Delays at the Patient and Health System Levels among New Sputum Positive Adult TB Patients in Bengaluru

Baseline Study Report 2017

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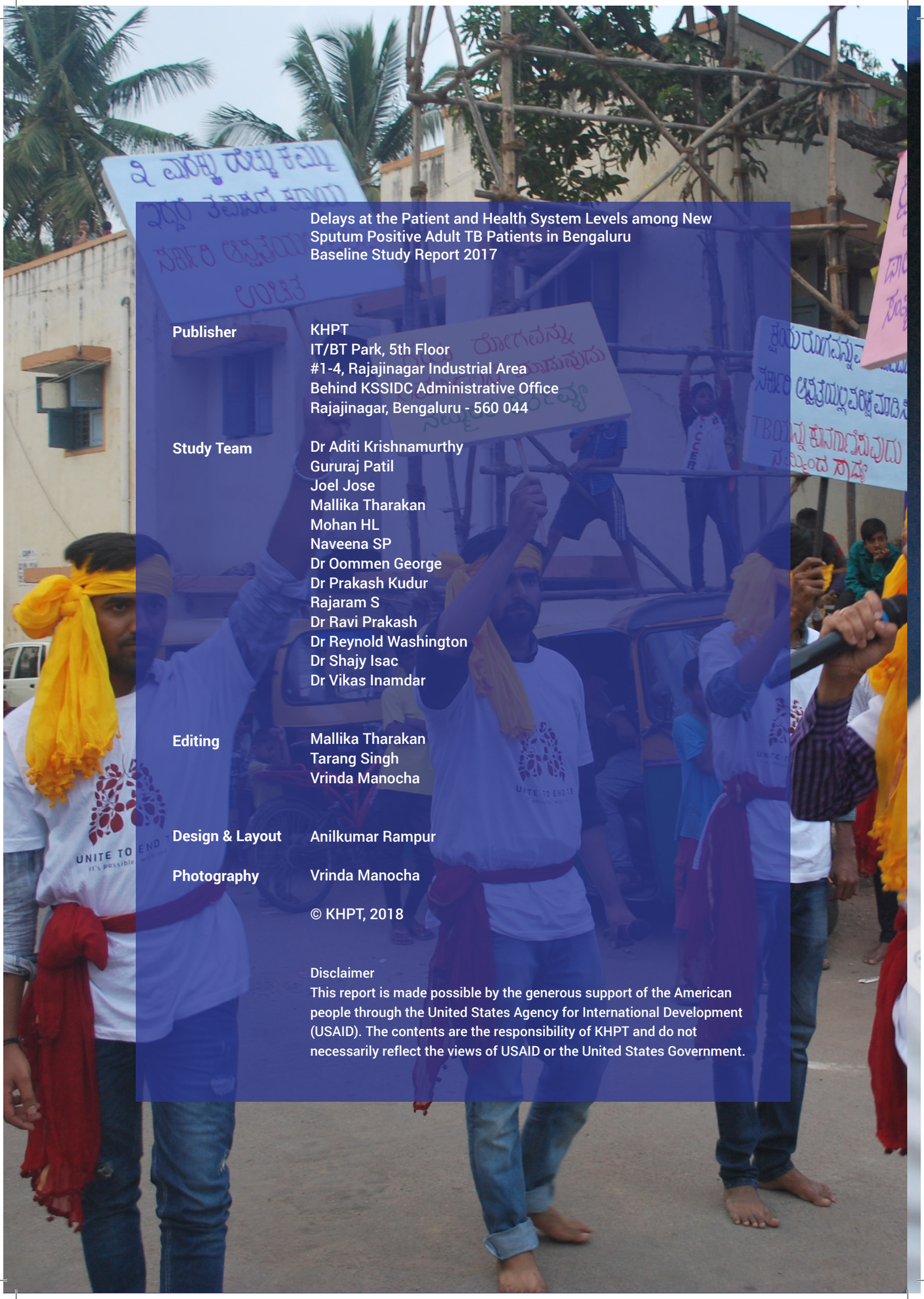

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Baseline Study Report 2017

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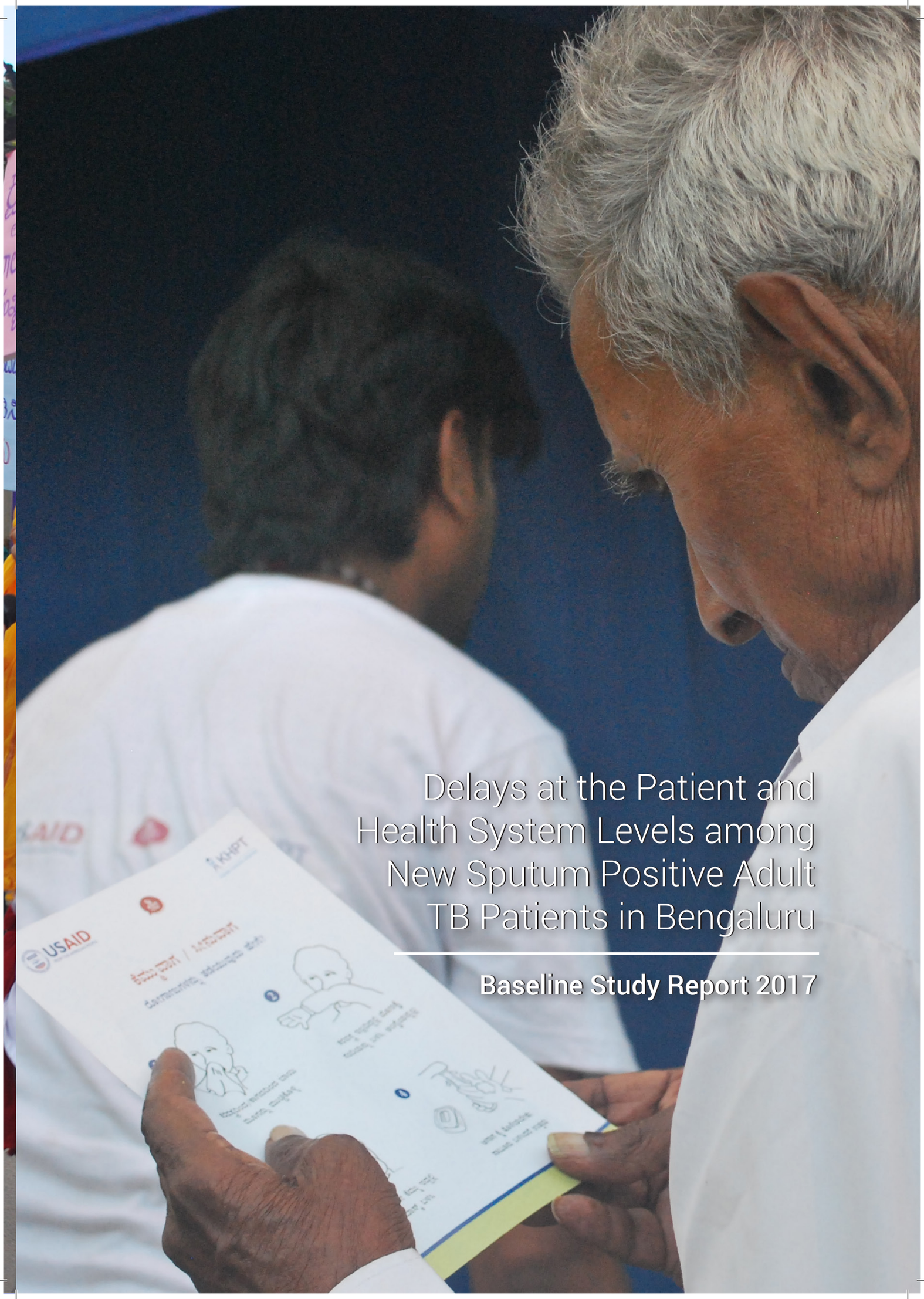

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BPL	Below Poverty Line
DMC	Designated Microscopy Centre
DOTS	Directly Observed Treatment Short Course
DTC	District Tuberculosis Centre
ESI	Employees' State Insurance
HIV	Human Immunodeficiency Virus
IEC	Institutional Ethics Committee/Information Education and Communication
KHPT	Karnataka Health Promotion Trust
NSP	New Sputum Positive
POMM	Practitioner of Modern Medicine
RNTCP	Revised National Tuberculosis Control Program
TB	Tuberculosis
THALI	Tuberculosis Health Action Learning Initiative
TU	Tuberculosis Unit
USAID	United States Agency for International Development

FOREWORD

The Government of India has set ambitious targets to eliminate TB by 2025 in the country. India has managed to scale up basic TB services in the public health system treating more than 10 million TB patients under RNTCP. As per the recent national strategic plan, the requirements for moving towards TB elimination have been integrated into the approach of "Detect-Treat-Prevent-Build". TB can be controlled if diagnosed early and treated completely. Transmission is also thus interrupted. The challenge with TB control in India is delay in diagnosis and inadequate or incomplete treatment, as a result of patient and provider behaviours, social stigma and health system related barriers. The strategies of community driven and patient centred approach adopted by the Tuberculosis Health Action Learning Initiative (THALI) undertaken by Karnataka Health Promotion Trust (KHPT), Bengaluru, and TB Alert India, Hyderabad envisaged to reduce the diagnostic and treatment delays.

As a part of the THALI program evaluation, KHPT conducted a study in Hyderabad and Bengaluru to understand the current level of patient and health system delays among adult new sputum positive patients accessing the RNTCP services in the year 2017. Patient delay is defined as the period of time between onset of symptoms (cough or fever) and the patient's first visit to a qualified health care provider (doctor). The health system delay is defined as the period from the first visit to the doctor until the patient is initiated on treatment. This includes two time periods, the time taken to make the first definitive diagnosis of TB (diagnostic delay) and the time taken from the time the diagnosis is made until treatment is initiated (treatment initiation delay).

A sample of 229 adult new sputum positive patients who had initiated treatment from the RNTCP during the three months prior to the date of survey were interviewed in Bengaluru. The patients were asked about their visits to various health care providers from the onset of their TB related symptoms, until they were initiated on TB treatment. The study provides valuable information about patient preferences for health seeking, providers' practices in relation to TB diagnosis and initiation of treatment and other barriers that a patient may face while seeking health care services. The State TB office and St John's Ethics Committee provided regulatory and ethics approvals for the study, respectively.

This report is prepared by the Karnataka Health Promotion Trust (KHPT). The results of this study will help programme managers understand the magnitude of patient and health system delay in TB diagnosis and treatment initiation and to focus on specific communication messages and programmatic issues to reduce these delays.

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ACKNOWLEDGEMENTS

The baseline study on “Delays at the Patient and Health System Levels Among New Sputum Positive Adult TB Patients in Bengaluru” was successfully completed due to the efforts and involvement of numerous organizations and individuals at different stages of the survey. We would like to thank everyone who was involved in the survey and made it a success.

We are grateful to the United States Agency for International Development (USAID) for funding this study as part of the Tuberculosis Health Action Learning Initiative (THALI), which establishes a holistic approach to TB control efforts in selected Indian cities. We gratefully acknowledge the continuous guidance and support of the various senior staff of Karnataka Health Promotion Trust (KHPT) in Bengaluru, towards the implementation of the study and preparation of this report. Our heartfelt thanks to the Institutional Ethics Committee of St. John’s Medical College and Hospital, Bengaluru, for approving the study. We are extremely thankful to the Joint Director (TB) and State TB Officer, Karnataka State, the District TB Officers of Bengaluru City and Bengaluru Urban for extending their support towards the successful completion of this study. Special thanks go to the local officials of the Revised National Tuberculosis Control Programme (RNTCP) for facilitating our access to the patient line list and for contacting the patients for data collection.

Thanks are also due to the program field staff for establishing the link between local RNTCP staff and the study team. We appreciate and acknowledge the hard work put in by the study coordinator, field supervisors and field interviewers in collecting the data.

Finally, we acknowledge the contribution of all the women and men of Bengaluru, who gave us their time, and responded to the lengthy questionnaires with tremendous patience and without any expectations from the study team.

Background

Tuberculosis (TB) is the leading cause of death from infectious diseases among adults in India; it kills more men than women, yet more women die from TB than from all causes associated with childbirth, combined. With a population of nearly 1.3 billion, and an incidence rate of 217 per 100,000 people, India has the highest number of TB cases globally, contributing to more than 25% of the world's TB burden. A total of 1.7 million new and relapsed TB patients, about 59% of the estimated global TB incidence, were notified in India in 2015. Also, an estimated 4.8 lakh people died from TB in India in 2015, which translates to 1315 deaths per day.

In order to accelerate TB control in India, the United States Agency for International Development (USAID), India, commissioned a new TB program, 'Championing a Tuberculosis-Free India (CHAMPION)' in 2016. One component of the CHAMPION program is an urban TB control initiative, namely the Tuberculosis Health Action Learning Initiative (THALI), which establishes a holistic approach to TB control efforts in selected Indian cities. The THALI project aims to improve lives of people who live at the Bottom of the Pyramid (BOP) by supporting innovative approaches to detect, notify and treat TB in urban communities through a catalytic process. USAID awarded the grant under this program to a consortium of partners led by Karnataka Health Promotion Trust (KHPT), Bengaluru. The project awarded to KHPT, along with its partner TB Alert India, will undertake activities which, through intermediate outcomes and outputs, will further lead to the goal of improved TB control in the two cities of Bengaluru (Karnataka) and Hyderabad (Telangana). THALI adopts community-centred and community-driven interventions to improve health seeking behaviour, access to services to increase TB case finding and improve treatment outcomes and patient care to persons undergoing TB treatment. The project also complements and enhances the capacity of the RNTCP to increase visibility of its services, to unlock public sector resources and to engage with all sectors of the health system to increase notification and subsequent public health action.

THALI is implemented with the following five key principles of TB control:

1. Appropriate health seeking behaviour among people with symptoms: People recognize early symptoms and signs of TB, know where to seek care and demand appropriate services.

2. Evidence-based diagnosis: All people with symptoms of TB are prescribed the best available and affordable bacteriological tests to establish a definitive diagnosis. These tests are done at certified, quality assured laboratories.

3. Standard, evidence-based treatment: Standard anti-TB regimens are used to treat new TB patients presumed to be drug sensitive. Previously-treated TB patients and those exposed to drug resistant TB are initiated into tailored treatment regimens, after drug sensitivity testing.

4. TB notification: All cases of TB patients diagnosed and initiated on treatment by clinical providers, and patients who test bacteriologically positive at laboratories, are notified to public health authorities.

5. Treatment follow-through: All patients initiated on TB treatment are counselled and closely monitored and supported, for treatment adherence and prevention of the spread of the disease.

THALI conducted a baseline study of patient and health system delays among New Sputum Positive (NSP) adult TB patients who had been initiated on treatment from the RNTCP, during 2016-17. The THALI program expects a reduction in these delays in the primary intervention areas of the cities of Bengaluru and Hyderabad. The baseline survey intends to provide information on the key outcome indicators of patient delay and health system delay in TB treatment. Patient delay is defined as the number of days between onset of symptoms (cough or fever) and the patient's first visit to a qualified health care provider (doctor). Health system delay is defined as the period from the first visit of the patient to the doctor, until treatment initiation. This includes two time periods; the time taken to make the first definitive diagnosis of TB (diagnostic delay) and the time taken to initiate treatment after a diagnosis has been made (treatment initiation delay).

The indicators as measured by the baseline survey will serve as benchmark values to measure the success of the program in reducing delay. TB diagnosis and treatment can be delayed due to delays in patients' health seeking behaviour, as well as due to delays in TB diagnosis and initiation of treatment by the health care provider. Any type of delay (patient delay, health system delay) can worsen the disease, increase the risk of death and enhance disease transmission within the community. A single person with active but untreated TB could infect up to 10-15 other people through close contact over the course of a year. Thus, early diagnosis of the disease and early initiation of treatment are important for effective prevention and control of TB. Community-level outreach activities among the slum population in the two cities are expected to influence appropriate changes in the health seeking behaviour of people with symptoms suggestive of TB. Additionally, the community and government engagement activities are expected to reduce health system delays. This report presents findings from the survey on patient and health system delays among NSP patients initiated on treatment from the RNTCP in Bengaluru.

Objectives of baseline study

The primary objective of the study is to estimate the reported delay among patients in diagnosis and in initiation of treatment among the RNTCP-registered new smear positive pulmonary adult (aged 18 and above) TB patients in the THALI intervention area of Bengaluru. The secondary objectives are to identify factors influencing patient delay and health system delay in diagnosis and treatment initiation of TB.

Study area, sample size and sample identification

The study area included only 11 Tuberculosis Units (TUs) in the Bengaluru Urban district under the THALI project. Out of the 11 TUs, eight TUs are from the Bengaluru City District Tuberculosis Centre (BBMP DTC) and three TUs are from Bengaluru Urban DTC. Anekal and Singasandra TUs were not included in the study, although these TUs are under the THALI project. The subjects were NSP adults diagnosed with pulmonary TB, who had been initiated on TB treatment from the RNTCP anytime during the three months prior to the survey in these 11 TUs. The target sample size was 225 NSP adult patients. The sample was proportionately distributed across TUs based on the number of NSP patients initiated on TB treatment within that during the quarter prior to the start of the survey. A list of all the NSP adult TB patients who had been initiated on treatment in each of the 11 TUs during the three months preceding the survey was prepared by the trained field interviewers. The interviewers then contacted the patients and obtained verbal consent for study participation. Contact was made either at the DOTS centre or through their mobile/land-line telephone contact numbers. Those who consented to a more detailed review were interviewed in person after obtaining written consent, until the proportionate sample size for a TU was achieved. If the targeted sample size was not reached in any TU, then an additional sample was drawn from another TU with new adult TB patients.

Survey tools

Trained interviewers used a semi-structured questionnaire to collect the required information from the NSP adult TB patient. The broad areas of inquiry included:

1. Household characteristics,
2. Socio-economic and demographic profile of the patients,
3. Alcohol drinking and smoking habits of the patients, and
4. Health seeking behaviour for the current illness.

Training of field staff

In order to minimize the non-sampling errors, a Monitoring Evaluation Research and Learning (MERL) specialist and a research coordinator trained field staff over a period of six days, to maintain standardized survey procedures. Field practice was incorporated into the training to enhance their competencies to adhere to survey procedures and to administer and fill the questionnaires. Training also included the procedures to be followed to obtain written consent and to maintain confidentiality of the respondents. The training organised from February 28 March 7, 2017 was attended by ten members of the staff, of which six field staff and one supervisor were selected to constitute the field team.

Field data collection

Field data collection was carried out by the six field investigators under supervision and support of the field supervisor, while the research coordinator organised the field data collection procedures. Field data collection for the study started on March 9, 2017 and was completed on May 11, 2017. The field staff included three female and three male field investigators.

Ethics approval

The Institutional Ethics Committee of St. John's Medical College and Hospital, Bengaluru, provided the ethics approval for the study.

Profile of Bengaluru Urban

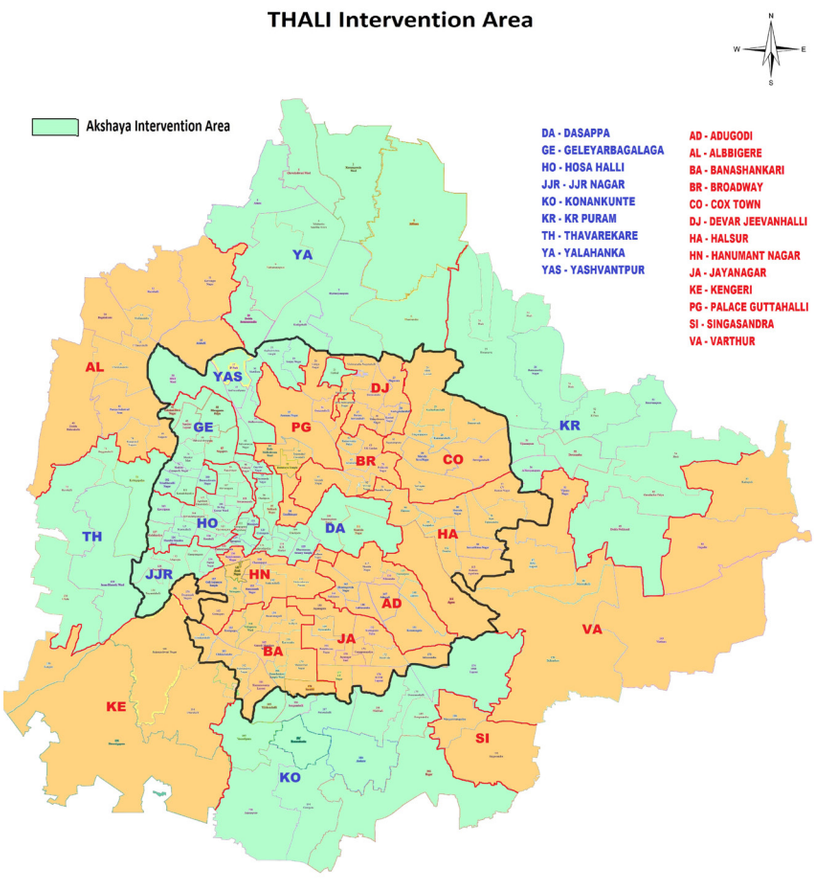
Bengaluru Urban is a district in the south Indian state of Karnataka. It is surrounded by the Bengaluru Rural district to on the east and north, the Ramanagara district to on the west and the Krishnagiri district of Tamil Nadu to on the south. Bengaluru Urban district comprises five Taluks or blocks, namely Bengaluru North, Bengaluru North (Addl.), Bengaluru South, Bengaluru East and Anekal.

According to the 2011 Census of India, the district has a population of 9,621,551 of which 5,022,661 (52.2%) are males and 4,598,890 are females with an overall sex ratio of 916 females per 1000 males. The district is the most populous one in Karnataka state. Out of the total population in the district, with 871,607 (9.1%) living in rural areas and 8,749,944 (90.9%) in urban areas, Bengaluru Urban district recorded a decadal population growth rate of 47.2% between 2001 and 2011. The overall population density in the district is 4381 persons per square kilometre. the Literacy rate among the population aged seven and above is 87.7%, with 91% males and 84% females being literate. Around 12.5% of the total population in the district belong to the Scheduled Castes, and 2% belong to the Scheduled Tribes. According to the 2011 Census, 23% of the district's population are children (0-14 years), 8% are aged 60 and over, and the remaining 69% belong to the working age group (15-59 years).

As per the RNTCP, Bengaluru Urban district has been divided into two districts, namely Bengaluru City District Tuberculosis Centre (DTC) and Bengaluru Urban DTC for operational purposes. Bengaluru City is further divided into 14 TUs and Bengaluru Urban into 10 TUs. THALI coverage area included a total of 13 TUs from Bengaluru City (DTC) and Bengaluru Urban (DTC). The total population in the THALI coverage area is estimated to be 5,330,628, of which 823,727 (15.4%) lives in 349 slum areas.

For the operational effectiveness of THALI, the project geographies were divided into three zones in Bengaluru. These zones are represented as Zone-A, Zone-B and Zone-C. Zone-A included slum areas from Abbigere, Devara Jeevanahalli and Palace Guttahalli TUs. Zone-B included slum areas from Anekal, Banashankari, Jayanagar, Kengeri and Singasandra TUs. Zone-C included slum areas from Broadway, Cox Town, Halasur, Varthur and Adugodi TUs.

Geographical area

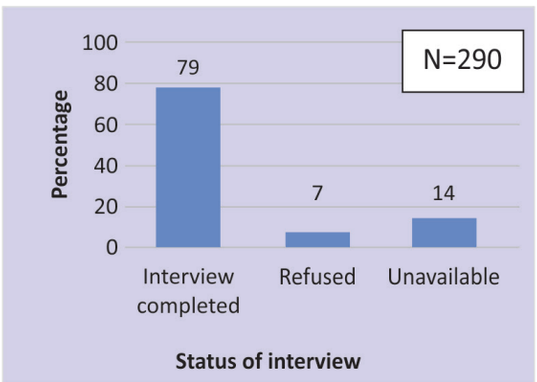


Zone	TU Name
A	Abbigere
	DJ Halli
	P G Halli
B	Anekal
	Banashankari
	Jayanagar
	Kengeri
	Singasandra
C	Broadway
	Cox Town
	Halasur
	Varthur
	Adugodi

Geographical layout of TUs, by zones, in Bengaluru Urban district.

Sample coverage

In total, 301 NSP adult TB patients who were started on treatment during the three months prior to the date of visit of the field interviewer, were listed by name from the 11 TUs. Of these, 290 (96%) patients could be contacted while the remaining 11 (4%) could not be contacted due to incorrect contact information and achievement of the sample size for the TU. Of the 290 NSP adult patients contacted, interviews were completed with 229 patients (79%), while 7% refused to participate in the study and another 14% could not be available for the interview. (Figure-1)



Profile of respondents

The background and characteristics of the patients interviewed are given in Table-1.

The mean age of the adult patients was 38 years. 31 % of the NSP adult patients were females with a mean age of 35 years, while the mean age of males was 39 years. Around 44% of the female patients and 29% of the male patients were less than 30 years old.

Overall, 75% of the respondents resided in slum areas and the remaining 25% in non-slum areas. We did not notice any sex differentials with respect to residential status of patients. Marital status data of the respondents reveals that 64% of them were married at the time of the survey, 26% were not married and the remaining 10% had reported dissolution of their marriage. More females (23%) reported dissolution of marriage than males (4%).

28% of the respondents were illiterate, while nearly two-fifths of the patients had completed middle school. Comparatively more females (50%) than males (37%) had completed middle school. With reference to occupational characteristics, 50% of the female respondents were not engaged in any occupation outside the home, compared to just 16% of the interviewed males. A little more than one-quarter of the respondents were daily labourers and more males (35%) than females (14%) were engaged as daily labourers.

Nearly 72% of respondents were Hindu, 23% Muslim and the remaining 5% belonged to other religions. However, more females (9%) than males (4%) belonged to other religions. Similarly, one-quarter of the patients belonged to either a Scheduled Caste or a Scheduled Tribe.

Overall, 38% of the patients earned Rupees 10,000 or more each month. The reported average personal monthly income was higher for males than females. About 46% of the respondents reported a household monthly income of Rupees 15,000 or more. We did not observe any differentials in monthly household income by the sex of the respondent.

Household composition data (Table-2) of the patients indicates that nearly half (48%) of them did not have a family member younger than 18 years and about one-third had more than one child in their household. Similarly, 23% of the patients had more than five persons in their household. On average, there were 4.5 persons per household.

Table 1: Percentage distribution of respondents according to selected background characteristics

Characteristic	Male	Female	Total
Sex			
Male			69.4
Female			30.6
Age			
18-29	28.9	44.3	33.6
30-49	46.5	35.7	43.2
50+	24.5	20.0	23.1
Mean age	**39.3**	**35.3**	**38.0**
Place of residence			
Slum area	74.2	78.6	75.5
Non-slum area	25.8	21.4	24.5
Marital status			
Currently married	67.9	55.7	64.2
Marriage dissolved	4.4	22.9	10.0
Never married	27.7	21.4	25.8

Characteristic	Male	Female	Total
Literacy and education			
Illiterate	28.9	24.3	27.5
Literate, middle incomplete	34.6	25.7	31.9
Middle completed	36.5	50.0	40.6
Occupation			
Business	8.8	4.3	7.4
Salaried job	7.5	12.9	9.2
Daily labour	35.2	14.3	28.8
Other job	32.1	18.6	27.9
Not working	16.4	50.0	26.6
Religion			
Hindu	73.6	67.1	71.6
Muslim	22.0	24.3	22.7
Other	4.4	8.6	5.6
Caste/Tribe			
Scheduled Caste	22.0	25.7	23.1
Scheduled Tribe	4.4	0.0	3.1
Others	73.6	74.3	73.8
Personal monthly income (in rupees)			
< 5000	22.0	41.4	27.9
5000-9999	29.6	37.1	31.9
10000+	47.8	14.3	37.6
Not mentioned	0.6	7.1	2.6
Mean personal income	**8797.5**	**5792.2**	**7921.5**
Household monthly income (in rupees)			
< 10000	17	14.3	16.2
10000-15000	35.8	35.7	35.8
15000+	45.3	48.6	46.3
Not mentioned	1.9	1.4	1.7
Mean household income (in rupees)	**17826.9**	**17999.9**	**17880.0**
Total			
Number of cases	**159**	**70**	**229**

Table 2: Percentage distribution of respondents according to household composition and amenities

Characteristic	Percent
Number of persons aged < 18 years	
0	48.0
1	19.7
2	20.1
3+	12.2
Mean number of persons aged < 18 years	**1.0**
Number of persons aged >= 18 years	
1	4.4
2	27.9
3	24.0
4+	43.7
Mean number of persons aged >= 18 years	**3.5**
Total number of household members	
<=2	11.8
3	18.3
4	29.3
5	17.9
6+	22.7
Mean number of persons	**4.5**
Has BPL card	
Yes	50.7
No	47.6
Don't know/Can't say	1.7
Ownership of present house	
Own house	29.7
Rented house	70.3
Number of rooms	
1	43.2
2	35.8
3	17.5
4+	3.5
Number of rooms used for sleeping	
1	81.7
2	16.6
3	1.3
4+	0.4

Characteristic	Percent
Own a radio	
Yes	32.3
No	67.7
Own a telephone	
Yes	3.1
No	96.9
Own a mobile	
Yes	95.2
No	4.8
Own a television	
Yes	96.5
No	3.5
Total percent	**100.0**
Number of cases	**229**

A little more than half of the patients had a Below Poverty Line (BPL) card. Rented homes for habitation were being used by 70% of the patients, and 56% of the total patients had houses with more than one room. However, 82% of the patients only had a single room for sleeping. While ownership of a landline telephone was very low, a majority of the patients reported that they had mobile phones (95%) and a television set (97%) in their homes. (Table-2).

Of the patients interviewed, 70% of them reported that they were permanent residents of Bengaluru (Table-3). 15% of patients reported that they had been staying in Bengaluru for less than 10 years and 14%, for more than 10 years. Around 25% of the respondents had moved into Bengaluru from a town and only 4% had moved into Bengaluru from a village. Similarly, 8% of the respondents reported that they had been away from their current place of residence for more than one month in the past one year.

Table 3: Percentage distribution of respondents according to migration and mobility status

Characteristic	Percent
Duration of stay in Bengaluru city	
Always	70.3
< 10 years	15.3
10+ years	14.4
Type of place from where the respondent moved in	
Not moved in	70.3
From another town	25.3
From a village	4.4
Whether the respondent had been away from the current place of residence for more than one month in the past one year	
Yes	8.3
No	91.7
Total percent	**100**
Number of cases	**229**

Knowledge of any other person having TB

All respondents were asked whether they had known anyone with TB before they were diagnosed with TB themselves and the duration of knowing this person. This information was collected to determine whether the patient had been in contact with a known TB patient. 30% of the respondents had come in contact with a TB patient before themselves being diagnosed with TB. Among the patients who reported knowing someone with TB, the duration of having known this person was less than one year for 12% of the respondents, between one to two years for 11% and more than two years for 77% of the study patients. (Table-4)

Table 4: Percentage distribution of respondents according to whether they knew anyone who had TB and the duration of knowing this person

Characteristic	Percent
Whether the respondent knew a TB patient before themselves being diagnosed with TB	
Yes	30.1
No	68.1
Don't know	1.7
Total	**100.0**
Number of cases	**229**
Duration of knowing this person	
1- 5 months	8.7
6-11 months	2.9
12-23 months	11.6
24+ months	76.8
Total	**100**
Number of cases	**69**

Presence of any other disease condition

The patients were also asked to report whether they had been diagnosed with any other disease condition (Table-5). At least one disease condition was reported by 26% of the respondents. Diabetes was reported by 19% of the respondents and occurred slightly more in males (20%) than in females (17%). Among patients who were 50 years or older, 45% and 15% reported having diabetes and high blood pressure (hypertension), respectively. In the 30-49-year age group, 19% reported diabetes while only 1% of the respondents between 18-29 years of age reported diabetes. Around one-fifth of the patients in Zone-C reported that they had diabetes, with roughly an equal percentage of patients reporting similarly in the other two zones.

Table 5: Percentage distribution of respondents according to previously diagnosed disease conditions, by sex, age and TUs

Name of disease	Sex of the respondent		
	Male	Female	Total
Diabetes	20.1	17.1	19.2
Asthma/Chronic respiratory disease	3.8	8.6	5.2
Heart disease	2.5	2.9	2.6
High BP/Hypertension	5.0	7.1	5.7
HIV/AIDS	0.0	2.9	0.9
Hyper/hypothyroidism	0.0	1.4	0.4
At least one disease	23.3	31.4	25.8
More than one disease	6.3	7.1	6.6
Number of cases	159	70	229

Name of disease	Sex of the respondent		
	18-25	30-49	50+
Diabetes	1.3	19.2	45.3
Asthma/Chronic respiratory disease	1.3	2.0	17.0
Heart disease	0.0	2.0	7.5
High BP/Hypertension	2.6	3.0	15.1
HIV/AIDS	1.3	0.0	1.9
Hyper/hypothyroidism	0.0	1.0	0.0
At least one disease	5.2	26.3	54.7
More than one disease	1.3	1.0	24.5
Number of cases	77	99	53

Name of disease	Sex of the respondent		
	Zone-A	Zone-B	Zone-C
Diabetes	18.6	18.5	20.2
Asthma/Chronic respiratory disease	3.5	9.3	4.5
Heart disease	0.0	3.7	4.5
High BP/Hypertension	4.7	11.1	3.4
HIV/AIDS	0.0	1.9	1.1
Hyper/hypothyroidism	0.0	0.0	1.1
At least one disease	22.1	29.6	27.0
More than one disease	4.7	11.1	5.6
Number of cases	86	54	89

Health seeking behaviour

Visit to the health care provider and diagnosis history

All patients were asked to provide details of their consultations with doctors or health care providers, made until TB diagnosis and treatment initiation. The analysis revealed that on average, patients consulted with either a Practitioner of Modern Medicine (POMM) or another health care provider at least 3.7 times before the diagnosis and treatment initiation. A POMM alone was consulted 3.6 times on average until diagnosis and treatment initiation. The number of consultations were slightly higher for females than males. For example, 41% of the females consulted a POMM four or more times as compared to 39% of males. Only 5% of the patients consulted the POMM once before their diagnosis and treatment initiation. (Table-6)

Table 6: Percentage distribution of respondents according to number of visits to any health care provider and number of visits to a POMM prior to treatment, by sex

Number of visits	Sex of the respondent		
	Male	Female	Total
Visited any health care provider			
1	2.5	2.9	2.6
2	23.3	19.1	22.0
3	31.4	30.9	31.3
4	18.9	23.5	20.3
5	10.1	10.3	10.1
6	5.0	4.4	4.8
7+	8.8	8.8	8.8
Mean number of visits	**3.7**	**3.8**	**3.7**
Visited a POMM			
1	5.0	4.4	4.8
2	24.5	23.5	24.2
3	31.4	30.9	31.3
4	17.6	22.1	18.9
5	8.2	8.8	8.4
6	5.0	2.9	4.4
7+	8.2	7.4	7.9
Mean number of visits	**3.6**	**3.6**	**3.6**
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**68**	**227**

Distribution of patients by the type of facility consulted (public or private) across different visits has been presented in Table-7. In the first three consultations, nearly two-thirds of the patients visited private facilities. However, after the third visit, the proportion of patients who consulted a public health facility was more than those who visited a private facility. In the first few visits, more female patients than male consulted a private health care facility.

Table 7: Percentage distribution of respondents according to the type of health care facility visited, by visit number and sex

Type of health facility	Sex of the respondent		
	Male	Female	Total
First visit			
Public health facility	20.8	19.1	20.3
Private health facility	69.8	75.0	71.4
Other	9.4	5.9	8.4
Number of cases	**159**	**68**	**227**
Second visit			
Public health facility	31.0	30.3	30.8
Private health facility	66.5	63.6	65.6
Other	2.6	6.1	3.6
Number of cases	**155**	**66**	**221**
Third visit			
Public health facility	42.4	30.2	38.6
Private health facility	55.9	66.0	59.1
Other	1.7	3.8	2.3
Number of cases	**118**	**53**	**171**
Fourth visit			
Public health facility	55.9	59.4	57.0
Private health facility	41.2	31.3	38.0
Other	2.9	9.4	5.0
Number of cases	**68**	**32**	**100**
Fifth visit			
Public health facility	55.3	50.0	53.7
Private health facility	42.1	37.5	40.7
Other	2.6	12.5	5.6
Number of cases	**38**	**16**	**54**

Note: Two HIV/AIDS patients have been excluded

Reasons for consulting the health care provider in male and female respondents were identified and have been presented in Table-8. The most frequently reported reasons for consulting a health care provider were closeness to patients' homes or easy accessibility (51%), recommendation of relatives or friends (44%) and a good reputation (42%). In addition, around 38% of the patients reported that the health care provider treated patients nicely and 24% reported that the consultation price was reasonable or low, which prompted them to go to a particular provider.

Table 8: Percentage distribution of respondents according to the main reason for visiting the health care provider, by sex

Main reason for visiting the provider	Sex of the respondent		
	Male	Female	Total
Close to home/Easy to access	47.8	58.8	51.1
Friends/Relatives recommended	45.9	41.2	44.5
Good reputation	43.4	39.7	42.3
Treats me nicely	35.2	44.1	37.9
Price is reasonable /Low cost	25.8	19.1	23.8
Convenient hours	15.1	13.2	14.5
Know provider personally	10.1	7.4	9.3
Doctor referred	5.7	4.4	5.3
No consultation fee	0.6	2.9	1.3
Other	1.3	1.5	1.3
Follow-up visit	0.6	1.5	0.9
Number of cases	**159**	**68**	**227**

Note: Two HIV/AIDS patients have been excluded

Table-9 presents the distribution of possible disease conditions reported by the health care provider upon each visit of the patient. Nearly all of the patients were informed about their disease condition during consultation, with only less than 10% of patients reporting that the provider did not tell them anything about their disease condition. In the first and second consultation visits, 49% and 34% of the patients respectively, were informed that common cough was the disease condition. The incidence of TB as the possible disease condition increased as the number of consultation visits to the provider increased. However, even during the fifth visit, about two-fifths of the patients were told by the health care provider that they either had a common cough or common cold, compared to 41% of the patients who were informed that they had TB.

Table 9: Percentage distribution of respondents according to information given by the health care provider on the patient's disease condition, by visit number and sex

Disease condition diagnosed	Sex of the respondent		
	Male	Female	Total
First visit			
Common cough	49.1	48.5	48.9
Common cold	12.6	10.3	11.9
Cough induced due to allergy	8.2	10.3	8.8
Chest congestion	3.1	1.5	2.6
Tuberculosis	3.1	2.9	3.1
Did not tell anything	7.5	13.2	9.3
Don't remember	0.0	1.5	0.4
Other	16.4	11.8	15.0
Number of cases	**159**	**68**	**227**
Second visit			
Common cough	30.3	42.4	33.9
Common cold	12.9	12.1	12.7
Cough induced due to allergy	9.7	9.1	9.5
Chest congestion	3.9	1.5	3.2
Tuberculosis	23.2	18.2	21.7
Did not tell anything	7.7	7.6	7.7
Other	12.3	9.1	11.3
Number of cases	**155**	**66**	**221**
Third visit			
Common cough	20.3	30.2	23.4
Common cold	10.2	11.3	10.5
Cough induced due to allergy	5.1	7.5	5.8
Chest congestion	5.9	3.8	5.3
Tuberculosis	41.5	39.6	40.9
Did not tell anything	5.9	3.8	5.3
Don't remember	0.8	0.0	0.6
Other	10.2	3.8	8.2
Number of cases	**118**	**53**	**171**

Note: Two HIV/AIDS patients have been excluded

Disease condition diagnosed	Sex of the respondent		
	Male	Female	Total
Fourth visit			
Common cough	22.1	9.4	18.0
Common cold	10.3	15.6	12.0
Cough induced due to allergy	8.8	6.3	8.0
Chest congestion	7.4	9.4	8.0
Tuberculosis	39.7	46.9	42.0
Did not tell anything	7.4	3.1	6.0
Other	4.4	9.4	6.0
Number of cases	**68**	**32**	**100**
Fifth visit			
Common cough	26.3	18.8	24.1
Common cold	15.8	18.8	16.7
Cough induced due to allergy	7.9	6.3	7.4
Tuberculosis	42.1	37.5	40.7
Did not tell anything	2.6	6.3	3.7
Other	5.3	12.5	7.4
Number of cases	**38**	**16**	**54**

Note: Two HIV/AIDS patients have been excluded

94% of the patients were prescribed medicines upon their first visit to the health care provider, with only about 9% being recommended a diagnostic test (Table-10). Recommendations for a diagnostic test steadily increased with the number of visits by the patient although, even on the fifth visit only 54% of the total respondents were recommended a test with nearly 46% still being prescribed medicines. In the first visit, recommendations for a diagnostic test were made more to males (10%) than females (6%). However, after the third visit, diagnostic tests were recommended slightly more to females than males.

Table 10: Percentage distribution of respondents according to the health care provider's recommendation, by visit number and sex

Disease condition diagnosed	Sex of the respondent		
	Male	Female	Total
First visit			
Diagnostic tests	10.1	5.9	8.8
Prescribed medicine	93.7	95.6	94.3
Referred to another doctor/hospital	3.8	5.9	4.4
Admission to hospital	1.3	0	0.9
Nothing	0	1.5	0.4
Number of cases	**159**	**68**	**227**

Disease condition diagnosed	Sex of the respondent		
	Male	Female	Total
Second visit			
Diagnostic tests	37.4	34.8	36.7
Prescribed medicine	69.0	71.2	69.7
Referred to another doctor/hospital	7.7	1.5	5.9
Admission to hospital	0.6	3	1.4
Referred to place for TB treatment	0.6	0	0.5
Number of cases	**155**	**66**	**221**
Third visit			
Diagnostic tests	49.2	47.2	48.5
Prescribed medicine	54.2	45.3	51.5
Referred to another doctor/hospital	7.6	11.3	8.8
Admission to hospital	4.2	5.7	4.7
Referred to place for TB treatment	1.7	3.8	2.3
Nothing	0.8	0	0.6
Number of cases	**118**	**53**	**171**
Fourth visit			
Diagnostic tests	55.9	59.4	57.0
Prescribed medicine	47.1	40.6	45.0
Referred to another doctor/hospital	11.8	6.3	10.0
Admission to hospital	0	3.1	1.0
Referred to place for TB treatment	1.5	0	1.0
Nothing	0	6.3	2.0
Number of cases	**68**	**32**	**100**
Fifth visit			
Diagnostic tests	52.6	56.3	53.7
Prescribed medicine	42.1	56.3	46.3
Referred to another doctor/hospital	10.5	12.5	11.1
Admission to hospital	7.9	0	5.6
Referred to place for TB treatment	5.3	0	3.7
Number of cases	**38**	**16**	**54**

Note: Two HIV/AIDS patients have been excluded

The distribution of the different diagnostic tests recommended by the heath care provider at each visit has been captured and presented in Table-11. A sputum test was recommended to 2% of the patients, while 3% were recommended an X-ray alone, in the first consultation. There was a gradual increase in the number of patients who were recommended a sputum test as the number of visits increased. A similar increase could be seen in the number of patients and particularly in female patients, who were recommended both an X-ray and sputum test till the fourth visit, after which there was a sharp decline in this recommendation.

Table 11: Percentage distribution of patients according to type of test recommended, by visit number and sex

Type of test recommended	Sex of the respondent		
	Male	Female	Total
First visit			
Sputum only	2.5	0.0	1.8
X-ray only	3.1	2.9	3.1
Both X-ray and sputum	1.9	2.9	2.2
Number of cases	**159**	**68**	**227**
Second visit			
Sputum only	12.3	12.1	12.2
X-ray only	7.1	1.5	5.4
Both X-ray and sputum	15.5	16.7	15.8
Number of cases	**155**	**66**	**221**
Third visit			
Sputum only	11.0	13.2	11.7
X-ray only	5.1	3.8	4.7
Both X-ray and sputum	32.2	30.2	31.6
Number of cases	**118**	**53**	**171**
Fourth visit			
Sputum only	22.1	12.5	19.0
X-ray only	8.8	0.0	6.0
Both X-ray and sputum	25.0	43.8	31.0
Number of cases	**68**	**32**	**100**
Fifth visit			
Sputum only	28.9	18.8	25.9
X-ray only	7.9	6.3	7.4
Both X-ray and sputum	13.2	25.0	16.7
Number of cases	**38**	**16**	**54**

Note: Two HIV/AIDS patients have been excluded

We also analysed the diffusion of diagnostic tests recommended to the patients at each visit according to the type of facility consulted (Table-12). At each visit, the percentage of patients who were recommended a sputum test was significantly higher at government facilities when compared to private facilities. Both sputum test and chest X-ray recommendations were also higher at government health facilities

Table 12: Percentage distribution of visits according to type of test recommended, by visit number and type of facility consulted

Type of test recommended	Type of facility consulted		
	Government facility	Private facility	Other
First visit			
Sputum only	6.5	0.0	5.3
X-ray only	4.3	3.1	0.0
Both X-ray and sputum	6.5	1.2	0.0
Number of cases	**46**	**162**	**19**
Second visit			
Sputum only	27.9	5.5	0.0
X-ray only	4.4	6.2	0.0
Both X-ray and sputum	29.4	9.7	12.5
Number of cases	**68**	**145**	**8**
Third visit			
Sputum only	16.7	8.9	0.0
X-ray only	7.6	3.0	0.0
Both X-ray and sputum	57.6	14.9	25.0
Number of cases	**66**	**101**	**4**
Fourth visit			
Sputum only	31.6	2.6	0.0
X-ray only	5.3	7.9	0.0
Both X-ray and sputum	40.4	21.1	0.0
Number of cases	**57**	**38**	**5**
Fifth visit			
Sputum only	41.4	9.1	0.0
X-ray only	10.3	4.5	0.0
Both X-ray and sputum	24.1	9.1	0.0
Number of cases	**29**	**22**	**3**

Note: Two HIV/AIDS patients have been excluded

Data on the type of test conducted across each visit to the health care provider was also collected and is shown in Table-13. The results indicate that very few of the patients did not comply with the test recommended to them. Though small, this was particularly applicable to chest X-ray recommendations. Both chest X-ray examinations and sputum tests were taken by more females than males in all visits, except the third visit.

Table 13: Percentage distribution of visits according to type of test conducted, by visit number and sex

Type of test conducted	Sex of the respondent		
	Male	Female	Total
First visit			
Sputum only	2.5	0.0	1.8
X-ray only	3.1	2.9	3.1
Both X-ray and sputum	1.9	2.9	2.2
Number of cases	**159**	**68**	**227**
Second visit			
Sputum only	11.6	12.1	11.8
X-ray only	7.1	1.5	5.4
Both X-ray and sputum	15.5	16.7	15.8
Number of cases	**155**	**66**	**221**
Third visit			
Sputum only	11.0	13.2	11.7
X-ray only	5.1	3.8	4.7
Both X-ray and sputum	32.2	30.2	31.6
Number of cases	**118**	**53**	**171**
Fourth visit			
Sputum only	22.1	12.5	19.0
X-ray only	8.8	0.0	6.0
Both X-ray and sputum	25.0	43.8	31.0
Number of cases	**68**	**32**	**100**
Fifth visit			
Sputum only	28.9	18.8	25.9
X-ray only	7.9	6.3	7.4
Both X-ray and sputum	13.2	25.0	16.7
Number of cases	**38**	**16**	**54**

Note: Two HIV/AIDS patients have been excluded

Table-14 provides the distribution of tests conducted according to the type of facility consulted by the patient. Results indicate that almost all of the patients who had been recommended either a sputum test or chest X-ray underwent the tests. Irrespective of the visit number, a larger proportion of patients underwent either a sputum test or chest X-ray after visiting a government facility. Similarly, as the number of consultations increased the proportion of patients undergoing sputum tests also increased, irrespective of type of provider consulted. Nearly all the patients, irrespective of the type of health care facility accessed by them, followed through on the recommended steps of their health care provider.

Table 14: Percentage distribution of visits according to type of test conducted, by visit number and type of facility consulted

Type of test conducted	Type of facility consulted		
	Government facility	Private facility	Other
First visit			
Sputum only	6.5	0.0	5.3
X-ray only	4.3	3.1	0.0
Both X-ray and sputum	6.5	1.2	0.0
Number of cases	**46**	**162**	**19**
Second visit			
Sputum only	26.5	5.5	0.0
X-ray only	4.4	6.2	0.0
Both X-ray and sputum	29.4	9.7	12.5
Number of visits	**68**	**145**	**8**
Third visit			
Sputum only	16.7	8.9	0.0
X-ray only	7.6	3.0	0.0
Both X-ray and sputum	57.6	14.9	25.0
Number of visits	**66**	**101**	**4**
Fourth visit			
Sputum only	31.6	2.6	0.0
X-ray only	5.3	7.9	0.0
Both X-ray and sputum	40.4	21.1	0.0
Number of visits	**57**	**38**	**5**
Fifth visit			
Sputum only	41.4	9.1	0.0
X-ray only	10.3	4.5	0.0
Both X-ray and sputum	24.1	9.1	0.0
Number of visits	**29**	**22**	**3**

Note: Two HIV/AIDS patients have been excluded

The patient distribution of sites where diagnostic tests were conducted is shown in Table-15. Surprisingly, the most frequently reported place of conducting the test was the government hospital. The Designated Microscopy Centre (DMC) was reported specifically by only 12% of the patients. The government TB hospital was reported as the place of testing by around 17% of the patients and medical colleges by 7%. More females than males were reported to have accessed their test at a private health facility.

Table 15: Percentage distribution of respondents according to the place of conducting the tests, by sex

Place of conducting the test	Sex of the respondent		
	Male	Female	Total
Municipal/corporation hospital	9.4	8.8	9.3
Government TB hospital	17.0	17.7	17.2
Medical college	7.6	5.9	7.1
Other government hospital	44.0	33.8	41.0
Designated Microscopy Centre	12.0	10.3	11.5
Private hospital	6.3	20.6	10.6
Private clinic	2.5	8.8	4.4
Any private lab	5.0	8.8	6.2
Don't know/Can't say	0.6	0.0	0.4
Number of cases	**159**	**68**	**227**

Note: Two HIV/AIDS patients have been excluded

The percentage distribution of patients according to the disease condition shared with them after conducting the test is presented in Table-16. After conducting the diagnostic test, 7% of the patients were told they did not have TB. This highlights that some patients were not identified by the health care provider to have TB even after testing. 6% were diagnosed with allergy, and about 8% of the patients reported that they did not know what the health care provider told them after conducting the diagnostic test.

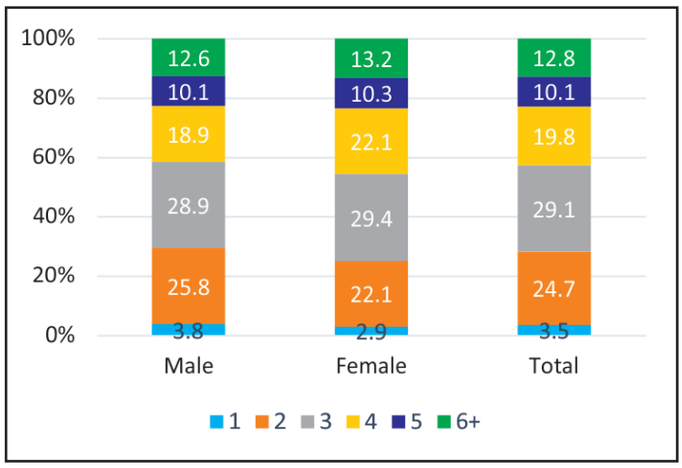
Table 16: Percentage distribution of respondents according to the information received about their disease condition after tests, by sex

Disease condition reported after test	Sex of the respondent		
	Male	Female	Total
No TB	5.0	2.0	7.0
Allergy	5.0	7.4	5.7
Chest congestion	4.0	0.0	4.0
TB	100	100	100
Don't know	5.0	3.0	8.0
Don't remember	0.5	0.0	0.3
Other	9.4	13.2	10.6
Number of cases	**159**	**68**	**227**

Note: Two HIV/AIDS patients have been excluded

The visit number by which the patient was diagnosed with TB has been shown in Figure-2. On average, about 3.6 consultation visits were made by the patients for them to be diagnosed with tuberculosis. More males (59%) than females (54%) were found to have TB before the fourth consultation. 23% of the respondents consulted a health care provider five or more times before they were diagnosed with TB.

Figure 2: Percentage distribution of respondents according to the visit number during which the provider informed them of their TB status, by sex



Patient and health system delays

Patient delay in seeking health care

The patient delay in visiting a qualified health care provider was also captured and has been presented in Table-17. We performed bivariate and regression analysis to determine characteristics that significantly influence patient delay. Patient delay in this study is defined as the number of days from the start of the symptoms (cough/fever) to the time when the patient first consulted a qualified health care provider. Overall, the average patient delay was roughly 23 days from the onset of symptoms.

Geographical factors: No difference in mean patient delay was noted between patients residing in slum areas and those staying in non-slum areas. Mean patient delay as per the TU areas grouped into three programme zones was found to be significant, with patients in Zone-B facing the highest patient delay (29 days) followed by patients in Zone-A (22 days) and Zone-C (20 days). The distance to the DOTS centre was also found to have significantly affected the patient delay with patients residing less than two kilometres (km) from the testing centre having the lowest mean patient delay of 19 days.

Individual factors: Although not significant, there was a difference of five days in the mean patient delay between males and females, with males facing a higher mean patient delay. The mean patient delay was found to be about 25 days among patients aged 50 years and above, against 22 days for patients aged below 50 years. We did not notice any difference in the mean patient delay between married patients and patients who had never married.

Table 17: Mean, median and interquartile range of patient delay, by selected characteristics

Characteristic	Mean patient delay	Standard deviation of patient delay	p-value	Median patient delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Sex							
Male	24.0	24.3		20.0	6.0	30.0	159
Female	19.2	17.8	0.139	15.0	6.0	30.0	68
Age							
< 50 years	22.0	22.6		15.0	5.0	30.0	175
50+	24.6	22.9	0.469	20.0	8.0	30.0	52
Place of residence							
Slum area	22.8	23.6		15.0	5.0	30.0	172
Non-slum area	21.8	19.4	0.781	20.0	7.0	30.0	55
Marital status							
Married or previously married	22.9	23.7		15.0	6.0	30.0	168
Never married	21.8	19.6	0.749	20.0	7.0	30.0	59
Literacy and education							
Illiterate or primary completed	25.2	25.3		20.0	7.0	30.0	100
More than primary completed	20.5	20.2	0.125	15.0	4.0	30.0	127
Occupation							
Daily labourer	23.6	25.0		20.0	5.0	30.0	66
Business	30.9	28.1		20.0	11.0	36.0	17
Salaried job	21.9	26.6		10.0	2.0	30.0	19
Other job	25.0	23.4		21.0	5.0	30.0	64
Not working	16.8	14.1	0.128	14.0	7.0	25.0	61
Religion							
Hindu	23.9	23.4		20.0	6.0	30.0	163
Non-Hindu	19.1	20.3	0.151	15.0	4.0	30.0	64
Caste/Tribe							
Scheduled Caste or Scheduled Tribe	27.8	27.7		25.0	6.0	30.0	59
Others	20.7	20.4	0.038	15.0	6.0	30.0	168
Personal monthly income (in rupees)							
< 5000	16.8	13.2		15.0	6.0	25.0	70
5000+	25.2	25.4	0.010	20.0	6.0	30.0	157
Monthly household income (in rupees)							
< 10000	15.9	13.2		12.0	6.0	26.0	40
10000+	24.0	25.4	0.040	20.0	6.0	30.0	187
Duration of stay in Bengaluru							
< 10 years	22.6	22.8		15.0	6.0	30.0	193
10+ years	22.2	21.9	0.924	21.0	5.0	30.0	34

Characteristic	Mean patient delay	Standard deviation of patient delay	p-value	Interquartile range			Number of cases
				Median patient delay	First quartile	Third quartile	
Personally knew someone with TB							
Yes	23.9	22.3		20.0	8.0	30.0	68
No	19.4	22.8	0.805	15.0	5.0	30.0	159
Number of household members							
< 5 members	22.1	21.4		20.0	6.0	30.0	135
5+ members	23.3	24.4	0.699	15.0	6.0	30.0	92
TU areas according to programme zones							
Zone – A	21.6	22.3		16.0	5.0	30.0	86
Zone – B	29.0	22.2		30.0	15.0	30.0	53
Zone – C	19.6	22.7	0.052	12.0	4.0	26.0	88

Note: Two HIV/AIDS patients have been excluded

Table 17: Mean, median and interquartile range of patient delay, by selected characteristics

Characteristic	Mean patient delay	Standard deviation of patient delay	p-value	Interquartile range			Number of cases
				Median patient delay	First quartile	Third quartile	
Type of facility first visited							
Government	28.6	25.9		23.0	7.0	30.0	46
Private	19.7	20.6		15.0	4.0	30.0	162
Other	32.9	26.3	0.007	25.0	11.0	49.0	19
Distance to DOTS centre							
<2 km	19.2	21.3		15.0	4.0	30.0	152
2+ km	29.5	23.8	0.001	30.0	12.0	30.0	75
Whether respondent consumed alcohol before TB diagnosis							
No	18.0	17.7		15.0	4.0	30.0	122
Yes	27.9	26.4	0.001	20.0	7.0	30.0	105
Whether respondent smoked before TB diagnosis							
No	18.5	17.0		15.0	6.0	30.0	130
Yes	28.1	27.6	0.001	20.0	7.0	30.0	97
Type of facility visited (based on all visits)							
Only government	34.0	27.5		28.0	18.0	49.0	34
Only private	14.1	12.9		10.0	4.0	20.0	46
Both (private and government)	22.6	22.8	<0.001	15.0	6.0	30.0	147
Total	**22.6**	**22.6**		**17.0**	**6.0**	**30.0**	**227**

Note: Two HIV/AIDS patients have been excluded

Patients who had completed primary or more years of schooling were found to have a smaller patient delay (21 days) than those who were either illiterate or had not completed primary level of education (25 days). Comparatively, patients who were not working were found to have the minimum mean patient delay, while the maximum mean patient delay was found among patients who were involved in a business. The difference in the mean patient delay was about five days between Hindu and non-Hindu patients, with Hindu patients having the greater mean patient delay. Patients belonging to either a Scheduled Caste or a Scheduled Tribe faced a mean patient delay of 28 days, whereas respondents not belonging to either category faced a significantly smaller mean patient delay of 21 days. We noticed a significant difference of eight days in the mean patient delay with respect to personal monthly income of the respondents, and this delay was smaller at 17 days for patients whose personal monthly income was less than Rupees 5000. We identified a significant patient delay (24 days) among patients with a household monthly income of more than Rupees 10,000 and a shorter delay (16 days) among patients with a household monthly income under Rupees 10,000. We did not find any difference among patient delay with respect to the duration of stay of respondents in Bengaluru city. Mean patient delay was slightly longer if the patient knew someone with TB prior to diagnosis. Patients living in households with less than five family members were found to have a longer patient delay than patients with five or more members and the difference was found to be significant.

Health seeking and other behavioural factors: The patient delay in consulting a non-qualified health care provider was almost 33 days if the patient first consulted a non-qualified health care provider. The results also indicate that on an average patients were reaching a private facility (20 days) earlier than a government facility (29 days). The mean patient delay was significantly greater if the patient either consumed alcohol or smoked tobacco before they were diagnosed with TB.

We also applied a multiple regression model to examine the factors responsible for patient delay. In the model, we included only those variables that were found to be significant below a 10% level in the bivariate analysis. Results of the multiple regression model for patient delay are given in Table-18. Instead of presenting the regression coefficients, we have chosen to present the adjusted mean patient delay estimated from the multiple regression model.

The adjusted mean patient delay according to the classification of programme zones indicates a significantly greater patient delay in respondents from Zone-B. The adjusted mean patient delay was 27 days for patients belonging to either a Scheduled Caste or a Scheduled Tribe and 21 days for patients who did not belong to either category, but this difference was not significant. We identified a longer delay for patients whose personal monthly income was Rupees 5000 or more and whose household income was Rupees 10,000 or more. Patients who first visited a heath facility other than a government or private one, had a significantly greater patient delay and the adjusted mean value was 33 days. Also, patients who resided two or more kilometres away from the DOTS centre faced an adjusted mean patient delay of 29 days, compared to a 19 day delay for patient who lived within two kilometres from the DOTS centre.

Table 18: Adjusted mean patient delay in seeking treatment from a qualified provider, using multiple regression model

Characteristic	Adjusted mean patient delay	95% CI	
		Lower	Upper
Caste/Tribe			
Scheduled Caste or Scheduled Tribe	26.8	21.5	32.2
Others	21.1	18.0	24.2
Personal monthly income (in rupees)			
< 5000	20.6	15.3	26.0
5000+	23.4	20.1	26.8
Monthly household income (in rupees)			
< 10000	18.9	11.8	26.0
10000+	23.4	20.3	26.4
TU areas according to programme zones			
Zone – A	22.1	17.7	26.5
Zone – B	28.5***	22.8	34.2
Zone –C	19.5	15.2	23.8
Type of facility first visited			
Government	21.2	13.3	29.1
Private	21.7	18.2	25.3
Other	33.0**	23.6	42.5
Distance to DOTS centre			
<2 km	19.2	15.9	22.5
2+ km	29.4*	24.7	34.1
Whether respondent consumed alcohol before TB diagnosis			
No	20.3	16.2	24.3
Yes	25.2	20.8	29.7
Whether respondent smoked before TB diagnosis			
No	20.1	16.2	24.0
Yes	25.9***	21.3	30.5
Type of facility visited (based on all visits)			
Only government	34.0	24.5	43.5
Only private	16.6*	10.3	23.0
Both (private and government)	21.8**	18.3	25.3
Total	**22.6**	**19.9**	**25.2**

Note: Two HIV/AIDS patients have been excluded
*significant at p-value < 0.01; **significant at p-value < 0.05 ***significant at p-value < 0.10

Delay in diagnosis and treatment initiation

Health system delay is defined as the number of days between the first consultation of a qualified health care provider and the day of treatment initiation. The mean, median and interquartile range of health system delay is shown in Table-19. The mean health system delay was found to be 39 days for men and 40 days for women.

Table 19: Mean, median and interquartile range of health system delay, by selected characteristics

Characteristic	Mean health system delay	Standard deviation of health system delay	p-value	Median health system delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Sex							
Male	38.8	31.1		31.0	18.0	52.0	159
Female	40.3	30.2	0.732	33.0	21.0	48.0	68
Age							
< 50 years	40.7	32.2		32.0	19.0	53.0	175
50+	34.5	25.0	0.208	28.0	20.0	47.0	52
Place of residence							
Slum area	40.6	30.6		34.0	21.0	51.0	172
Non-slum area	35.2	31.1	0.265	24.0	16.0	52.0	55
Marital status							
Married or previously married	40.4	30.8		32.0	21.0	54.0	168
Never married	36.1	30.6	0.362	29.0	17.0	47.0	59
Literacy and education							
Illiterate or primary completed	38.4	28.8		32.0	19.0	53.0	100
More than primary completed	39.9	32.3	0.714	31.0	20.0	47.0	127
Occupation							
Daily labourer	36.5	28.9		32.0	17.0	48.0	66
Business	39.4	31.7		32.0	21.0	45.0	17
Salaried job	42.0	26.6		37.0	23.0	57.0	19
Other job	37.8	26.7		31.0	19.0	56.0	64
Not working	42.9	37.5	0.796	31.0	21.0	48.0	61
Religion							
Hindu	39.4	31.9		31.0	20.0	51.0	163
Non-Hindu	39.1	27.8	0.947	35.0	18.0	52.0	64
Caste/Tribe							
Scheduled Caste or Scheduled Tribe	42.4	37.1		28.0	16.0	59.0	59
Others	38.2	28.2	0.357	32.0	21.0	48.0	168
Personal monthly income (in rupees)							
< 5000	36.9	34.8		27.0	17.0	47.0	70
5000+	40.3	28.8	0.432	35.0	21.0	54.0	157

Characteristic	Mean health system delay	Standard deviation of health system delay	p-value	Median health system delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Household monthly income (in rupees)							
< 10000	37.1	38.8		25.0	13.0	45.0	40
10000+	39.7	28.9	0.625	34.0	21.0	52.0	187
Duration of stay in Bengaluru							
< 10 years	39.4	38.8		32.0	19.0	51.0	193
10+ years	38.4	28.9	0.857	33.0	20.0	57.0	34
Personally knew someone with TB							
Yes	42.7	35.4		35.0	15.0	61.0	68
No	37.8	28.5	0.277	32.0	21.0	47.0	159
Number of household members							
< 5 members	37.7	28.9		31.0	19.0	48.0	135
5+ members	41.6	33.3	0.355	35.0	19.0	52.0	92
TU areas according to programme zones							
Zone – A	45.1	36.1		37.0	20.0	55.0	86
Zone – B	45.0	30.9		37.0	25.0	57.0	53
Zone – C	30.1	21.7	0.002	25.0	15.0	39.0	88

Note: Two HIV/AIDS patients have been excluded

Table 19: Mean, median and interquartile range of health system delay, by selected characteristics

Characteristic	Mean health system delay	Standard deviation of health system delay	p-value	Median health system delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Type of facility first visited							
Government	39.9	39.2		28.0	11.0	58.0	46
Private	41.3	28.7		35.0	22.0	52.0	162
Other	20.4	15.1	0.019	21.0	6.0	33.0	19
Distance to DOTS centre							
<2 km	39.6	30.6		32.0	20.0	52.0	152
2+ km	38.6	31.3	0.809	31.0	18.0	48.0	75
Whether respondent consumed alcohol before TB diagnosis							
No	40.2	29.7		34.0	21.0	51.0	122
Yes	38.2	32.0	0.642	30.0	17.0	51.0	105

Characteristic	Mean health system delay	Standard deviation of health system delay	p-value	Median health system delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Whether respondent smoked before TB diagnosis							
No	39.6	31.6		32.0	20.0	48.0	130
Yes	38.8	29.8	0.839	32.0	19.0	51.0	97
Type of facility visited (based on all visits)							
Only government	26.6	31.3		15.0	6.0	32.0	34
Only private	29.9	21.9		24.0	16.0	41.0	46
Both (private and government)	45.1	31.5	< 0.001	37.0	24.0	57.0	147
Number of consultation visits							
<3	21.4	25.5		14.0	7.0	23.0	56
3-4	36.0	21.8		32.0	23.0	47.0	117
5+	64.9	35.9	< 0.001	60.0	38.0	86.0	54
Total	**39.3**	**30.8**		**32.0**	**19.0**	**51.0**	**227**

Note: Two HIV/AIDS patients have been excluded

Geographical factors: We noticed that the patients living in slum areas faced a longer health system delay (41 days) than non-slum area residents (35 days), but the difference was not found to be statistically significant. An analysis across programme zones indicates that patients in Zone-C had a shorter health system delay when compared to Zone-A and Zone-B patients.

Individual factors: Health system delay did not vary with the sex of the respondent. Although not significant, the patients who were less than 50 years of age experienced a longer health system delay (41 days) than those who were older than 50 years (35 days). A difference in health system delay according to literacy and education status was not noticed. Health system delay was slightly longer for patients who were not working (43 days) or were engaged in a salaried job (42 days). Patients belonging to either a Scheduled Caste or a Scheduled Tribe faced a longer health system delay (42 days) than non-Scheduled Caste and Tribe patients (38 days). This variation however, was not considered significant. We also did not find any difference in the health system delay according to personal monthly income and household monthly income. There was a slightly longer health system delay if the patient knew someone with TB prior to their own diagnosis of TB. Duration of stay in Bengaluru city did not affect the health system delay. Although not significant, we found a longer health system delay among patients who lived with 5 or more household members.

Health seeking and other behavioural factors: Health system delay was found to be significantly greater (41 days) if the patient had first consulted a private health facility. However, based on all patient visits, the health system delay was significantly greater for those who consulted both private and government facilities prior to treatment. The lowest health system delay of 27 days was noticed with patients who visited only a government health facility. Mapping the health system delay against the number of consultation visits made by the patient indicated that multiple visits to the provider significantly increased the delay. The average health system delay was found to be around 21 days for patients who made less than three consultation visits, 36 days for those who made three or four visits, and 65 days for patients who made more than five visits. No difference in health system delay was found according to either consumption of alcohol or usage of tobacco.

A multiple regression model was applied next, to understand the risk factors for health system delay. The estimated adjusted mean health system delay from the regression model is presented in Table-20. As per the bivariate analysis, none of the individual characteristics were significantly associated with the health system delay. However, most of the health seeking behaviours were significantly associated with the health system delay in the analysis.

A significantly low health system delay of 34 days was noticed among the patients from Zone-C after accounting for other variables. The adjusted mean health system delay was greatest for patients from Zone-A of the TU areas at 44 days. Surprisingly, the health system delay was significantly smaller for those who first consulted an unqualified health care provider. This result may have been caused by an already prolonged patient delay found earlier among patients who first consulted an unqualified health care provider, thus prompting the qualified health provider to make a diagnosis and initiate treatment quickly. Health system delay was significant for patients who consulted both government and private health facilities for treatment. These patients may have been shopping for healthcare providers in private and government facilities, causing a longer health system delay. The health system delay was found to be shorter for patients who continued to visit only a government health facility. Results indicate that private health care providers may have taken more time to recommend the appropriate test, thereby causing a longer health system delay even with the patients having consulted them earlier. A major factor that significantly affected the health system delay was found to be the number of consultation visits made by the patient. The health system delay was significantly smaller at 23 days if the number of consultation visits was less than three and significantly greater at 64 days for those who consulted the health care provider five or more times.

Table 20: Adjusted mean health system delay in initiating TB treatment, using multiple regression model, by selected characteristics

Characteristic	Adjusted mean health system delay	95% CI	
		Lower	Upper
TU areas according to programme zones			
Zone – A	44.4	39.0	49.8
Zone – B	40.4	33.5	47.4
Zone – C	33.5*	28.2	38.9
Type of facility first visited			
Government	50.1	40.4	59.8
Private	38.9***	34.5	43.2
Other	16.2*	4.7	27.9
Type of facility visited (based on all visits)			
Only government	29.3	17.4	41.3
Only private	34.5	26.7	42.2
Both (private and government)	43.1**	38.8	47.4
Number of consultation visits			
< 3	23.1	16.0	30.3
3-4	35.4*	30.8	40.0
5+	64.4*	57.5	71.2
Total	**39.3**	**36.0**	**42.5**

Note: Two HIV/AIDS patients have been excluded
*significant at p-value < 0.01, **significant at p-value < 0.05, ***significant at p-value < 0.10

Total delay in treatment initiation

Total delay is the summation of patient delay and health system delay and is expressed in number of days. The mean total delay and other statistics for total delay according to selected characteristics is presented in Table-21. In Bengaluru, on average, it took 62 days for a patient to start the TB treatment from the RNTCP.

Table 21: Mean, median and interquartile range of total delay, by selected characteristics

Characteristic	Mean health system delay	Standard deviation of health system delay	p-value	Interquartile range			
				Median total delay	First quartile	Third quartile	Number of cases
Sex							
Male	62.8	37.3		57.0	31.0	80.0	159
Female	59.5	32.5	0.524	53.0	35.0	77.0	68
Age							
< 50 years	62.7	37.6		55.0	33.0	80.0	175
50+	59.1	29.5	0.534	57.0	34.0	75.0	52
Place of residence							
Slum area	63.4	35.1		59.0	35.0	78.0	172
Non-slum area	57.1	38.0	0.258	46.0	27.0	72.0	55
Marital status							
Married or previously married	63.2	35.3		58.0	35.0	79.0	168
Never married	57.9	37.5	0.325	47.0	30.0	77.0	59
Literacy and education							
Illiterate or primary completed	63.6	34.7		62.0	35.0	82.0	100
More than primary completed	60.5	36.8	0.513	48.0	34.0	77.0	127
Occupation							
Daily labourer	60.1	38.5		47	30	77	66
Business	70.4	41.1		64	34	91	17
Salaried job	63.9	33.7		69	31	87	19
Other job	62.8	30.9		65	35	84	64
Not working	59.7	37.5	0.836	51	35	68	61
Religion							
Hindu	63.3	37.5		56.0	34.0	84.0	163
Non-Hindu	58.2	31.3	0.335	54.0	34.0	73.0	64
Caste/Tribe							
Scheduled Caste or Scheduled Tribe	70.3	40.7		64.0	38.0	94.0	59
Others	58.9	33.6	0.036	52.0	34.0	75.0	168

Characteristic	Mean health system delay	Standard deviation of health system delay	p-value	Median total delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Personal monthly income (in rupees)							
< 5000	53.7	35.1		44.0	30.0	65.0	70
5000+	65.5	35.7	0.022	63.0	37.0	84.0	157
Household monthly income (in rupees)							
< 10000	53.0	35.1		43.0	33.0	59.0	40
10000+	63.7	35.7	0.086	61.0	34.0	82.0	187
Duration of stay in Bengaluru							
< 10 years	62.1	36.3		55.0	34.0	78.0	193
10+ years	60.6	33.8	0.830	55.0	31.0	78.0	34
Personally knew someone with TB							
Yes	65.8	39.5		58.0	34.0	85.0	68
No	60.1	34.2	0.277	54.0	34.0	77.0	159
Number of household members							
< 5 members	59.8	33.9		52.0	34.0	77.0	135
5+ members	64.8	38.5	0.300	60.0	34.0	84.0	92

Note: Two HIV/AIDS patients have been excluded

Table 21: Mean, median and interquartile range of total delay, by selected characteristics

Characteristic	Mean total delay	Standard deviation of total delay	p-value	Median total delay	Interquartile range		Number of cases
					First quartile	Third quartile	
TU areas according to programme zones							
Zone – A	66.7	39.2		63.0	34.0	84.0	86
Zone – B	74.0	33.8		68.0	54.0	89.0	53
Zone – C	49.7	29.8	<0.001	40.0	30.0	62.0	88
Type of facility first visited							
Government	68.4	42.5		60.0	34.0	94.0	46
Private	61.0	34.6		55.0	34.0	78.0	162
Other	53.3	26.7	0.259	51.0	28.0	70.0	19
Distance to DOTS centre							
<2 km	58.8	34.5		50.0	34.0	77.0	152
2+ km	68.1	38.0	0.067	66.0	36.0	84.0	75

Table 21: Mean, median and interquartile range of total delay, by selected characteristics

Characteristic	Mean total delay	Standard deviation of total delay	p-value	Interquartile range			Number of cases
				Median total delay	First quartile	Third quartile	
Whether respondent consumed alcohol before TB diagnosis							
No	58.1	33.6		52.0	34.0	74.0	122
Yes	66.2	38.0	0.092	63.0	34.0	85.0	105
Whether respondent smoked before TB diagnosis							
No	58.1	34.4		51.0	33.0	77.0	130
Yes	66.9	37.3	0.066	64.0	38.0	85.0	97
Type of facility visited (based on all visits)							
Only government	60.6	35.7		54.0	33.0	77.0	34
Only private	43.9	26.5		36.0	27.0	54.0	46
Both (private and government)	67.7	36.7	< 0.001	63.0	39.0	84.0	147
Number of consultation visits							
<3	47.7	33.9		37.0	24.0	59.0	56
3-4	57.9	30.8		51.0	34.0	76.0	117
5+	85.1	37.7	< 0.001	76.0	61.0	105.0	54
Total	**61.8**	**35.9**		**55.0**	**34.0**	**78.0**	**227**

Note: Two HIV/AIDS patients have been excluded

Geographical factors: Patients residing in slum areas (63 days) had a slightly greater total delay than patients residing in non-slum areas (57 days). Calculation of total delay across the TU zones indicates that patients from Zone-B have the longer mean total delay (74 days), followed by Zone-A (67 days) and Zone-C (50 days). Patients who were residing within two kilometres of the DOTS centre were found to have a total delay of 58 days as compared to 68 days for patients residing two or more kilometres from the DOTS centre.

Individual factors: The total delay was nominally longer for males than females. The average total delay was 63 days for patients aged less than 50 years, whereas it was 59 days for those aged 50 or more years. Patients who were either illiterate or had not completed primary schooling experienced a longer total delay (64 days) than those who had completed primary schooling (61 days). Total delay was longer for patients who were engaged in a business (70 days) and lowest for those who were not working or engaged as daily labourers (60 days). Patients belonging to Hinduism had a total delay of 63 days as compared to the total delay of 58 days for patients who were not Hindus. Similarly, patients belonging to either Scheduled Castes or Tribes experienced a significantly greater total delay (70 days) than the rest (59 days). Patients whose personal monthly income was less than Rupees 5000 faced a significantly smaller total delay than patients whose personal monthly income was Rupees 5000 or more. Similarly, patients whose monthly household income was less than Rupees 10,000 had smaller total delay as compared to those whose monthly household income was Rupees 10,000 or more. Among the patients who knew someone with TB prior to their own diagnosis of TB, the total delay was 66 days compared to 60 days for those who did not know any TB patient prior to their diagnosis. Total delay was slightly greater for patients having five or more household members than patients with less than five household members.

Health seeking and other behavioural factors: Patients who first visited a government health facility had a longer mean total delay than patients who visited a private health facility or other health facilities first. This is because the patient delay was longer for patients who consulted a government health facility first. The total delay was longer if the patient consulted a health care provider from both private and government facilities. Multiple consultations with the health care provider escalated the total delay. For example, the average total delay was nearly 48 days for patients who had less than three consultation visits prior to a TB diagnosis and 85 days for those who had five or more consultation visits. Total delay was significantly greater for patients who consumed alcohol and who used tobacco prior to being diagnosis with TB as compared to patients who did not use either prior to their diagnosis.

The adjusted mean total delay in initiating TB treatment from multiple regression model is given in Table-22. In the bivariate analysis, we identified three individual characteristics (caste/tribe, personal monthly income, and monthly household income), two geographical factors (TU areas according to programme zones and distance to DOTS centre) and four health seeking and behavioural characteristics (consumption of alcohol and use of tobacco before diagnosis, type of health facility visited across all consultations and total number of consultations) as significantly associated with the total delay at a p-value below 10% level.

Table 22: Adjusted mean total delay in initiating the TB treatment, using multiple regression model

Characteristic	Mean total delay	95% CI	
		Lower	Upper
Caste/Tribe			
Scheduled Caste or Scheduled Tribe	69.7	61.5	77.9
Others	59.1**	54.3	63.8
Personal monthly income (in rupees)			
< 5000	57.0	49.0	65.0
5000+	64.0	58.9	69.1
Monthly household income (in rupees)			
< 10000	60.3	49.6	71.0
10000+	62.2	57.6	66.7
TU areas according to programme zones			
Zone – A	66.7	60.0	73.4
Zone – B	70.4	61.8	78.9
Zone – C	52.0*	45.4	58.6
Distance to DOTS centre			
<2 km	58.9	53.9	63.8
2+ km	67.9**	60.8	75.0
Whether consumed alcohol before TB diagnosis			
No	60.6	54.4	66.7
Yes	63.3	56.6	70.0
Whether smoked respondent before TB diagnosis			
No	59.5	53.7	65.3
Yes	65.0	58.1	71.9

Table 22: Adjusted mean total delay in initiating the TB treatment, using multiple regression model

Characteristic	Mean total delay	95% CI	
		Lower	Upper
Type of facility visited (based on all visits)			
Only government	68.2	57.0	79.4
Only private	49.4*	40.2	58.6
Both (private and government)	64.3	59.1	69.5
Number of consultation visits			
< 3	49.0	40.0	57.9
3-4	57.9	52.2	63.6
5+	83.7*	75.2	92.1
Total	**61.8**	**57.8**	**65.9**

Note: Two HIV/AIDS patients have been excluded
*significant at p-value < 0.01; **significant at p-value < 0.05

The adjusted total delay in initiating TB treatment was found to be significantly greater among patients who belonged to either the Scheduled Castes or Scheduled Tribes, compared to patients who didn't belong to this group. The estimated adjusted mean total delay was roughly 70 days for patients falling under the former category as compared to 59 days for patients under the latter category. Patients whose personal monthly income was more than Rupees 5000 had a greater total delay than patients whose personal monthly income was less than Rupees 5000, but the difference was not significant when other variables were controlled for. The effect of monthly household income was also not found to be significant, though patients whose monthly household income was more than Rupees 10,000 faced a marginally greater total delay in starting the treatment.

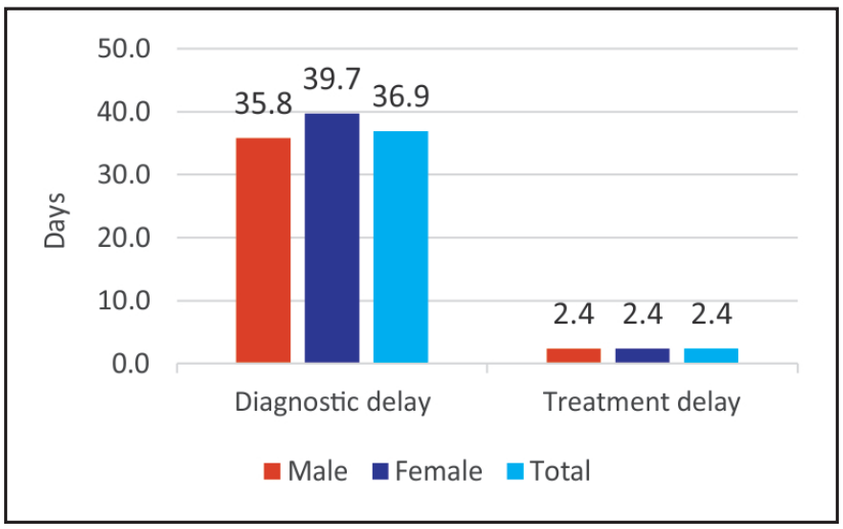
The adjusted mean total delay according to TU programme zones indicates that patients accessing treatment from Zone-C had a significantly shorter total delay. The difference in the total delay for treatment initiation was nine days between patients who resided within two km of the DOTS centre and those who resided more than two km from it, with the former having the shorter delay of 59 days.

We noticed a difference of 3-5 days in total delay among patients who consumed alcohol and used tobacco prior to diagnosis with TB as compared to patients who did not consume alcohol or use tobacco, but the difference was not significant when other variables were controlled for.

The total delay in initiating TB treatment was significantly shorter, if the patient consulted only a private health care provider. This may be due to the fact that patient delay was comparatively shorter for those who visited only a private health facility prior to their treatment. Multiple consultations with the health care provider significantly increased the total delay in initiating TB treatment. For example, patients who consulted their health care provider less than three times had a total delay of 49 days against a delay of 84 days among patients who consulted their health care provider five or more times.

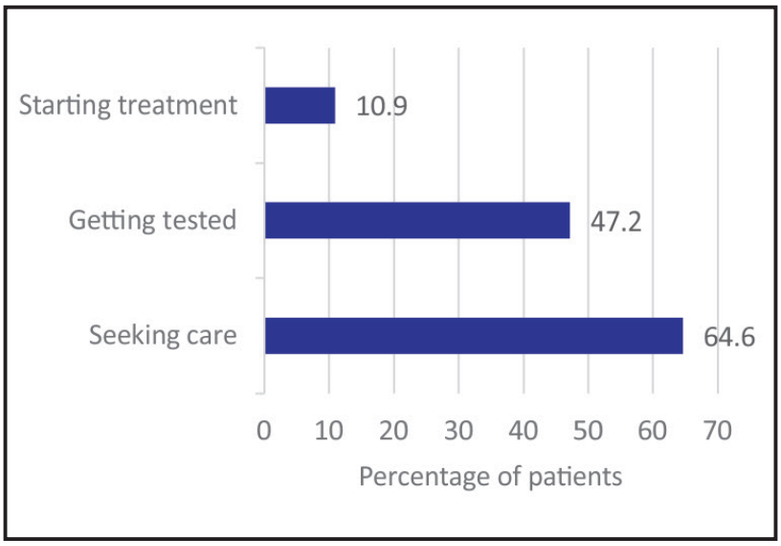
We also analysed the health system delay by splitting it into diagnostic delay and treatment delay. Diagnostic delay is the number of days it takes for a patient to be diagnosed with TB after first visiting a qualified health care provider and treatment delay is the number of days in which treatment is started after a TB diagnosis. In total, the mean diagnostic delay was nearly 37 days and the mean treatment delay was about two days (see Figure-3). This indicates that once a diagnosis of TB was made, there was not much delay in initiating the treatment for TB. The diagnostic delay was slightly longer for females than males, with the latter being diagnosed almost four days earlier than the former. No difference in treatment delay was found between males and females.

Figure 3: Mean diagnostic delay and treatment delay, by sex of the patient



We also asked all the patients whether they thought there was a delay in seeking care from the health care provider, delay in getting tested for TB and delay in starting the treatment for TB. Figure-4 provides the distribution of patients who mentioned such delays. Overall, 65%, 47% and 11% of the patients reported there was a delay in seeking care, getting tested for TB, and starting treatment for TB respectively. This indicates that more patients perceived a patient delay rather than a diagnostic or treatment delay.

Figure 4: Percentage distribution of patients reporting perceived delays in seeking care from the health care provider, getting tested for TB and in starting the treatment for TB



Follow-up after treatment initiation

Table-23 provides the distribution of patients across time intervals between diagnosis and visit of a grassroots-level government health worker to the patients' home. About two-fifths of the patients had not been visited by any government health worker at their homes. Around 49% of the females and 39% of the males reported that they were not visited by the government health worker at their home after their diagnosis of TB.

Table 23: Percentage distribution of respondents according to the number of days after diagnosis of TB, that the government health worker visited the respondent at home, by sex

Number of days between TB diagnosis and health worker's home visit	Sex of the respondent		
	Male	Female	Total
0	0.6	4.3	1.7
1-3 days	44.0	31.4	40.2
4-7 days	15.7	15.7	15.7
8+days	0.6	0.0	0.4
Not visited	39.0	48.6	41.9
Mean number of days	**2.93**	**2.75**	**2.88**
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**70**	**229**

The average gap between diagnosis and the health worker's visit was found to be three days. It is important to note that around two-fifths of the patients reported that the government health worker visited the patient's home within three days of diagnosis. More males (45%) than females (31%) were reported to have been visited by the government health care provider within three days of diagnosis of TB.

We also captured the distance a patient had to travel from their home to the facility from where they received their TB medicine and the results have been presented in Table-24, below. Almost half of the patients resided within one kilometre of the DOTS centre and nearly one-fifth of the patients resided three or more kilometres from the DOTS centre. The average distance from the residence to the DOTS centre was less than two kilometres.

Table 24: Percentage distribution of respondents according to distance travelled and money spent on transportation to reach the facility from where medicines were acquired, by sex

Distance and amount spent	Sex of the respondent		
	Male	Female	Total
Distance to the facility			
< 1 km	48.4	50.0	48.9
1-2 km	18.9	17.1	18.3
2-3 km	15.1	17.1	15.7
3-4 km	3.8	7.1	4.8
4+ km	13.8	8.6	12.2
Mean distance	1.64	1.43	1.58

Distance and amount spent	Sex of the respondent		
	Male	Female	Total
Whether paid for transportation to reach the facility			
Yes	34	37.1	34.9
No	66	62.9	65.1
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**70**	**229**
Amount spent on transportation			
<50 Rupees	35.2	15.4	28.7
50-99 Rupees	46.3	76.9	56.3
100+ Rupees	18.5	7.7	15
Mean amount spent	**62.6**	**60.0**	**61.8**
Total percent	**100**	**100**	**100**
Number of cases	**54**	**26**	**80**

Irrespective of the distance between the respondents' homes and the DOTS centre, 35% of the patients had to pay for transportation to reach and travel back from the facility. 29% of the patients reported spending less than Rupees 50 on this travel, with more males (35%) than females (15%) reporting the same. Patients who paid for transportation, incurred an average expense of around Rupees 62 per trip.

Treatment and care related issues

All respondents were also asked questions to ascertain the perceived quality and quantity of care received by them prior to and during their treatment. Patients were asked if they were accompanied by anyone during their visit to the health care centre and if so, their relation to this person. Around 12% of the patients reported that no one accompanied them, with more males (15%) than females (6%) reporting the same. The majority of respondents were accompanied by their spouses (37%), overall and across both the genders. This was however, reported by more males (39%) than females (33%). Parents accompanied nearly 18% of the patients, and more female patients (24%) were accompanied by their parents than male patients (16%). Other family members, such as children and siblings accompanied 15% and 7% of the patients, respectively. (Table-25)

Table 25: Percentage distribution of respondents according to their relation with the person who accompanied them to health care facilities before diagnosis, by sex

Accompanying person	Sex of the respondent		
	Male	Female	Total
No one accompanied	15.1	5.7	12.2
Wife/husband	39.0	32.9	37.1
Mother/father	15.7	24.3	18.3
Son/daughter	11.3	22.9	14.8
Sister/brother	6.3	10.0	7.4

Accompanying person	Sex of the respondent		
	Male	Female	Total
Mother-in-law/ father-in-law	1.9	0.0	1.3
Brother-in-law/sister-in-law	0.0	1.4	0.4
Other relatives	3.8	0.0	2.6
Friend	5.0	1.4	3.9
Other	1.9	1.4	1.7
Total percent	**100**	**100**	**100**
Number of cases	**159**	**70**	**229**

Distribution of patients according to the person who informed them of their TB diagnosis, as well as the patients' emotional status or reaction, has been presented in Table-26. The doctor informed 90% of the patients of their TB diagnosis. This was more common in female patients (93%) than in male patients (89%). The government health worked conveyed this information to 9% of the respondents, and relatives to 1% of the patients.

Nearly half of the patients reported being scared, and 20% being depressed, upon first hearing about their diagnosis. More females reported feeling scared (69%) than males (42%) after being told about their diagnosis of TB. Across both the genders, more than 14% of the patients did not first believe that they had TB. Interestingly, this was more common among male patients (18%) than female patients (7%).

Table 26: Percentage distribution of respondents according to who informed them of their TB status and their emotional status upon getting this information, by sex

	Sex of the respondent		
	Male	Female	Total
Person who informed the respondent about TB diagnosis			
Doctor	88.7	92.9	90.0
Government health worker	10.1	5.7	8.7
Relative	0.6	1.4	0.9
Other	0.6	0.0	0.4
Mood of the patient after knowing about the diagnosis			
Scared	41.5	68.6	49.8
Depressed	22.6	12.9	19.7
Angry	8.2	5.7	7.4
Did not believe	17.6	7.1	14.4
Other	10.1	5.7	8.7
Total percent	**100**	**100**	**100**
Number of cases	**159**	**70**	**229**

Personal habits such as alcohol consumption and tobacco usage before and after being diagnosed with TB and change in food habits, were also mapped. Results of these inquiries are given in Table-27. Both alcohol consumption and tobacco usage was found to be negligible in females both before and after diagnosis. Nearly two-thirds of male respondents reported that they consumed alcohol before being diagnosed and 58% reported that they stopped after being diagnosed with TB. In other words, 93% of the male patients who consumed alcohol

before being diagnosed reported that they did not consume alcohol post TB diagnosis. Tobacco use too, was common in 61% of the male patients before being diagnosed with TB. Incidence of tobacco use decreased after diagnosis in male patients with 53% of them reporting that they stopped using tobacco after diagnosis. This indicates that around 8% of the male patients continued to use tobacco even after knowing that they had TB.

Table 27: Percentage distribution of respondents according to change in personal habits before and after TB diagnosis, by sex

Personal habits before being diagnosed with TB	Sex of the respondent		
	Male	Female	Total
Alcohol consumption			
Never consumed alcohol	35.2	97.1	54.1
Consumed alcohol every day	54.7	1.4	38.4
Consumed alcohol once a week	7.5	1.4	5.7
Consumed alcohol once a month	2.5	0.0	1.7
Tobacco consumption			
Never smoked/used tobacco	39.0	100.0	57.6
Smoked or used tobacco every day	53.5	0.0	37.1
Smoked or used tobacco once a week	4.4	0.0	3.1
Smoked or used tobacco once a month	3.1	0.0	2.2
Personal habits after being diagnosed with TB			
Alcohol consumption			
Never consumed alcohol	35.2	97.1	54.1
Consumed alcohol every day	6.3	0.0	4.4
Consumed alcohol once a month	0.6	0.0	0.4
Stopped drinking alcohol	57.9	2.9	41.0
Tobacco consumption			
Never smoked/used tobacco	39.0	100.00	57.60
Smoked or used tobacco every day	5.7	0.00	3.90
Smoked or used tobacco once a week	2.5	0.00	1.70
Stopped smoking/tobacco use	52.8	0.00	36.70
Change in food habits			
No change	25.2	20.0	23.6
Quantity of food reduced	17.0	30.0	21.0
Quantity of food increased	40.3	25.7	35.8
Type of food eaten changed	2.5	2.9	2.6
Reduction in number of times food was eaten	3.1	1.4	2.6
Increase in number of times food was eaten	13.8	20.0	15.7
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**70**	**229**

With respect to the patient's food and eating habits after being diagnosed with TB, almost a quarter of the patients reported that they did not change their food habits, post diagnosis. However, one-fifth of the patients said that they reduced the quantity of food eaten after being diagnosed with TB, and this was reported more by females (30%) than males (17%).

After being diagnosed with TB, the quantity of food eaten was increased by one-third of the total patients. More males (40%) than females (26%) reported this increase. Similarly, an increase in the number of times food was eaten was reported by 16% of the patients, with more females (20%) than males (14%) having reported this change.

Table 28: Percentage distribution of respondents according to thoughts on disclosure of their illness, status of disclosure, and its repercussions, by sex

Disclosure	Sex of the respondent		
	Male	Female	Total
Whether people with TB should disclose their TB status			
Yes	49.1	41.4	46.7
No	50.9	58.6	53.3
Informed friends/relatives of their diagnosis			
Yes	67.9	57.1	64.6
No	32.1	42.9	35.4
Change in relationship with family after disclosure of illness			
Yes	3.1	5.7	3.9
No	96.9	94.3	96.1
Change in relationship with friends/relatives after disclosure of illness			
Yes	3.1	4.3	3.5
No	96.9	95.7	96.5
Total percent	**100**	**100**	**100**
Number of cases	**159**	**70**	**229**

Table-28 presents the extent of disclosure of the patients' TB status and its impact on relationships. Sharing their TB status with others was only felt to be important by 47% of the respondents. However, 65% of the patients reported disclosing their TB diagnosis to either friends or relatives. A change in the relationship of patients with family or friends after disclosure was found in only 5% of the respondents.

The respondents were also asked to share their opinions regarding the kind of support that is needed during diagnosis and treatment of TB, as well as their suggestions to help individuals get treatment for TB as soon as possible, without delay. Some of the frequently cited suggestions were that persons with symptoms of TB (with cough) should get their sputum tested early and the health care provider should recommend such a test sooner. The DMC being closer to patients' homes and provisioning of medicines at home were some of the external factors that were suggested for a better treatment experience. Following the doctor's advice on treatment, starting the medicines without delay and providing correct information about consumption of medicines (or treatment adherence), were the most commonly reported suggestions to help someone initiate treatment of TB. The suggestions for a person to successfully complete treatment and be fully cured of TB free were to start the treatment early, consume nutritious food, follow the doctor's advice on treatment and complete the full course of treatment.

We also collected information on the amount spent by the patients on consultations, diagnostic tests, medicines and the total expenditure for each visit to the health care provider prior to treatment initiation. The mean and percentage distribution according to amount spent by sex is given in Table-29. The mean consultation fee spent by the patient was Rupees 252. No money was spent by nearly one-fifth of the patients on consultation. The consultation amount was Rupees 400 or more for nearly 24% of patients. More females than males reported having spent Rupees 400 or more towards consultation fees. For diagnostic tests, about 47% of the patients did not spend any amount. However, around 7% of the patients reported that they had spent Rupees 2000 or more for diagnostic tests. The average expenditure for diagnostic tests was calculated to be Rupees 485 and females spent more on diagnostic tests than males.

Table 29: Percentage distribution of respondents according to amount paid for consultations, tests and medicines, by sex

Amount paid for (in Rupees)	Sex of the respondent		
	Male	Female	Total
Consultation			
No fee	23.3	16.2	21.1
1-199	29.6	23.5	27.8
200-399	23.3	30.9	25.6
400+	22.0	27.9	23.8
Not mentioned	1.9	1.5	1.8
Mean consultation fee	**239.76**	**280.75**	**252.08**
Tests			
No fee	47.2	47.1	47.1
1-999	37.7	29.4	35.2
1000-1999	6.9	11.8	8.4
2000+	5.7	10.3	7.0
Not mentioned	2.5	1.5	2.2
Mean test fee	**385.84**	**714.36**	**484.99**
Medicine			
No fee	11.9	10.3	11.5
1-999	57.9	50.0	55.5
1000-1999	17.6	19.1	18.1
2000+	10.1	19.1	12.8
Not mentioned	2.5	1.5	2.2
Mean expenditure on medicine	**882.43**	**1267.94**	**998.78**
Total			
No fee	6.3	8.8	7.0
1-999	41.5	25.0	36.6
1000-1999	21.4	25.0	22.5
2000+	27	38.2	30.4
Not mentioned	3.8	2.9	3.5
Mean total amount spent	**1518.53**	**2150.36**	**1708.95**
Number of cases	**159**	**68**	**227**

Note: Two HIV/AIDS patients have been excluded

The average expenditure for medicine was estimated to be Rupees 1000. A little over one-tenth of the patients did not pay anything for medicine while 13% of the patients spent Rupees 2000 or more. In total, around 7% of the patients did not spend any money on consultations, medicine and diagnostic tests. The total mean amount spent prior to TB treatment was about Rupees 1710. The total expenditure was more than Rupees 2000 for 30% of the patients. The total amount spent by patients prior to the initiation of treatment was more for females than males.

Summary and conclusions

Through THALI's community-level intervention activities, it is envisaged that more people in the slum areas of Bengaluru will recognize early symptoms and signs of TB, know where to seek care and demand appropriate services for TB. This will eventually reduce the number of visits to the health care provider and reduce the patient and health system delays in initiating TB treatment. The present survey among the adult NSP patients accessing RNTCP services for TB treatment in Bengaluru provides baseline information to understand the current level of patient and health system delays.

In Bengaluru district, we contacted 290 adult NSP patients of which 229 adult NSP patients consented to be interviewed. 28% of the adult NSP patients were illiterate. The results clearly indicate that visual and verbal communication strategies would be required to improve prevention and control of TB among this strata of the population.

Around 82% of the patients lived in homes having only one room for sleeping. This emphasizes the importance of imparting information on cough hygiene and indoor household air quality in the house during community activities, in order to control and prevent the spread of TB at the household level. It is also important to note that around 8% of the patients spent one or more months away from their current place of residence.

Nearly 30% of the adult NSP patients had come in contact with a known TB patient before being diagnosed for TB themselves. Out of this group, only 23% of had come in contact with the TB patient within the last two years and 77% had come in contact with the TB patient more than two years before. This indicates that contact screening may yield identification of more TB cases if it is carried out continuously for more than two years after diagnosis.

One quarter of the NSP adult patients also had other selected disease conditions, particularly diabetes (19%). More than half of the patients aged 50 and over were found to have at least one co-morbid condition and 45% of them had diabetes. Special attention may be required for these identified subgroups of patients who have co-morbid conditions, for better TB care and management.

27% of the adult NSP patients consulted any health care provider five or more times prior to the initiation of treatment. It is apparent that multiple consultations with any health care provider may delay the initiation of TB treatment. It is therefore important to increase awareness of the need to visit a qualified provider at the onset of TB symptoms and to reduce shopping for multiple qualified health care providers after diagnosis, in order to initiate TB treatment as early as possible.

Once a person with TB-related symptoms reaches the health care provider, it is important for the provider to recommend appropriate diagnostic tests for disease identification. Invariably recommending a sputum test was more common if the patient consulted a public health facility, irrespective of the visit number. Since the number of patients consulting a private health facility was relatively higher in the first few visits and recommendations for sputum test were relatively less common, it may be helpful to inform people to demand a diagnostic test when they recognize the signs and symptoms of TB. Such behaviour may result in earlier diagnosis, reduction in the number of consultations and reduction in the delay in starting TB treatment.

Nearly, 17% of the patients resided and travelled more than three km to reach the DOTS centre for getting treated. This may have implications on treatment completion, treatment adherence and treatment outcomes.

Out-of-pocket expenditure related to the current illness indicated that on an average, patients spent around Rupees 1710 prior to TB treatment. Half of the total expenditure was on medicines and a quarter was on diagnostic tests. The total average expenditure, if the patient only consulted a government facility for the current illness, was Rupees 740 prior to TB treatment. This indicates that patients who made multiple visits combined with consulting private facilities ended up spending more. In order to reduce this out-of-pocket expenditure, it may be important to educate patients to avoid multiple visits when having symptoms and signs of TB and also utilise public sector facilities where TB services are available free of cost.

Almost 7% of the male patients continued to consume alcohol and around 9% continued to smoke even after their TB diagnosis. Drug side effects and toxicity were found to be more among persons who drank alcohol while being on TB medication. These patients may require intervention components such as special counselling, which encourages them to complete the TB treatment.

Patient delay, which is understood as the number of days taken to consult a qualified health care provider first, after the start of symptoms, was an average of 23 days. Qualified health care providers include all public health facilities, referral hospitals such as medical colleges, Employees' State Insurance (ESI) hospitals as well as private health facilities having doctors practicing modern medicine. Individual characteristics such as caste/ tribe, personal monthly income, monthly household income and habits such as alcohol consumption and smoking were found to be significantly associated with patient delay in the bivariate analysis. In addition to these individual characteristics, TU geographies categorised into programme zones, the distance of the DOTS centre from the residence of TB patient and the type of facility visited first, were strongly associated with patient delay. The mean patient delay was more than one month if the patient first consulted an unqualified health care provider.

Although we identified many individual characteristics associated with patient delay in the bivariate analysis, only the habit of smoking was identified to be significantly influencing the patient delay after controlling for other variables. In addition, even though we did not find any statistical significance in patient delay for some of the individual characteristics, it may be important to focus on those subgroups of the population which have shown a longer patient delay in the multivariate model with messages on consulting a qualified health care provider as soon as possible when a person experiences the symptoms and signs of TB. The subgroups of the population which should be focused on are people belonging to a Scheduled Caste or Scheduled Tribe and who consume alcohol. Also, in order to reduce the patient delay, focus may be required in the TU areas of Zone-B and patients who are residing more than two km away from the DOTS centres. In order to reduce this delay, it may be important to make the individuals consult a formal medical provider when they have symptoms and signs of TB through appropriate messages and the referral of presumptive TB cases.

Health system delay, which is the number of days taken to start the TB treatment after first consulting a qualified health care provider - including government health facilities, private health facilities with allopathic doctors, referral hospitals such as ESI hospitals, medical colleges or government TB hospitals - was an average of 39 days. We did not notice any association between individual characteristics and the health system delay. However, type of health facility first consulted, type of facility visited based on all consultations, and multiple consultations were found to be associated with the health system delay. Based on all the consultation visits, mean health system delay was found to be shorter among patients who consulted only a public health facility. The health system delay was greater if the patient visited both private and public health facilities prior to their diagnosis and treatment (45 days) as compared to patients who visited only a public health facility. Similarly, health system delay was 65 days for those patients who had five or more consultation visits prior to diagnosis and treatment of TB.

As per the multiple regression analysis, the patients in Zone-C were found to have a significantly shorter health system delay as compared to patients in Zone-A. Patients who first consulted an informal health care provider were found to have a significantly shorter health system delay. This could be because the patient who first consulted an informal health care provider already had a greater patient delay, thus prompting the health care provider to recommend a sputum test early. Also, patients who consulted both private and public health facilities, and those who consulted a health care provider three or more times, were observed to have significantly greater health system delays. These results emphasise the importance of reducing the number of visits to the health facility as well as going to a public health facility first to minimise the health system delay. This is also indicative

of the importance of behaviour change communication activities for community members to help achieve the aforementioned changes. Further, these results indicate the need for behaviour change among health care providers towards recommending the appropriate diagnostic test as well as among the patients towards demanding a diagnostic test.

Health system delay was further divided into two: diagnostic delay (the number of days taken to diagnose TB through sputum test after visiting a qualified health care provider) and treatment delay (which is the number of days taken to start the treatment after the diagnosis of pulmonary TB through sputum test). The results indicate that diagnostic delay (37 days) was longer than the treatment delay (two days). This indicates that diagnostic delay has to be reduced drastically in order to reduce the health system delay. The analysis of health system delay clearly indicated that multiple consultations by the individual patient was the most important factor and this seems to be influenced by the individual's behaviour. Multiple consultation visits by the patient also may be because of the provider not recommending the appropriate diagnostic test.

Total delay, which is a combination of health system delay and patient delay, indicated that a major factor for a longer total delay was five or more consultation visits. Patients belonging to Scheduled Castes or Scheduled Tribes, patients who accessed treatment from Zone-B TU areas, and patients who lived two or more kilometres away from the DOTS centre also had a greater total delay. The results indicate that there may need to be a focus on these identified subgroups of the population in order to reduce the total delay.

The results also indicate the quantum of contact screening required per index adult NSP patient, which was, on an average, 3.5 immediate household members, including one child under the age of 18 years and 2.5 adult members. If there were 1000 sputum positive adult TB patients identified, screening may be required for 3500 household members, including 1000 children under the age of 18 years.

As per the RNTCP, one of the mandates of the front-line health worker is to verify the address of all diagnosed TB patients and educate them and their families on the plan of treatment. However, our study shows that about 42% of the patients were not visited by the government health worker at their home. This underlines the need to focus on follow-up visits in order to identify and educate the person with TB on completing treatment successfully.

There are, however, some limitations to the study. The delay, calculated in the number of days, was likely to be influenced by the recall bias of the patients. However, since we included the adult NSP patients who were initiated on treatment during the three months prior to the survey, the recall bias in the number of consultation visits, type of provider visited for the consultation, duration between consultation visits and duration between diagnosis and treatment, may be minimal. Similarly, the study is based on patients accessing RNTCP services and we may not be able to generalise the delays as such, since there could be patients accessing services in the private sector. However, the results from this study reveal that the health system delay is greater when patients consult only a private health care provider.

Programme implications and recommendations

Numerous programme implications can be drawn from the base line study results. Since 28% of the patients were found to be illiterate, the Information, Education and Communication (IEC) activities related to disseminating knowledge and health seeking behaviour for TB should include visual and verbal media. Also, a majority of the patients either had access to a mobile phone or a television set, which can be leveraged as a preferred method for communication to disseminate knowledge and health seeking behaviour for TB. As such, there is scope to support the government in designing TV and mobile-compatible messaging on TB, to modify patients' health seeking behaviour once they perceive the symptoms of TB.

The results further indicate that there is a large patient delay in consulting a qualified provider among TB patients who first consulted an unqualified health care provider practising Ayurveda, homeopathy, Unani, or a pharmacist. This delay could augment the incidence of TB infection in the community. Programme outreach activities by the community health worker at the city level, and referrals of persons with symptoms suggestive of TB, may change the health seeking behaviour of persons, influencing them to opt for appropriate health care facilities and qualified

providers. Community-level structures envisaged under the programme, such as health information centres and engagement of key opinion leaders, may also play an important role in reducing both patient and health system delay. The trained volunteers managing the health information centres at the community will either refer the person identified as having presumptive TB directly to the DMC for diagnosis or refer them to the community health worker, allowing the person to choose the appropriate health care facility and diagnosis. Similarly, key opinion leaders at the community level should also support the programme by identifying symptomatic patients from the community and referring them to the community health worker. This will reduce both the patient delay and health system delay and reduce the number of consultation visits made to various health care provider.

We also noticed a large health system delay, which mainly included a delay in diagnosis of TB. Sputum collection and transportation carried out under the programme may reduce the health system delay by assisting in transportation of sputum samples to the appropriate testing centre and obtaining the test results from the testing centre. Most frequently, the patients interviewed in the study cited the distance to DMC and lack of family support as the reasons for delay in diagnosis. In addition, the dissemination of information on testing centres and referral of presumptive cases to the appropriate testing centre through community structures could reduce the health system delay measured in this study.

Recommendations for appropriate tests were found to be more common at public health facilities. However, most of the patients visited private providers for the first few consultations before moving to public health facilities. Another reason for diagnostic delay was the health care provider not recommending a sputum test early on. So, it may be important for the patient to demand the appropriate test, even when consulting a private health care provider. This will reduce the delay in diagnosis as well as multiple consultations with the provider. Further, this will lead to a positive behaviour change in the private provider when more and more presumptive TB cases demand an appropriate test for diagnosis. The community level programme staff and the community structures established through the programme are making efforts to create an atmosphere enabling the community to demand appropriate diagnostic tests when they recognise the symptoms of TB.

As discussed, the dissemination of information on appropriate tests, availability of testing centres, appropriate diagnostic tests and community referrals will reduce the number of consultations. Consequently, patients will be knowledgeable about appropriate tests as well as the availability of free testing, thereby reducing the expenditure incurred prior to the initiation of treatment, which has been currently estimated at Rupees 1710.

The study result emphasizes the need for screening diabetes patients for TB. To enable this, the project should collaborate with state health and non-communicable diseases departments for screening diabetes patients for TB. In particular, this should be carried out with persons aged above 50, since incidence of diabetes was found to be higher among this age group. This collaboration could be actualised by organising health camps for diabetes patients and identifying presumptive TB cases through screening, by the project staff. The presumptive TB cases identified should be recommenced appropriate diagnostic tests. Such a collaboration will greatly reduce both the patient and health system delays.

The programme also examined the occurrence of contact screening of the patients by the community health worker. The results indicate that a community health worker needs to screen 3.5 persons on an average, per household. However, to identify more TB patients through contact screening, it should be carried out continuously for more than two years after treatment of the patient has been completed and not just during treatment. Therefore, contact screening carried out for a shorter duration may not yield more TB patients and may not show much progress in reducing the patient and health system delays.

In order to reach a larger male population, the project plans to disseminate awareness on TB in labour camps and construction sites, and conduct street plays as well as IEC van shows in the evening hours. The project focuses more on counselling and soft skills training for persons who consume alcohol and smoke tobacco. Such activities may enable them to go for diagnostic testing, thus reducing both patient and health system delays.

KEY LEARNINGS

- The mean patient and health system delays in Bengaluru among the adult NSP patient were 23 days and 39 days, respectively.
- Health system delay was mainly due to diagnostic delay which was on average, 37 days, while treatment delay was two days.
- Recommendations for appropriate tests were more common among patients consulting a public health care provider, irrespective of visit number.
- However, patients consulted a public health care provider only at a later stage.
- The patients spent an average of Rupees 1710 prior to their TB treatment.
- Nearly one-fifth of the NSPs also had diabetes.
- Contact screening has to be carried out for more than two years in order to identify more TB patients.


ANTI-TB CATEGORY 1D-II-B (40-54 kg)
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