## **Original Research Article**

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph 20200951

# Proportion and determinants of delay in diagnosis of pulmonary tuberculosis in a tertiary care centre of Gadag, Karnataka

## Shivanand Prabhunatti, Aravind Karinagannanavar\*, Jagadish Gaddeppanavar

Department of Community Medicine, Gadag Institute of Medical Sciences, Gadag, Karnataka, India

Received: 30 December 2019 Revised: 31 January 2020 Accepted: 01 February 2020

## \*Correspondence:

Dr. Aravind Karinagannanavar, E-mail: draravindmbbs5@gmail.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:** In 1993, the World Health Organization (WHO) declared a state of global emergency for tuberculosis (TB), due to the steady increase of the disease worldwide. India is the highest TB burden country accounting for one fifth (21%) of the global incidence. Objectives were to study: 1) average delay in diagnosis of newly diagnosed pulmonary tuberculosis cases, 2) reasons for the delayed diagnosis of pulmonary tuberculosis patients and 3) extra cost incurred by the newly diagnosed pulmonary tuberculosis patients.

**Methods:** An observational study was conducted from April 2017 to October 2017 using a non-probability purposive sampling. Delayed diagnosis is defined as the time interval between the onset of symptoms to the initiation of treatment after 16 days. The data was collected using a pretested semi-structured questionnaire. The performa included socio demographic profile of the study subjects, duration of delay in diagnosis, reasons for delay in diagnosis, direct and indirect cost incurred by the study subjects.

**Results:** In present study we found that out of 66 patients majority of them found that for the first visit most of the patients preferred private hospitals (34.8%) followed by PHC (22.7%), district hospital (21.2%) CHC (13.6%) and the least was pharmacy (7.6%). Out of 66 patients, majority of the patients (63.6%) were diagnosed of pulmonary tuberculosis after their second visit. The main reasons were lack of awareness and lack of facilities in the peripheral health system.

**Conclusions:** The mean patient delay was 13.13 days and the mean health care system delay was 25.3 days in diagnosing pulmonary tuberculosis.

Keywords: Delay in diagnosis, Determinants, Pulmonary tuberculosis

## **INTRODUCTION**

According to WHO "Tuberculosis or TB is an infectious bacterial disease caused via droplets from throat and lungs of people with the active respiratory disease". In 1993, the World Health Organization (WHO) declared a state of global emergency for tuberculosis (TB), due to the steady increase of the disease worldwide. In 1995 the DOTS (directly observed treatment, short course) strategy was established as the key intervention to achieve tuberculosis control worldwide. In 1995 the DOTS (directly observed treatment, short course) strategy was established as the key intervention to achieve

The global targets of this strategy are to achieve 70% case detection and 85% cure rates by 2005. In 2003, DOTS program successfully treated 84% of all registered new smear positive patients, but detected only 28% of the estimated tuberculosis cases in the world. Therefore, the target of 70% case detection might not be reached until 2013, unless interventions are made that are able to increase the case-detection rate.<sup>1</sup>

India is the highest TB burden country accounting for one fifth (21%) of the global incidence and 17<sup>th</sup> among the 22

high burden countries in terms of TB incidence rate.<sup>2</sup> India has a complex and highly heterogeneous health care delivery system, with both public and private sector (both formal and informal) health care providers.3 There is evidence, albeit limited, that patients with TB symptoms often begin seeking advice in the informal private sector, from chemists and unqualified practitioners, then seek care from qualified practitioners, and eventually end up in the public sector for free treatment.<sup>4</sup> Various reasons including poverty, population growth, migration and HIV/AIDS are the major factors for the continued threat of TB in the world, but a significant problem lies with the fact that many cases remain undiagnosed. This could be due to number of factors, principally found within categories: patients delaying seeking healthcare or failure of health care systems to diagnose patients in a timely manner.5 Early diagnosis of the disease and prompt initiation of treatment are essential for an effective tuberculosis (TB) control program.<sup>6</sup> Despite achieving the targets of case finding of 70% and treatment completion rate of over 85%, TB remains an important public health issue.<sup>7</sup> With this background an effort has been made to know the reasons for delay in diagnosis and its determinants.

Objectives were to study average delay in diagnosis of newly diagnosed pulmonary tuberculosis cases, reasons for the delayed diagnosis of pulmonary tuberculosis patients and extra cost incurred by the newly diagnosed pulmonary tuberculosis patients.

## **METHODS**

An observational study using a case series design was conducted among a new case of pulmonary tuberculosis patient visiting the district hospital GIMS Gadag from April 2017 to Oct 2017. All the new cases of Pulmonary Tuberculosis visited the district hospital GIMS Gadag during the study period were included. Non probability purposive sampling technique was used. A new case of pulmonary tuberculosis patient who visited the district hospital GIMS Gadag were included in the study and a patient not willing to participate were excluded.

## Case definition

A new case is the person diagnosed of Pulmonary Tuberculosis through sputum examination first time or taken treatment for less than 4 weeks.

Delayed diagnosis is defined as the time interval between the onset of symptoms to the initiation of treatment after 16 days.

## Methods of data collection

The newly diagnosed pulmonary tuberculosis patient visiting the district hospital was interviewed after taking the written consent. The data was collected using a pretested semi-structured questionnaire. The Performa

included socio demographic profile of the study subjects, duration of delay in diagnosis, reasons for delay in diagnosis, direct and indirect cost incurred by the study subjects.

In present study direct cost included,

- Clinic fees
- Money spent for drugs and investigations.

Indirect cost included,

- Transport fees of the person and accompanying people.
- Deprive in daily wage of the subject on the particular day of his checkup.

## Statistical tools

Data was entered in a excel format and analyzed using EpiInfo Software. Descriptive statistics like frequencies, percentages, mean and standard deviation were calculated.

## **RESULTS**

In present study we found that out of 66 patients, majority of them belong to age group between 21 to 30 years, 31 to 40 years and 41 to 50 years, were males (62.1%), were Hindus. Patients had education up to PUC only (30.3%), degree holders (18.2%), primary education (18%) and few had secondary education (7.6%). Only 10% of the patients were illiterate. Based on occupation most of the patients were unemployed (34.8%), some of them were clerical (16.7%) and unskilled (31.8%). Only few of them were semi-professionals (4.5%) and professionals (4.5%). 51.5% of the patients were from nuclear family. Most of the patients were married (74.2%).

Present study found that for the first visit most of the patients preferred private hospitals (34.8%) when they had chronic cough and other symptoms of pulmonary tuberculosis followed by PHC (22.7%), District hospital (21.2%), CHC (13.6%) and the least was pharmacy (7.6%).

Table 3 shows the distribution of patients based on their second visit to various health systems. Out of 66 patients, 14 were diagnosed in the first visit. Remaining of the 52 patients, majority of them (80.8%) directly contacted district hospital when they were not diagnosed in the first visit to various health systems.

Table 4 shows the distribution of patients based on their third visit to various health systems. Out of 52 patients visited health system for the second time, 42 were diagnosed in the same visit. Remaining of the patients (10) visited the district hospital.

Table 1: Sociodemographic profile of the study subjects.

Variable	Frequency	Percentage
Age (years)		
Up to 20	6	9.09
21 to 30	15	22.7
31 to 40	15	22.7
41 to 50	15	22.7
51 to 60	7	10.6
Above 60	8	12.1
Gender		
Female	25	37.9
Male	41	62.1
Religion		
Hindu	58	87.9
Muslim	8	12.1
Education		
Illiterate	10	15.2
Primary	18	27.3
Secondary	5	7.6
PUC	20	30.3
Degree	12	18.2
Postgraduate	1	1.5
Occupation		
Unemployed	23	34.8
Unskilled	21	31.8
Skilled	5	7.6
Clerical	11	16.7
Semi-profession	3	4.5
Profession	3	4.5
Type of family		
Joint	32	48.5
Nuclear	34	51.5
Marital status		
Married	49	74.2
Unmarried	9	13.6
Widow	8	12.1

Table 2: Distribution of patients based on their first visit to various health systems.

First health system	Frequency	Percentage
Private hospital	23	34.8
РНС	15	22.7
District hospital	14	21.2
СНС	9	13.6
Pharmacy	5	7.6
Total	66	100.0

Above Table 5 shows the distribution of patients based on their diagnosis after various contacts. Out of 66 patients, majority of the patients (63.6%) were diagnosed of pulmonary tuberculosis after their second visit. Then 21.2% of the patients were diagnosed at first contact. Very few of them (15.2%) were diagnosed in the third contact of health system.

Table 3: Distribution of patients based on their second visit to various health systems.

Second health system	Frequency	Percentage
District hospital	42	80.8
РНС	4	7.7
Private hospital	4	7.7
СНС	2	3.8
Total	52	100.0

Table 4: Distribution of patients based on their third visit to various health systems.

Third health system	Frequency	Percentage
District hospital	10	100.0
Total	10	100.0

Table 5: Distribution of patients based on their diagnosis after various contacts.

Patients diagnosed at	Frequency	Percentage
Second visit	42	63.6
First visit	14	21.2
Third visit	10	15.2
Total	66	100

Table 6: The mean delay in approaching the health care and diagnosis.

Mean delay in approaching the	13.13 days
health care	
Range of delay in approach	0-70 days
Mean delay in diagnosis	25.3 days
Range of delay in diagnosis	0-164 days

Table 6 shows the mean delay of the patients in approaching the health care (patient delay) were found to be 13.13 days. The range of delay in approaching the health care was from 0 to 70 days. The mean delay in diagnosis of pulmonary tuberculosis (health system delay) was found out to be 25.3 days. The range of health system delay in diagnosis was from 0 to 164 days.

Table 7: Proportion of delay in approaching the health care by patients.

	Frequency	Percentage
Approached health in right time	46	69.7
Delayed approached to health	20	30.3
Total	66	100

Table 7 shows 69.7% of the patients approached the health care system in right time and 30.3% of the patients had delayed approach to health care system.

Table 8: Proportion of delay in diagnosis due to health care system.

	Frequency	Percentage
Diagnosed in right time (first contact)	14	30.4
Delayed diagnosis	32	69.6
Total	46	100

Table 8 shows 30.4% of the patients diagnosed in right time and 69.6% of the patients had delayed diagnosis due to health care system delay.

Table 9: Determinants of delay in diagnosis.

Determinant	Frequency	Percentage
Patient delay	20	30.30
Health system delay	46	69.70

In present study about one third of the patients reached the health system late mainly due to lack of awareness about symptoms of TB. Two third of the patients diagnosed late due to health system delay. The main reasons were lack of facilities in the peripheral health centers.

Table 10: Cost incurred by the patients in diagnosis.

Cost incurred by patients	Mean	Range
Direct cost	Rs 71.27	Rs 5-150
Indirect cost	Rs 228.53	Rs 50-500

The mean direct cost incurred by the patients in diagnosis of pulmonary tuberculosis was found to be Rs 71.27 and ranges between Rs 5 to 15 while the mean indirect cost incurred was found to be Rs 228.53 and it ranges between Rs 50 to 500.

## **DISCUSSION**

This study showed an overall mean time from the onset of first pulmonary symptom to first health facility visit (patient delay) and first health facility visit to TB diagnosis (health system delay) for new smear-positive pulmonary TB patients of 13.13 days and 25.3 days respectively. In the study conducted in urban township of Maharashtra state, a mean patient delay of 29.24 days and mean health system delay of 21.7 days was found. This shows that the patients living in and around the tertiary care center of Gadag have some awareness about the symptoms of pulmonary tuberculosis while the people living in urban township of Maharashtra may be less educated and unaware of the symptoms of pulmonary tuberculosis.

In another study conducted in the year 2015 in medical college hospitals of Puduchery, majority (67.4%) of the patients were male and married (68.8%). Majority (86%) of the patients were literate. The median patient delay,

health system delay and total delay was 36 days, 28.5 days and 81 days respectively. In present study also majority (62.1%) of the patients were male. This shows that there is male preponderance in this disease. The reason for this may be different smoking habits, consumption of alcohol, chewing of tobacco and many more. Most of our study subjects were educated up to PUC (30.3%) and primary school (27.3%). Only 15.2% were found to be illiterate. Most of the patients diagnosed of Pulmonary Tuberculosis were unemployed or unskilled by occupation.

In present study many patients were diagnosed at their third contact of the health system. This suggests that they may not be aware of the free treatment which is provided under RNTCP. The mean delay in diagnosis of Pulmonary Tuberculosis (health system delay) was found out to be 25.3 days. This suggests that there may be lack of facilities in the various health care centers and some other reasons for poor diagnosis. The mean patient delay in our study subjects was found to be 13.13 days. Patients in this area are not well educated and unaware of this deadly disease. Most of the patients were from rural areas. This may suggest that rural people are not getting the proper facilities. The diagnosis centers may be too far away from the resident places.

The mean direct cost incurred by the patients in diagnosis was found to be Rs 71.27. the patients have spent a lot of money on unwanted things like chest x-ray, tablets, etc. The mean indirect cost incurred by the patients in diagnosis was found to be Rs 228.53. Many patients were diagnosed at their third contact. During all their visits, they were deprived of their daily wage and spent a lot of money in travelling. So my study suggests that there is a lot of problem with the patients in seeking health care and poor health facilities among health centers.

## **CONCLUSION**

In conclusion, this study shows that, in patients with Pulmonary Tuberculosis diagnosed in tertiary care center of Gadag, the total time from onset of symptom to diagnosis of pulmonary tuberculosis is too long. There were several delays in the diagnosis of tuberculosis patients. Health care system delay appears to be the main problem in delay in diagnosis in our study setting. Even the patient behavior of seeking the health care appears to be more. Many of the patients with TB symptoms often begin seek advice in the informal private hospitals, from chemists and unqualified practitioners, then seek care from qualified practitioners and eventually end up in the public sector for free treatment. Many of those patients who visited the private sector wasted a lot of money in unnecessary tablets, chest x-rays. Some patients who were diagnosed at their third contact were deprived of their daily wages. For an effective tuberculosis control and delayed diagnosis, efforts should be made to reduce these delays. Physicians and the public should be educated about tuberculosis. Health care system and

laboratory delays should be improved. The government must undertake initiatives for mass awareness and screening programs to identify and overcome the delay in diagnosis of pulmonary tuberculosis in India.

### ACKNOWLEDGEMENTS

The authors thank the Professor and Head department of community medicine and General Medicine for their kind support. The authors are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed. The authors are also thank all the study subjects for their kind support.

Funding: ICMR-STS

Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

### **REFERENCES**

- 1. World Health Organization. Global tuberculosis control: surveillance, planning, financing: WHO report 2005. World Health Organization; 2005.
- 2. India TB. RNTCP Status Report, Central TB Division, DGHS. Ministry of Health and Family Welfare. 2011;2011:114-5.
- 3. Hazarika I. Role of private sector in providing tuberculosis care: evidence from a population based survey in India. J Glob Infect Dis. 2011;3(1):19.

- 4. Kapoor SK, Raman AV, Sachdeva KS, Satyanarayana S. How did the TB patients reach DOTS services in Delhi? A study of patient treatment seeking behavior. PLOS ONE. 2012;7(8):e42458.
- 5. Yimer S, Bjune G and Alene G. Diagnostic and treatment delay among pulmonary tuberculosis patients in Ethiopia: a cross sectional study. BMC Infect Dis. 2005;5:112.
- 6. World Health Organization. Global tuberculosis report, 2012. Geneva, Switzerland: WHO; 2012.
- World Health Organization. Global tuberculosis report, 2014. Geneva, Switzerland: WHO; 2014.
- 8. Konda S, Melo C, Giri P, Behera A. Determinants of delays in diagnosis and treatment of pulmonary tuberculosis in a new urban township in India: A cross-sectional study. Int J Med Sci Public Health. 2014;3(2):140-5.
- Natesan M, Chauhan RC, Cherian J, Purty AC, Singh Z, Joice S, et al. Patient and health system delay among new pulmonary tuberculosis patients diagnosed at medical college hospitals in Puducherry, India. Int J Res Med Sci. 2015;3(1):188-93.

Cite this article as: Prabhunatti S, Karinagannanavar A, Gaddeppanavar J. Proportion and determinants of delay in diagnosis of pulmonary tuberculosis in a tertiary care centre of Gadag, Karnataka. Int J Community Med Public Health 2020;7:976-80.