

# Delay in healthcare seeking, diagnosis, and treatment of patients with tuberculosis: A cross-sectional study



Mahendra Chouksey<sup>1</sup>, Vimal Arya<sup>2</sup>, Nilima Takhelchangbam<sup>3</sup>

<sup>1</sup>Associate Professor, Department of Community Medicine, Gajra Raja Medical College, Gwalior, Madhya Pradesh,

<sup>2</sup>Associate Professor, <sup>3</sup>Senior Resident, Department of Community Medicine, MLB Medical College, Jhansi, Uttar Pradesh, India

Submission: 20-03-2023

Revision: 02-06-2023

Publication: 01-07-2023

## ABSTRACT

**Background:** One of the greatest challenges in the fight against tuberculosis (TB) is the delay in seeking medical care among those who are sick. This can be complemented by delays in providing prompt health-care services. **Aims and Objectives:** The aims of this study were to estimate the number of patients facing delays and to understand the various reasons for individual and health system delays. **Materials and Methods:** In this cross-sectional study, new sputum positive cases of > 18 years registered at the two TB Units of two community health centers of a district in Uttar Pradesh from March 2018 to April 2019 were included. The primary outcome was patient delay and health system delay. They were assessed from patient interviews as well as through records. **Results:** A total of 120 patients were included in the study of which, 76 had been subjected to one or the other form or a combination of delay. The factors such as age, education level, occupation, socioeconomic condition, and the walking duration to the nearest health center were found to be significantly associated with delay. The patient delay was seen in 37 (30.8%) with median delay of 45 days (interquartile range [IQR] 37–53). The health system delay was observed in 48 (40.0%) patients with median delay of 24.5 days (IQR 12.0–47.2). **Conclusion:** In spite of robust program implementation, patient factor delays continue to prevail which contributes to the total delay. Addressing delay in Tb is of utmost important so as to progress to TB elimination.

**Key words:** Tuberculosis; Health system delay; Patient Delay

## INTRODUCTION

*Mycobacterium tuberculosis*, the organism that causes tuberculosis (TB), typically affects the lungs. Airborne particles carry the TB virus from an infected person to a susceptible one. Every year, 10 million individuals grow infected with TB. Although being a preventable and treatable condition, TB kills 1.5 million people annually, making it the leading infectious killer in the world.<sup>1</sup> The prevalence of TB is relatively high worldwide. More than 26% of all cases come from India. This covers cases of both human immune deficiency virus-TB and multidrug-resistant TB. The revised national TB program has been upgraded to national TB elimination program with its goal to eliminate TB by 2025.<sup>2</sup> The delay in seeking medical

attention among individuals who get symptomatic for TB is one of the main obstacle in the fight against TB. Delays in obtaining healthcare for TB can happen at various points, including when a person has to detect their symptoms, seek care, and wait for a diagnosis and treatment (health system delay).<sup>3</sup> These delays are caused by a number of variables, including socioeconomic, individual, and health system considerations. Delays in seeking healthcare for TB have serious effects. The longer a person goes without treatment, the worse their condition gets, and the more likely it is that they may infect others. Drug-resistant TB, which is significantly more difficult to treat and can be fatal, can also result from postponing therapy.<sup>4</sup> Delays in seeking medical attention can also result in higher health-care expenses and lost productivity for both individuals and society at large.

### Access this article online

**Website:**

<http://nepjol.info/index.php/AJMS>

**DOI:** 10.3126/ajms.v14i7.53407

**E-ISSN:** 2091-0576

**P-ISSN:** 2467-9100

Copyright (c) 2023 Asian Journal of Medical Sciences



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### Address for Correspondence:

Dr. Vimal Arya, Associate Professor, Department of Community Medicine, MLB Medical College, Jhansi, Uttar Pradesh, India.

**Mobile:** +91-9452595018. **E-mail:** aryadvimal@gmail.com

## Aims and objectives

We undertook this study with an aim to estimate the number of patients facing delays and to understand the various reasons for individual and health system delays.

## MATERIALS AND METHODS

This cross-sectional study was conducted at the TB Units (TU) situated at block community health centers (CHC) of Chirgaon and block CHC of Badagaon of district Jhansi, Uttar Pradesh. Chirgaon TU has one Designated Microscopy Center (DMC), while Badagaon TU has two DMC. All new sputum positive pulmonary TB patients aged more than 18 years enrolled with TU of Chirgaon CHC and TU of Badagaon CHC who were diagnosed during March 2018–April 2019 were eligible for participation in the study. Patients with extra-pulmonary TB, other categories than new sputum positive, not on treatment during the data collection period, not willing to participate, and seriously ill patients were excluded from the study. Based on the previous records, around 10–12 new sputum positive patients are being registered every month at Chirgaon and Badagaon TU. Studies have shown that around 69.4% of the patients were not diagnosed at their first point of contact with a health facility.<sup>5</sup> Expecting some change over these years regarding missed diagnosis in first visit and to get the large sample size, P was taken 50% with 5% alpha error and absolute precision (E) of 10%. The sample size was calculated to be 100 calculating 20% of non-responders; the corrected sample size is 120.

Expecting the same trend, it was estimated that it would take approximately 12 months to reach the required sample size. After obtaining approval from the Institutional Ethics Committee and the concerned authorities in the TUs, all patients satisfying the inclusion criteria and registered at these two TU were taken up for the study until the desired sample size was reached.

During the study period, 158 patients were registered under the Chirgaon and Badagaon TU, details of the study participants were obtained from the TB registers as well as by visiting the government health centers that were under the CHC Chirgaon and CHC Badagaon. All these patients were contacted through telephone or through the DOTS provider/STS and obtained their verbal permission to visit them. Those who gave permission were visited at their residence or at the health centers or any place of their convenience. The procedure was continued until the desired sample size was reached. The time limit to interview the participants with TB was taken as 4 weeks with the start of treatment to minimize the recall bias.

A standardized World Health Organization questionnaire on diagnostic delay adopted from a study on eastern Mediterranean regions was used for this study.<sup>6</sup> It was translated into the local language Hindi using a TB expert and a Hindi Teacher, then back translated and compared. The questionnaire was pilot tested to check for discrepancies and modified. Informed verbal consent was taken from the patients; the investigator visited the participants and information to them explained on the purpose of the study. Voluntary nature of participation, anonymity and confidentiality of the concerns, and the disease were assured to every participant. Participant was verbally explained in their own language (Hindi) and further queries were clarified. The health status of the participants with TB was checked and they were encouraged to be take regular treatment.

To assess the duration of delay from onset of symptoms to the commencement of ATT, delay was broken into four categories, namely, patient delay, diagnostic delay, treatment delay, and total delay and measures have done in days and as per the operational definitions below. Diagnostic and treatment delay constitute health system delay. Patients' records were checked and if records were not available, delays were directly asked from the patient.

### Operational definitions

#### *Patient delay*

The time interval from the appearance of the first symptoms of TB until the first visit to any health-care facilities acceptable duration was set at 30 days.<sup>7</sup>

#### *Diagnostic delay*

It is the time interval between the onset of symptoms and confirmation of TB in the patient. This includes both patient factor delay in diagnosis and health-care system delay. Acceptable duration was set at 5 days.<sup>7</sup>

#### *Treatment delay*

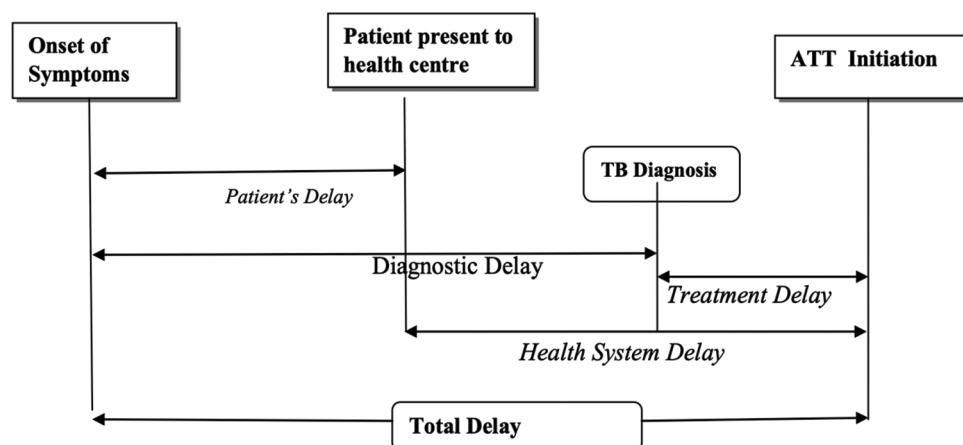
It is the time interval from the first consultation at any health facilities until the date of initiation of ATT. This includes both patient factor delay in initiating treatment and health-care system delay. Acceptable duration was set at 2 days.<sup>7</sup>

#### *Total delay*

It is the sum of patient delay, diagnostic delay, and treatment delay. Acceptable duration was set at 37 days.<sup>7</sup>

Figure 1 represents the graphical picture of the different categories of delays.

The data thus collected were entered in Microsoft Excel and analyzed using IBM-SPSS, v22.0. The numerical



**Figure 1:** Different categories of delays and their relationships

variables are expressed in means and categorical variables as frequency and percentages. The delays are presented as mean duration days and median with interquartile ranges (IQR). Bivariate analysis was performed to assess the relationship between each of the independent variable and the dependent variable (delay) using Chi-square test or Fisher Exact test, as appropriate.  $P < 0.05$  was considered statistically significant Reason for delays is presented in the form of bar graphs.

## RESULTS

Out of the total 120 new sputum positive patients who were interviewed, delay either in patient factor or health system delay were found in 76 (63.3%) of them. The distribution of sociodemographic factors and their association with delay is shown in Table 1. Among the delayed category, majority belonged to the age group of 36–60 years (65.8%). Male gender was found to have a predominance among the delayed category (58%) and 50% of them were illiterate. The patients in this category majorly belonged to the lower socioeconomic condition (49%). Majority of the patients in the delayed category reported having to walk for 30 min to 1 h to reach the nearest health center (40%). The factors such as age, education level, occupation, socioeconomic condition, and the walking duration to the nearest health center were found to be significantly associated with delay in healthcare seeking, diagnosis, and treatment.

Table 2 shows the mean duration of the various categories of delay. The patient delay was seen in 37 (30.8%) with median delay of 45 days (IQR 37–53). The health system delay was observed in 48 (40.0%) patients with median delay of 24.5 days (IQR 12.0–47.2). Diagnosis delay and treatment delay were seen in 49 (40.8%) and 15 (12.5%) patients, respectively. Since delays can overlap, these numbers are not mutually exclusive.

Figures 2 and 3 depict the self-reported reasons for patient delay and the perceived reasons for health system delay by the patients, respectively. The major reason contributing to patient delay among 37 patients was assumption by the patients regarding the disease to be self-limiting (64.9%) and hence not seeking timely care. Fear of diagnosis leading to deferral in seeking care was reported by 12 (32.4%) patients and economic constrains was reported by 27.0%. The delay in diagnosis and treatment initiation was majorly due to patient not reporting on time (62.5%) followed by low medication stock 41.7%.

## DISCUSSION

Early diagnosis and initiation of treatment is a determining factor for spread and infectivity of pulmonary TB. Delay in it may worsen the disease and cause higher mortality which still remains prevailing problem around the globe especially in resource-limited countries.<sup>4,8-10</sup> The present study focuses on assessing the various delay in TB treatment and associated factors among patients with pulmonary TB.

In the present study, the median patient delay was 55 days which is generally considered to be on the higher side. Shorter median patient delay was reported from Sikkim by Tobgay et al., (21 days),<sup>11</sup> Mandi, Himachal Pradesh by Thakur and Murhekar (15 days),<sup>12</sup> and Maharashtra by Nimbarte et al., (19 days).<sup>13</sup> While Hamza et al., (30 days)<sup>14</sup> and Bawankule et al., (up to 116 days)<sup>15</sup> report longer patient delay. The differences may be due to variation in the operational definition of patient delay and selection of the study population.

In the present study, factors such as age, education level, occupation, socioeconomic condition, and the walking duration to the nearest health center were found to be significantly associated with delay in healthcare seeking, diagnosis, and treatment. Similarly, study from Ethiopia

**Table 1: Sociodemographic distribution and their association with total delay in seeking health-care services for pulmonary tuberculosis among new sputum positive patients (n=120)**

Variable	Delayed (n=76)		Non-delayed (n=44)		$\chi^2$	P-value*
	n	%	n	%		
Age (years)					8.14	0.017
18–35	19	25	22	50		
36–60	50	65.8	18	40.9		
>60	7	9.2	4	9.1		
Gender					0.17	0.683
Male	58	76.3	35	79.5		
Female	18	23.7	9	20.5		
Education level					18.29	<0.001
Illiterate	38	50	7	15.9		
Primary	21	27.6	12	27.3		
Secondary	12	15.8	16	36.4		
College and above	5	6.6	9	20.5		
Occupation					14.43	0.002
Homemaker/unemployed	13	17.1	16	36.4		
Unskilled/daily wage	35	46.1	9	20.5		
Semiskilled/farmers/salaried	23	30.3	10	22.7		
Students	5	6.6	9	20.5		
SES*					17.89	<0.001
Lower	49	64.5	11	25.0		
Middle	24	31.6	31	70.5		
Upper	3	3.9	2	4.5		
Walk time to the nearest health center					17.96	<0.001
<15 min	4	5.3	7	15.9		
15–30 min	5	6.6	13	29.5		
30 min–1 h	40	52.6	12	27.3		
>1 h	27	35.5	12	27.3		

\*Figures in bold are statistically significant values; \*Modified BG Prasad classification (as per AICPI of the month when data collected-middle upper and middle lower clubbed as middle class)

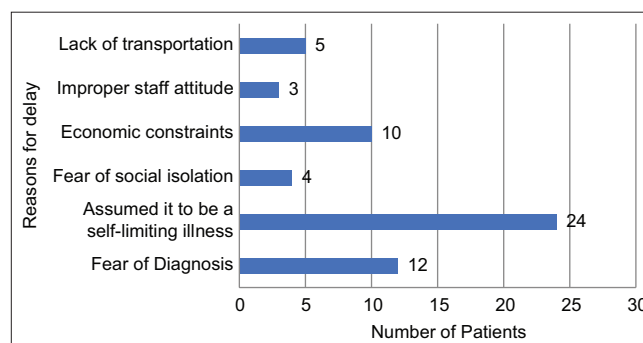
**Table 2: Mean duration of the various categories of delay**

Delay category	Number of patients		Mean±SD (days)	Median (interquartile range)
	n	%		
Patient's delay*	37	30.8	44.3±8.8	45 (37–53)
Diagnostic delay*	49	40.8	20.0±18.2	18 (10–45)
Treatment delay*	15	12.5	4.7±1.4	5 (3.5–6)
Health system delay*	48	40.0	23.2±18.1	24.5 (12.0–47.2)
Total delay	76	63.3	49.5±18.4	51 (37.7–64.3)

\*Not mutually exclusive

showed that age above 45 years (OR=2.62, 95% CI, 1.13–6.02) was significantly associated with increased patients' diagnostic delay.<sup>16</sup> However, study conducted by Paramasivam et al., in Kerala, India, showed the effect of increasing diagnostic delays with increasing age, particularly after 61 years (72.6%) (OR: 2.07; 95%CI: 0.90–4.76).<sup>17</sup>

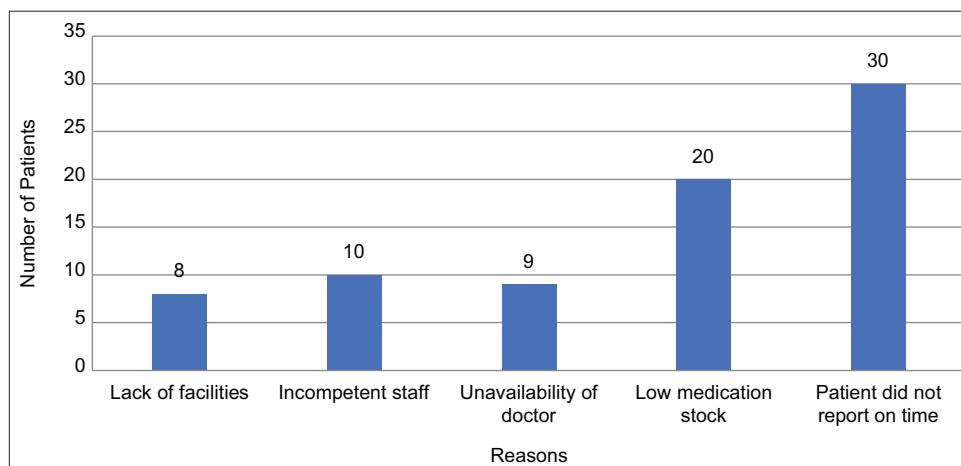
The present study did not show any significant association with delay and female sex that this is not the case with



**Figure 2:** Reasons for delay in seeking healthcare for pulmonary TB symptoms by the patients (n=37). This figure demonstrates the various reasons self-reported by the new sputum positive patients who were identified to have reported to a healthcare for their symptoms for the 1<sup>st</sup> time more than 30 days of symptom onset. The reasons listed are not mutually exclusive

other studies where being of female gender was identified as independent associated factor for development of unacceptable total delay in treatment of TB than their counterparts.<sup>18,19</sup> This difference may be because the number of female patients are far less than the male patients in the present study.

The present study showed that socioeconomic status was associated significantly with increased delay. This may be



**Figure 3:** Perceived reasons for health system delay by the patients (n=48). This figure demonstrates the various reasons self-reported by the new sputum positive patients who were identified to have been subjected to health system delays. The reasons listed are not mutually exclusive

due to lack of funds to attend professional health facilities, lack of time, or other poverty-related factors. The present study reveals that time taken to reach home from the health-care center is significantly associated with longer delay in diagnosis of TB patients. Long travel time or distance to the first health-care provider was found to be a significant determinant with studies in China and sub-Saharan African countries.<sup>20,21</sup> A study conducted in rural Ethiopia agreed that the difficulty of geographic access to health facilities was identified as one of the primary reasons for patient delay indicating that geographic issues can also influence the timeliness of medical service, particularly in remote and poor areas.<sup>22</sup>

The majority of the patients' beliefs that their condition will go away on its own (64.9%) and their failure to seek treatment right away were the main causes of the delays in care for the 37 patients. Twelve (32.4%) patients reported this fear, while 27.0% said that they were experiencing financial difficulties. Patient tardiness (62.5%) and limited medicine supply (41.7%) were the two main causes of the delay in diagnosis and treatment initiation.

#### Limitations of study

Our study contains a component of recall bias as a limitation. To reduce the recollection bias, we restricted participation to newly diagnosed sputum positive cases. One drawback of the study is that because it only included patients receiving care at government hospitals and excluded those receiving care in other sectors, its findings cannot be applied to the entire population. Another drawback is that the only viewpoint visible in TB cases is from the standpoint of the patient. To comprehend these delays better, more research is needed to examine the provider perspective.

## CONCLUSION

Delays in seeking medical attention for TB are a serious issue that needs for a multifaceted solution. This study found that delay in healthcare seeking, diagnosis, and treatment by patients experiencing TB symptoms were significantly associated with age, illiteracy, lower socioeconomic conditions, and longer walking distance to the nearest healthcare sector. Delay was found majorly at the patient level.

## ACKNOWLEDGMENT

We would like to express our gratitude to everyone who has offered support and assistance in any way during the course of our research.

## REFERENCES

1. Tuberculosis. Available from: <https://www.who.int/health-topics/tuberculosis> [Last accessed on 2023 Mar 20].
2. Tuberculosis-National Health Portal of India. Available from: <https://www.nhp.gov.in/disease/respiratory/lungs/tuberculosis> [Last accessed on 2023 Mar 20].
3. 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):233-239.
4. Seung KJ, Keshavjee S and Rich ML. Multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis. *Cold Spring Harb Perspect Med.* 2015;5(9):a017863. <https://doi.org/10.1101/cshperspect.a017863>
5. Ananthkrishnan R, Jeyaraju AR, Palani G and Sathiyasekaran B. Care seeking behaviour of the TB patients who were registered in an urban government tuberculosis control in Chennai, Tamilnadu, India. *J Clin Diagn Res.* 2012;6(6):990-993.
6. World Health Organization. Regional Office for the Eastern Mediterranean. Diagnostic and Treatment Delay in Tuberculosis.

- Report No: WHO-EM/TDR/009/E. Geneva: World Health Organization; 2006. Available from: <https://apps.who.int/iris/handle/10665/116501> [Last accessed on 2023 Mar 20].
7. Goel K, Kondagunta N, Soans SJ, Bairy AR and Goel P. Reasons for patient delays and health system delays for tuberculosis in South India. *Indian J Community Health*. 2011;23(2):87-89.
  8. World Health Organization. *Global Tuberculosis Report 2016*. Geneva: World Health Organization; 2016. p. 142. Available from: <https://apps.who.int/iris/handle/10665/250441> [Last accessed on 2023 Mar 20].
  9. Virenfeldt J, Rudolf F, Camara C, Furtado A, Gomes VF, Aaby P, et al. Treatment delay affects clinical severity of tuberculosis: A longitudinal cohort study. *BMJ Open*. 2014;4(6):e004818. <https://doi.org/10.1136/bmjopen-2014-004818>
  10. Gebreegziabher SB, Bjune GA and Yimer SA. Total delay is associated with unfavorable treatment outcome among pulmonary tuberculosis patients in West Gojjam Zone, Northwest Ethiopia: A prospective cohort study. *PLoS One*. 2016;11(7):e0159579. <https://doi.org/10.1371/journal.pone.0159579>
  11. Tobgay KJ, Sarma PS and Thankappan KR. Predictors of treatment delays for tuberculosis in Sikkim. *Natl Med J India*. 2006;19(2):60-63.
  12. Thakur R and Murhekar M. Delay in diagnosis and treatment among TB patients registered under RNTCP Mandi, Himachal Pradesh, India, 2010. *Indian J Tuberc*. 2013;60(1):37-45.
  13. Nimbarte SB, Wagh V and Selokar D. Health seeking behaviour among pulmonary tuberculosis patients in rural part of central India. *Int J Biol Med Res* 2011;2:394-7.
  14. Hamza A, Demissie M, Gare S and Teshome G. Delay in Tuberculosis Diagnosis among Tuberculosis Patients at the Three Hospitals: Asella, Robe and Abomsa of Arsi Zone, Oromia Regional State, March, 2015. *OALib* 2015;2(12):1-13.
  15. Bawankule S, Quazi SZ, Gaidhane A and Khatib N. Delay in DOTS for new pulmonary tuberculosis patient from rural area of Wardha District, India. *Online J Health Allied Sci*. 2010;9(1):5.
  16. 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. <https://doi.org/10.1186/1471-2334-5-112>
  17. Paramasivam S, Thomas B, Chandran P, Thayyil J, George B and Sivakumar CP. Diagnostic delay and associated factors among patients with pulmonary tuberculosis in Kerala. *J Family Med Prim Care*. 2017;6(3):643-648. <https://doi.org/10.4103/2249-4863.222052>
  18. Alavi SM, Bakhtiyariniya P and Albagi A. Factors associated with delay in diagnosis and treatment of pulmonary tuberculosis. *Jundishapur J Microbiol*. 2015;8(3):e19238. <https://doi.org/10.5812/jjm.19238>
  19. Buregyeya E, Criel B, Nuwaha F and Colebunders R. Delays in diagnosis and treatment of pulmonary tuberculosis in Wakiso and Mukono districts, Uganda. *BMC Public Health*. 2014;14(1):586. <https://doi.org/10.1186/1471-2458-14-586>
  20. Li Y, Ehiri J, Tang S, Li D, Bian Y, Lin H, et al. Factors associated with patient, and diagnostic delays in Chinese TB patients: A systematic review and meta-analysis. *BMC Med*. 2013;11(1):156. <https://doi.org/10.1186/1741-7015-11-156>
  21. Finnie RK, Khoza LB, van den Borne B, Mabunda T, Abotchie P and Mullen PD. Factors associated with patient and health care system delay in diagnosis and treatment for TB in sub-Saharan African countries with high burdens of TB and HIV. *Trop Med Int Health*. 2011;16(4):394-411. <https://doi.org/10.1111/j.1365-3156.2010.02718.x>
  22. Tadesse T, Demissie M, Berhane Y, Kebede Y and Abebe M. Long distance travelling and financial burdens discourage tuberculosis DOTS treatment initiation and compliance in Ethiopia: A qualitative study. *BMC Public Health*. 2013;13(1):424. <https://doi.org/10.1186/1471-2458-13-424>

#### Authors' Contributions:

**MC**- Definition of intellectual content, literature survey, prepared first draft of manuscript, implementation of study protocol, data collection, data analysis, and manuscript preparation; **VA**- Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision; **NT**- Design of study, literature survey, statistical analysis and interpretation, manuscript preparation, review, and submission of article.

#### Work attributed to:

Maharani Laxmi Bai Medical College, Jhansi.

#### Orcid ID:

Mahendra Chouksey - <https://orcid.org/0009-0007-4921-3911>

Vimal Arya - <https://orcid.org/0009-0007-0698-9891>

Nilima Takhelchangbam - <https://orcid.org/0000-0003-2304-5933>

**Source of Support:** Nil, **Conflicts of Interest:** None declared.