Reduction in Patient and Health System Delays among Adult New Sputum Positive TB patients in Bengaluru

Results from two cross-sectional surveys

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Reduction in Patient and Health System Delays among Adult New Sputum Positive TB patients in Bengaluru
Results from two cross-sectional surveys

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KHPT
IT/BT Park, 5th Floor
#1-4, Rajajinagar Industrial Area
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Rajajinagar, Bengaluru - 560 044

Study Team

Mr Arin Kar
Dr Joseph Francis Munjattu
Dr K Karthikeyan
Ms Mallika Tharakan
Mr Mohan H L
Ms Poornima B S
Dr Rajaram S
Dr Reynold Washington
Mr Sandeep H

Editing

Ms Vrinda Manocha

Design & Layout

Mr Anilkumar Rampur

Photography

Ms Vrinda Manocha

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The photographs included in this report are of THALI's various community engagement activities and do not represent field activities carried out during the surveys.

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ATT	Anti Tuberculosis Treatment
BPL	Below Poverty Line
CHW	Community Health Worker
CC	Community Coordinator
CMIS	Computerized Management Information System
CBNAAT	Cartridge Based Nucleic Acid Amplification Test
DBT	Direct Benefit Transfer
DMC	Designated Microscopy Centre
DOTS	Directly Observed Treatment Short Course
DTC	District Tuberculosis Centre
HIV	Human Immunodeficiency Virus
IEC	Institutional Ethics Committee/Information Education and Communication
KHPT	Karnataka Health Promotion Trust
NSP	New Sputum Positive
NTEP	National TB Elimination Programme
PCS	Prevention, Care and Support
PRAD	Patient Referral and Diagnosis
PSG	Patient Support Group
TB	Tuberculosis
THALI	Tuberculosis Health Action Learning Initiative
TU	Tuberculosis Unit
USAID	United States Agency for International Development

FOREWORD

GOVERNMENT OF KARNATAKA
OFFICE OF THE JOINT DIRECTOR (TB), LADY WILLINGDON STATE TB CENTRE,
4TH MAIN ROAD, SAMPANGI RAMANAGAR, BANGALORE-560 027.
E-mail: STOKA@rntcp.org, ☎ : 080 - 22249364; Fax - 080 – 22249361

FOREWORD

The Honourable Prime Minister announced a commitment to End TB by 2025, five years ahead of the Sustainable Development Goals. The Government of India scaled up TB diagnostic and treatment services in the public health system and strengthened partnerships with the private sector, which resulted in more than 2.4 million TB patients being notified in the year 2019. Consequently, the number of missing cases reduced to about 10% in 2019 as compared to almost 33% in 2017. The National Strategic Plan for Tuberculosis Elimination (2017-25) moves towards the goal of TB elimination through the integrated approach of "Detect-Treat-Prevent-Build". TB can be controlled if diagnosed early and treated completely, thus interrupting transmission. The challenge with TB control in India is delayed diagnosis and inadequate treatment or incomplete treatment as a result of patient and provider behaviours, social stigma, and health system- related barriers. Karnataka Health Promotion Trust (KHPT), Bengaluru, and TB Alert India, Hyderabad, under the Tuberculosis Health Action Learning Initiative (THALI) funded by the United States Agency for International Development (USAID) developed community-driven and patient-centred approaches to reduce diagnostic and treatment delays.

As a part of the THALI programme evaluation, KHPT conducted baseline and end-line studies in Hyderabad and Bengaluru to understand the changes in the various delays, such as patient delay, health system delay and total delay, among adult new sputum positive patients accessing services under the National Tuberculosis Elimination Program (NTEP) in the years 2017 and 2019. In both baseline and end-line surveys, a targeted sample of 225 adult new sputum positive patients who had initiated TB treatment from the NTEP during the three months prior to the date of survey were interviewed in each of the cities. The results indicate a significant reduction in patient and total delay between the two surveys. The reduction in delay was significant, cutting across all age groups, gender categories and other socio-economic characteristics of patients. The study also provides valuable information about patient preferences for health seeking, providers' practices in relation to TB diagnosis and initiation of treatment, and other barriers that patients may face while seeking health care services. The State TB Office and St John's Medical College and Hospital Institutional Ethics Committee provided regulatory and ethics approvals for the study, respectively.

This report is prepared by the Karnataka Health Promotion Trust (KHPT), Bengaluru This report presents the findings of the study conducted in Bengaluru. The results of this study will help program managers understand the magnitude of patient and health system delay in diagnosis and treatment initiation and also understand the changes in the delay, as well as the health seeking behaviour, during THALI's intervention in Bengaluru. The study also highlights the effect of the programme exposure on reducing the delay among the new adult TB patients accessing TB services.

Dr. Ramesh Chandra Reddy
Joint Director, State TB Division,
Bangaluru, Karnataka

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The study on “Reduction in Patient and Health System Delays among Adult New Sputum Positive TB patients in Bengaluru - Results from two cross-sectional surveys” was successfully completed due to the efforts and involvement of numerous organizations and individuals at different stages of the survey. As far as possible, we would like to thank everyone who was involved in the survey and who made this possible.

First of all, we are grateful to USAID India for funding this study as a part of the larger project, namely, the Tuberculosis Health Action Learning Initiative (THALI), which established a holistic approach to TB control efforts in selected Indian cities. We gratefully acknowledge the continued guidance and support from various senior staff of Karnataka Health Promotion Trust (KHPT) in Bengaluru towards the implementation of the study and preparation of the report. Our heartfelt thanks to the institutional ethics committee of St. John’s Medical College and Hospital, Bengaluru for the approving the study. We are extremely thankful to the State TB Officer and Joint Director (TB), Karnataka State and the District TB Officers of Bengaluru Urban and Bengaluru City for extending their support to complete the study successfully. Special thanks go to the local officials of the National Tuberculosis Elimination Programme (NTEP) for making available the patient line list and for facilitating contact with the patients for the data collection.

Thanks are also due to the program field staff for establishing the link between local NTEP staff and the study team. We appreciate and acknowledge the hard work put in by the study coordinator and study field teams in the baseline survey. The end-line survey was carried out by Karvy Insights and we express our gratitude to the staff of the organisation who were involved. We also acknowledge the hard work put in by the field supervisors and field interviewers in collecting the baseline and end-line survey data.

Finally, we acknowledge all the study participants, women and men of Bengaluru, who spent their time and responded to the lengthy questionnaires with tremendous patience and without any expectation in return from the study team. Their participation has resulted in a wealth of learning for TB program implementers and policy makers.

01

INTRODUCTION

Background

The KHPT-led Tuberculosis Health Action Learning Initiative (THALI) is a four-year (2016-2020) patient-centred, family-focused TB prevention and care initiative supporting vulnerable people in gaining access to quality TB care services from health care providers of the patient's choice. The project is implemented in Karnataka by KHPT and in Telangana and Andhra Pradesh by TB Alert India (TBAI). In the first two years of implementation, KHPT and TBAI worked in collaboration with the National Tuberculosis Elimination Program (NTEP) and focused on behavior change among two target groups: (1) people living in urban slums, and (2) private health care providers in Bengaluru and Hyderabad cities.

The project underwent a strategic shift in the third and fourth years. Under the refined strategy, THALI worked with and through, (1) communities, especially key populations affected by TB, and (2) state and local governments and program managers of NTEP. The direct engagement with private sector health care providers was gradually discontinued in August 2017. Besides Bengaluru and Hyderabad cities, in the third and fourth years, the project expanded to cover additional geographies and population. The project coverage increased from about 3 million in two cities to a total population of 31 million people in 13 districts of Karnataka, 9 million people in 5 districts of Telangana and 14 million people in 3 districts of Andhra Pradesh.

Implementation approach

THALI's implementation approach is based on 5 principles in order to prevent and control TB in the project geographies.

1. **Appropriate health-seeking behaviour of people with TB symptoms:** People recognize early symptoms and signs of TB, know where to seek care, and demand microbiological testing for TB diagnosis and quality services;
2. **Evidence-based diagnosis:** All persons with symptoms of TB are prescribed the best available and affordable microbiological tests to establish 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 on tailored treatment regimens, after drug sensitivity testing;
4. **TB notification:** All TB patients diagnosed and initiated on treatment by clinical providers, and all patients tested microbiologically positive for TB at laboratories, are notified to public health authorities;
5. **Treatment follow through:** All TB patients initiated on TB treatment are counselled, monitored and supported for treatment adherence, completion and prevention of spread of the disease.

The above mentioned 5 principles are envisaged to promote demand creation, service delivery and public health support systems, and are aligned well with global and national strategies for TB elimination.

Community engagement

The THALI project's field level activities mainly included engagement with the communities living in the slum areas of the cities of Bengaluru and Hyderabad. A cadre of Community Health Workers (CHWs) supervised by Community Coordinators (CCs) carried out these activities through consistent and systematic outreach. This team of dedicated frontline workers began community engagement activities in September 2016 in the areas under the Bengaluru Urban DTC and Bengaluru City (BBMP) DTC. The Community Health Workers' (CHWs) activities continued until May 2019 in Bengaluru City (BBMP) DTC; and until September 2019 in Bengaluru Urban DTC. Community engagement was initiated through a slum entry program by conducting a slum mapping exercise in all the slums of Bengaluru city. According to the final mapping data, we identified 654 slums in Bengaluru city, catering to 3,26,474 households and 1.52 million populations within 24 TB units (TU).

The CHWs subsequently conducted Information Education and Communication (IEC) campaigns on TB in the community through in-person contacts, small group meetings, large group meetings and school education programs, and were involved in active case finding campaigns conducted by the government. Each CHW covered about 5-25 slum areas with a population ranging from 20000-32000 on an average. They were later aligned to geographies covered by the Designated Microscopy Centre (DMC). About 8-10 CHWs were supervised by a CC.

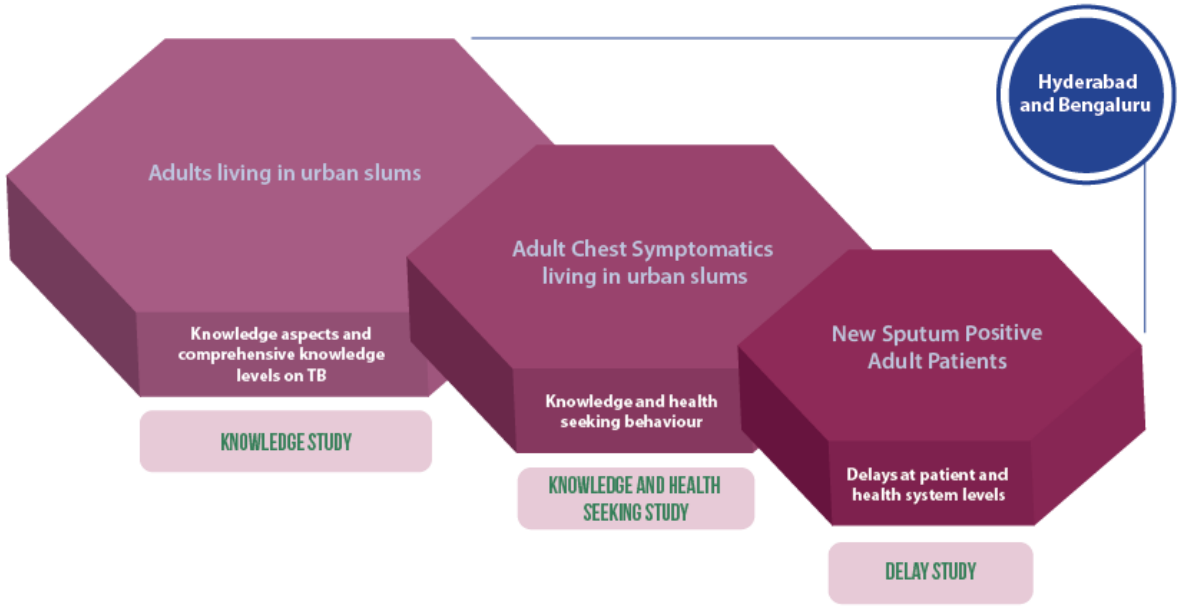
In addition, using a 'screening pathway', CHWs actively identified individuals with symptoms suggestive of TB after these IEC activities, and referred them for sputum testing to the DMC, a government facility which conducts sputum microscopy, and for CBNAAT testing (Cartridge Based Nucleic Acid Amplification Test). Any person having a persistent cough for more than 14 days and/ or having night sweats, sudden weight loss, blood in sputum, reduced appetite, persistent chest pain and enlarged lumps in the lymph nodes was identified as a TB symptomatic. The process of referral included filling up a form in triplicate and handing over two sputum cups with clear instructions of how and when to collect the sputum. If the individual could not go themselves to the DMC to hand over the samples for testing, the CHW would transport the sample for testing on behalf of the referred person. When a sample tested positive for TB, the CHW would accompany him/her to the public health facility for further counselling and treatment initiation. Following initiation of the TB treatment, the CHW followed up with the individual twice a month during the intensive phase and once a month during the continuation phase of treatment. During the follow-up visits, the CHWs provided family level counselling, adherence monitoring and support, nutritional advice, moral support, and support to obtain social entitlements, including the Government's direct benefit transfer (DBT) scheme providing each patient ₹ 500 per month. Information on DBT was collected after the introduction of the Nikshya Poshan Yojana scheme by the Government of India in the year 2018. In addition, all TB patients were motivated to attend patient support group (PSG) meetings from 2018. Patients' weights were monitored on a regular basis. They were referred for follow-up tests, counselled on behavior change when relevant, and referred for adverse drug reactions or side effects management. All inputs, including weight measurements, follow-up test results and treatment adherence were documented by the CHW with the supportive supervision of the CC, using a Patient Referral and Diagnosis (PRAD) form for referral, and a Prevention, Care and Support card (PCS) for treatment adherence support. The outcome of the TB treatment was recorded and validated by medical teams. Both forms, once filled, were verified for completeness by the CC, before entry into a computerized management information system (CMIS) on a regular basis.

During the September 2016 -June 2019 period, the CHWs in Bengaluru referred 17, 914 symptomatic persons for diagnostic tests, out of which 13,819 persons had underwent. Among the tested persons, 1234 persons were found to have TB and 1204 persons were started on TB treatment.

02

STUDY DESIGN

Project Evaluation



The overall project evaluation design included surveys among three target groups, namely adults living in slum areas of Hyderabad and Bengaluru cities, chest symptomatics in the urban slums and adult New Sputum Positive (NSP) TB patients accessing anti-tuberculosis treatment (ATT) in these two cities. The mentioned evaluation was implemented through baseline and end-line surveys conducted amongst the target groups mentioned above. The survey amongst the adults living the slum areas included knowledge aspects and we assessed the changes over time. The study among the chest symptomatics examined knowledge and health seeking behaviours as well as the changes over the time. The study among the adult NSP TB patients examined and assessed the various delays related to initiating ATT and compared the changes over time. This report pertains to the study among adult NSP TB patients accessing ATT in Bengaluru city.

Study objectives

The primary objective of the study was to estimate the reported TB delays; viz., patient delay and health system delay. Patient delay is defined as the period between onset of symptoms and first consultation with a qualified doctor. Health system delay is the period between the first consultation and TB treatment initiation. The evaluation also intended to study the changes in the reported delays between baseline and end-line surveys and to identify activities within the THALI program that could have influenced this change. We therefore assessed the exposure of respondents to the THALI program, and examined the effect of the program exposure on the reduction in the different TB delays. In addition, we also examined the changes in health-seeking behaviours among the NSP pulmonary adult TB patients, between baseline and end-line studies.

Study Design

In Bengaluru city, the study areas included 8 TUs in Bengaluru City District Tuberculosis Centre (DTC) and 3 TUs from the Bengaluru Urban DTC. In Bengaluru, during the first phase of THALI, we implemented the program only in these 11 TUs of Bengaluru City DTC and of Bengaluru Urban DTC. Therefore, we decided to conduct the baseline only in 11 TUs. However, at the time of end line these 11 TUs had been bifurcated and the total number of TUs increased to 17.

Eligible study participants were NSP adults (aged 18 years and above) diagnosed with pulmonary TB who had been initiated on NTEP ATT in the three months prior to the survey. We excluded persons who were either

terminally or seriously ill at the time of the survey. Terminally ill or seriously ill patients are described as those who are either bedridden or admitted to hospital at the time of the survey.

The target sample size was fixed at 225 NSP adult patients. The sample size was estimated based on the assumed change in the total delay over the project period with 95% confidence and 80% power. In order to calculate the required sample size, we assumed a total delay of 60 days at the base line and assumed this value would decline to 45 days over the project period, with a standard deviation of 56 days. Based on the said assumptions, the sample size for obtaining the city-level estimate was close to 180 and this number was inflated to 225 in order to account for a 25% non-response. The required sample size was distributed proportionately across different TUs based on the number of NSP patients identified within that TU between October and December 2016 for the base line survey. For the end line survey, this was based on the patients on ATT during the three months' period between June and August, 2019.

We sought permission from the State Tubeculosis Office prior to conducting these studies. We obtained ethics approval from St John's Medical College and Hospital Institutional Ethics Committee, Bengaluru. The field team prepared a list of all the NSP adult TB patients (aged 18 years and above) who had been initiated on ATT in each of the TUs during the three months preceding the survey. The study team contacted potential eligible participants either at the Directly Observed Therapy (DOTS) centers or through their mobile/land-line telephone contact numbers and obtained their verbal consent for participating in the study. Trained field investigators met those adults who had provided verbal consent and obtained written informed consent to participate in the study. If the targeted sample size was not reached in any TU, then an additional sample was drawn from the another.

Data collection

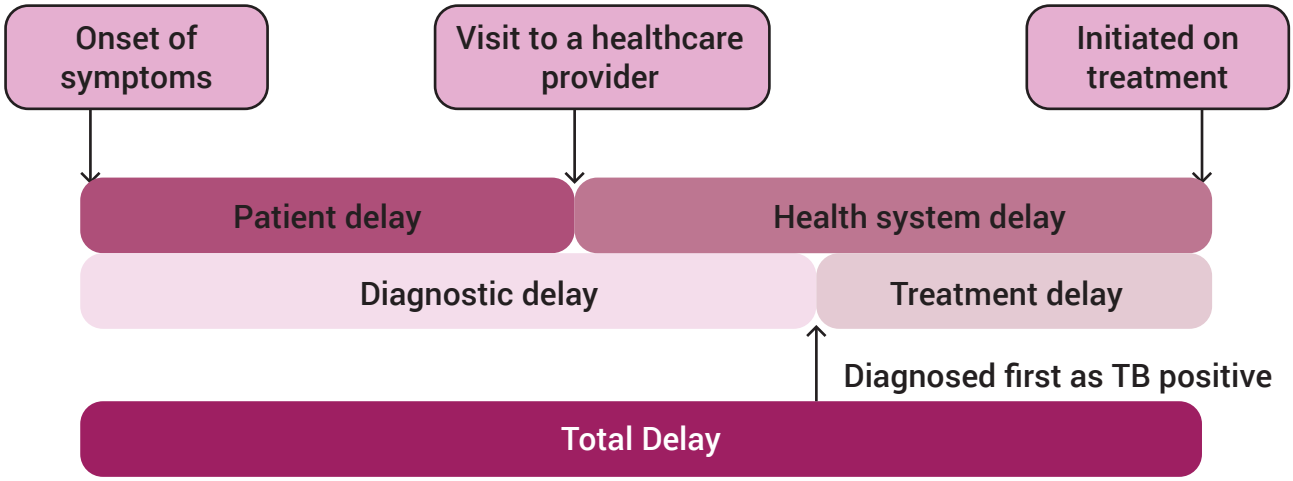
We provided mandatory training for five days including field practice for the field staff. The mandatory pre-fieldwork training session for the field staff included procedures followed with respect to enrolling prospective participants and obtaining consent (and handling non-consent). All field staff were trained to inform all eligible patients that their participation in the study was voluntary. The field staff were trained to adhere to the study protocol and ensure that the interviews were conducted in private places, where the study participant felt comfortable answering the questions, and that no other persons were present during the interview. The field staff were given clear instructions that the identity of the respondent should not be revealed to any third party. The field staff were trained to maintain complete confidentiality in regard to the recorded transcript and not to show the questionnaire to any other person. For the baseline, the recorded transcript was directly entered into the computer. Trained field investigators administered a semi-structured questionnaire to participants in the local language. For the end-line survey, we used a mobile application database to record responses. Before collecting the information, all the respondents gave their consent in written form.

As indicated earlier, the participants decided on the venue for the interview, either at the DOTS center or at the participant's home or any other convenient place. The questionnaire was designed to collect information on participant experiences at different health facilities after the onset of the symptoms in relation to the current illness. In particular, field investigators enquired about the facility consulted, recommendations made by the health care provider, the time interval between consultations, types of diagnostic tests recommended, and diagnosis communicated to the patient at the end of each consultation, if any. In addition, field investigators enquired about the costs that the patient had incurred for consultations, diagnostic tests, and medications at each visit. The baseline data was collected between March and May 2017 and the end-line data collection was carried out between October 2019 and January 2020.

KHPT's field-study team directly collected the baseline data. This study team was separate from the program implementation team. However, Karvy Insights, a private consulting firm with large scale survey experience, collected the end-line data. The data analysis was carried out using Stata version 14.0.

Definition of delays

The different delays between the onset of symptoms and the initiation of ATT treatment are depicted in the picture below. The World Health Organization (WHO) mainly defined two types of delays in diagnosis and initiation of treatment: patient delay which is defined as the time interval (in days) between onset of symptoms and presentation to a healthcare provider, and health system delay, which is defined as the time interval (in days) between the date of accessing a healthcare provider's services and the initiation of ATT. The sum of these two time intervals (in days) is the total delay and is defined as the time interval from the onset of illness to the initiation of treatment. The above delays can also be further divided into diagnostic delay, which is the time interval (in days) between symptom onset and first diagnosis as TB-positive, and treatment delay, which is the time interval (in days) between first diagnosis as TB-positive and initiation of ATT.



Sample coverage

As indicated, we listed all NSP patients accessing the TB treatment from the TUs of Bengaluru during the reference period. The patient list included 301 adult persons during the three months prior to the baseline survey; in the end-line, we listed 514 adult NSP persons. From the list, we contacted 290 adult persons and 285 adult persons for the baseline and end-line surveys, respectively. Other persons could not be contacted because of a wrong contact numbers, phones remaining unreachable, death, hospitalization and achievement of sample size for the specific TU. Out of the contacted adults, 7% (20) from the baseline and 14% (41) from the end-line refused to participate in the survey. Another 14% and 6% from the baseline and end-line, respectively, were not available. Overall, nearly 79% of the adults contacted during both baseline and end-line surveys consented to interviews. Table 1 provides the details of the sample coverage in both baseline and end line surveys.

Table 1: Sample coverage details of contacted NSP patients in the baseline and end-line surveys, Bengaluru

Status of survey	Baseline		End-line	
	Number of cases	Percent	Number of cases	Percent
Contacted	290	100	285	100.0
Unavailable	41	14.1	18	6.3
Refused	20	6.9	41	14.4
Interview completed	229	79.0	226	79.3

03

PROFILE OF THE HOUSEHOLDS AND RESPONDENTS

Profile of the respondents

We did not notice any difference between the age and sex distribution of the respondents interviewed during the baseline and end-line surveys (see Table 2). The proportion of patients from the slum areas was higher in the baseline as compared to the end-line. In regard to marital status, the proportion of people married at the time was higher in the end-line as compared to baseline. The proportion of persons who completed middle level of school or higher was higher in the end-line as compared to the baseline. In terms of occupation, we noticed that the proportion of persons working in a salaried job, either in government or the private sector, was higher in the end-line as compared to the baseline. The proportion of Hindus was higher in the end-line survey. The personal monthly income as well as household income increased between the baseline and end-line. For instance, the proportion of persons having a personal monthly income of ₹10000 or more increased from 38% to 69% and that of persons with a household monthly income of ₹15000 or more increased from 46% to 89% between baseline and end-line surveys.

Table 2: Percentage distribution of respondents according to selected background characteristics in the baseline and end-line surveys, Bengaluru

Characteristic	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Sex						
Male					69.4	68.9
Female					30.6	31.1
Age						
18-29	28.9	29.2	44.3	42.7	33.6	33.4
30-49	46.5	38.2	35.7	40.2	43.2	38.8
50+	24.5	32.6	20.0	17.1	23.1	27.8
Mean age	**39.3**	**41.1**	**35.3**	**35.1**	**38.0**	**39.2**
Place of residence						
Slum area	74.2	55.6	78.6	58.5	75.5	56.5
Non-slum area	25.8	44.4	21.4	41.5	24.5	43.5
Marital status						
Currently married	67.9	78.5	55.7	69.5	64.2	75.7
Marriage dissolved	4.4	0.7	22.9	12.2	10.0	4.3
Never married	27.7	20.8	21.4	18.3	25.8	20.0
Literacy and education						
Illiterate	28.9	23.6	24.3	28.0	27.5	25.0
Literate, 1-7 years of schooling	34.6	24.3	25.7	14.6	31.9	21.3
8+ years of schooling	36.5	52.1	50.0	57.3	40.6	53.7

Occupation						
Business	8.8	23.6	4.3	2.4	7.4	17.0
Salaried job	7.5	21.5	12.9	11.0	9.2	18.2
Daily labour	35.2	29.2	14.3	12.2	28.8	23.9
Other job	32.1	18.1	18.6	13.4	27.9	16.6
Not working	16.4	7.6	50.0	61.0	26.6	24.2
Religion						
Hinduism	73.6	84.7	67.1	73.2	71.6	81.1
Islam	22.0	11.8	24.3	24.4	22.7	15.7
Other	4.4	0.7	8.6	0.0	5.6	0.5
Caste/Tribe						
Scheduled Caste	22.0	14.6	25.7	13.4	23.1	14.2
Scheduled Tribe	4.4	11.1	0.0	9.8	3.1	10.7
Others	73.6	74.3	74.3	76.8	73.8	75.1
Personal monthly income (in ₹)						
< 5000	22.0	7.6	41.4	62.2	27.9	24.6
5000-9999	29.6	2.8	37.1	8.5	31.9	4.6
10000+	47.8	86.8	14.3	28.0	37.6	68.5
Not mentioned	0.6	2.8	7.1	1.2	2.6	2.3
Mean personal income	**8797.5**	**16260.7**	**5792.2**	**6117.3**	**7921.5**	**13068.5**
Household monthly income (in ₹)						
< 10000	17.0	0.0	14.3	0.0	16.2	0.0
10000-15000	35.8	9.7	35.7	7.3	35.8	9.0
15000+	45.3	89.6	48.6	87.8	46.3	89.0
Not mentioned	1.9	0.7	1.4	4.9	1.7	2.0
Mean household income	**17826.9**	**26304.2**	**17999.9**	**26641.0**	**17880.0**	**26406.0**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**156**	**70**	**70**	**229**	**226**

The household composition indicated that the proportion of persons living in households with 2 adult members slightly increased (28% to 36%), and the proportion of households with 4 or more adult members reduced (44% to 38%) between baseline and end-line surveys (see Table 3). Consequently, household size slightly reduced on an average from 4.5 persons per household to 4.2 persons per household. In the end-line survey, 71% of the respondents reported that their household has a Below Poverty Line (BPL card) and this number was 51% in the baseline survey. The proportion of respondents having houses with 3 or more rooms was also comparatively higher in the end-line survey as compared to the baseline survey. The proportion of households owning mobile phones and televisions remained the same between baseline and end-line surveys.

Table 3: Percentage distribution of respondents according to household composition and household amenities in the baseline and end-line surveys, Bengaluru

Characteristic	Baseline	End-line
Number of persons aged <18 years		
0	48.0	46.5
1	19.7	21.5
2	20.1	25.1
3+	12.2	7.0
Number of persons aged >= 18 years		
1	4.4	2.6
2	27.9	36.1
3	24.0	23.3
4+	43.7	38.1
Total number of household members		
<=2	11.8	11.3
3	18.3	22.6
4	29.3	34.8
5	17.9	17.2
6+	22.7	14.1
Mean number of persons	**4.5**	**4.2**
Has BPL card		
Yes	50.7	70.8
No	47.6	29.2
Don't know/Can't say	1.7	3.2
Ownership of present house		
Own house	29.7	38.0
Rented house	70.3	62.0

Number of rooms		
1	43.2	1.4
2	35.8	8.5
3	17.5	54.3
4+	3.5	35.8
Number of rooms used for sleeping		
1	81.7	25.9
2	16.6	59.8
3	1.3	12.6
4+	0.4	1.7
Own a radio		
Yes	32.3	2.3
No	67.7	97.7
Own a telephone		
Yes	3.1	0.5
No	96.9	99.5
Own a mobile		
Yes	95.2	99.5
No	4.8	0.5
Own a television		
Yes	96.5	93.4
No	3.5	6.6
Total percent	**100**	**100**
Number of cases	**229**	**226**

A lower proportion of the respondents in the end-line (59%) reported that they were permanent residents of Bengaluru as compared to the baseline (70%) (see Table 4). A higher percentage of the respondents had moved to Bengaluru from villages in the end-line (18%) as compared to the baseline (4%).

Table 4: Percentage distribution of respondents according to migration status and mobility in the baseline and end-line surveys, Bengaluru

Characteristic	Baseline	End-line
Duration of stay in the present city		
Always	70.3	58.5
<10 years	15.3	20.3
10+ years	14.4	21.2
Type of place from where the respondent moved in		
Not moved in	70.3	58.5
From another town	25.3	23.1
From a village	4.4	18.4
Total percent	**100**	**100**
Number of cases	**229**	**226**

Of the respondents interviewed in the baseline, 30% of them reported that they knew someone with TB before they had been diagnosed with their current illness and this reduced to 12% in the end-line (see Table 5). A higher percentage of respondents in the end-line responded 'don't know' when asked whether they knew anyone who had had TB before they had been diagnosed with TB. Among the respondents who reported knowing someone with TB, the duration of having known this person was more than two years for more than 70% of respondents in both baseline and end-line surveys.

Table 5: Percentage distribution of respondents according to whether they knew anyone who had TB before they had been diagnosed with their current illness and the duration of knowing the person who had TB in the baseline and end-line surveys, Bengaluru

Characteristic	Baseline	End-line
Whether the respondent knew anyone who had TB before diagnosed with current illness (TB)		
Yes	30.1	11.9
No	68.1	65.0
Don't know	1.7	23.0
Total percent	**100**	**100**
Number of cases	**229**	**226**
Duration of knowing this person		
1- 5 months	8.7	0.0
6-11 months	2.9	7.3
12-23 months	11.6	21.9
24+ months	76.8	70.7
Total percent	**100**	**100**
Number of cases	**69**	**27**

04

HEALTH SEEKING BEHAVIOUR

Health seeking behaviour

It may be important to note the number of consultation visits to various healthcare providers reported prior to the initiation of the treatment. We classified the number of consultation visits according to visits to any healthcare provider and visits to a qualified healthcare provider. The mean number of total consultation visits made by the patient reduced between baseline and end-line surveys (see Table 6). The mean number of total consultation visits reduced from 3.7 visits to 2.6 visits in Bengaluru and the mean number of consultation visits was almost the same for both males and females. It is important to note that higher order consultation visits were reduced drastically between the baseline and end-line. For instance, one-fifth of the respondents in the baseline reported 5 or more consultation visits to a formal healthcare provider and this reduced to less than 3% in the end-line.

Table 6: Percentage distribution of respondents by sex according to the number of visits to any healthcare provider and number of visits to a qualified healthcare provider prior to the initiation of treatment in the baseline and end-line surveys, Bengaluru

Number of visits	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Visited any healthcare provider						
1	2.5	4.9	2.9	1.3	2.6	3.8
2	23.3	45.1	19.1	50.0	22.0	46.6
3	31.4	38.2	30.9	38.8	31.3	38.4
4	18.9	9.0	23.5	8.8	20.3	8.9
5+	23.9	2.8	23.5	1.3	23.7	2.3
Mean number of visits	**3.7**	**2.6**	**3.8**	**2.6**	**3.7**	**2.6**
Visited a qualified healthcare provider						
1	5.0	9.0	4.4	8.8	4.8	8.9
2	24.5	46.5	23.5	46.3	24.2	46.4
3	31.4	35.4	30.9	37.5	31.3	36.1
4	17.6	6.3	22.1	6.3	18.9	6.3
5+	21.4	2.8	19.1	1.3	20.7	2.3
Mean number of visits	**3.6**	**2.5**	**3.6**	**2.5**	**3.6**	**2.5**
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

While examining the type of facility visited by the respondent at each consultation visit, we noticed that there was a slight increase in the proportion of persons visiting a public health facility the first time between baseline (20%) and end-line (25%), although a majority of them consulted a private facility the first time (71% in baseline and 63% in end-line) (see Table 7). We noticed a positive relation with going to a public health facility and the number of consultation visits in both baseline and end-line surveys. The results revealed that in the end-line a greater proportion of respondents had visited public sector health facilities from the second consultation visit onwards as compared to the baseline.

Table 7: Percentage distribution of respondents by sex at each consultation visit, according to the type of health care facility visited in the baseline and end-line, Bengaluru

Type of health facility	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Public health facility	20.8	25.0	19.1	23.8	20.3	24.6
Private health facility	69.8	63.2	75.0	63.7	71.4	63.4
Other	9.4	11.8	5.9	12.5	8.4	12.0
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**
Second visit						
Public health facility	31.0	66.4	30.3	53.2	30.8	62.3
Private health facility	66.5	32.8	63.6	45.6	65.6	36.8
Other	2.6	0.7	6.1	1.3	3.6	0.9
Number of cases	**155**	**148**	**66**	**68**	**221**	**216**
Third visit						
Public health facility	42.4	77.8	30.2	76.9	38.6	77.5
Private health facility	55.9	22.2	66.0	23.1	59.1	22.5
Other	1.7	0.7	3.8	1.3	2.3	0.9
Number of cases	**118**	**78**	**53**	**33**	**171**	**111**
Fourth visit						
Public health facility	55.9	82.4	59.4	75.0	57.0	80.4
Private health facility	41.2	17.6	31.3	25.0	38.0	19.6
Other	2.9	0.0	9.4	0.0	5.0	0.0
Number of cases	**68**	**18**	**32**	**7**	**100**	**25**
Fifth visit						
Public health facility	55.3	100.0	50.0	100.0	53.7	100.0
Private health facility	42.1	0.0	37.5	0.0	40.7	0.0
Other	2.6	0.0	12.5	0.0	5.6	0.0
Number of cases	**38**	**4**	**16**	**1**	**54**	**5**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

Table 8 provides the distribution of respondents according to the main reason for consulting a particular health care provider. We noticed that there was slight change in the response to the reason for going to a particular provider. For instance, according to the baseline survey, the three most frequently reported reasons for going to a particular provider were the proximity to the patients' residence or easy access (51%), recommendations from friends or relatives (45%), and good reputation of the provider (42%). However, in the end-line, good reputation of the provider (67%), low cost or reasonable price (40%) and proximity to residence or easy access (31%) were the three most frequently reported reasons for consulting a particular provider. We did not notice much difference in the reasons according to the sex of the respondent. The most frequently reported reasons for going to a particular provider are closely related to the access, quality and affordability.

Table 8: Percentage distribution of respondents by sex according to the main reason for consulting a particular healthcare provider in the baseline and end-line surveys, Bengaluru

Type of health facility	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Reason to go to the provider						
Good reputation	43.4	67.4	39.7	65.0	42.3	66.5
Price is reasonable /Low-cost	25.8	38.9	19.1	41.3	23.8	39.7
Close to home/Easy to access	47.8	30.6	58.8	32.5	51.1	31.3
Convenient hours	15.1	4.2	13.2	7.5	14.5	5.4
Treats me nicely	35.2	13.9	44.1	15.0	37.9	14.3
Friends/Relatives recommended	45.9	3.5	41.2	0.0	44.5	2.2
Know provider personally	10.1	0.7	7.4	1.3	9.3	0.9
No consultation fee	0.6	5.6	2.9	6.3	1.3	5.8
Doctor referred	5.7	4.2	4.4	0.0	5.3	2.7
Follow-up visit	0.6	10.4	1.5	7.5	0.9	9.4
Other	1.3	0	1.5	0.0	1.3	0.0
Don't know/Can't say	0.0	0.7	0.0	0.0	0.0	0.5
Number of cases	**159**	**156**	**68**	**68**	**227**	**224**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

The suspected disease conditions reported by healthcare providers at different consultation visits are detailed in Table 9. During the first consultation visit, nearly half of the respondents in the baseline and two-fifths in the end-line reported that the healthcare provider informed the patient that s/he is having a minor cough. However, in the end-line, around 45% of the respondents said that the health care provider did not tell them anything about the disease condition during the first consultation visit. In both the baseline and end-line, as the number of consultation visits increased, the provider's suspicion of TB as the disease condition also increased, except for the third visit in the end-line. Two-thirds of respondents in the end-line study who had a third consultation visit said that the disease condition suspected by the health care provider was cough due to allergy.

Table 9: Percentage distribution of respondents by sex according to the disease condition reported by the healthcare provider at each consultation visit in the baseline and end-line surveys, Bengaluru

Disease condition reported	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Minor cough	49.1	40.3	48.5	40.0	48.9	40.2
Common cold	12.6	0.7	10.3	1.3	11.9	0.9
Cough induced due to allergy	8.2	4.9	10.3	11.3	8.8	6.8
Chest congestion	3.1	0.0	1.5	0.0	2.6	0.0
Tuberculosis	3.1	5.6	2.9	1.3	3.1	4.2
Did not tell anything	7.5	41.0	13.2	45.0	9.3	42.2
Don't remember	0.0	0.0	1.5	0.0	0.4	0.0
Other	16.4	7.6	11.8	1.3	15.0	5.7
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**
Second visit						
Minor cough	30.3	10.2	42.4	7.6	33.9	9.4
Common cold	12.9	1.5	12.1	0.0	12.7	1.0
Cough induced due to allergy	9.7	1.5	9.1	2.5	9.5	1.8
Chest congestion	3.9	0.0	1.5	0.0	3.2	0.0
Tuberculosis	23.2	54.7	18.2	51.9	21.7	53.9
Did not tell anything	7.7	21.2	7.6	27.8	7.7	23.3
Don't remember	0.0	9.5	0.0	7.6	0.0	8.9
Other	12.3	1.5	9.1	2.5	11.3	1.8
Number of cases	**155**	**148**	**66**	**68**	**221**	**216**

Third visit						
Minor cough	20.3	8.3	30.2	5.1	23.4	7.4
Common cold	10.2	0.0	11.3	2.6	10.5	0.8
Cough induced due to allergy	5.1	70.8	7.5	64.1	5.8	68.8
Chest congestion	5.9	0.0	3.8	0.0	5.3	0.0
Tuberculosis	41.5	15.3	39.6	23.1	40.9	17.6
Did not tell anything	0.8	4.2	0.0	5.1	0.6	4.5
Other	10.2	1.4	3.8	0.0	8.2	1.0
Number of cases	**118**	**78**	**53**	**33**	**171**	**111**
Fourth visit						
Minor cough	22.1	11.8	9.4	0.0	18.0	8.6
Common cold	10.3	0.0	15.6	0.0	12.0	0.0
Cough induced due to allergy	8.8	0.0	6.3	0.0	8.0	0.0
Chest congestion	7.4	0.0	9.4	0.0	8.0	0.0
Tuberculosis	39.7	76.5	46.9	87.5	42.0	79.5
Did not tell anything	7.4	11.8	3.1	12.5	6.0	12.0
Other	4.4	0.0	9.4	0.0	6.0	0.0
Number of cases	**68**	**18**	**32**	**7**	**100**	**25**
Fifth visit						
Minor cough	26.3	25.0	18.8	0.0	24.1	20.9
Common cold	15.8	0.0	18.8	0.0	16.7	0.0
Cough induced due to allergy	7.9	0.0	6.3	0.0	7.4	0.0
Tuberculosis	42.1	50.0	37.5	100.0	40.7	58.3
Did not tell anything	2.6	25.0	6.3	0.0	3.7	20.9
Other	5.3	0.0	12.5	0.0	7.4	0.0
Number of cases	**38**	**4**	**16**	**1**	**54**	**5**

Note: 2 HIV/AIDS patients each in the baseline and in the end line were excluded

The distribution of the type of recommendations made by the healthcare provider at each consultation visit is provided in Table 10. For the first two consultation visits, a majority of the respondents were prescribed medicine in both baseline and end line surveys. The results also indicated that there was a gradual increase in the proportion of respondents reported to have received recommendations for diagnostic tests in both baseline and end-line surveys as the number of consultation visits increases. However, in the end-line, more respondents at each consultation visit received recommendations for diagnostic tests from the healthcare provider as compared to the baseline survey. For example, at the third consultation visit, 49% received recommendations for a diagnostic test in the baseline survey and this increased to 83% in the end-line survey. The results from the end-line clearly indicate that there was a shift in recommending diagnostic tests at an earlier visit.

Table 10: Percentage distribution of respondents by sex according to type of recommendations made by the healthcare provider at each consultation visit in the baseline and end-line surveys, Bengaluru

Recommendations	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Diagnostic tests	10.1	29.9	5.9	25.0	8.8	28.4
Prescribed medicine	93.7	93.7	95.6	92.5	94.3	93.4
Referred to another doctor/ hospital	3.8	4.2	5.9	3.8	4.4	4.0
Admission to hospital	1.3	6.9	0.0	0.0	0.9	4.8
Referred to place for TB treatment	0.0	0.7	0.0	0.0	0.0	0.5
Nothing	0.0	2.1	1.5	1.3	0.4	1.8
Number of cases	159	155	68	69	227	224
Other	16.4	7.6	11.8	1.3	15.0	5.7
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**
Second visit						
Diagnostic tests	37.4	62.8	34.8	62.0	36.7	62.5
Prescribed medicine	69.0	84.7	71.2	84.8	69.7	84.7
Referred to another doctor/ hospital	7.7	1.5	1.5	2.5	5.9	1.8
Admission to hospital	0.6	2.2	3.0	1.3	1.4	1.9
Referred to place for TB treatment	0.6	1.5	0.0	0.0	0.5	1.0
Nothing	0.0	0.0	0.0	1.3	0.0	0.4
Number of cases	**155**	**148**	**66**	**68**	**221**	**216**

Third visit						
Diagnostic tests	49.2	83.3	47.2	82.1	48.5	82.9
Prescribed medicine	54.2	70.8	45.3	69.2	51.5	70.4
Referred to another doctor/ hospital	7.6	1.4	11.3	2.6	8.8	1.7
Admission to hospital	4.2	0.0	5.7	0.0	4.7	0.0
Referred to place for TB treatment	1.7	4.2	3.8	0.0	2.3	2.9
Nothing	0.8	0.0	0.0	2.6	0.6	0.8
Number of cases	**118**	**78**	**53**	**33**	**171**	**111**
Fourth visit						
Diagnostic tests	55.9	82.4	59.4	100.0	57.0	87.2
Prescribed medicine	47.1	88.2	40.6	75.0	45.0	84.6
Referred to another doctor/ hospital	11.8	0.0	6.3	0.0	10.0	0.0
Admission to hospital	0.0	0.0	3.1	0.0	1.0	20.9
Referred to place for TB treatment	1.5	0.0	0.0	0.0	1.0	0.0
Nothing	0.0	0.0	6.3	2.6	2.0	0.8
Number of cases	**68**	**18**	**32**	**7**	**100**	**25**
Fifth visit						
Diagnostic tests	52.6	100.0	56.3	0.0	53.7	0.0
Prescribed medicine	42.1	75.0	56.3	100.0	46.3	79.1
Referred to another doctor/ hospital	10.5	0.0	12.5	0.0	11.1	0.0
Admission to hospital	7.9	25.0	0.0	0.0	5.6	20.9
Referred to place for TB treatment	5.3	0.0	0.0	0.0	3.7	0.0
Number of cases	**38**	**4**	**16**	**1**	**54**	**5**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

The distribution of specific tests recommended according to sex of the respondent at each consultation visit is provided in Table 11. Although recommendations for either X-Ray or sputum testing was lower during the first consultation visit, an X-Ray was recommended for a slightly higher proportion of respondents during the first visit in both baseline and end-line surveys. Irrespective of the sex of the respondent, the proportion of respondents who received recommendations for a sputum test gradually increased as the number of consultation visits increased in both baseline and end-line surveys. Similarly, a higher proportion were reported to have received the recommendation for a sputum test at the earliest visit in the end-line as compared to the baseline survey. We also noticed that the proportion of respondents who received recommendations for both sputum and X-Ray tests almost doubled between baseline and end-line surveys.

Table 11: Percentage distribution of respondents by sex according to type of test recommended at each consultation visit in the baseline and end-line surveys, Bengaluru

Type of test recommended	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Sputum only	2.5	4.2	0.0	1.3	1.8	3.3
X-Ray only	3.1	11.8	2.9	13.7	3.1	12.4
Both X-Ray and sputum	1.9	7.6	2.9	5.0	2.2	6.8
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**
Second visit						
Sputum only	12.3	17.5	12.1	15.2	12.2	16.8
X-Ray only	7.1	4.4	1.5	1.3	5.4	3.4
Both X-Ray and sputum	15.5	38.7	16.7	41.8	15.8	39.7
Number of cases	**155**	**148**	**66**	**68**	**221**	**216**
Third visit						
Sputum only	11.0	11.1	13.2	17.9	11.7	13.2
X-Ray only	5.1	4.2	3.8	7.7	4.7	5.2
Both X-Ray and sputum	32.2	66.7	30.2	56.4	31.6	63.6
Number of cases	**118**	**78**	**53**	**33**	**171**	**111**
Fourth visit						
Sputum only	22.1	41.2	12.5	25.0	19.0	36.8
X-Ray only	8.8	0.0	0.0	0.0	6.0	0.0
Both X-Ray and sputum	25.0	35.3	43.8	75.0	31.0	46.1
Number of cases	**68**	**18**	**32**	**7**	**100**	**25**
Fifth visit						
Sputum only	28.9	25.0	18.8	0.0	25.9	20.9
X-Ray only	7.9	0.0	6.3	0.0	7.4	0.0
Both X-Ray and sputum	13.2	75.0	25.0	0.0	16.7	62.6
Number of cases	**38**	**4**	**16**	**1**	**54**	**5**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

The specific diagnostic tests recommended according to type of health facility visited at each consultation indicated that the recommendation for sputum and X-Ray was comparatively higher for patients visiting a public health facility as compared to a private facility. We also noticed that the recommendation for diagnostic tests such as sputum test or X-Ray increased between baseline and end-line irrespective of type of facility. In both the baseline and end-line, the proportion of respondents who received recommendations for either a sputum test or X-Ray was relatively lower in the first two visits among the persons who visited a private facility. Between the baseline and end-line, there was a shift to earlier recommendations for a sputum test, particularly among respondents who visited a public health facility.

Table 12: Percentage distribution of visits according to type of test recommended and type of facility consulted at each consultation visit in the baseline and end-line surveys, Bengaluru

Type of test recommended	Government facility		Private facility		Other	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Sputum only	6.5	9.4	0.0	1.5	5.3	0.0
X-Ray only	4.3	13.6	3.1	14.3	0.0	0.0
Both X-Ray and sputum	6.5	5.5	1.2	8.7	0.0	0.0
Number of cases	**46**	**55**	**162**	**142**	**19**	**27**
Second visit						
Sputum only	27.9	24.7	5.5	3.8	0.0	0.0
X-Ray only	4.4	2.2	6.2	5.4	0.0	0.0
Both X-Ray and sputum	29.4	47.2	9.7	27.9	12.5	0.0
Number of cases	**68**	**134**	**145**	**80**	**8**	**2**
Third visit						
Sputum only	16.7	14.7	8.9	7.8	0.0	NA
X-Ray only	7.6	1.0	3.0	19.8	0.0	NA
Both X-Ray and sputum	57.6	74.8	14.9	25.0	25.0	NA
Number of cases	**66**	**86**	**101**	**25**	**4**	**0**
Fourth visit						
Sputum only	31.6	45.8	2.6	0.0	0.0	NA
X-Ray only	5.3	0.0	7.9	0.0	0.0	NA
Both X-Ray and sputum	40.4	43.6	21.1	56.4	0.0	NA
Number of cases	**57**	**20**	**38**	**5**	**5**	**0**

Fifth visit						
Sputum only	41.4	20.9	9.1	NA	0.0	NA
X-Ray only	10.3	0.0	4.5	NA	0.0	NA
Both X-Ray and sputum	24.1	62.6	9.1	NA	0.0	NA
Number of cases	**29**	**5**	**22**	**0**	**3**	**0**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

Table 13 provides the distribution of respondents according to the type of test conducted by sex at each consultation visit in the baseline and end-line surveys. While examining both Table 11 and Table 13, we noticed that all the respondents had undergone the recommended tests. In the end-line, we noticed that in the third consultation visit, a few of the male and female respondents underwent a sputum test, even though the healthcare provider did not recommend this test. It is important to note that the proportion of respondents who underwent both a sputum test and an X-Ray almost doubled between the baseline and end-line surveys, irrespective of sex of the respondent. Similarly, there was gradual increase in the proportion of respondents carrying out the recommended tests as the number of consultation visits increased.

Table 13: Percentage distribution of respondents by sex, according to type of test conducted at each consultation visit in the baseline and end-line surveys, Bengaluru

Type of test conducted	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Sputum only	2.5	4.2	0.0	1.3	1.8	3.3
X-Ray only	3.1	11.8	2.9	13.7	3.1	12.4
Both X-Ray and sputum	1.9	7.6	2.9	5.0	2.2	6.8
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**
Second visit						
Sputum only	11.6	17.5	12.1	19.0	11.8	18.0
X-Ray only	7.1	4.4	1.5	1.3	5.4	3.4
Both X-Ray and sputum	15.5	38.7	16.7	38.0	15.8	38.5
Number of cases	**155**	**148**	**66**	**68**	**221**	**216**
Third visit						
Sputum only	11.0	15.3	13.2	25.6	11.7	18.4
X-Ray only	5.1	4.2	3.8	7.7	4.7	5.2
Both X-Ray and sputum	32.2	62.5	30.2	48.7	31.6	58.4
Number of cases	**118**	**78**	**53**	**33**	**171**	**111**

Fourth visit						
Sputum only	22.1	41.2	12.5	25.0	19.0	36.8
X-Ray only	8.8	0.0	0.0	0.0	6.0	0.0
Both X-Ray and sputum	25.0	35.3	43.8	75.0	31.0	46.1
Number of cases	**68**	**18**	**32**	**7**	**100**	**25**
Fifth visit						
Sputum only	28.9	25.0	18.8	0.0	25.9	20.9
X-Ray only	7.9	0.0	6.3	0.0	7.4	0.0
Both X-Ray and sputum	13.2	75.0	25.0	0.0	16.7	62.6
Number of cases	**38**	**4**	**16**	**1**	**54**	**5**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

The distribution of the respondents according to the type of facility consulted and the specific test carried out as per the healthcare provider's recommendation is given in Table 14. An examination of Table 12 and Table 14 indicated that the majority of respondents underwent the specific tests as per the recommendation of the healthcare provider, irrespective of the type of health facility. Similarly, in the end-line, amongst the respondents who made a third visit, 9% who went to private health facilities and 4% who went to public health facilities underwent only a sputum test even though they were recommended both sputum tests and X-Rays. We also noticed an increase in the recommendations and patients undergoing both sputum and X-Rays between the baseline and end-line irrespective of the number of consultation visits and this increment was particularly higher among respondents who consulted a private health facility, except among those who went for a third visit.

Table 14: Percentage distribution of respondents according to type of test conducted and type of facility consulted in the baseline and end-line surveys, Bengaluru

Type of test conducted	Government facility		Private facility		Other	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Sputum only	6.5	9.4	0.0	1.5	5.3	0
X-Ray only	4.3	13.6	3.1	14.3	0.0	0
Both X-Ray and sputum	6.5	5.5	1.2	8.7	0.0	0
Number of cases	**46**	**55**	**162**	**142**	**19**	**27**
Second visit						
Sputum only	26.5	26.0	5.5	4.9	0.0	0
X-Ray only	4.4	2.2	6.2	5.4	0.0	0
Both X-Ray and sputum	29.4	45.9	9.7	26.8	12.5	0
Number of cases	**68**	**134**	**145**	**80**	**8**	**2**

Third visit						
Sputum only	16.7	19.0	8.9	16.4	0.0	NA
X-Ray only	7.6	1.0	3.0	19.8	0.0	NA
Both X-Ray and sputum	57.6	70.5	14.9	16.4	25.0	NA
Number of cases	**66**	**86**	**101**	**25**	**4**	**0**
Fourth visit						
Sputum only	31.6	45.8	2.6	0.0	0.0	NA
X-Ray only	5.3	0.0	7.9	0.0	0.0	NA
Both X-Ray and sputum	40.4	43.6	21.1	56.4	0.0	NA
Number of cases	**57**	**20**	**38**	**5**	**5**	**0**
Fifth visit						
Sputum only	41.4	20.9	9.1	NA	0.0	NA
X-Ray only	10.3	0	4.5	NA	0.0	NA
Both X-Ray and sputum	24.1	62.6	9.1	NA	0.0	NA
Number of cases	**29**	**5**	**22**	**0**	**3**	**0**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

We examined the distribution of respondents according to the place where the sputum test was conducted by sex, and the results are presented in Table 15. Overall, in the baseline, 79% of the respondents were reported to have undergone the sputum test in a public health facility, and it increased to 89% in the end-line. We noticed an increase in the proportion of respondents going for a sputum test in a public health facility for both males and females, but the increment was higher for females. We noticed an equal proportion of respondents going to a private facility for a sputum test in the baseline and end-line. However, a higher proportion of females in the baseline as compared to the end-line (29% vs. 17%) and a slightly higher proportion of males in the end-line as compared to the baseline (14% vs. 9%) underwent the sputum test in the private facilities. It is also important to note that 8% and 10% of the respondents in the baseline and end-line underwent a sputum test more than once. With respect to testing of sputum more than once, the proportion was 15% in the baseline and 5% in the end-line for females and 4% in the baseline and 13% in the end-line for males.

Table 15: Percentage distribution of respondents by sex, according to the place where the sputum test was conducted in the baseline and end-line surveys, Bengaluru

Place of conducting the test	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Municipal/corporation hospital	9.4	12.5	8.8	15.0	9.3	13.4
Government TB hospital	17.0	54.2	17.7	47.5	17.2	51.8
Medical college	7.6	4.9	5.9	1.3	7.1	3.6
Other government hospital	44.0	18.8	33.8	21.3	41.0	19.6
Designated Microscopy Centre	12.0	6.3	10.3	0.0	11.5	4.0
Private hospital	6.3	11.8	20.6	11.3	10.6	11.6
Private clinic	2.5	2.1	8.8	6.3	4.4	3.6
Any private lab	5.0	0.7	8.8	0.0	6.2	0.5
Don't know/Can't say	0.6	1.4	0.0	2.5	0.4	1.8
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

The percentage distribution of respondents according to the disease condition shared with them after conducting the test is presented in Table 16. An almost equal proportion of respondents in both the baseline and end-line, in the range of 21-23%, reported that the disease condition shared with them after the diagnostic test was not TB, except in the case of female respondents. In case of females, 24% in the baseline and 33% in the end-line reported that the disease condition shared with them was not TB. In the range of 4%-6% of respondents in the baseline and end-line reported that they either don't know the disease condition shared with them was or the healthcare provider did not tell them about the disease after they received the test result. The increment in saying this response between baseline and end-line was mainly due to the reporting by males (4% vs. 7%).

Table 16: Percentage distribution of respondents by sex according to disease condition shared with them after the tests in the baseline and end-line surveys, Bengaluru

Disease condition reported after test	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
No TB	3.1	13.2	2.9	20.0	3.1	15.6
Allergy	5.0	2.8	7.4	0.0	5.7	1.8
Chest congestion	2.5	0.7	0.0	9.0	1.8	0.5
TB	100.0	100.0	100.0	100.0	100.0	100.0
Don't know	3.1	4.2	3.0	1.3	3.5	3.1
Don't remember	0.6	2.8	0.0	2.5	0.4	2.7
Other	9.4	5.6	13.2	3.8	10.6	4.9
Number of cases	159	155	68	69	227	224
Don't know/Can't say	0.6	1.4	0.0	2.5	0.4	1.8
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**

Note:- 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

Table 17 provides the distribution of respondents across time intervals between diagnosis and visit of a grassroots level government health worker to the patients' home. The result suggests that there was an increase in the proportion of respondents who received a home visit by a grassroots level health worker between baseline and end-line surveys. For example, 42% of the respondents in the baseline reported that the grassroots level health worker did not visit them after they were diagnosed with TB; this was around 30% in the end line survey. However, among the people who received the visit of a grassroots level government health workers at home, the interval between diagnosis and the visit increased between baseline and end-line. Overall, the average interval between diagnosis and visit of the grassroots level worker in the baseline was 3 days and it increased to 7 days in the end-line. The delay in visiting was slightly higher for males than females in the end-line survey.

Table 17: Percentage distribution of respondents by sex according to the number of days after the diagnosis of TB the government health worker visited the respondent at home in the baseline and end-line surveys, Bengaluru

	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Number of days after the diagnosis of TB that the government health worker visited the home						
0	0.6	0.0	4.3	0.0	1.7	0.0
1-3 days	44.0	30.6	31.4	41.5	40.2	34.0
4-7 days	15.7	17.4	15.7	9.8	15.7	15.0
8+days	0.6	21.5	0.0	20.7	0.4	21.3
Not visited	39.0	30.6	48.6	28.0	41.9	29.8
Mean number of days	**2.93**	**7.25**	**2.75**	**5.61**	**2.88**	**6.73**
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**156**	**70**	**70**	**229**	**226**

All respondents were asked about the distance from their present residence to the facility from where he/she takes the TB medicines, and the amount spent for transportation for each visit to the facility. Overall, nearly half of the respondents in the baseline reported that they stay within one kilometer of the facility from where the TB medicines were collected. However, in the end-line, less than 5% of the respondents reported that they stay within one kilometer of the facility from where the TB medicines were collected. The average distance to the facility reported between baseline and end-line increased from 1.6 kilometers to 3.1 kilometers. Around 35% of the respondents in the baseline survey reported that they spent money for the transportation to reach the facility, and this increased to 55% in the end-line survey. Among the respondents who reported that they spent money for travel to the facility, the amount paid was ₹62 in the baseline and it increased to ₹79 in the end-line.

Table 18: Percentage distribution of respondents by sex according to distance travelled and money spent on transportation to reach the facility from where medicines were collected, in the baseline and end-line surveys, Bengaluru

	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Distance to the facility						
< 1 km	48.4	4.2	50.0	2.4	48.9	3.6
1-2 kms	18.9	25.0	17.1	30.5	18.3	26.7
2-3 kms	15.1	29.9	17.1	37.8	15.7	32.3
3-4 kms	3.8	9.0	7.1	6.1	4.8	8.1
4+ kms	13.8	31.9	8.6	23.2	12.2	29.2
Mean distance	**1.6**	**3.2**	**1.4**	**2.9**	**1.6**	**3.1**
Whether respondent paid for transportation to reach the facility						
Yes	34.0	53.5	37.1	58.5	34.9	55.0
No	66.0	46.5	62.9	41.5	65.1	45.0
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**156**	**70**	**70**	**229**	**226**
Amount spent on transportation (in ₹)						
50	35.2	16.9	15.4	22.9	28.7	18.9
50-99	46.3	49.4	76.9	52.1	56.3	50.3
100+	18.5	32.5	7.7	20.8	15.0	28.6
Don't know/can't say	0.0	1.3	0.0	4.2	0.0	2.2
Mean amount spent	**63**	**83**	**60**	**73**	**62**	**79**
Total percent	**100**	**100**	**100**	**100**	**100**	**100**
Number of cases	**54**	**84**	**26**	**41**	**80**	**125**

The respondents were asked to mention the person who accompanied them for all or most of the visits they made to the various health facilities before their TB diagnosis. The percentage of respondents who reported that no one accompanied them during their visits to the various health until they were diagnosed with TB slightly increased between the baseline and end-line survey (from 12% to 19%), and the increase was slightly higher for males (15% to 23%) than for females (6% to 10%). The largest proportion of respondents said that the accompanying person was their spouse in both the baseline and end-line surveys, irrespective of the sex of the respondent. The parents and son or daughter were the other persons most widely-reported to accompany the respondent.

Table 19: Percentage distribution of respondents by sex according to their relationship with the person who accompanied them to healthcare facilities before diagnosis in the baseline and end-line surveys, Bengaluru

	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Person who accompanied them						
No one accompanied	15.1	22.9	5.7	9.8	12.2	18.8
Wife/husband	39.0	44.4	32.9	51.2	37.1	46.6
Mother/father	15.7	15.3	24.3	15.9	18.3	15.5
Son/daughter	11.3	11.1	22.9	17.1	14.8	13.0
Sister/brother	6.3	2.8	10.0	4.9	7.4	3.4
Mother-in-law/ father-in-law	1.9	0.7	0.0	0.0	1.3	0.5
Brother-in-law/sister-in-law	0.0	0.0	1.4	0.0	0.4	0.0
Other relatives	3.8	0.0	0.0	0.0	2.6	0.0
Friend	5.0	2.8	1.4	1.2	3.9	2.3
Other	1.9	0.0	1.4	0.0	1.7	0.0
Total percent	**100**	**100**	**100**	**100.0**	**100**	**100**
Number of cases	**159**	**156**	**70**	**70**	**229**	**226**

We enquired with all the respondents about the person who informed them that they had TB, the respondents' emotional status upon knowing their TB status, and what the respondent understood about TB when they were informed about their TB status. In both the baseline and end-line surveys, a majority of the respondents, irrespective of sex, said that the doctor informed them that they were diagnosed with TB. About 9% of the respondents said that a government health worker other than doctor informed them about their TB status. Upon knowing their disease status, nearly half or more than half of the respondents in both the baseline and end-line surveys were scared; reporting of this emotional status was slightly higher among females than males. The other two most frequently-reported emotional reactions after knowing about their disease status were depression and disbelief in both baseline and end-line surveys. The respondents' knowledge about TB at the time of finding out their TB status was asked only in the end-line survey. The highest proportion of respondents understood that TB is curable (70%), followed by the knowledge that TB spreads through air (56%),

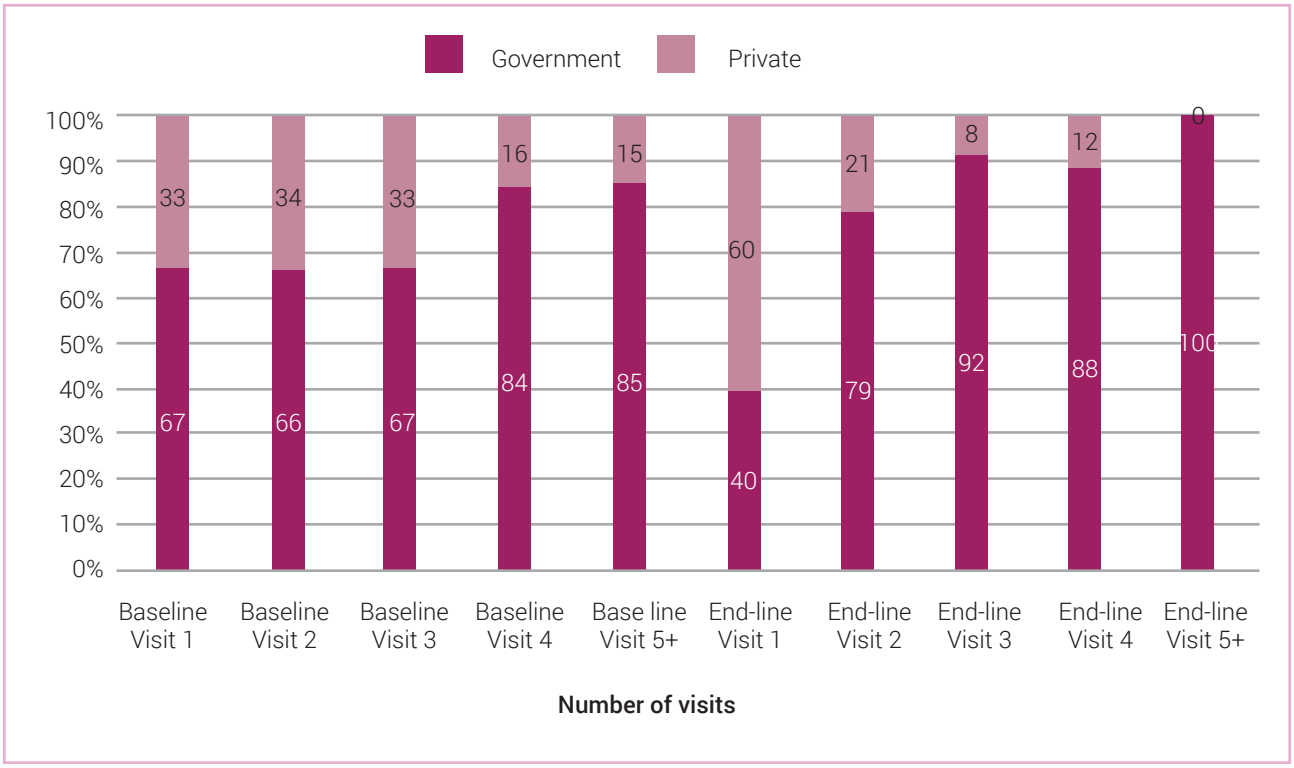
that medicines has to be taken for a longer duration (55%), and that the respondent's family is at risk of getting TB (54%). This indicates that several respondents had a knowledge gap related to various aspects of TB at the time they were informed about their disease condition.

Table 20: Percentage distribution by sex of respondents according to the person who informed them of their TB status, and their emotional status upon getting this information in the baseline and end-line surveys, Bengaluru

Item	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Person who informed the respondent about TB						
Doctor	88.7	89.6	92.9	93.9	90.0	90.9
Government health worker	10.1	10.4	5.7	6.1	8.7	9.1
Relative	0.6	0.0	1.4	0.0	0.9	0.0
Other	0.6	0.0	0.0	0.0	0.4	0.0
How the respondent felt after knowing about his/her TB diagnosis						
Scared	41.5	47.2	68.6	61.0	49.8	51.5
Depressed	22.6	36.8	12.9	24.4	19.7	32.9
Angry	8.2	0.7	5.7	2.4	7.4	1.2
Did not believe	17.6	15.3	7.1	12.2	14.4	14.3
Other	10.1	0.0	5.7	0.0	8.7	0.0
Total percent	**100**	**100**	**100**	**100**	**100**	**100**
Number of cases	**159**	**156**	**70**	**70**	**229**	**226**
What the respondent understood about TB when informed that he/she had TB						
TB is curable		72.2		65.9		70.2
Medicines to be taken for longer duration		54.9		53.7		54.5
TB spreads through air		58.3		50.0		55.7
My family will be at risk of getting TB		56.9		47.6		54.0
Cough is the common symptom of TB		47.9		28.0		41.7
Sputum is the test for diagnosis of TB		29.9		25.6		28.5

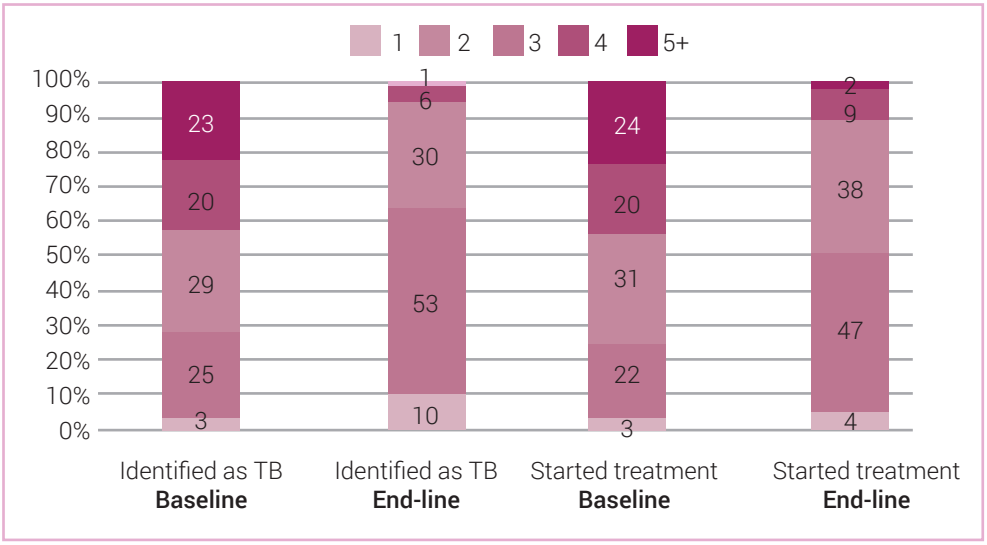
Figure 1 provides the comparison between baseline and end-line of the distribution of respondents according to type of facility in which the decision to test was made and the health condition was first identified as TB, by consultation visits. In the end-line survey, the proportion of respondents who received the recommendation for a diagnostic test and identified as TB first in the first visit was comparatively higher for private health facilities (60%) as compared to public health facilities (40%). However, in the subsequent consultation visits, the recommendation to conduct the test and first identification as TB first was made in greater proportion by government facilities in both baseline and end-line surveys. Similarly, the proportion of respondents who received a recommendation for tests from the government facility and identified as TB first at various consultation visits increased between the baseline and end-line.

Figure 1. Type of facility in which the decision to test was taken and the person was first identified as TB positive, Bengaluru



The distribution of respondents according to the consultation visit number when the person was identified as TB first and the final visit number prior to initiating treatment is given in Figure 2. From this graph, one can visualize that in the baseline, about 57% percent of respondents were identified as TB-positive on or before the third visit and this increased to 93% in the end-line survey. However, 56% of them were initiated on treatment on or before the third visit in the baseline, and this increased to 89% in the end-line survey. One can also note that after diagnosis of TB first, there is a negligible proportion of respondents who delay starting the treatment and go for another consultation visit before starting treatment, and this proportion slightly increased between baseline and end-line.

Figure 2. Distribution of respondents according to the visit number at which they were first identified as TB-positive and at which they started TB treatment, Bengaluru



All the respondents were asked about changes they made in their food habits after they were diagnosed with TB. There was a slight increase in the proportion of respondents who reported that there was no change in their food habits between baseline and end-line surveys. We noticed an increase in the proportion of respondents who reported that the quantity of food they had eaten increased after they were diagnosed with TB, between the baseline and end-line (36% vs. 47%), and this increment was greater in females (26% vs. 40%) than males (40% vs. 49%). Similarly, reporting of change in the type of food consumed was comparatively higher in the end-line as compared to the baseline (40% vs. 3%). In the end-line a negligible proportion of the respondents said that they reduced the quantity of food consumed, as compared to baseline survey (4% vs. 21%). We also noticed that the number of times food was eaten by the respondent also increased between the baseline and end-line surveys (16% vs 31%). There was a clear and noticeable change in the food habits among the respondents between baseline and end-line surveys.

Table 21: Percentage distribution of respondents by sex according to change in food habits after being diagnosed with TB in the baseline and end-line surveys, Bengaluru

	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Change in food habits						
No change	25.2	29.2	20.0	26.8	23.6	28.4
Quantity of food reduced	17.0	2.8	30.0	6.1	21.0	3.8
Quantity of food increased	40.3	49.3	25.7	40.2	35.8	46.5
Type of food eaten changed	2.5	38.9	2.9	42.7	2.6	40.1
Number of times food is eaten reduced	3.1	3.5	1.4	1.2	2.6	2.8
Number of times food is eaten increased	13.8	33.3	20.0	26.8	15.7	31.3
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**159**	**156**	**70**	**70**	**229**	**226**

The respondents were also asked about their opinion on disclosing their disease status to others; the results are provided in Table 22. We noticed a reduction, between baseline and end-line surveys, in the proportion of respondents who said that one should disclose their disease status to other people (from 47% to 38%), showing that there could be an increase in perceived stigma and discrimination among TB patients. We also noticed that the respondents would prefer to hide the disease status from friends or relatives, as only 32% of the respondents in the end-line said that they had informed either a friend or a relative of their disease status, when compared to 65% in the baseline. However, a negligible proportion of respondents reported that they experienced discrimination from family, friends or relative after disclosing their disease status to them.

In the end-line survey, about 5% of the respondents said that a healthcare provider mistreated them, either before or after diagnosis of TB. More females (7%) than males (4%) said that a health care provider mistreated them either before or after their diagnosis. A loss of job or change of job was reported by 13% of the respondents in the end-line survey and this was reported by more males (15%) than females (9%).

Table 22: Percentage distribution of respondents by sex according to thoughts on disclosure of their illness, status of disclosure, and its repercussions in the baseline and end-line surveys, Bengaluru

	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Whether people with TB should disclose their TB status						
Yes	49.1	41	41.4	30.5	46.7	37.7
No	50.9	59	58.6	69.5	53.3	62.3
Whether friends/relatives informed that respondent has TB						
Yes	67.9	34.7	57.1	26.8	64.6	32.3
No	32.1	65.3	42.9	73.2	35.4	67.7
Whether relationship with family changed after knowing that the respondent has TB						
Yes	3.1	0	5.7	2.4	3.9	0.8
No	96.9	100	94.3	97.6	96.1	99.2
Whether relationship with friends/relatives changed after knowing that the respondent has TB						
Yes	3.1	6.3	4.3	4.9	3.5	5.8
No	96.9	93.8	95.7	95.1	96.5	94.2
Whether any healthcare provider treated the respondent badly before or after their TB diagnosis						
Yes		3.5		7.3		4.7
No		96.5		92.7		95.3
Whether the respondent lost his/her job or was forced to change his/her job after their TB diagnosis						
Yes		14.6		8.5		12.7
No		85.4		91.5		87.3
Total percent	**100**	**100**	**100**	**100**	**100**	**100**
Number of cases	**159**	**156**	**70**	**70**	**229**	**226**

In the end-line survey, the respondents were asked about the direct benefit transfer (DBT) scheme for TB patients, and the results are provided in Table 23. Nearly nine-tenths of the respondents were aware of the DBT scheme and the awareness was slightly higher among males (89%) than females (84%). Most of the respondents who were aware about the DBT scheme were linked to DBT. However, only about 11% of the respondents said that they had received the DBT amount in their account at the time of the end-line survey. This indicates that there could be delay in releasing the DBT amount to TB patients. Nearly 10% of the TB patients were not linked to DBT.

Table 23: Percentage distribution of respondents by sex who knew about DBT, were linked to DBT and received the DBT amount in the end-line survey, Bengaluru

	Male	Female	Total
Aware of DBT scheme			
Yes	88.9	84.2	87.4
No	11.1	15.8	12.6
Linked to DBT scheme			
Yes	87.5	82.9	86.1
No	12.5	17.1	13.9
Total percent	**100**	**100**	**100**
Number of cases	**156**	**70**	**226**
Received DBT amount			
Yes	11.9	10.3	11.4
No	88.1	89.1	88.6
Total percent	**100**	**100**	**100**
Number of cases	**136**	**58**	**194**

We enquired into details about the costs incurred by the respondents at each visit in terms of consultation, diagnostic tests, medicines and the total sum. We noticed a slight reduction in the consultation costs paid by the respondents between baseline and end-line (₹ 252 to ₹ 237) (see Table 24). This is mainly due to the reduction in the number of consultation visits made between baseline and end-line surveys. Although there was a reduction in costs related to consultations, the proportion of respondents who did not pay any consultation fee was higher in the baseline as compared to the end-line survey (21% vs. 5%). However, we noticed a huge spike in the costs to respondents for diagnostic tests between the baseline and end-line. The amount spent on diagnostic tests in the baseline was ₹ 485 and it increased to ₹ 1321 in the end-line; the increase was found to be higher for males (₹ 385 to ₹ 1278) than females (₹ 714 to ₹1419). The proportion of respondents who spent over ₹ 2000 substantially increased between the baseline and end-line surveys. There was a decline in the proportion of respondents who did not incur any cost on tests between baseline and end-line surveys. However, the amount spent on medicines declined during the period, especially for female respondents. In the case of male respondents, the amount spent on medicines increased from ₹ 882 to ₹ 1163. The sum of the costs paid for all these items also increased from ₹ 1709 in the baseline to ₹2605 in the end-line survey. The increment seen in medical costs was mainly due to the spike in expenditure due to diagnostic tests.

Table 24: Percentage distribution of respondents by sex according to amount paid for consultations, diagnostic tests, medicine and total cost in the baseline and end-line surveys, Bengaluru.

Amount paid for (in ₹)	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Consultation						
No fee	23.3	4.2	16.2	6.3	21.1	4.8
1-199	29.6	48.6	23.5	40.0	27.8	46.0
200-399	23.3	26.4	30.9	31.3	25.6	27.9
400+	22.0	20.8	27.9	22.5	23.8	21.3
Not mentioned	1.9	0.0	1.5	0.0	1.8	0.0
Mean	**239.8**	**234.7**	**280.8**	**243.0**	**252.1**	**237.2**
Tests						
No fee	47.2	12.5	47.1	7.5	47.1	11.0
1-999	37.7	44.4	29.4	48.7	35.2	45.8
1000-1999	6.9	19.4	11.8	20.0	8.4	19.6
2000+	5.7	22.9	10.3	23.8	7.0	23.2
Not mentioned	2.5	0.7	1.5	0.0	2.2	0.5
Mean	**385.8**	**1278.0**	**714.4**	**1419.3**	**485.0**	**1321.4**
Medicine						
No fee	11.9	9.7	10.3	5.0	11.5	8.3
1-999	57.9	72.2	50.0	72.5	55.5	72.3
1000-1999	17.6	4.2	19.1	8.8	18.1	5.6
2000+	10.1	13.2	19.1	13.7	12.8	13.4
Not mentioned	2.5	0.7	1.5	0.0	2.2	0.5
Mean	**882.4**	**1163.3**	**1267.9**	**781.6**	**998.8**	**781.6**
Total						
No fee	6.3	0.7	8.8	0.0	7.0	0.5
1-999	41.5	43.1	25.0	27.5	36.6	38.3
1000-1999	21.4	20.8	25.0	30.0	22.5	23.6
2000+	27.0	34.7	38.2	42.5	30.4	37.1
Not mentioned	3.8	0.7	2.9	0.0	3.5	0.5
Mean	**1518.5**	**2677.4**	**2150.4**	**2443.9**	**1709.0**	**2605.6**
Number of cases	**159**	**155**	**68**	**69**	**227**	**224**

Note: 2 HIV/AIDS patients each in the baseline and in the end-line were excluded

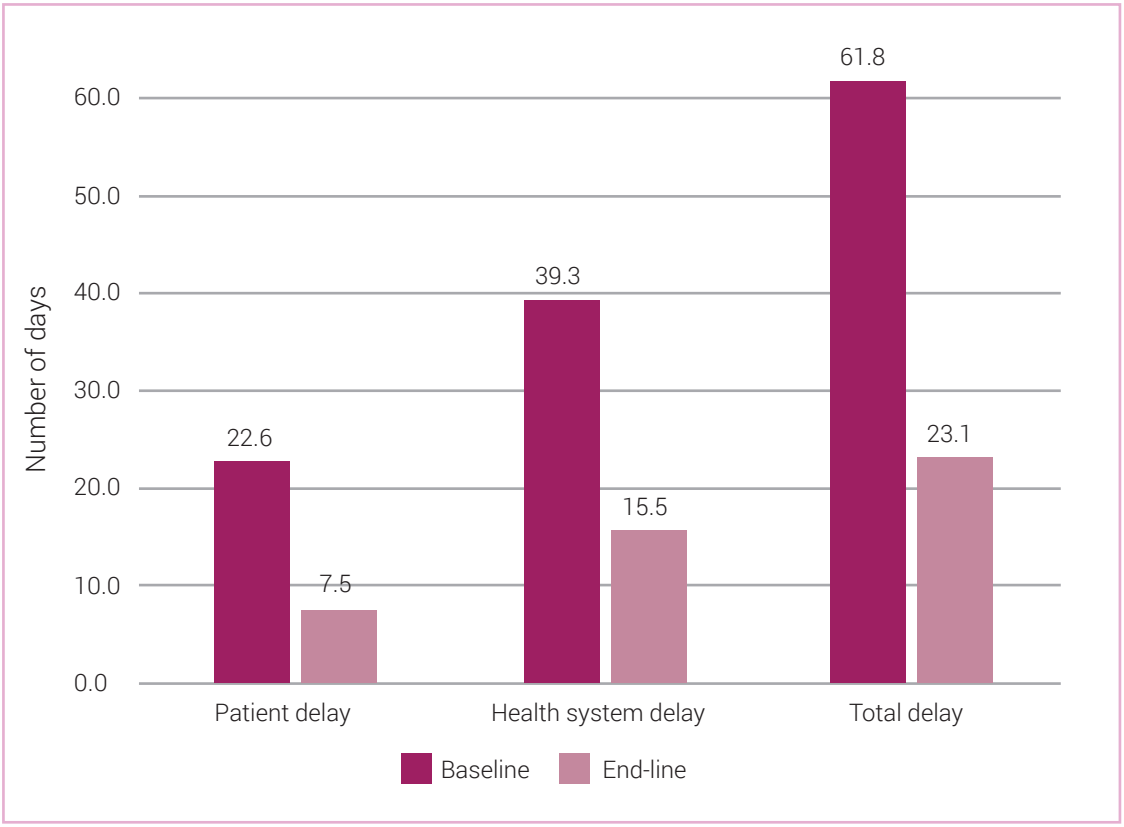
05

PATIENT, HEALTH SYSTEM AND TOTAL DELAYS

Patient, health system and total delays

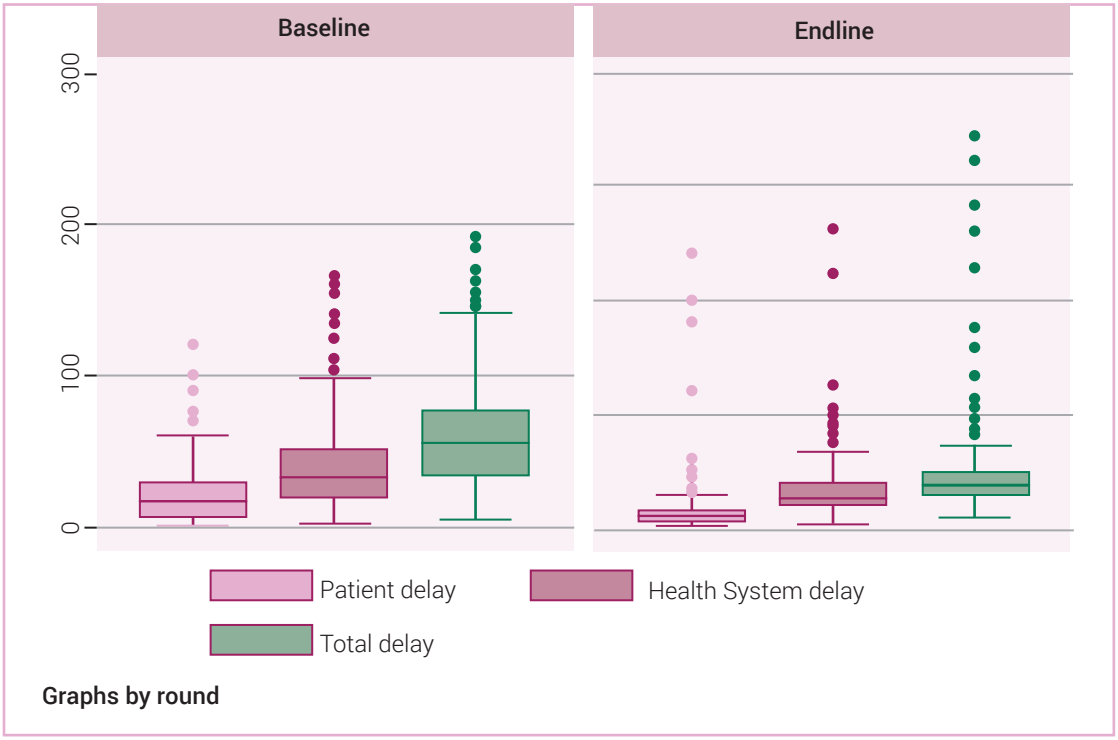
Changes in the patient, health system and total delays between baseline and end-line surveys were examined and are provided in Figure 3. Mean patient delay was reduced from 23 days in the baseline to 8 days in the end-line survey, almost a reduction of 15 days. The health system delay was reduced from 39 days in the baseline to 16 days in the end-line, and the reduction was 23 days. The total delay was reduced from 62 days to 23 days over the time period and the reduction seen was around 39 days. The reduction in total delay was comparatively more due to the reduction in health system delay rather than the reduction in patient delay.

Figure 3: Mean patient, health system and total delays, Bengaluru



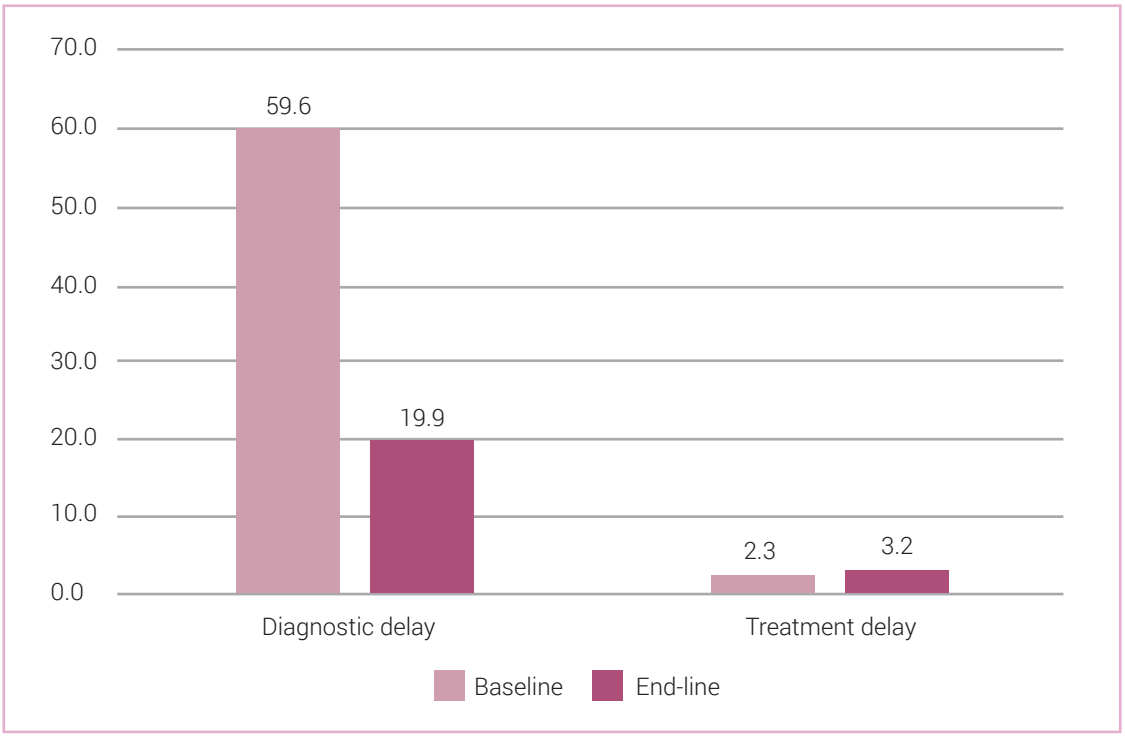
We also observed the distribution of delays through box plots, which provide five summary measures such as minimum, first quartile, median, third quartile and maximum (see Figure 4). The box plot indicates that there was no difference in the minimum values between the baseline and end-line surveys. The quartile range for various delays were shorter in the end-line survey as compared to the baseline survey, particularly for the patient and total delays. The whisker after the third quartile range indicates that in the baseline survey, the number of days for the last 25% patients is identified to have a large difference. However, the number of outliers are comparatively higher in the end-line survey as compared to the baseline survey. The box plot also suggests that the three delays examined were varied largely in the baseline rather than in the end-line.

Figure 4: Box-plot for patient, health system and total delays, Bengaluru



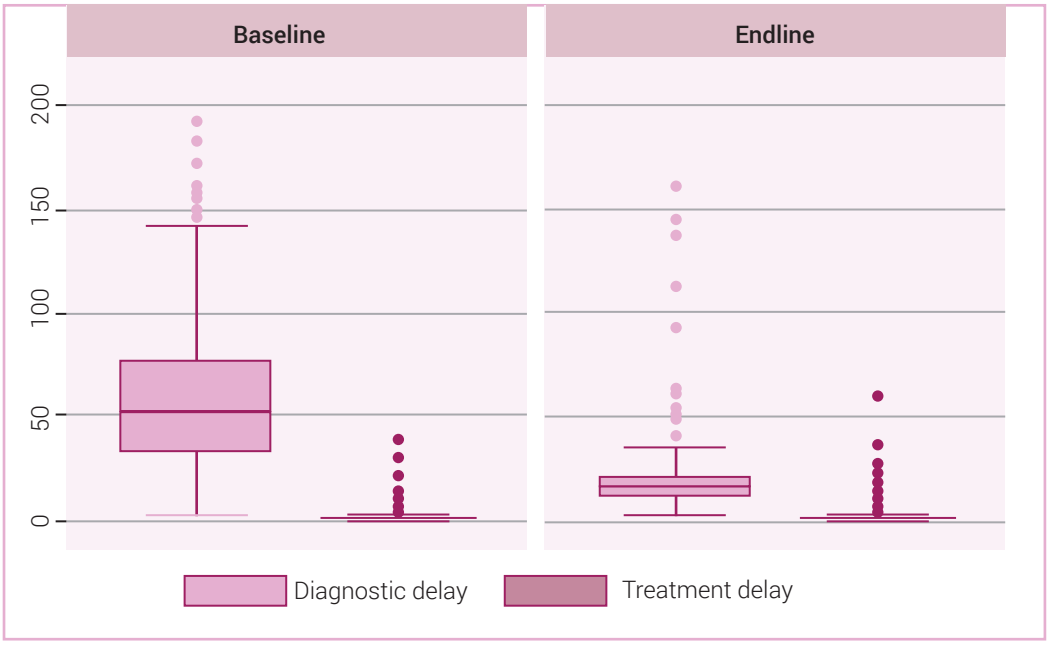
In addition to the three delays, we also examined the diagnostic delay and the treatment delay. Diagnostic delay is the delay expressed in days from the onset of the symptoms to the first TB diagnosis, and treatment delay is the delay expressed in days from the respondent being first diagnosed with TB to initiating TB treatment. Figure 5 indicates that the diagnostic delay was reduced from 60 days in the baseline to 20 days in the end-line. However, there was a negligible increase in the treatment delay, it increased from 2 days to 3 days between the baseline and end-line. This indicates that there could be a few respondents who are going for more than one test to confirm or may be waiting for a second opinion to initiate the TB treatment immediately after diagnosis.

Figure 5: Mean diagnostic and treatment delays, Bengaluru



The box plot for the diagnostic and treatment delay is provided in Figure 6. The width of the quartile range was minimal for the treatment delay. However, the width of the quartile range was reduced between baseline and end-line studies. The box plot also reveals that the variation in the days from the third quartile to the maximum value was higher in the baseline as compared to the end-line. The number of outliers in the baseline for the diagnostic delay was slightly closer than the outliers for the end-line for the diagnostic delay.

Figure 6: Box-plot for diagnostic and treatment delays, Bengaluru



The changes in the various delays over the time period according to socio-economic and demographic characteristics are examined and the results are provided in Table 25. We noticed a significant decline in all the delays examined between baseline and end-line. However, we observed that the changes in the delays for groups with different socio-economic and demographic characteristics were not the same. For instance, we noticed a relatively higher reduction in the patient delay among males, persons aged 50 and above, persons who are illiterate or have completed primary education, persons who are employed in regular income jobs (working in private or government salaried jobs or business), persons who belong to the Hindu religion, persons who belongs to Scheduled Castes or Scheduled Tribes, persons whose personal income is ₹5000 or more, persons whose household income is ₹10000 or more, persons who knew a person with TB before they were diagnosed with TB, and persons living in households with 5 or more persons, as compared to their counterparts. Similarly, the decline in health system delay was comparatively higher for females, persons aged less than 50 years, persons living in slum areas, ever married persons, persons employed in regular income jobs, persons who belong to Islam, persons belonging to Scheduled Castes or Scheduled Tribes, persons who knew a person with TB before they were diagnosed with TB, and persons living in households with 5 or more persons, as compared to their counterparts. Further, the decline in total delay was comparatively higher for persons aged less than 50 years, persons residing in slum areas, persons who are ever married, persons who are illiterate or have completed primary schooling, persons employed in regular income jobs, persons who belong to Scheduled Castes or Scheduled Tribes, persons whose personal income is ₹5000 or more, persons whose household income is ₹10000 or more, persons who knew a person with TB before they were diagnosed with TB, and persons living in households with 5 or more persons, as compared to their counterparts.

Table 25: Mean patient delay in seeking care from a formal health provider according to selected characteristics in the baseline and end-line surveys, Bengaluru

Characteristic	Mean patient delay			Mean health system delay			Mean total delay		
	Base line	End-line	p-value	Base line	End-line	p-value	Base line	End-line	p-value
Sex									
Male	24.0	7.9	<0.001	38.8	15.9	<0.001	62.8	23.8	<0.001
Female	19.2	6.7	<0.001	40.3	14.7	<0.001	59.5	21.4	<0.001
Age									
< 50 years	22.0	7.9	<0.001	40.7	15.3	<0.001	62.7	23.2	<0.001
50+	24.6	6.6	<0.001	34.5	16.3	<0.001	59.1	22.8	<0.001
Residential status									
Slum area	22.8	8.0	<0.001	40.6	15.9	<0.001	63.4	23.8	<0.001
Non-slum area	21.8	7.2	<0.001	35.2	15.3	<0.001	57.1	22.5	<0.001
Marital status									
Ever married	22.9	7.3	<0.001	40.4	15.9	<0.001	63.2	23.2	<0.001
Never married	21.8	8.3	<0.001	36.1	14.2	<0.001	57.9	22.6	<0.001
Literacy and education									
Illiterate or primary completed	25.2	6.7	<0.001	38.4	15.4	<0.001	63.6	22.1	<0.001
More than primary completed	20.5	8.1	<0.001	39.9	15.7	<0.001	60.5	23.8	<0.001
Occupation									
Not working	20.3	9.0	<0.001	39.6	16.1	<0.001	59.9	25.1	<0.001
Regular income	26.2	4.6	<0.001	40.8	13.9	<0.001	66.9	18.5	<0.001
Irregular income	25.0	9.4	0.001	37.8	17.5	<0.001	62.8	26.9	<0.001
Religion									
Hinduism	23.9	7.3	<0.001	39.3	15.8	<0.001	63.3	23.1	<0.001
Islam	20.2	9.2	0.014	41.4	12.7	<0.001	61.6	21.9	<0.001
Others	14.6	5.9	0.193	28.7	22.6	0.435	43.3	28.5	<0.001
Caste/Tribe									
Scheduled Caste or Scheduled Tribe	27.8	4.2	<0.001	42.4	13.2	<0.001	70.3	17.4	<0.001
Non-scheduled Caste or Scheduled Tribe	20.7	8.7	<0.001	38.1	16.3	<0.001	58.9	25.0	<0.001

Personal monthly income (in ₹)									
< 5000	16.8	8.0	<0.001	36.9	15.3	<0.001	53.7	23.3	<0.001
5000+	25.1	7.5	<0.001	40.3	15.7	<0.001	65.5	23.2	<0.001
Monthly household income (in ₹)									
< 10000	15.9	4.4	<0.001	37.1	15.0	<0.001	53.0	19.4	<0.001
10000+	24.0	7.6	<0.001	39.7	15.6	<0.001	63.7	23.2	<0.001
Personally knew someone with TB									
Yes	23.1	3.3	<0.001	42.7	10.9	<0.001	65.8	14.2	<0.001
No	22.3	8.1	<0.001	37.8	16.2	<0.001	60.1	24.3	<0.001
Number of household members									
< 5 members	22.1	8.7	<0.001	37.7	16.7	<0.001	59.8	25.4	<0.001
5+ members	23.3	5.1	<0.001	41.6	13.0	<0.001	64.8	18.1	<0.001

Note: 2 HIV/AIDS patients each in the baseline and in the end line were excluded

The various mean delays according to various characteristics related to health facilities and consultation visits were also examined and the results are presented in Table 26. We noticed a significant reduction in patient, health system and total delays between baseline and end-line for almost all the categories, except for respondents who were accompanied by persons other than family members. Reductions in patient delay were relatively higher for respondents who stayed more than 2 kilometers from the DOTS centre, who were accompanied by a family member, and whose reasons for going to the first facility were different from the good reputation and proximity to their home, as compared to their counterparts. Decline in health system delay was relatively higher for respondents who first visited a public health facility, who consulted both private and government facilities until treatment initiation, who had 5 or more consultation visits, who stayed within 2 kilometres of the DOTS centre, who visited the health facility alone, and who said that they visited the first facility because it was close to their home, as compared to their counterparts. For the total delay, the reduction was larger for respondents who visited a public health facility first, who had 5 or more consultation visits, who stayed more than 2 kilometres away from the DOTS centre, and who said that they visited the first facility due to reasons other than the good reputation of the provider and the facility's proximity to the residence.

Table 26: Mean patient, health system and total delays in initiating TB treatment according to characteristics related to health facility and consultation visits, Bengaluru

Characteristic	Mean patient delay			Mean health system delay			Mean total delay		
	Base line	End-line	p-value	Base line	End-line	p-value	Base line	End-line	p-value
Type of facility first visited									
Government				39.8	13.7	<0.001	68.4	21.7	<0.001
Private				41.3	17.6	<0.001	61.0	23.8	<0.001
Other				20.4	8.2	<0.001	53.3	22.2	<0.001
Type of facility visited (based on all visits)									
Only government				26.6	11.6	0.002	60.6	19.5	<0.001
Only private				29.9	11.1	<0.001	43.9	18.0	<0.001
Both (private & government)				45.1	18.4	<0.001	67.7	25.8	<0.001
Total number of consultation visits									
< 3				21.4	9.6	<0.001	47.7	15.6	<0.001
3-4				36.0	21.0	<0.001	57.9	30.0	<0.001
5+				64.9	32.8	0.049	85.1	44.6	0.020
Distance to DOTS centre									
<2 kms	19.2	7.7	<0.001	39.6	13.7	<0.001	58.8	21.4	<0.001
2+ kms	29.5	7.5	<0.001	38.6	16.3	<0.001	68.1	23.8	<0.001
Persons who accompanied respondents to health facility before diagnosis of TB									
No one accompanied	15.9	6.1	0.003	41.8	11.3	<0.001	57.8	17.4	<0.001
Accompanied by a family member	23.9	7.6	<0.001	40.0	16.1	<0.001	63.9	23.7	<0.001
Accompanied by others	20.5	15.8	0.597	30.3	26.4	0.817	50.8	42.3	0.656
Reason for going to the first facility									
Good reputation	14.7	7.7	0.028	38.5	17.3	<0.001	53.2	25.0	<0.001
Close to home/easy access	19.6	8.1	<0.001	40.7	13.0	<0.001	60.3	21.0	<0.001
Other reason	27.3	6.9	<0.001	38.2	14.8	<0.001	65.5	21.7	<0.001

Note: 2 HIV/AIDS patients each in the baseline and in the end line were excluded

Exposure to THALI Program

We asked all the respondents about their exposure to the various community-level activates carried out through the THALI program. Since the program exposure was applicable at the end-line, we asked all these questions only to the respondents who were interviewed in the end-line survey. Table 27 provides the results of the exposure to various community-level programs. The various community-level activities mainly include in-person communication, sensitization meetings, patient support group meetings, meetings and mass campaigns conducted at the community, follow-up visits, and screening for symptoms. Overall, 10% of the respondents said that they personally knew the THALI staff, 6% reported that they were exposed to various community-level activities and around one-third reported to have seen the various IEC materials developed under the THALI project shown to them. We did not notice any difference in the exposure according to sex of the respondent. Overall, about 37% of the respondents were found to have been exposed to various community-level activities conducted under the THALI project.

Table 27: Percentage distribution by sex of respondents who were exposed to THALI program activities in the end-line, Bengaluru

Exposure to program	Male	Female	Total
KHPT/THALI CHW	10.4	10.0	10.3
Exposed to community level activities	6.3	3.8	5.5
Exposed to IEC materials prior to treatment	32.6	30.0	31.8
Exposed to any of these activities	38.2	35.0	37.2
Number of cases	**156**	**70**	**226**

The source from which the respondents had been exposed to selected IEC materials shown to them by survey staff was also enquired into, and the results are provided in Table 28. A majority of the respondents reported that they had seen the IEC materials in the public hospital, followed by a proportion who had been shown the material by the THALI CHW. We did not observe any differentials in the distribution according to the sex of the respondent.

Table 28: Percentage distribution of respondents by sex, according to the place seen or the person who showed them the IEC materials in the end-line, Bengaluru

Place where IEC materials seen/ persons who showed IEC materials	Male	Female	Total
KHPT/THALI CHW	41.4	38.2	40.4
Public hospital	88.5	90.9	89.2
Anganwadi centre	1.9	7.3	3.5
Petty shop/tea shop	3.9	3.6	3.8
Members of self-help group	4.8	1.8	3.9
Members of slum association	1.0	5.5	2.3
Members of youth group	0	1.8	0.5

Members of labour unions	1.0	1.8	1.2
During mass campaign conducted by KHPT	1.0	0.0	0.7
Don't know	2.9	0.0	2.0
Number of cases	**113**	**47**	**160**

Note: Includes respondents who had seen the IEC material after treatment also

Table 29 provides the distribution of the respondents according to the key messages or information they received from the IEC materials. More than half of the respondents reported that the key messages they received after seeing the IEC materials were that there are no food restrictions for people with TB (83%), that nutritious food should be eaten during the TB treatment (63%), one's TB status should be disclosed to family members (63%), one should get tested for TB if one has a persistent cough for more than 2 weeks (58%), and what the symptoms of TB are (51%). A comparatively higher percentage of females (63%) than males (56%) reported that taking a test for TB, if one has persistent cough for more than 2 weeks, was the key message they received through the IEC materials.

Table 29: Percentage distribution of respondents by sex, according to key messages or information received from the IEC materials, in the end-line, Bengaluru

Key messages received from the IEC material	Male	Female	Total
No food restrictions for people with TB	83.7	80.4	82.7
Eat nutritious food during TB treatment	64.4	60.7	63.3
Disclose the TB status to family member	64.4	58.9	62.8
Test for TB, if one has persistent cough for more than 2 weeks	55.8	62.5	57.8
Understand symptoms of TB	51.9	48.2	50.8
Test sputum for TB	44.2	46.4	44.9
TB can be completely cured	40.4	42.9	41.1
Adherence to TB medication is imoprtant	31.7	39.3	34.0
Alcohol consumption is a barrier to good adherence to medication	37.5	41.1	38.6
Alcohol consumption during treatment worsen the symptoms of TB	33.7	39.3	35.3
Alcohol consumption during treatment may adversely affect treatment outcomes	29.8	32.1	30.5
Don't know/can't say	2.9	10.7	5.2
Number of cases	**113**	**47**	**160**

Note: Includes respondents who had seen the IEC material after treatment also

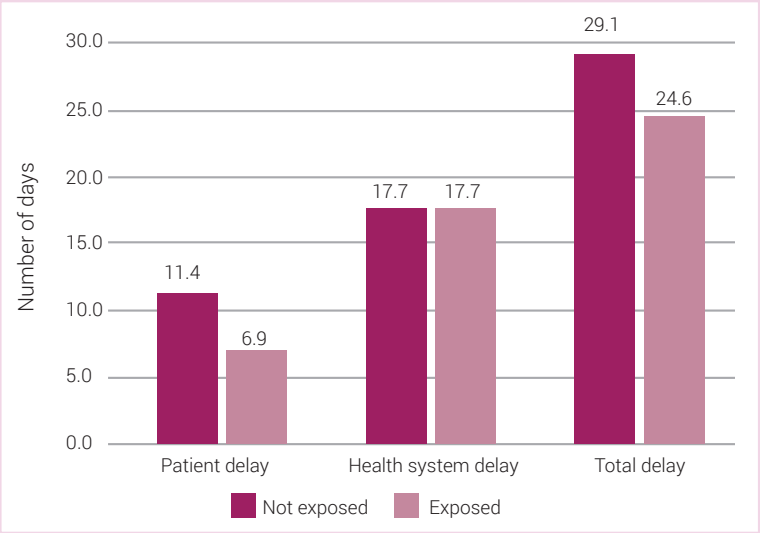
THALI's effect on various delays

We noticed a significant decline in the various delays over the project period according to respondents' socio-economic and demographic characteristics and also by the characteristics of consultation visits. However, we were not able to attribute with any certainty the change in delays to the introduction of the program. In reality, the causal effect of any intervention program for individual "i" is the comparison of individual "i's" outcome if he/she is exposed to the intervention (i.e. the potential outcome in the presence of intervention), and individual "i's" outcome he/she is not exposed to the intervention (the potential outcome in the absence of intervention). The major problem of causal inference of the intervention program is that, for each individual, we can observe only one of these potential outcomes, because each unit (each individual at a particular point in time) will receive either treatment or control, not both. However, due to availability of advanced statistical techniques, one will be able to identify the effect of the program using non-experimental data. Matching methods are the techniques that attempt to replicate, as closely as possible, the ideal of randomized experiments when using observational data (non-experimental data) and provide a way to estimate the causal effect of the intervention program. The goal of matching is, for every exposed unit, to find one (or more) non-exposed unit(s) with similar observable characteristics against whom the effect of the intervention can be assessed. By matching exposed units to similar non-exposed units, matching enables a comparison of outcomes among exposed and non-exposed units to estimate the effect of the intervention, reducing bias due to confounding. We used the Euclidean distance metric to match the exposed and non-exposed individuals through the nearest neighborhood matching method and used the characteristics such as sex of the person, age of the person and residential status of the person to match each observation and applied this matching method to the pooled data of the delay study conducted in both Bengaluru and Hyderabad. We used characteristics such as age, sex, residential status, name of the city, occupation, education, religion, marital status, caste/tribe, household income, facility first visited, type of facility visited for all the consultation visits, and total number of consultation visits of the respondent as the covariates.

Before discussing the effect of the program on the delays, we examined the percentage of respondents who were exposed to the THALI program. The number of respondents as per the pooled data was 451. The exposure of the program is defined as the exposure to any community activities conducted and exposure to selected IEC materials shown to the respondent. Overall, 34% of the respondents were exposed to the program and the remaining 66% were not exposed to the program.

Figure 7 provides the mean patient, health system and total delays according to the program exposure. It indicates that there is significant difference in the patient and total delays according to the program exposure status. Mean patient delay was 7 days among those exposed to the program and 11 days for those who were not exposed. Similarly, the total delay was 25 days for those exposed to the program and 29 days for those who were not exposed to the program.

Figure 7: Mean patient, health system and total delays according to program exposure from the pooled data of Bengaluru and Hyderabad



The results of the effect of the exposure to the intervention program from the nearest neighbourhood matching method using the pooled data are given in Table 29. We used different socio-economic and demographic characteristics as well as the characteristics related to consultation visits, as discussed earlier. However, we examined the kernel density plots and the box plots for all the covariates used in the nearest neighbourhood matching method to identify whether balancing property was achieved. In the final model, we included only the covariates whose kernel density and box plots using the matched data appear to be balanced. In other words, in the final model we did not use the covariates whose kernel density and box plots of the matched data indicated covariate imbalance. The results indicate that the exposure to program would have significantly reduced the patient delay by almost 4 days if all the TB patients were exposed to program as compared to if all the TB patients were not exposed to the program. The 95% CI indicates that on the higher side, exposure to the program would have reduced the patient delay by 6 days and on the lower side, indicates that it should have reduced the patient delay by almost 2 days. Similarly, the total delay would have reduced by 4.2 days if all the TB patients were exposed to the program as compared to if all the TB patients were not exposed to the program. The results also indicate that any community activity will lead to a change in patient delay and thus the total delay, and may not have any effect on health system delay, which may be absolutely driven by healthcare provider behaviour and the characteristics of the health system.

Table 30: Average intervention effect of exposure to the THALI community program on various delays from the pooled data of Bengaluru and Hyderabad

Average intervention effect	Male	Female	Total	
Exposed to THALI program				
Patient delay	-3.96	<0.001	-6.07	-1.85
Health system delay	-0.21	0.908	-3.71	3.30
Total delay	**-4.22**	**0.039**	**-8.23**	**-0.21**

Covariates used: patient's residential status, sex of the patient, age of the patient, education, occupation and number of consultation visits
For patient delay, number of consultation visits is not used as a covariate
We used patient's residential status, sex of the patient and age of the patient as matching variables.

Since almost all the field level activities conducted by the CHWs were completed when the end-line survey was undertaken, other program activities carried out in the slum areas of Bengaluru might have indirectly influenced the early diagnosis and treatment initiation for TB. We were not able to capture these in the survey. For instance, using the 'screening pathway', the CHWs referred individuals with TB symptoms for sputum testing to the nearest public sector labs.

06

PROGRAM IMPLICATIONS AND RECOMMENDATIONS

Limitations of the study

There are some limitations to the study. The various delays expressed in the number of days from the onset of symptoms to initiation of TB treatment was likely to have been influenced by recall bias. However, since we included the NSP adults who initiated TB treatment during the three months prior to the survey, the recall bias might be minimal. Similarly, the study is based on the patients accessing NTEP services. We may therefore not be able to generalize the delays as there could be adults with TB who have had no contact whatsoever with the public sector. The characteristics of these adults who access only the private sector could be quite different from the characteristics of adults with TB in our study. Accessing NSP adults with TB from the private sector was not feasible, given the diversity and magnitude of private providers within these two large cities. Moreover, diagnoses of NSP is largely the domain of the public sector, as the private sector tends to be limited in its capacity to independently perform TB tests to microbiologically confirm TB. Similarly, we were not able to attribute with any certainty the reduction in the delays fully to the introduction of the program, although we were able to identify the effect of the program to some extent through the use of the nearest neighborhood matching method. There could be indirect effects of the program, which we were not able to observe, because some of the activities were completed prior to the end-line survey and the respondents interviewed did not have a chance to be exposed to those activities. As such, we were not able to completely attribute the reduction in the various delays over the time period to the community activities carried out. The matching method used in the report relies on observed characteristics to construct a comparison group, and so it requires the strong assumption of no unobserved differences in the exposed and non-exposed groups that are also associated with the outcomes of interest. We used only three important characteristics to identify the matched comparison group, so we might have left out other potentially important characteristics.

Key changes observed

It may be important to highlight the key changes observed in respondents' health seeking behavior between the baseline and end-line surveys. We noticed an earlier shift in health seeking to the public sector health facilities between baseline and end-line surveys. By the second visit a higher proportion of patients in the end-line were found to be visiting the public sector as compared to the baseline. However, whether this was self-determined or because they were referred by the private sector is not known. We also noticed that a higher proportion of private and public sector were recommending diagnostic tests at earlier consultation visits in the end-line survey as compared to the baseline. For instance, by the second visit, the proportion of respondents which received recommendations for diagnostic tests such as sputum tests and X-Rays doubled during the period. This resulted in around 90% diagnosed with TB and initiated on treatment by the third visit in the end-line as compared to 56% diagnosed with TB and initiated on treatment in the baseline. We noticed a significant reduction in various delays between the baseline and end-line irrespective of socio-demographic and health seeking characteristics.

Program implications and recommendations

Since nearly one quarter of the patients were found to be illiterate, any of the Information, Education and Communication (IEC) activities for disseminating knowledge and information on correct health seeking behavior for TB should include both visual and verbal media. Also, almost all the respondents had access to a mobile phone. This can be made a preferred method for communicating information on the prevention and control of TB.

Recommendations for appropriate tests were improved over the time period, and such recommendations were found to be more common at public health facilities. However, although consultation visits to the private providers were reduced over the time period, 40% or more patients visited a private health care provider in the first two consultation visits. The results indicated that private healthcare providers were not recommending a

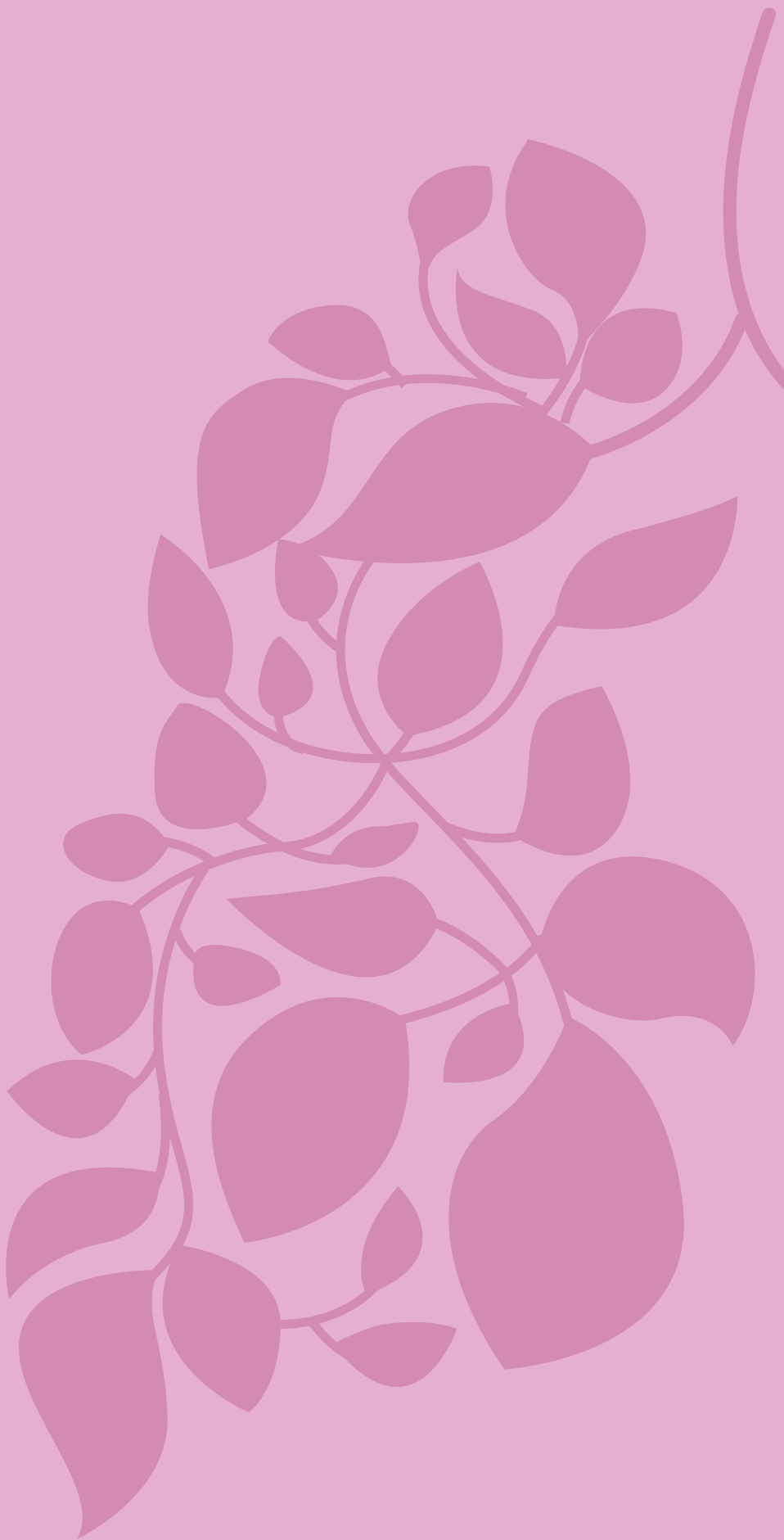
sputum test early on and therefore, it may be important for the patient to demand the appropriate test when they are consulting a private healthcare provider. This will reduce the delay in diagnosis as well as multiple consultations with the provider. Further, this could lead to a positive behaviour change in the private provider when more and more presumptive TB cases demand an appropriate test for diagnosis. In the future, programs may consider either focusing on behaviour change among private health care provider or behavior change among the community for demanding the appropriate test for TB.

The results also indicated that those who shopped between the public and private sector and those who waited for someone to accompany them had comparatively the longest delays in TB diagnosis and treatment initiation. In the future, programs need to consider these two elements of health seeking behavior- not shopping between public and private sector, or creating self-confidence to go forward for a test, without waiting for anyone to accompany them.

The pooled data analysis indicated that the community activities conducted as a whole had significantly reduced the patient delay and the total delay in TB diagnosis and treatment initiation. The community activities did not have any impact on the health system delay. In fact, one may not expect community activities to reduce the health system delay, which may mostly be influenced by the provider's behavior in recommending the test, or the health system's ability to provide the appropriate test when recommended. In some cases, it could be because the patient did not believe the diagnosis and went to another doctor to confirm the same. This was evident in the graph showing the visit number at which they were first identified as TB positive and when they started the treatment. In the future, programs should consider dissemination of information on the problems of visiting between sectors, and raising demand for appropriate tests, which is likely to change provider behavior, as discussed previously. Programs may consider developing technological innovations that can disseminate information on changing the said behaviors effectively among the community members as well as healthcare providers.

Conclusions

In Bengaluru, the major activities of the THALI program were carried out in the slum areas by CHWs in the form of community engagement through awareness creation, in-person communication, IEC materials, and referrals of individuals with TB symptoms for sputum testing to the nearest public sector labs. These program activities carried out in the community were expected to reduce the various delays, such as patient, health system and total delays, in diagnosis and initiating TB treatment among vulnerable populations, especially among slum dwellers. We noticed that the reduction in the various delays between the baseline and end-line surveys were more among persons who reside in the slum areas than non-slum areas. The reduction in various delays was found across all the socio-economic and demographic characteristics examined. However, although there was a reduction, we noticed that those persons who shop between private and government facilities tends to have greater delays than the persons who don't shop between health facilities. Similarly, persons who consult the provider a greater number of times also tend to have greater delays than those who had fewer visits. Similarly, although there was a shift in the respondent going to a public health facility in the first two consultation visits, a higher proportion of the respondents still visited private health care providers, among whom recommendations for appropriate tests was lower. Therefore, there is a need to create behavior change among healthcare providers and also among respondents to ask for appropriate test, so that the healthcare provider recommends them. Finally, we identified that community engagement activities conducted by locally trained community health workers can significantly reduce patient delays and total delays in TB diagnosis and treatment initiation.



KHPT
IT/BT Park, 5th Floor
#1-4, Rajajinagar Industrial Area
Behind KSSIDC Administrative Office
Rajajinagar, Bengaluru - 560 044

T: +91 80 4040 200 F: +91 80 4040 300 W: www.khpt.org E: khptblr@khpt.org