affecting time delay to treatment in a tuberculosis control programme in a sub Saharan African country: the experience of the Gambia. Int J Tuberc Lung Dis. 2001;5(3):233-99.
- 13. Yamasaki-Nakagawa M, Ozasa K, Yamada N, Osuga K, Shimouchi A, Ishikawa et al. Gender difference in delays to diagnosis sand health care seeking behavior in a rural area of Nepal. Int J Tuberc Lung Dis. 2001;5(1):24-31.
- 14. Balasubramanian R, Garg R, Santha T, Gopi PG, Subramani R et al. Gender disparity in Tuberculosis: report from a rural DOTS programme in South India. Int J Tuberc Lung Dis. 2004;8(3):323-32.

- 15. Lawn SD, Afful B, Acheampong W. Pulmonary tuberculosis: diagnostic delay in Ghanian adults. Int J Tuberc Lung Dis. 1998;2(8):635-40.
- Long N, Johansson E, Diwan VK, Winkurist A. Different tuberculosis in men and women: beliefs from focus groups in Vietnam. Soc Sci Med. 1999;49:815-22.
- 17. Van der werf MJ, Chechulin Y, Yegoraova OB, Marcinuk T, Stopolyanskiy A, Voloschuk V et al. Health care seeking behavior for tuberculosis symptoms in kiev city, Ukraine. Int J Tuberc lung Dis. 2006;10(4):390-5.
- 18. Salaniponi FM, Harries AD, Banda HT, Kang'Ombe C, Mphasa N, Mwale A et al. Care seeking behavior and diagnostic processes in patients with smear-positive pulmonary tuberculosis in Malawi. Int J Tuberc lung Dis. 2000;4(4):327-32.
- 19. Liam CK, Tang BG. Delays in the diagnosis and treatment of pulmonary tuberculosis in patients attending a university teaching hospital. Int J tuberc Dis. 1997;1(4):326-32.
- Goel K, Kondagunta N, Soans SJ, Bairy AR, Goel P. Reasons for patient delays & health system delays for tuberculosis in south India. Indian J Community Health. 2011;23(2):87-9.
- 21. Tobgay KJ, Sarma SP, Thankappan KR. Predictors of treatment delays for tuberculosis in Sikkim. Natl Med J India. 2006;19(2):60-3.
- 22. Yamasaki-Nakagawa M, Ozasa K, Yamada N, Osuga K, Shimouchi A, Ishikawa et al. Gender difference in delays to diagnosis sand health care seeking behavior in a rural area of Nepal. Int J Tuberc lung Dis. 2001;5(1):24-31.
- 23. Odusanya OO, Babafemi JO. Patterns of delays amongst pulmonary tuberculosis patients in Lagos. Nigera. BMC Pub Health. 2004;4:18.
- Steen TW, Mazonde GN. Pulmonary tuberculosis in Kweneng District, Botswana: delays in diagnosis in 212 smear positive patients. Int J Tuberc Lung Dis. 1998;2(8):627-34.

Cite this article as: Sumana M, Sreelatha CY, Renuka M, Ishwaraprasad GD. Patient and health system delays in diagnosis and treatment of tuberculosis patients in an urban tuberculosis unit of south India. Int J Community Med Public Health 2016;3:796-804.