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

Results from two cross-sectional surveys

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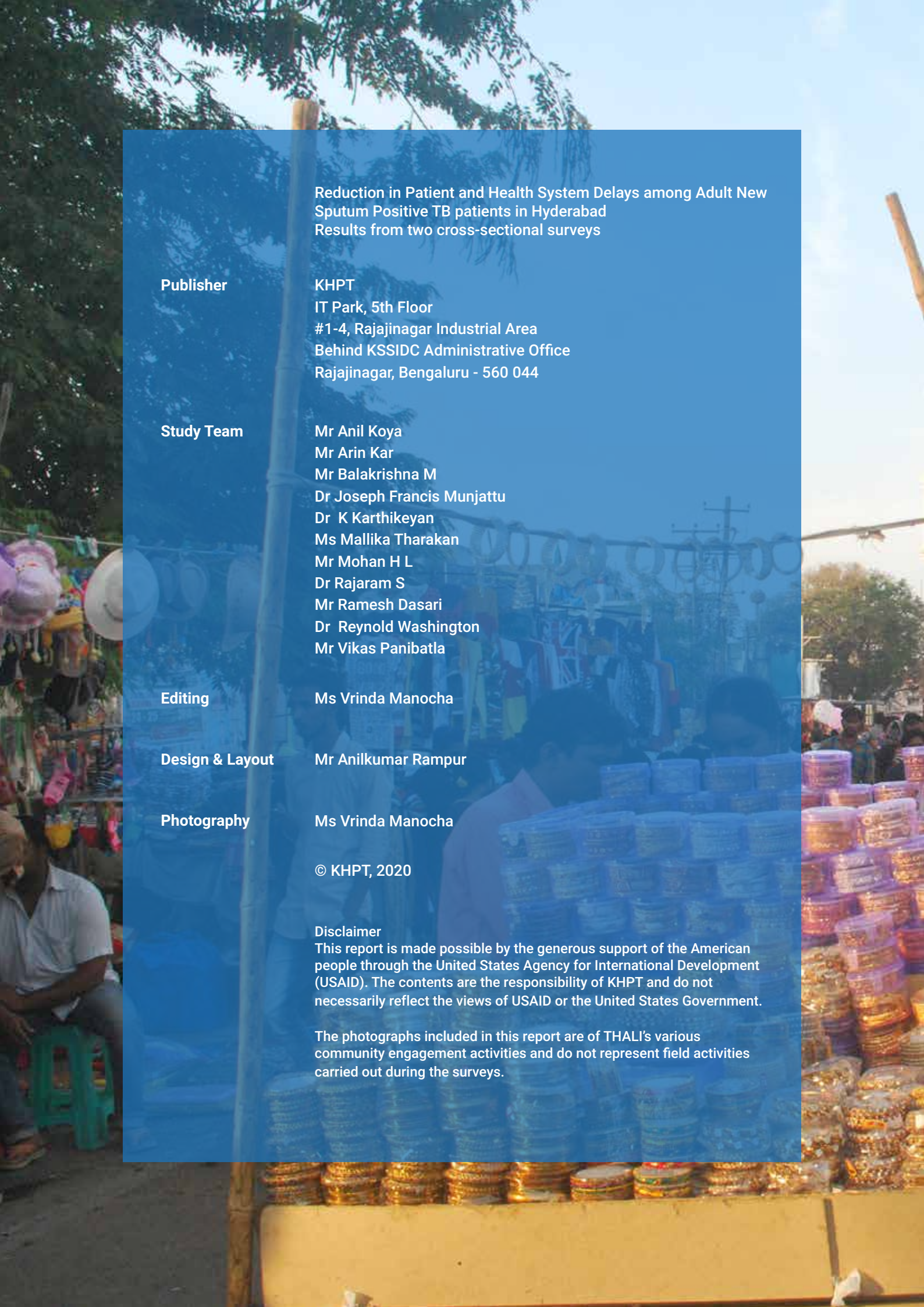

Reduction in Patient and Health System Delays among Adult New Sputum Positive TB patients in Hyderabad
Results from two cross-sectional surveys

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Disclaimer
This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of KHPT and do not necessarily reflect the views of USAID or the United States Government.

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.

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

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TABLES & FIGURES

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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 TELANGANA

Office of the Joint Director (TB), Telangana

DM&HS Campus, Sultan Bazar, Hyderabad - 095

01-09-2020

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) in partnership with TB Alert India, Hyderabad. This report presents the findings of the study conducted in Hyderabad. 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 Hyderabad. The study also highlights the effect of the programexposure on reducing the delay among the new adult TB patients accessing TB services.

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The study on "Reduction in Patient and Health System Delays among Adult New Sputum Positive TB patients in Hyderabad – 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), Telangana State and the District TB Officer of Hyderabad 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 Hyderabad, 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 healthcare 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 healthcare 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 the National Tuberculosis Elimination Program (NTEP). The direct engagement with private sector healthcare 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 behavior 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 Hyderabad District Tuberculosis Office, and ceased activities in September 2019. Community engagement was initiated through the slum entry program by conducting a slum mapping activity in all the slums of Hyderabad city. According to the final mapping data, we identified 942 slums in Hyderabad, covering 2,93,980 households, a population of 1.45 million population and 19 Tuberculosis Units (TUs).

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.

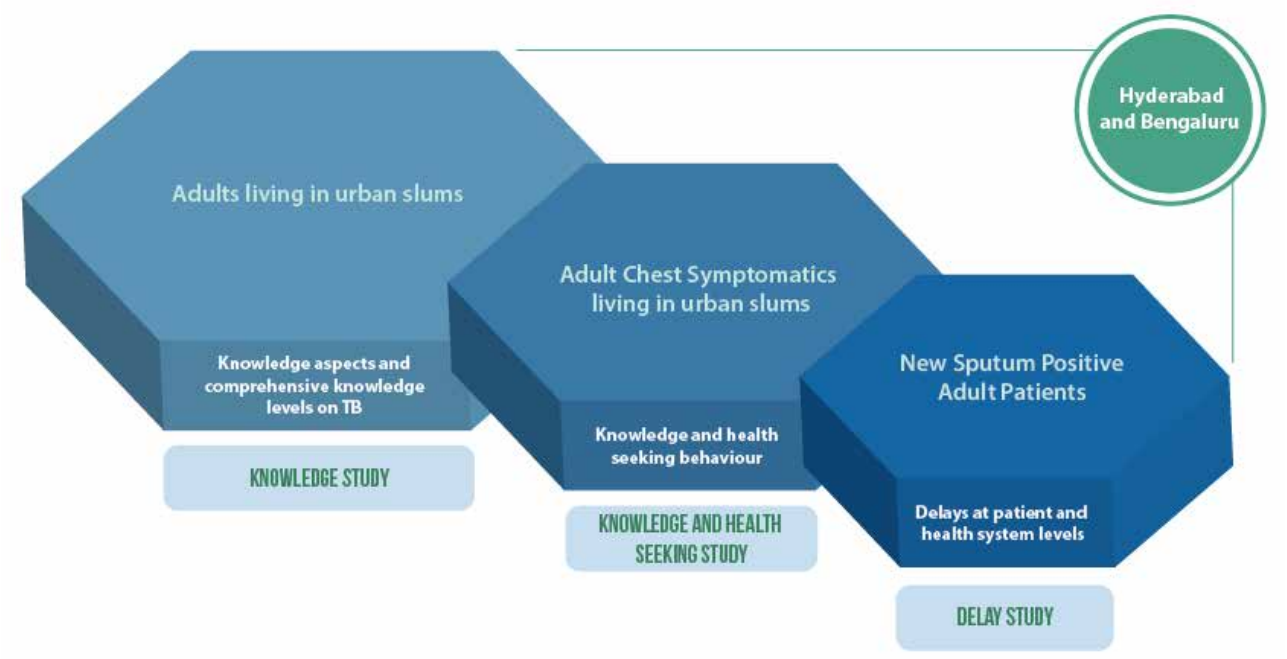
In addition, using a 'screening pathway', CHWs actively identified individuals with symptoms suggestive of TB after these IEC activities, and referred them for sputum testing to the DMC, a government facility which conducts sputum microscopy, and for CBNAAT testing (Cartridge Based Nucleic Acid Amplification 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 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 Hyderabad referred 17,936 symptomatic persons for diagnostic tests, and out of this, 13,952 persons underwent tests. Among the tested persons, 2997 persons were found to have TB and 2993 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 evaluation was implemented through baseline and end-line surveys conducted amongst the target groups mentioned above. The survey among the adults living in the slum areas included knowledge aspects regarding TB; we assessed the changes over time. The study amongst the chest symptomatics examined knowledge and health seeking behaviors, as well as changes over time. The study amongst the adult NSP TB patients examined the various delays related to initiating the ATT, and assessed and compared the changes over time. The present report pertains to the study amongst the adult NSP TB patients accessing ATT in Hyderabad 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 behaviors among the NSP pulmonary adult TB patients, between baseline and end-line studies.

Study Design

In Hyderabad city, we included all the 19 TUs from the Hyderabad District Tuberculosis Centre in our study. 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 those who were either bedridden or admitted to hospital at the time of 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 baseline survey. For the end-line survey, this was based on the patients initiated on treatment during the three-month period between June and August 2019.

We obtained permission from the State TB Office to carry out the study in the 19 TUs in Hyderabad. St John's Medical College and Hospital Institutional Ethics Committee, Bengaluru, reviewed the application and provided the ethics approval. 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 another TU.

Data collection

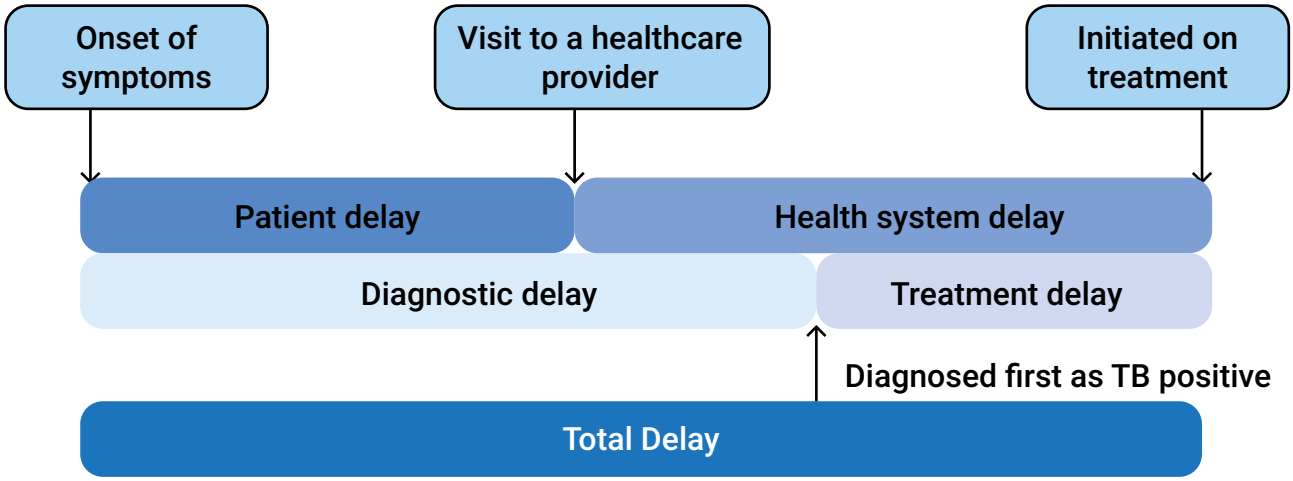
We trained the field staff over a period of five days, which included field work. The mandatory pre-fieldwork training session for the field staff included procedures followed with respect to enrolling prospective participants and obtaining written consent (and handling non-consent). All field staff 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 to ensure that interviews were conducted in private places where the study participant felt comfortable answering the questions and where no other persons were present. The field staff was 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 of the recorded transcript and were instructed 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 the semi-structured questionnaire to consented participants in the local language. For the end-line survey, we used a mobile application database to record the response of the participants.

As indicated earlier, the participants decided the venue for the interview, either at the DOTS center or at the participant's home or any other convenient spot. The questionnaire was designed to collect information on the participant's experiences at different health facilities from the onset of TB symptoms during the current illness. In particular, field investigators enquired about the facility consulted, recommendations made by the healthcare 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 the patient had incurred for consultations, diagnostic tests and medications at each visit. The baseline data was collected between February 2017 and April 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

Different delays occurring until the initiation of ATT are depicted in the picture below. The WHO mainly defines two types of delays in diagnosis and initiation of treatment; patient delay, which is defined as the time interval (in days) between the onset of symptoms and presentation to a healthcare provider, and health system delay, defined as the time interval (in days) between the accessing a healthcare provider 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 ATT. The above delays can also be further divided into diagnostic delay, which is the time interval (in days) between the onset of symptoms and first diagnosis of TB, and treatment delay, which is the time interval (in days) between the first diagnosis of TB and initiation of ATT.



Sample coverage

We listed 469 adult persons for the baseline survey and 442 adult NSP persons in the end-line, which was all the NSP patients accessing TB treatment from the TUs of Hyderabad during the reference period. From the list, we contacted 357 and 288 adult persons for the baseline and end-line surveys, respectively. Other persons were not contacted because of reasons such as wrong contact number, phone not reachable, death, hospitalization and achievement of sample size for the specific TU. Out of the contacted adults, 24% (84) in the baseline and 18% (52) in the end-line refused to participate in the survey. Another 12% and 4% in the baseline and end-line were not available. Overall, 64% of the adults contacted in baseline and 78% in the end-line surveys consented to the interview. Table 1 provides the details of 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, Hyderabad

Status of survey	Baseline		End-line	
	Number of cases	Percent	Number of cases	Percent
Contacted	357	100	288	100
Unavailable	44	12.3	10	3.5
Refused	84	23.5	52	18.1
Interview completed	229	64.2	225	78.1

03

PROFILE OF THE HOUSEHOLDS AND RESPONDENTS

Profile of the respondents

We did not notice any difference in the age and sex distribution of the respondents interviewed between baseline and end-line surveys. The proportion of patients from the slum areas was slightly higher in the end-line (78%) as compared to baseline (65%). According to marital status, the proportion of currently married people was higher in the baseline (72%) as compared to the end-line (62%). The proportion of persons who were illiterate was comparatively more in the end-line (45%) as compared to baseline (28%). The proportion of Muslims was slightly higher in the end-line (48%) as compared to baseline survey (35%). We noticed a dip in the personal monthly income between the baseline and end-line, particularly among females. However, there was slight increase in the household monthly income in the end-line survey as compared to the baseline.

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

Characteristic	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Sex						
Male					55.9	55.4
Female					44.1	44.6
Age						
18-29	21.9	28.3	60.4	57.9	38.9	41.6
30-49	53.1	41.4	25.7	27.0	41.0	34.9
50+	25.0	30.3	13.9	15.1	20.1	23.4
Mean age	**40.2**	**39.7**	**31.2**	**31.6**	**36.3**	**36.0**
Place of residence						
Slum area	64.8	75.8	64.4	81	64.6	78.1
Non-slum area	35.2	24.2	35.6	19	35.4	21.9
Marital status						
Currently married	75.8	69.7	66.3	53.2	71.6	62.3
Marriage dissolved	3.9	0.0	7.9	11.9	5.7	5.4
Never married	20.3	30.3	25.7	34.9	22.7	32.4
Literacy and education						
Illiterate	27.3	48.5	27.7	41.3	27.5	45.2
Literate, 1-7 years of schooling	36.7	16.2	22.8	11.9	30.6	14.2
8+ years of schooling	35.9	35.4	49.5	46.8	41.9	40.5

Occupation						
Business	11.7	12.1	3.0	2.4	7.9	7.7
Salaried job	8.6	11.1	7.9	4.8	8.3	8.3
Daily labour	36.7	33.3	10.9	13.5	25.3	24.4
Other job	27.3	26.3	8.9	0.8	19.2	14.8
Not working	15.6	17.2	69.3	78.6	39.3	44.8
Religion						
Hinduism	68.8	53.5	51.5	46.0	61.1	50.2
Islam	28.9	45.5	43.6	51.6	35.4	48.2
Other	2.3	0.0	5.0	1.6	3.5	0.7
Caste/Tribe						
Scheduled Caste	31.3	18.2	17.8	22.2	25.3	20.0
Scheduled Tribe	3.1	2.0	5.0	0.8	3.9	1.5
Others	65.6	79.8	77.2	77.0	70.7	78.5
Personal monthly income (in ₹)						
< 5000	14.1	20.2	41.6	80.2	26.2	47.2
5000-9999	51.6	19.2	32.7	5.6	43.2	13.1
10000+	33.6	40.4	22.8	10.3	28.8	26.9
Not mentioned	0.8	20.2	3.0	4.0	1.7	12.9
Mean personal income	**8980.3**	**9498.7**	**6408.2**	**1958.7**	**7860.0**	**5756.2**
Household monthly income (in ₹)						
< 10000	28.9	12.1	27.7	14.3	28.4	13.1
10000-15000	43.8	45.5	49.5	31.0	46.3	38.9
15000+	25.0	20.2	18.8	27.8	22.3	23.6
Not mentioned	2.3	22.2	4.0	27.0	3.1	24.4
Mean household income	**14322.4**	**14714.3**	**13752.6**	**16222.8**	**14073.4**	**15370.0**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**128**	**124**	**101**	**101**	**229**	**225**

The household composition indicated that the distribution remained the same between baseline and end-line for the number of adult members in the household. However, we noticed a change in the distribution of the number of children in the household, with a higher proportion of respondents saying that there were no children below the age of 18 years in their house in the end-line survey (43%) as compared to the baseline (32%). Additionally, the proportion of respondents who reported to have 3 or more children was comparatively higher in the baseline (23%) as compared to the end-line (15%). The household size slightly reduced on an average from 5.1 persons per household to 4.8 persons per household. The proportion of respondents holding a BPL card remained the same between the baseline and end-line. The proportion of respondents having houses with 3 or more rooms was also significantly higher in the end-line (51%) as compared to baseline (31%). However, the proportion of respondents living in households having only one room for sleeping was comparatively higher in the end-line (65%) as compared to baseline (58%). The proportion of households owning mobiles 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, Hyderabad

Characteristic	Baseline	End-line
Number of persons aged <18 years		
0	31.9	42.9
1	15.3	16.0
2	30.1	26.2
3+	22.7	14.9
Number of persons aged >= 18 years		
1	0.4	2.9
2	34.5	30.3
3	21.8	24.0
4+	43.2	42.8
Total number of household members		
<=2	7.4	11.3
3	14.0	16.2
4	24.9	25.2
5	19.7	18.8
6+	34.1	28.4
Mean number of persons	**5.1**	**4.8**
Has BPL card		
Yes	81.2	78.9
No	18.8	20.2
Don't know/Can't say	0.0	0.9

Ownership of present house		
Own house	31.0	34.2
Rented house	69.0	65.8
Number of rooms		
1	26.6	14.7
2	41.9	34.3
3	20.5	29.6
4+	10.9	21.4
Number of rooms used for sleeping		
1	57.6	64.7
2	35.8	31.9
3	6.1	3.1
4+	0.4	0.4
Own a radio		
Yes	4.4	3.1
No	95.6	96.9
Own a telephone		
Yes	3.9	2.0
No	96.1	98.0
Own a mobile		
Yes	99.1	97.8
No	0.9	2.2
Own a television		
Yes	93.9	93.2
No	6.1	6.8
Total percent	**100.0**	**100.0**
Number of cases	**229**	**225**

A comparatively higher proportion of respondents in the end-line (88%) reported that they were permanent residents in Hyderabad, as compared to baseline (68%). A higher percentage of the respondents moved to Hyderabad from villages in the baseline (21%) as compared to the end-line (6%).

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

Characteristic	Baseline	End-line
Duration of stay in the present city		
Always	67.7	88.0
<10 years	14.0	8.4
10+ years	18.3	3.6
Type of place from where the respondent moved in		
Not moved in	67.7	88.0
From another town	11.8	5.8
From a village	20.5	6.2
Total percent	**100**	**100**
Number of cases	**229**	**225**

Of the respondents interviewed in the baseline, 42% reported that they knew someone with TB before they had been diagnosed with their current illness; this was drastically reduced to 16% in the end-line. However, a higher percentage of respondents in the end-line said that they didn't know, when asked whether they knew anyone who had TB before they were diagnosed with TB. Among the respondents who reported knowing someone with TB, the duration of having known this person for more than two years was higher in the end-line (63%) as compared to the baseline (39%).

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

Characteristic	Baseline	End-line
Whether the respondent knew anyone who had TB before diagnosed with current illness (TB)		
Yes	41.9	15.6
No	58.1	72.4
Don't know	0.0	12.0
Total percent	**100**	**100.0**
Number of cases	**229**	**225**
Duration of knowing this person		
< 1 month	2.1	11.4
1- 5 months	9.4	11.4
6-11 months	27.1	2.9
12-23 months	22.9	11.4
24+ months	38.5	62.9
Total percent	**100**	**100**
Number of cases	**96**	**35**

04

HEALTH SEEKING BEHAVIOUR

Health seeking behaviour

It may be important to note the number of consultation visits to various healthcare providers prior to the initiation of the treatment. We classified the number of consultation visits according to any healthcare provider visited and visits to a qualified healthcare provider. The mean of total number of consultation visits reduced from 4.1 visits to 2.8 visits between the baseline and end-line (see Table 6). The mean number of consultation visits was higher for females than males in the baseline and no sex differentials in the consultation visits were observed in the end-line. We noticed that the higher order consultation visits were reduced between the baseline and end-line. For example, 35 percent of the respondents in the baseline had 5 or more consultation visits, and this was reduced to 8 percent 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 provide prior to the initiation of treatment in the baseline and end-line surveys, Hyderabad

Number of visits	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Visited any healthcare provider						
1	3.2	5.1	4.0	11.1	3.6	7.8
2	21.0	43.9	15.0	39.7	18.3	42.0
3	22.6	32.7	16.0	31.0	19.6	31.9
4	21.0	12.2	27.0	7.9	23.7	10.3
5+	32.2	6.1	38.0	10.3	34.9	8.0
Mean number of visits	**3.94**	**2.76**	**4.38**	**2.76**	**4.14**	**2.76**
Visited a qualified healthcare provider						
1	8.9	12.5	6.0	25.8	7.6	18.5
2	25.0	47.9	19.0	37.9	22.3	43.4
3	19.4	28.1	17.0	21.8	18.3	25.2
4	23.4	7.3	24.0	7.3	23.7	7.3
5+	11.3	4.2	14.0	7.3	12.5	5.6
Mean number of visits	**3.55**	**2.48**	**4.12**	**2.36**	**3.80**	**2.43**
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded in the baseline and end-line surveys, respectively.

In terms of the type of facility visited according to the number of consultation visits, the results indicated that the proportion of respondents going to an informal sector health facility the first time increased between baseline (19%) and end-line (26%), particularly among females (see Table 7). As the number of consultation visits gradually increased, the proportion of respondents going to a public facility also increased, for both baseline and end-line surveys. One can clearly notice that a greater proportion had visited the public sector by the second visit in the end-line. However, it may be of some concern that about one-tenth of the respondents visited an informal sector health facility (herein-after termed as other), such as an Ayurveda or Unani clinic, an unqualified practitioner, or a chemist, even at the second consultation visit in the end-line.

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

Type of health facility	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Public health facility	14.5	20.4	17.0	15.9	15.6	18.4
Private health facility	62.1	59.2	70.0	52.4	65.6	56.1
Other	23.4	20.4	13.0	31.7	18.8	25.5
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**
Second visit						
Public health facility	39.2	51.6	35.4	47.3	37.5	49.7
Private health facility	50.8	35.5	60.4	42.9	55.1	38.7
Other	10.0	12.9	4.2	9.8	7.4	11.6
Number of cases	**120**	**115**	**96**	**90**	**216**	**205**
Third visit						
Public health facility	50.0	60.0	49.4	67.7	49.7	63.4
Private health facility	43.6	40.0	45.7	27.4	44.6	34.4
Other	6.4	0.0	4.9	4.8	5.7	2.1
Number of cases	**94**	**62**	**81**	**50**	**175**	**112**
Fourth visit						
Public health facility	59.1	72.2	55.4	65.2	57.3	69.1
Private health facility	39.4	22.2	43.1	30.4	41.2	25.9
Other	1.5	5.6	1.5	4.3	1.5	5.0
Number of cases	**66**	**23**	**65**	**18**	**131**	**41**
Fifth visit						
Public health facility	60.0	50.0	52.6	76.9	56.4	65.7
Private health facility	37.5	50.0	44.7	23.1	41.0	34.3
Other	2.5	0.0	2.6	0.0	2.6	0.0
Number of cases	**40**	**8**	**38**	**11**	**78**	**19**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient are excluded in baseline and end-line survey, respectively.

Table 8 provides the distribution of respondents according to the main reason for consulting a particular healthcare provider. We noticed that there was shift in the response to the reason for going to a particular provider between the baseline and end-line surveys. For instance, according to the baseline survey, the top three most frequently reported reasons for going to a particular provider were proximity to residence or easy access (48%), recommendations from friends or relatives (48%) and follow-up visits (42%). However, in the end-line, the good reputation of the provider (78%), proximity to home or easy access (28%) and reasonable prices/low cost (19%) were the top three most frequently reported reasons for consulting a particular provider. In the baseline, more females (53%) than males (44%) said proximity to home or easy access was the reason for visiting a particular healthcare provider. However, in the end-line, more males (33%) than females (24%) reported these reasons for going to a particular health facility. The most frequently reported reason for going to a particular provider in the end-line is closely related to 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, Hyderabad

Type of health facility	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Reason to go to the provider						
Good reputation	26.6	75.5	31.0	80.2	28.6	78.1
Price is reasonable /Low-cost	13.7	19.4	17.0	19.1	15.2	19.2
Close to home/Easy to access	44.4	32.7	53.0	23.8	48.2	27.7
Convenient hours	2.4	6.1	2.0	4.8	2.2	5.4
Treats me nicely	6.5	2.0	13.0	5.6	9.4	4.0
Friends/Relatives recommended	47.6	7.1	49.0	4.8	48.2	5.8
Only provider in the area	4.8	1.0	2.0	1.6	3.6	1.3
Know provider personally	28.2	2.0	28.0	3.2	28.1	2.7
No consultation fee	21.0	10.2	23.0	10.3	21.9	10.3
Doctor referred	8.1	1.0	12.0	3.2	9.8	2.2
Follow-up visit	41.9	9.2	42.0	4.8	42.0	6.7
Other	25.0	4.1	30.0	6.4	27.2	5.4
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded from the baseline and end-line survey, respectively.

The suspected disease condition reported by the healthcare provider at different consultation visits is provided in Table 9. During the first consultation visit, the highest proportion of the respondents in the baseline (42%) said that the healthcare provider suspected that the respondent was having a minor cough. However, in the end-line, the highest proportion of the respondents (41%) said that the healthcare provider did not tell them anything about their disease condition during the first consultation visit. However, from the subsequent consultation visits, more respondents reported that the healthcare provider did not inform them about their disease condition. In both baseline and end-line studies, as the number of consultation visits increased, the suspicion of TB as the disease condition also increased. It is also important to note that in the end-line study, from the second consultation visit onwards, an increased proportion of the respondents said that the healthcare provider considered them to have tuberculosis, as compared to the baseline.

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, Hyderabad

Disease condition reported	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Minor cough	45.2	26.5	37.0	26.2	42.4	26.4
Common cold	4.8	3.1	8.0	4	5.9	3.5
Cough induced due to allergy	4.0	12.2	3.0	7.9	3.7	10.3
Chest congestion	1.6	4.1	1.0	0.0	1.4	2.2
Tuberculosis	7.3	8.2	2.0	11.1	5.5	9.5
Did not tell anything	29.8	38.8	38.0	44.4	32.6	41.3
Don't remember	0.0	1.0	0.0	0.8	0.0	0.9
Other	7.3	6.1	11.0	5.6	8.5	5.9
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**
Second visit						
Minor cough	25.8	31.2	20.8	23.2	23.6	27.7
Common cold	1.7	2.2	3.1	3.6	2.3	2.8
Cough induced due to allergy	2.5	8.6	1.0	5.4	1.9	7.2
Chest congestion	4.2	4.3	1.0	0.9	2.8	2.8
Tuberculosis	19.2	26.9	17.7	33.0	18.5	29.6
Did not say anything	36.7	26.9	44.8	30.4	40.3	28.4
Other	10.0	0.0	11.5	3.6	10.6	1.6
Number of cases	**120**	**115**	**96**	**90**	**216**	**205**

Third visit						
Minor cough	14.9	28.0	14.8	16.1	14.9	22.7
Common cold	5.3	0.0	0.0	4.8	2.9	2.1
Cough induced due to allergy	2.1	8.0	1.2	4.8	1.7	6.6
Chest congestion	0.0	4.0	3.7	0.0	1.7	2.2
Tuberculosis	27.7	38.0	24.7	48.4	26.3	42.6
Did not say anything	42.6	22.0	50.6	22.6	46.3	22.3
Other	7.4	0.0	4.9	3.2	6.3	1.4
Number of cases	**94**	**62**	**81**	**50**	**175**	**112**
Fourth visit						
Minor cough	9.1	11.1	6.2	13.0	8.0	12.0
Common cold	3.0	5.6	1.5	0.0	2.5	3.0
Cough induced due to allergy	0.0	5.6	3.1	0.0	1.2	3.0
Chest congestion	4.5	5.6	7.7	0.0	5.8	3.0
Tuberculosis	30.3	55.6	26.2	56.5	28.7	56.0
Did not say anything	43.9	16.7	47.7	21.7	45.4	19.0
Don't remember	1.5	0.0	0.0	0.0	0.9	0.0
Other	7.6	0.0	7.7	8.7	7.6	3.9
Number of cases	**66**	**23**	**65**	**18**	**131**	**14**
Fifth visit						
Minor cough	5.0	33.3	7.9	15.4	6.4	22.9
Common cold	5.0	0.0	2.6	0.0	3.8	0.0
Cough induced due to allergy	5.0	0.0	7.9	0.0	6.4	0.0
Tuberculosis	40.0	66.7	23.7	53.8	32.1	59.2
Did not say anything	40.0	0.0	50.0	23.1	44.9	13.4
Don't remember	2.5	0.0	0.0	0.0	1.3	0.0
Other	2.5	0.0	7.9	7.7	5.1	4.5
Number of cases	**40**	**8**	**38**	**11**	**78**	**19**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded from the baseline and end-line survey, respectively.

The distribution of the recommendations made by the healthcare provider at each consultation visit is provided in Table 10. At the first consultation visit, for a majority of the respondents, the healthcare provider prescribed medicine in both baseline (88%) and end-line (95%) surveys. At the second consultation visit, more respondents in the baseline received prescriptions for medicine (71%), but in the end-line, more respondents received recommendations for diagnostic tests (76%). We noticed a gradual increase in the proportion of persons reported to have received recommendations for diagnostic tests as the number of consultation visits increased in both baseline and end-line surveys. However, in the end-line, more respondents at each consultation visits received diagnostic tests as the recommendation from the healthcare provider, as compared to the baseline survey. For example, at the first consultation visit, 26% received recommendations for a diagnostic test in the baseline survey, and this was 35% in the end-line survey.

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, Hyderabad

Recommendations	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Diagnostic tests	22.6	32.7	31.0	38.1	26.3	35.1
Prescribed medicine	89.5	95.9	85.0	94.4	87.5	95.3
Referred to another doctor/ hospital	1.6	7.1	0.0	9.5	0.9	8.2
Admission to hospital	1.6	2.0	1.0	2.4	1.3	2.2
Referred to place for TB treatment	1.6	7.1	0.0	4.0	0.9	5.7
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**
Second visit						
Diagnostic tests	52.5	75.3	52.1	75.9	52.3	75.5
Prescribed medicine	67.5	60.2	76.0	64.3	71.3	62.0
Referred to another doctor/ hospital	2.5	8.6	4.2	14.3	3.2	11.1
Admission to hospital	3.3	3.2	1.0	3.6	2.3	3.4
Referred to place for TB treatment	3.3	8.6	2.1	11.6	2.8	9.9
Number of cases	**120**	**115**	**96**	**90**	**216**	**205**
Third visit						
Diagnostic tests	63.8	88.0	63.0	88.7	63.4	88.3
Prescribed medicine	68.1	48.0	59.3	54.8	64.0	51.0
Referred to another doctor/ hospital	1.1	8.0	3.7	9.7	2.3	8.7
Admission to hospital	2.1	0.0	1.2	1.6	1.7	0.7

Referred to place for TB treatment	1.1	8.0	0.0	12.9	0.6	10.2
Number of cases	**94**	**62**	**81**	**50**	**175**	**112**
Fourth visit						
Diagnostic tests	71.2	83.3	63.1	65.2	67.2	75.2
Prescribed medicine	53.0	44.4	49.2	43.5	51.1	44.0
Referred to another doctor/ hospital	3.0	0.0	3.1	4.3	3.1	2.0
Admission to hospital	1.5	0.0	1.5	13.0	1.5	5.9
Referred to place for TB treatment	3.0	11.1	1.5	21.7	2.3	15.9
Nothing	1.5	0.0	0.0	0.0	0.8	0.0
Number of cases	**66**	**23**	**65**	**18**	**131**	**14**
Fifth visit						
Diagnostic tests	75.0	83.3	65.8	92.3	70.5	88.6
Prescribed medicine	45.0	16.7	47.4	23.1	46.2	20.4
Referred to another doctor/ hospital	0.0	0.0	2.6	0.0	1.3	0.0
Admission to hospital	2.5	0.0	5.3	0.0	3.8	0.0
Referred to place for TB treatment	7.5	0.0	5.3	15.4	6.4	9.0
Number of cases	**40**	**8**	**38**	**11**	**78**	**19**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded from the baseline and end-line survey, respectively.

The specific tests, such as sputum test and X-Ray, recommended to the respondent at each consultation visit, according to type of test and sex of the respondent, is provided in Table 11. The proportion of respondents who received recommendations for both sputum test and X-Ray increased substantially between the baseline and end-line survey for each consultation visit. As the number of consultation visits increased, the recommendations for sputum or X-Ray tests also increased, irrespective of the sex of the respondent. Similarly, we also noticed an increase in the number of respondents who reported to have received the recommendation for only a sputum test until the fourth visit in both the 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, Hyderabad

Type of test recommended	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Sputum only	3.2	3.1	5.0	1.6	4.0	2.4
X-Ray only	7.3	12.2	17.0	7.9	11.6	10.3
Both X-Ray and sputum	6.5	16.3	4.0	23.0	5.4	19.4
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**
Second visit						
Sputum only	14.2	21.5	19.8	11.6	16.7	17.2
X-Ray only	10.0	5.4	14.6	8.0	12.0	6.5
Both X-Ray and sputum	20.0	43.0	8.3	53.6	14.8	47.6
Number of cases	**120**	**115**	**96**	**90**	**216**	**205**
Third visit						
Sputum only	25.5	22.0	17.3	22.6	21.7	22.3
X-Ray only	8.5	8.0	18.5	9.7	13.1	8.7
Both X-Ray and sputum	23.4	58.0	16.0	54.8	20.0	56.6
Number of cases	**94**	**62**	**81**	**50**	**175**	**112**
Fourth visit						
Sputum only	39.4	33.3	35.4	21.7	37.4	28.1
X-Ray only	10.6	50.0	9.2	39.1	9.9	45.1
Both X-Ray and sputum	16.7	16.7	12.3	39.1	14.5	26.8
Number of cases	**66**	**23**	**65**	**18**	**131**	**14**
Fifth visit						
Sputum only	40.0	16.7	28.9	7.7	34.6	11.4
X-Ray only	5.0	0.0	5.3	7.7	5.1	4.5
Both X-Ray and sputum	22.5	66.7	28.9	76.9	25.6	72.6
Number of cases	**40**	**8**	**38**	**11**	**78**	**19**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient are excluded in the baseline and end-line survey, respectively.

In both the baseline and the end-line, the proportion of respondents who received recommendations for either a sputum test or X-Ray was relatively lower in first the two visits, particularly among persons who visited private facilities. We also noticed that recommendations for diagnostic tests such as sputum tests or X-Rays increased between the baseline and end-line, irrespective of the type of facility and number of consultation visits. However, in the end-line, there was a reduction in the proportion of respondents who received the recommendation only for X-rays as the number of consultation visits increased, except for at the fourth visit. In the end-line, at the fourth visit, a higher proportion of respondents said that they received recommendations only for X-ray tests, particularly among those who visited a public health facility. Irrespective of the visit number, a larger proportion of patients received recommendations for either sputum tests or chest X-rays if they visited a government facility in both the baseline and end-line.

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, Hyderabad

Type of test recommended	Government facility		Private facility		Other	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Sputum only	20.0	5.0	1.4	1.6	0.0	2.2
X-Ray only	2.9	9.1	17.0	13.1	0.0	5.0
Both X-Ray and sputum	14.3	37.6	4.8	21.6	0.0	1.4
Number of cases	**35**	**41**	**147**	**126**	**42**	**57**
Second visit						
Sputum only	34.6	28.1	6.7	5.7	0.0	9.1
X-Ray only	8.6	4.0	16.0	10.7	0.0	3.6
Both X-Ray and sputum	23.5	53.0	10.9	49.2	0.0	14.6
Number of cases	**81**	**102**	**119**	**79**	**16**	**22**
Third visit						
Sputum only	35.6	28.2	9.0	10.6	0.0	0.0
X-Ray only	10.3	2.3	16.7	21.2	10.0	0.0
Both X-Ray and sputum	23.0	62.7	19.2	49.0	0.0	0.0
Number of cases	**87**	**71**	**78**	**39**	**10**	**2**
Fourth visit						
Sputum only	56.0	40.7	13.0	0.0	0.0	0.0
X-Ray only	5.3	46.4	16.7	38.7	0.0	60.8
Both X-Ray and sputum	14.7	12.9	13.0	61.3	50.0	39.2
Number of cases	**75**	**28**	**54**	**11**	**2**	**2**

Fifth visit					
Sputum only	45.5	6.8	21.9	20.3	0.0
X-Ray only	0.0	0.0	12.5	13.1	0.0
Both X-Ray and sputum	27.3	86.4	25.0	46.4	0.0
Number of cases	**44**	**12**	**32**	**7**	**2**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded in baseline and end-line surveys, respectively.

We also analyzed the percentage distribution of respondents according to the test undertaken at each consultation visit. Table 13 provides the distribution of respondents by sex according to the type of test they underwent at each consultation visit in the baseline and end-line surveys. By examining the results in Table 11 and Table 13, we noticed that at each consultation visit, very few respondents had not undergone the recommended test by the healthcare provider. In the end-line, we found that few males in particular did not undergo tests which were recommended to them. It is important to note that the proportion of respondents who underwent both a sputum test and X-Ray increased almost two to three times, between the baseline and end-line, irrespective of consultation visits and sex of the person. Similarly, from the second visit onwards, the proportion of respondents who underwent a sputum test also increased, irrespective of the sex of the person, in both baseline and end-line surveys.

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

Type of test conducted	Male		Female		Total	
	Baseline	**End-line**	**Baseline**	**End-line**	**Baseline**	**End-line**
First visit						
Sputum only	2.4	3.1	6.0	1.6	4.0	2.4
X-Ray only	6.5	12.2	16.0	7.9	10.7	10.3
Both X-Ray and sputum	6.5	16.3	3.0	23.0	4.9	19.4
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**
Second visit						
Sputum only	13.3	24.7	20.8	11.6	16.7	19.0
X-Ray only	10.0	5.4	13.5	8.0	11.6	6.5
Both X-Ray and sputum	20.0	40.9	6.3	53.6	13.9	46.4
Number of cases	**120**	**115**	**96**	**90**	**216**	**205**
Third visit						
Sputum only	25.5	24.0	17.3	22.6	21.7	23.4
X-Ray only	8.5	8.0	17.3	11.3	12.6	9.5
Both X-Ray and sputum	22.3	56.0	14.8	53.2	18.9	54.8
Number of cases	**94**	**62**	**81**	**50**	**175**	**112**

Fourth visit						
Sputum only	37.9	38.9	33.8	21.7	35.9	31.2
X-Ray only	10.6	5.6	9.2	0.0	9.9	3.0
Both X-Ray and sputum	15.2	38.9	12.3	39.1	13.7	39.0
Number of cases	**66**	**23**	**65**	**18**	**131**	**14**
Fifth visit						
Sputum only	40.0	16.7	28.9	7.7	34.6	11.4
X-Ray only	5.0	0.0	5.3	7.7	5.1	4.5
Both X-Ray and sputum	16.7	66.7	26.3	76.9	23.1	72.6
Number of cases	**40**	**8**	**38**	**11**	**78**	**19**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded in the baseline and end-line survey, respectively

The distribution of the respondents according to the type of facility consulted and the specific test carried out as per the provider's recommendation is provided in Table 14. An examination of the results provided in Tables 12 and 14 revealed that a majority of the respondents carried out the specific tests as per the recommendation of the healthcare provider, irrespective of the type of health facility and consultation visit, in both the baseline and end-line surveys. However, in the end-line, we noticed that some of the respondents who visited a private health facility at the fourth visit did not undergo the recommended tests, and respondents who visited a public facility at the same visit underwent additional tests. In the end-line, 13% of the respondents who visited a public health facility at the fourth visit received recommendations for both sputum and X-Ray tests, but 42% of them underwent both sputum and X-Ray tests. The proportion of patients who were recommended to have both sputum and X-Rays tests by the third visit was higher in the end-line, irrespective of the type of facility visited. Similarly, the proportion of respondents who underwent the test was also higher in the end-line. We noticed an increment of more than two to three times in conducting both X-Ray and sputum tests between the baseline and end-line surveys, irrespective of the type of health facility consultation visits. This increment in the proportion undergoing both X-Ray and sputum tests was comparatively higher for respondents who visited a government facility as compared to a private facility for all consultation visits, except the second consultation visit.

Table 14: Percentage distribution of respondents according to the type of test conducted and type of health facility at each consultation visit in the baseline and end-line surveys, Hyderabad

Type of test conducted	Government facility		Private health facility		Other	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
First visit						
Sputum only	20.0	5.0	1.4	1.6	0.0	2.2
X-Ray only	2.9	9.1	15.6	13.1	0.0	5.0
Both X-Ray and sputum	11.4	37.6	4.8	21.6	0.0	1.4
Number of cases	**35**	**41**	**147**	**126**	**42**	**57**

Second visit						
Sputum only	33.3	31.8	7.6	5.7	0.0	9.1
X-Ray only	7.4	4.0	16.0	10.7	0.0	3.6
Both X-Ray and sputum	23.5	50.6	9.2	49.2	0.0	14.6
Number of cases	**81**	**102**	**119**	**79**	**16**	**22**
Third visit						
Sputum only	35.6	29.9	9.0	10.6	0.0	0.0
X-Ray only	10.3	2.3	15.4	23.3	10.0	0.0
Both X-Ray and sputum	23.0	60.9	16.7	46.9	0.0	0.0
Number of cases	**87**	**71**	**78**	**39**	**10**	**2**
Fourth visit						
Sputum only	54.7	40.7	11.1	11.8	0.0	0.0
X-Ray only	5.3	4.4	16.7	0.0	0.0	0.0
Both X-Ray and sputum	13.3	42.0	13.0	26.9	50.0	60.8
Number of cases	**75**	**28**	**54**	**11**	**2**	**2**
Fifth visit						
Sputum only	45.5	6.8	21.9	20.3	0.0	
X-Ray only	0.0	0.0	12.5	13.1	0.0	
Both X-Ray and sputum	27.3	86.4	18.8	46.4	0.0	
Number of cases	**44**	**12**	**32**	**7**	**2**	

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded from the baseline and end-line surveys, respectively

We examined the distribution by sex of respondents according to the place where the sputum test was conducted, and the results are presented in Table 15. Overall, in the baseline and end-line, almost all the respondents underwent the sputum test in a public health facility. There was no difference in responses by sex. There was a negligible increase in the proportion of respondents going for sputum tests in private facilities between baseline (27%) and end-line surveys (30%). This observed increment is mainly due to the increase in the proportion of females undergoing sputum tests in private facilities between the baseline (23%) and end-line (29%). It is also important to note that the proportion of respondents undergoing sputum testing more than once reduced between the baseline and end-line, from 31% to 21%. The reduction in the proportion of respondents undergoing sputum testing more than once was slightly greater for males (reduced from 32% to 19%) than for females (reduced from 31% to 23%).

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

Place of conducting the test	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Municipal/corporation hospital	30.7	1.0	24.0	3.2	27.7	2.2
Government TB hospital	21.0	58.2	17.0	60.3	19.2	59.4
Medical college	0.8	1.0	0.0	0.8	0.5	0.9
Other government hospital	5.7	15.3	7.0	18.3	6.3	17.0
Designated Microscopy Centre	41.1	14.3	57.0	11.9	48.2	13.0
Private hospital	15.3	13.3	6.0	14.3	11.2	13.8
Private clinic	2.4	11.2	0.0	11.1	1.3	11.2
Any private lab	12.1	5.1	17.0	3.2	14.3	4.0
Other	2.4	0.0	3.0	0.0	2.7	0.0
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient are excluded from the baseline and end-line survey, respectively.

The percentage distribution of respondents according to the disease condition shared with them by the healthcare provider after conducting the test is presented in Table 16. Overall, in the baseline, a little above one-quarter of the respondents reported that the disease condition shared with them after the diagnostic test was something other than TB; this response was reduced to 13% in the end-line. In case of females, 33% in the baseline and 14% in the end-line survey reported that the disease condition mentioned to them was something other than TB. In the case of males, this was 23% and 12% in the baseline and end-line, respectively. However, irrespective of the sex of the respondent, in the end-line, a higher proportion of respondents reported that they didn't know their disease condition after showing the test result, as compared to the baseline. In the baseline, about 5% of the respondents said that the healthcare provider did not tell them anything about their condition after the diagnostic test.

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

Disease condition reported after test	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
No TB	1.6	2.0	2.0	3.2	1.8	2.7
Allergy	1.6	5.1	1.0	4.0	1.3	4.5
Chest congestion	2.4	1.0	4.0	0.0	3.1	0.5
TB	100.0	100.0	100.0	100.0	100.0	100.0
Don't know	0.8	13.3	4.0	11.9	2.2	12.5
Don't remember	0.8	3.1	0.0	1.6	0.5	2.2
Doubted TB	8.9	0.0	10.0	0.0	9.4	0.0
Did not tell any thing	4.0	0.0	7.0	0.0	5.4	0.0
Other	17.7	4.1	26.0	7.1	21.5	5.8
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded from the baseline and end-line survey, respectively.

All respondents were asked about the distance from their present residence to the facility from which they were taking their TB medicines, and the amount spent for each visit to the facility. Overall, nearly one-third of the respondents in the baseline reported that they stayed within one kilometre of the facility from which the TB medicines were collected. However, in the end-line, less than 5% of the respondents reported that they stay within one kilometre of the facility from which the TB medicines were collected. The average distance to the facility reported between the baseline and end-line slightly increased from 1.8 kilometres to 3.2 kilometres. Around 56% of the respondents in the baseline survey reported that they had spent money on transportation to reach the facility and this increased to 77% in the end-line survey. In the end-line, a higher proportion of females (82%) than males (55%) were reported to have spent money on transportation to reach the DOTS centre. Among the respondents who reported that they had spent money on travel to the facility, the amount paid was ₹63 in the baseline, and it increased to ₹87 in the end-line, with females (₹94) spending more than males (₹80).

Table 17. Percentage distribution of respondents by sex , according to distance from the residence, distance travelled and money spent on transportation to reach the facility from where medicines were acquired, in the baseline and end-line surveys, Hyderabad

	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Distance to the DOTS centre						
< 1 km	31.3	3.0	31.7	2.4	31.4	2.7
1-2 kms	21.1	36.4	28.7	19.0	24.5	28.6
2-3 kms	20.3	23.2	16.8	30.2	18.8	26.4
3-4 kms	9.4	17.2	12.9	15.9	10.9	16.6
4+ kms	18.0	20.2	9.9	32.5	14.4	25.8
Mean number of days	**2.08**	**3.03**	**1.56**	**3.44**	**1.85**	**3.22**

Whether paid for transportation to reach the facility						
Yes	56.3	72.7	54.5	81.7	55.5	76.8
No	43.8	27.3	45.5	18.3	44.5	23.2
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**128**	**124**	**101**	**101**	**229**	**225**
Amount spent on transportation (in ₹)						
₹<50	31.9	1.4	41.1	3.9	35.9	2.6
₹50-99	43.1	72.2	28.6	62.1	36.7	67.4
₹100+	23.6	19.4	26.8	29.1	25	24.1
No response	1.4	6.9	3.6	4.9	2.3	5.9
Mean amount spent	**64.59**	**79.85**	**60.35**	**94.08**	**62.76**	**86.75**
Total percent	**100**	**100**	**100**	**100**	**100**	**100**
Number of cases	**72**	**91**	**56**	**84**	**128**	**175**

The respondents were asked about which person accompanied them for all or most of their consultation visits before their TB diagnosis. In the baseline, close to one-fifth of the patients reported that no one accompanied them before their TB diagnosis; this was reported more by males (25%) than females (11%). However, the proportion of respondents unaccompanied was reduced to 8% in the end-line survey. The highest proportion of respondents said that the accompanying person was their spouse in both the baseline and end-line surveys, particularly among males. Similarly, the responses of the spouse as the accompanying person increased between baseline and end-line surveys. The next most frequently reported persons who accompanied the respondent were the parents and son or daughter, in both baseline and end-line surveys.

Table 18: Percentage distribution of respondents by sex according to their relation with the person who accompanied them to healthcare facilities before diagnosis in the baseline and end-line surveys, Hyderabad

	Male		Female		Total	
	Baseline	**End-line**	**Baseline**	**End-line**	**Baseline**	**End-line**
Person who accompanied respondent						
No one accompanied	25.0	11.1	10.9	3.2	18.8	7.5
Wife/husband	27.3	50.5	26.7	33.3	27.1	42.8
Mother/father	14.8	17.2	28.7	35.7	21.0	25.5
Son/daughter	14.8	11.1	15.8	19.0	15.3	14.7
Sister/brother	10.9	7.1	8.9	6.3	10.0	6.7
Mother-in-law/ father-in-law	2.3	0.0	2.0	0.8	2.2	0.4
Brother-in-law/sister-in-law	0.8	0.0	1.0	1.6	0.9	0.7
Other relatives	2.3	2.0	3.0	0.0	2.6	1.1

Friend	1.6	1.0	1.0	0.0	1.3	0.6
Other	0.0	0.0	2.0	0.0	0.9	0.0
Total percent	**100**	**100**	**100**	**100**	**100**	**100**
Number of cases	**128**	**124**	**101**	**101**	**229**	**225**

We enquired from all the respondents about the person who informed them that they have TB, their emotional status upon finding out about their TB status, and what they understood about TB when they were informed about their TB status (see Table 19). In both the baseline and end-line surveys, a majority of the respondents, irrespective of sex, said that a doctor informed them of their diagnosis. A higher percentage of respondents in the end-line (10%) said that a government health worker informed them about their status as compared to the baseline survey (4%). In the baseline, upon knowing their disease status, the most frequently-reported emotional state was depressed (41%) and scared (34%). In the end-line survey, close to three-quarters of the respondents said that they were scared. In the end-line, we enquired about the respondents' knowledge about TB when they were told about their disease status, and the result indicated that most of them were aware that TB is curable (74%), TB spreads through air (56%), and that TB medicine has to be taken for a longer duration (53%).

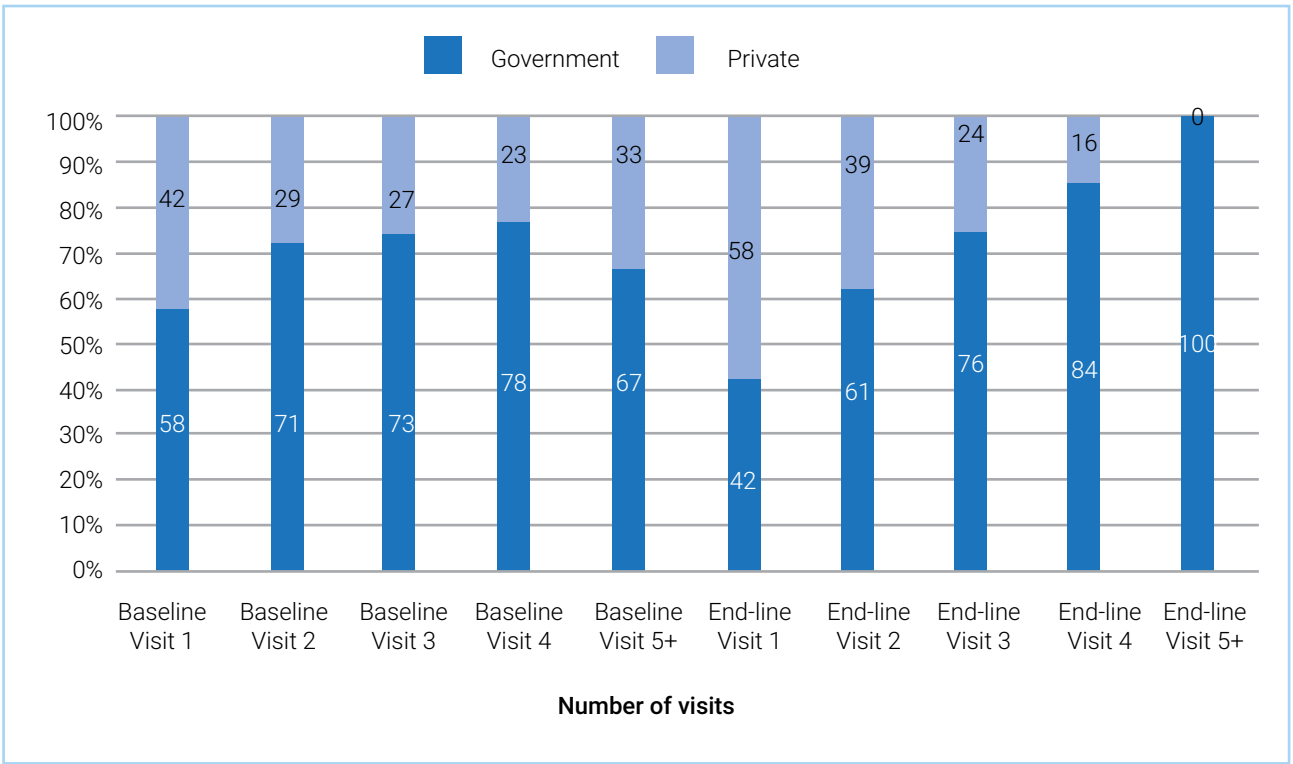
Table 19: Percentage distribution of respondents by sex according to the person who informed them of their TB status and their emotional status upon getting this information in the baseline and end-line surveys, Hyderabad

	Male		Female		Total	
	Baseline	**End-line**	**Baseline**	**End-line**	**Baseline**	**End-line**
Person who informed the respondent about TB						
Doctor	97.7	89.9	90.1	88.1	94.3	89.1
Government health worker	0.8	10.1	7.9	11.1	3.9	10.6
Relative	1.6	0	2.0	0.8	1.7	0.4
How the respondent felt about knowing his/her TB diagnosis						
Scared	30.5	71.7	37.6	76.2	33.6	73.7
Depressed	41.4	23.2	40.6	19.0	41.0	21.3
Angry	0.8	1.0	0.0	1.6	0.4	1.3
Did not believe	12.5	4.0	8.9	2.4	10.9	3.3
Other	14.8	0.0	12.9	0.8	14.0	0.4
Total percent	**100**	**100**	**100**	**100**	**100**	**100**
Number of cases	**128**	**124**	**101**	**101**	**229**	**225**
What the respondent understood about TB when informed that he/she had TB						
TB is curable		72.7		74.6		73.6
To take the medicines for longer duration		49.5		57.1		52.9

TB spreads through air	52.5	59.5	55.7
My family will be risk of getting TB	43.4	52.4	47.5
Cough is the common symptom of TB	35.4	50.0	41.9
Sputum is the test for diagnosis of TB	41.4	55.6	47.8

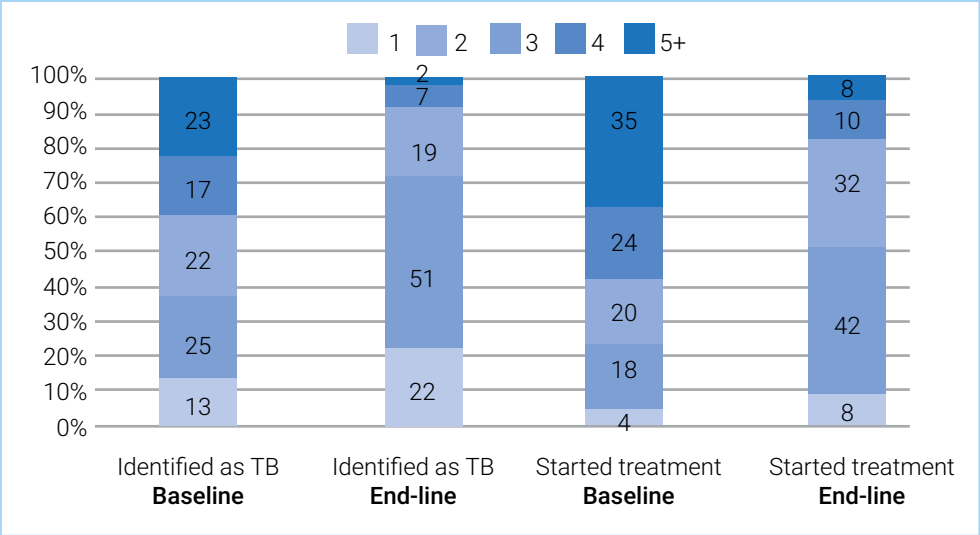
Figure 1 provides the comparison of the distribution of respondents according to the type of facility at which the decision to test was taken and the respondent was first identified as TB-positive, between the baseline and end-line. In the end-line survey, the proportion of respondents who received the recommendation for the diagnostic test and were first identified as TB-positive at the first visit was comparatively higher for private health facilities (58%) as compared to government facilities (42%). However, at all other subsequent consultation visits, the proportion of recommendations to conduct the test and the first identification of respondents as TB positive was greater at the government facilities in both baseline and end-line surveys. Similarly, the proportion of respondents who received the recommendations for tests from the government facilities and were identified as TB positive first at various consultation visits increased between the baseline and end-line surveys, except for the first two consultation visits. There was an increase in the proportion of respondents who received recommendations for tests, as well as were identified as TB positive first, for the first two visits in private health facilities between the baseline and end-line surveys.

Figure 1: Type of facility in which the decision to test and identified as TB first according to consultation visits, Hyderabad



The distribution of respondents according to the consultation visit number during which the person was identified as TB-positive 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 60% percent of respondents were identified as TB-positive on or before the third visit and this increased to 92% in the end-line. Similarly, only 42% of them were initiated on treatment on or before third visit in the baseline (18% drop off) and this increased to 82% (10% drop off) in the end-line. The results revealed that after the first diagnosis of TB, about 18% and 10% of respondents in the baseline and end-line surveys delayed starting the treatment and went for another consultation visit before starting the treatment. This proportion slightly reduced between the baseline and end-line survey.

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, Hyderabad



All respondents were asked about changes made to their food habits after they were diagnosed with TB. An almost similar proportion of respondents said that they made no change to their food habits between the baseline and end-line surveys (see Table 20). We noticed a comparatively higher increase in the proportion of respondents saying that they ate more frequently, between baseline and end-line surveys (24% vs 49%). Also, the proportion of respondents changing the type of food they ate was comparatively higher in the end-line as compared to the baseline (41% vs. 20%).There was a fall in the proportion of respondents reporting that they had reduced the quantity of food they consumed (14% vs. 4%), and reduced the frequency of meals, between baseline and end-line surveys (13% vs. 7%).

Table 20: Percentage distribution of respondents by sex according to changes in food habits after being diagnosed with TB in the baseline and end-line surveys, Hyderabad

Item	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Change in food habits						
No change	14.1	13.1	7.9	7.9	11.4	10.8
Quantity of food reduced	16.4	3.0	9.9	5.6	13.5	4.2
Quantity of food increased	60.2	66.7	65.3	73.0	62.4	69.5
Type of food eaten changed	17.2	42.4	22.8	39.7	19.7	41.2
Number of times food is eaten reduced	11.7	6.1	15.8	7.1	13.5	6.5
Number of times food is eaten increased	18.0	40.4	31.7	59.5	24.0	49.0
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**128**	**124**	**101**	**101**	**229**	**225**

Respondents were also asked about their opinion on disclosing their diseases status to others; the results are provided in Table 21. We did not find much variation between baseline and end-line in the proportion of respondents who mentioned that one should disclose their disease status to other people. We also found that respondents would prefer to hide their disease status from friends or relatives, as only 14% of the respondents in the end-line told that they had informed either a friend or a relative, as compared to 33% in the baseline. However, in the baseline, a higher proportion of respondents reported that they experienced discrimination from family or friends or relatives after disclosing their disease status, as compared to the end-line survey.

In the end-line survey, none of the respondents said that a healthcare provider mistreated him/her either before or after the diagnosis of TB. In the end-line, although none of the females were reported to have lost or changed their jobs, 9% of males reported this happening.

Table 21: Percentage distribution of respondents by sex according to their thoughts on disclosure of their illness, status of disclosure, and its repercussions in the baseline and end-line surveys, Hyderabad

	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Whether people with TB should disclose their TB status						
Yes	35.9	39.4	31.7	33.3	34.1	36.7
No	64.1	60.6	68.3	66.7	65.9	63.3
Whether they informed friends/relatives that they have TB						
Yes	34.4	12.1	31.7	15.1	33.2	13.5
No	65.6	87.9	68.3	84.9	66.8	86.5
Whether their relationship with their family changed after knowing that the respondent has TB						
Yes	25.8	3.0	16.8	4.0	21.8	3.5
No	74.2	97	83.2	96.0	78.2	96.5
Whether relationships with friends/relatives changed after knowing that the respondent has TB						
Yes	9.4	4.0	12.9	4.8	10.9	4.4
No	90.6	96.0	87.1	95.2	89.1	95.6
Whether any healthcare provider treated the respondent badly before or after the TB diagnosis						
Yes		1.0		0.8		0.9
No		99.0		99.2		99.1
Whether respondents lost their job or were forced to change jobs after their TB diagnosis						
Yes		9.1		0.0		5.0
No		90.9		100		95.0
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of cases	**128**	**123**	**101**	**101**	**229**	**225**

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 22. Nearly two-thirds of the respondents were aware of the DBT scheme for TB patients, and the awareness was slightly higher among females (69%) than males (61%). Most of the people who were aware about the DBT scheme were linked to DBT. However, among the respondents who had been linked to DBT, only about 13% of the respondents said that they had received the DBT amount in their account.

Table 22: Percentage distribution of respondents by sex who knew about DBT, were linked to DBT and received the DBT amount in the end-line survey, Hyderabad

	Male	Female	Total
Aware of DBT scheme			
Yes	60.6	69.0	64.4
No	39.4	31.0	35.6
Linked to DBT scheme			
Yes	60.6	65.1	62.6
No	39.4	34.9	37.4
Total percent	**100**	**100**	**100**
Number of cases	**124**	**101**	**225**
Received DBT amount			
Yes	10.0	15.9	12.7
No	90.0	84.1	87.3
Total percent	**100**	**100**	**100**
Number of cases	**76**	**66**	**142**

We enquired about details of the costs incurred by the respondents at each visit in terms of consultation, diagnostic tests, medicines and the sum total expenditure, and the results are presented in Table 23. Although the number of consultation visits reduced between baseline and end-line surveys, we noticed an increase in the consultation costs paid by the respondents (₹220 vs. ₹316). The increase in the consultation costs was higher in case of males (₹177 vs. ₹330) as compared to females (₹273 vs. ₹299) between the baseline and end-line. In the baseline, one-quarter of the respondents reported that they did not pay any consultation fee and this reduced to 3% in the end-line survey. However, we noticed an increase of ₹600 in the costs incurred on the diagnostic tests between baseline and end-line surveys. The amount spent on diagnostic tests in the baseline was ₹1348 and it increased to ₹1917 in the end-line. The increase was found to be higher for females (₹1263 to ₹2110) than males ((₹1416 to ₹1759). The proportion of respondents who spent over ₹2000 increased comparatively between baseline and end-line surveys, and there was a decline in the proportion of respondents who did not incur any costs for tests. However, the amount spent on medicines declined during the period and the decline was more for males (₹959 to ₹781) as compared to females (₹979 to ₹913). The sum of the costs paid for all these items also increased from ₹2535 in the baseline to ₹3073 in the end-line. The increment seen in the medical costs was mainly due to the increase in the expenditure on diagnostic tests.

Table 23: Percentage distribution of respondents by sex according to the amount paid for consultations, diagnostic tests, medicines and the total cost in the baseline and end-line surveys, Hyderabad

Amount paid for (in ₹)	Male		Female		Total	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Consultation						
No fee	24.2	4,1	25.0	1.6	24.6	3.0
1-199	39.5	31.6	27.0	40.5	33.9	35.6
200-399	24.2	29.6	22.0	21.4	23.2	25.9
400+	12.1	34.7	26.0	36.5	18.3	35.5
Mean	**176.65**	**330.15**	**272.8**	**299.13**	**219.58**	**316.11**
Tests						
No fee	41.1	11.2	32.0	11.1	37.1	11.2
1-999	17.7	30.6	22.0	30.2	19.6	30.4
1000-1999	14.5	24.5	24.0	19.0	18.8	22
2000+	26.6	33.7	22.0	38.1	24.6	35.7
Mean	**1416.01**	**1759.8**	**1262.85**	**2109.56**	**1347.63**	**1916.76**
Medicine						
No fee	21.0	7.1	25.0	8.7	22.8	7.9
1-999	51.6	68.4	44.0	63.5	48.2	66.2
1000-1999	12.1	15.3	17.0	13.5	14.3	14.5
2000+	15.3	9.2	14.0	12.7	14.7	10.8
Mean	**958.75**	**781.07**	**978.86**	**913.44**	**967.73**	**840.47**
Total						
No fee	12.1	1	15.0	0.0	13.4	0.06
1-999	35.5	22.4	22.0	24.6	29.5	23.4
1000-1999	12.9	21.4	17.0	16.7	14.7	19.3
2000+	39.5	55.1	46.0	57.1	42.4	56
Mean	**2551.41**	**2871.02**	**2514.51**	**3321.06**	**2534.94**	**3072.99**
Number of cases	**124**	**123**	**100**	**101**	**224**	**224**

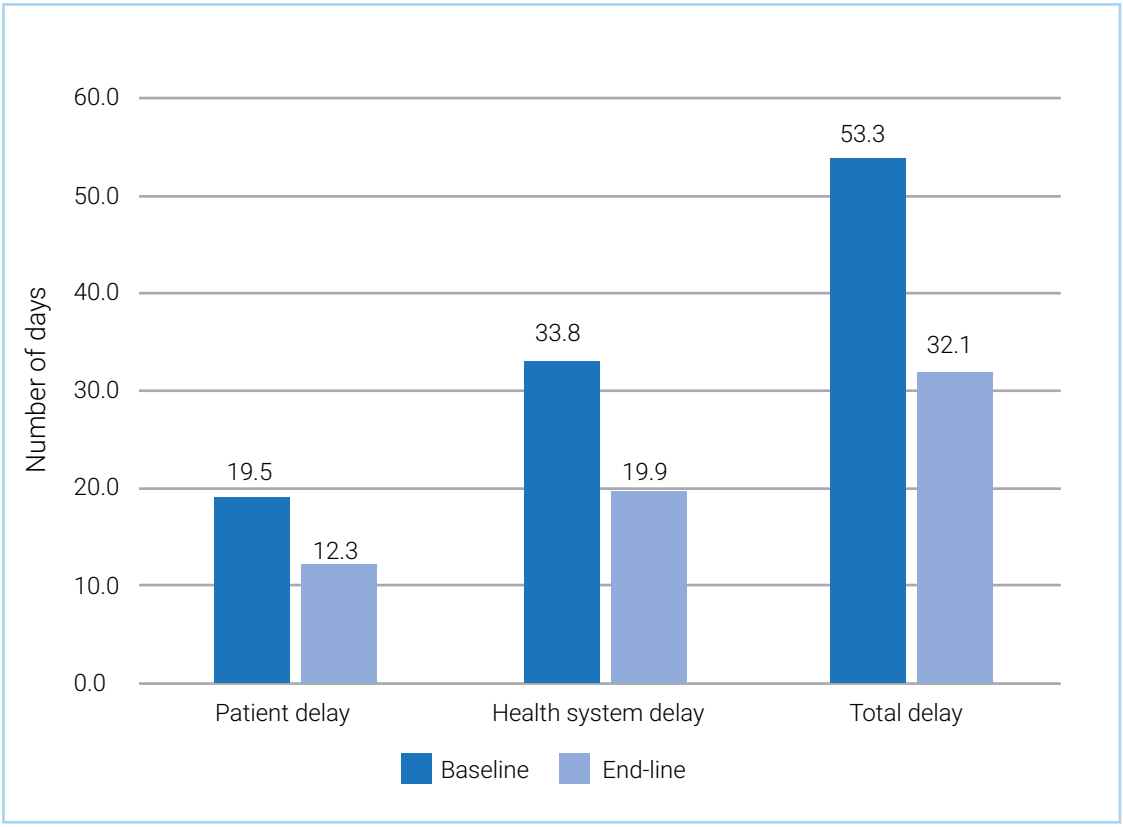
05

PATIENT, HEALTH SYSTEM AND TOTAL DELAYS

Patient, health system and total delays

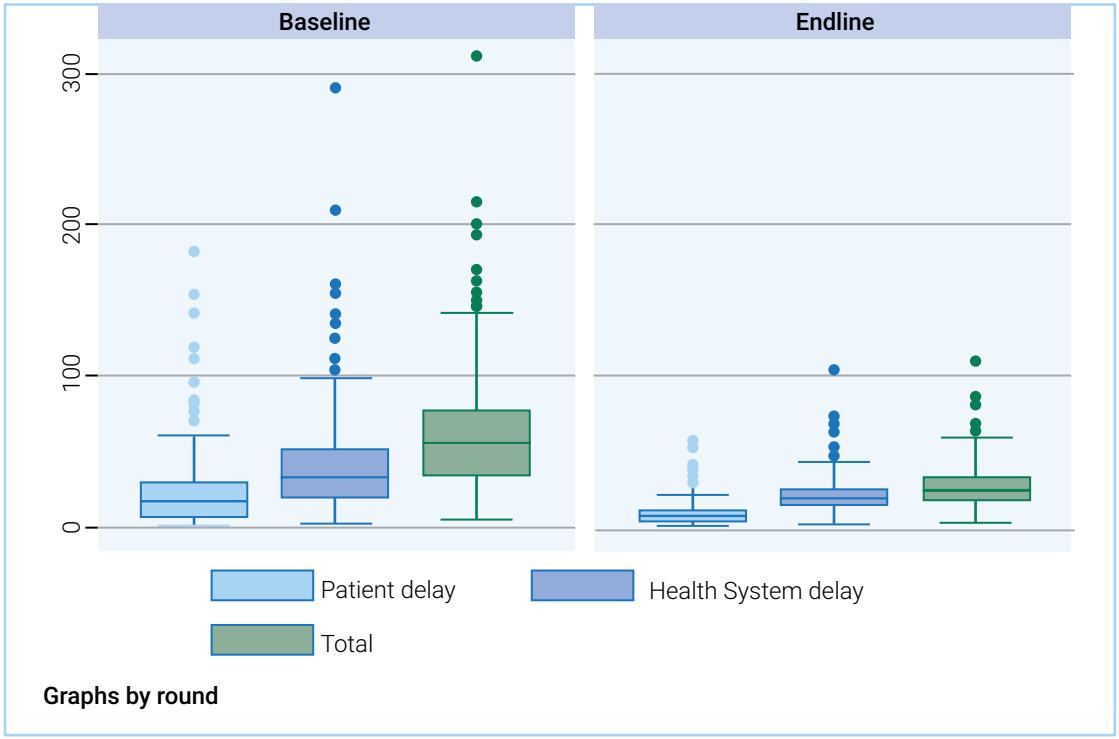
The changes in the patient, health system and total delays between baseline and end-line surveys were examined, and are provided in Figure 3. The mean patient delay was reduced from 20 days in the baseline to 12 days in the end-line survey, almost a reduction of 8 days in the patient delay. The health system delay was reduced from 34 days in the baseline to 20 days in the end-line and the reduction was 14 days. The total delay reduced from 53 days to 32 days over the time period, a reduction of around 21 days.

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



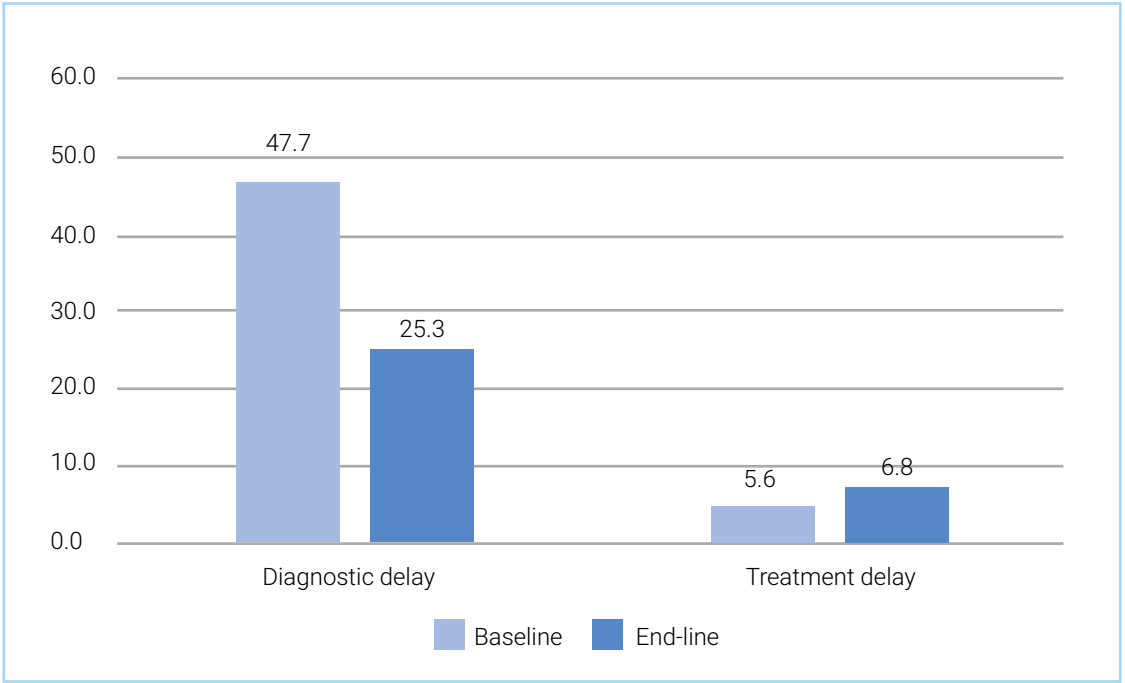
We also observed the distribution of delays through box plots and Figure 4 provides five summary measures such as minimum, first quartile, median, third quartile and maximum. The boxplot indicates that there is no difference in the minimum values between the baseline and end-line surveys. The quartile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

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



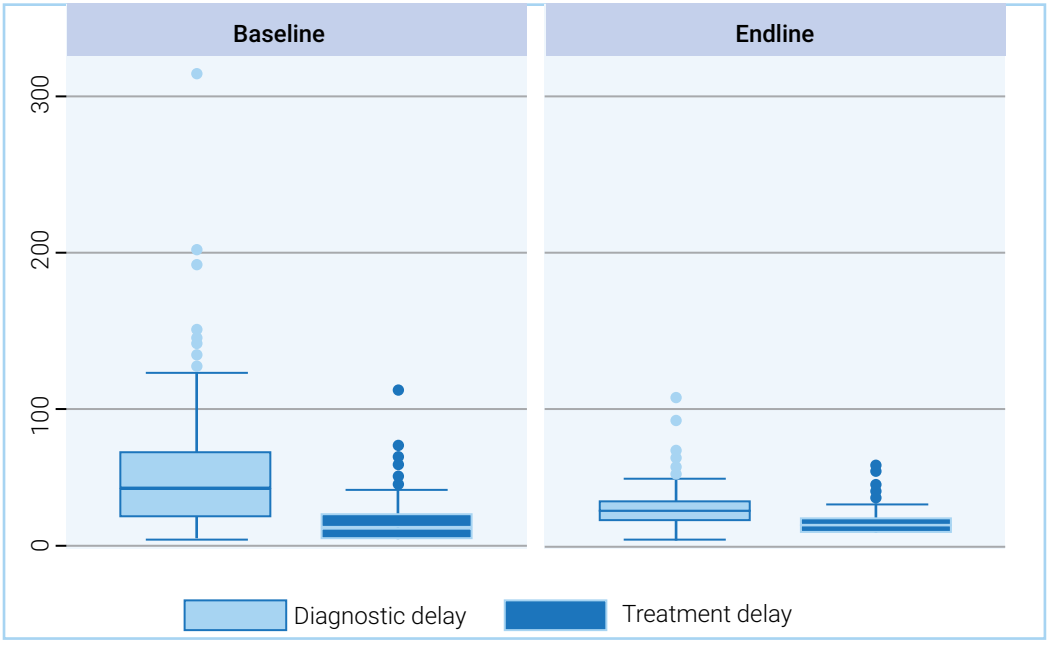
In addition to the three delays, we also examined the diagnostic delay and treatment delay. Diagnostic delay is the delay expressed in days from the onset of the symptoms to first diagnosis as TB positive, and treatment delay is the delay expressed in days from first diagnosis as TB positive to initiating TB treatment. Figure 5 indicates that the diagnostic delay reduced from 48 days in the baseline to 25 days in the end-line. However, there was negligible increase in the treatment delay, from 6 days to 7 days between baseline and end-line. This indicates that there could be respondents who are going for more than one test to confirm or may be waiting for a second opinion before initiating TB treatment immediately after diagnosis.

Figure 5: Mean diagnostic and treatment delays, Hyderabad



The box plot for 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, particularly for the diagnostic delay, indicating a closer value for the delays. 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 end-line for the diagnostic delay was slightly closer than the outliers for the baseline for the diagnostic delay.

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



The changes in the various delays over the time period, according to socio-economic and demographic characteristics has been examined, and the results are provided in Table 24. For mean patient delay, the results did not show any significant decline between baseline and end-line surveys for females, people living in non-slum areas, never-married persons, regular income group (people involved in business or a salaried job in either private or government), Muslims, other religious groups, persons whose monthly household income is less than ₹10000, persons who knew someone with TB prior to the diagnosis of his/her TB, and person with five or more household members.

In case of health system and total delays, we did not notice a significant decline between baseline and end-line surveys for persons with regular incomes, persons belonging to religions other than Hinduism or Islam and for persons living in non-slum areas. We also observed that the changes in the delays for different socio-economic and demographic groups were not equal. For example, we noticed a relatively greater reduction in patient delay among males, persons aged 50 and above, ever married persons, persons who were illiterate or had completed primary education, persons who were employed in irregular income jobs (working as daily labor, painter, driver, mason, domestic helper etc.), persons who belong to the Hindu religion, persons who belong to Scheduled Castes or Scheduled Tribes, persons whose household income was ₹10000 or more, 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 50 and above, persons who were not employed, persons belonging to a Scheduled Caste or Scheduled Tribe, persons whose monthly income was less than ₹5000, and persons who knew someone with TB prior to the diagnosis of his/her TB, as compared to their counterparts. Subsequently, the decline in total delay was comparatively higher for persons aged 50 and above, persons who resided in slum areas, persons who were ever married, persons who are illiterate or completed primary schooling, persons who were either not working or having irregular income jobs, persons who belong to the Hindu religion, persons who belong to a Scheduled Caste or Scheduled Tribe, persons whose personal income was less than ₹5000, persons whose household income was ₹10000 or more, persons who knew someone with TB prior to the diagnosis of his/her TB, and persons living in households with less than 5 persons, as compared to their counterparts.

Table 24: Mean patient, health system and total delays in diagnosis and initiating TB treatment according to selected characteristics, Hyderabad

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	21.6	11.4	0.001	29.7	20.0	0.006	51.3	31.4	<0.001
Female	16.9	13.3	0.094	38.9	19.7	<0.001	55.9	33.0	<0.001
Age									
< 50 years	18.4	12.2	0.002	32.4	20.4	<0.001	50.8	32.6	<0.001
50+	23.8	12.5	0.036	39.3	18.0	<0.001	63.0	30.5	<0.001
Residential status									
Slum area	18.5	12.0	0.002	34.7	18.5	<0.001	53.2	30.5	<0.001
Non-slum area	21.5	13.1	0.067	32.1	24.7	0.234	53.6	37.8	0.033
Marital status									
Ever married	21.0	11.8	<0.001	33.6	20.0	<0.001	54.6	31.9	<0.001
Never married	14.7	13.2	0.547	34.4	19.5	<0.001	49.1	32.7	<0.001
Literacy and education									
Illiterate or primary completed	22.1	11.8	0.001	35.3	20.9	0.001	57.4	32.7	<0.001
More than primary completed	17.5	12.8	0.053	32.6	18.7	<0.001	50.1	31.5	<0.001
Occupation									
Not working	18.6	11.6	0.002	37.6	19.7	<0.001	56.2	31.3	<0.001
Regular income	14.2	14.9	0.797	28.2	24.4	0.465	42.4	39.3	0.556
Irregular income	27.6	12.6	0.034	25.5	15.8	0.016	53.1	28.3	0.001
Religion									
Hinduism	22.1	11.5	<0.001	34.4	19.5	<0.001	56.6	31.0	<0.001
Islam	15.5	13.1	0.337	32.7	19.5	<0.001	48.2	32.6	<0.001
Others	16.5	10.2	0.562	33.6	39.7	0.748	50.1	49.9	0.990
Caste/Tribe									
Scheduled Caste or Scheduled Tribe	23.5	10.8	0.014	38.9	18.9	0.006	62.4	29.7	<0.001
Non-scheduled Caste or Scheduled Tribe	17.9	12.7	0.009	31.6	20.1	<0.001	49.5	32.8	<0.001

Personal monthly income (in ₹)									
< 5000	20.1	12.5	0.008	37.4	18.8	<0.001	57.5	31.4	<0.001
5000+	19.3	11.8	0.012	32.4	21.3	0.006	51.8	33.2	<0.001
Monthly household income (in ₹)									
< 10000	13.2	12.2	0.580	34.8	19.5	0.003	48.0	31.7	0.003
10000+	22.4	12.3	<0.001	33.3	20.1	<0.001	55.7	32.4	<0.001
Personally knew someone with TB									
Yes	21.3	15.8	0.331	36.9	16.0	<0.001	58.2	31.8	0.003
No	18.3	11.7	0.001	31.6	20.5	<0.001	49.8	32.2	<0.001
Number of household members									
< 5 members	23.3	11.4	<0.001	32.6	19.3	0.001	56.0	30.7	<0.001
5+ members	16.4	13.3	0.203	34.8	20.5	<0.001	51.1	33.7	<0.001

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patient were excluded from the baseline and end-line survey, respectively.

The various mean delays, according to various characteristics related to health facility and consultation visits were also examined, and the results are presented in Table 25. We noticed a significant reduction in the total delay between the baseline and end-line for almost all the categories, except for respondents who were accompanied by persons other than family members. In case of health system delay, the reduction was not significant for respondents who first visited a public health facility, who visited only a public health facility, who had less than 5 consultation visits, who went alone and who were accompanied by persons other than a family member. Between the baseline and end-line, the reduction in patient delay was not significant for those who visited the health facilities by themselves, those who were accompanied by persons other than a family member and those who reported that they visited the facility because it was close to home or easy to access. However, the reduction in patient delay was relatively higher for persons who resided within 2 kilometers of the DOTS centre, who were not accompanied and for whom the reason for going to the first facility was something other than the provider's good reputation and proximity to the facility, when compared to their counterparts. Decline in the health system delay was relatively greater for respondents who had first visited a private health facility, who had consulted only private facilities until treatment initiation, who had 5 or more consultation visits, who had visited the health facility with some family member, and who said that they had visited the first facility for reasons other than the proximity to home and the provider's good reputation, as compared to their counterparts. For the total delay, the reduction was higher for respondents who first visited other facilities such as informal providers, chemists, etc., who visited only private health facilities, who had 5 or more consultation visits, who resided less than 2 kilometres away from the DOTS centre, who were accompanied by family members, 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 25: Mean patient, health system and total delays in initiating TB treatment according to characteristics related to health facility and consultation visits, Hyderabad

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				21.1	17.6	0.319	42.3	29.7	0.051
Private				39.4	23.8	<0.001	53.4	34.0	<0.001
Other				25.0	13.0	0.005	62.2	29.8	<0.001
Type of facility visited (based on all visits)									
Only government				14.9	14.6	0.929	46.8	28.8	0.002
Only private				48.8	15.0	<0.001	59.5	24.9	<0.001
Both (private & government)				37.8	24.9	0.001	54.6	37.2	<0.001
Total number of consultation visits									
< 3				10.6	13.9	0.065	32.5	25.9	0.050
3-4				26.7	25.3	0.609	47.2	37.5	0.017
5+				57.9	28.1	0.011	74.6	42.7	0.010
Distance to DOTS centre									
<2 kms	21.3	12.9	0.029	34.3	20.0	0.005	55.6	32.9	0.002
2+ kms	17.3	11.9	0.002	33.1	19.8	<0.001	50.4	31.7	<0.001
Persons who accompanied respondents to health facility before diagnosis of TB									
No one accompanied	27.6	18.2	0.413	23.7	23.0	0.881	51.3	41.2	<0.001
Accompanied by a family member	17.2	11.7	0.001	36.5	19.3	<0.001	53.8	30.9	<0.001
Accompanied by others	20.8	16.6	0.551	33.2	30.8	0.845	54.0	47.4	0.656
Reason for going to the first facility									
Good reputation	18.6	11.7	0.045	29.4	21.8	0.039	48.0	33.4	0.002
Close to home/easy access	17.8	13.1	0.221	32.2	15.3	0.001	50.0	28.4	<0.001
Other reason	21.3	13.2	0.068	36.3	18.2	0.005	57.6	31.5	0.001

Note: 5 HIV/AIDS patients and 1 HIV/AIDS patients were excluded from the baseline and end-line survey, respectively.

Exposure to THALI Program

We asked all the respondents about their exposure to the various community-level activities 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 26 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, and mass campaigns conducted at the community, follow-up visits and screening for symptoms. Overall, 13% of the respondents said that they personally knew the THALI staff, 14% reported that they were exposed to various community-level activities and nearly one-quarter were reported to have seen the various IEC materials shown to them. We noticed that comparatively more male (26%) respondents were reported to have been exposed to IEC materials shown to them, as compared to females (20%). Overall, about 31% of the respondents were found to have been exposed to the various community-level activities conducted, and this was comparatively more for males (34%) as compared to females (27%).

Table 26: Percentage distribution by sex of respondents who were exposed to program activities in the end-line, Hyderabad

Exposure to program	Male	Female	Total
TB Alert/THALI CHW	12.1	13.5	12.7
Exposed to community level activities	14.1	14.3	14.2
Exposed to IEC materials prior to treatment	26.3	19.8	23.4
Exposed to any of these activities	34.3	27.0	31.0
Number of cases	**124**	**101**	**205**

The source through which the respondents were exposed to the selected IEC materials shown to them by the interviewers was also asked about, and the results were provided in Table 27. A majority of the respondents reported that they had seen the IEC materials in the public hospital (56%), followed by the Anganwadi centre (20%) and with or through the THALI CHW (19%). Other sources were reported by negligible proportions. More females (28%) than males (14%) reported that they had seen the IEC materials in the Anganwadi Centre.

Table 27: Percentage distribution of respondents by sex according to the place or person who had shown them IEC materials in the end-line, Hyderabad

Place where IEC materials seen/ persons who showed IEC materials	Male	Female	Total
TB Alert/THALI CHW	19.2	17.4	18.5
Public hospital	57.5	54.4	56.3
Anganwadi centre	14.9	28.3	20.1
Petty shop/tea shop	4.3	2.2	3.5
Members of labour unions	0.0	2.2	0.8
Community based organisations	2.1	0.0	1.3
During mass campaign conducted by TB Alert India	4.3	4.4	4.3

Others (specify)	2.1	2.2	2.2
Don't know	6.4	10.9	8.1
Total cases	**59**	**37**	**96**

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

Table 28 provides the distribution of the respondents according to the key messages or information they received from the IEC materials. The more frequently reported key messages or information received after seeing the IEC materials included eating nutritious food during the TB treatment (69%), a lack of food restrictions for people with TB (42%), the need to test sputum for and the test for TB (37%), and the fact that one should test for TB if one has persistent cough for more than 2 weeks (36%). A comparatively higher percentage of females reported recalling the message of eating nutritious food during the TB treatment (76% vs. 64%) and testing for TB if one has a persistent cough for more than two weeks (50% vs. 28%) as the key message or information they received after seeing the IEC materials.

Table 28: Percentage distribution of respondents by sex, according to key messages or information received from the IEC materials, in the end-line, Hyderabad

Key messages received from the IEC material	Male	Female	Total
No food restrictions for people with TB	40.4	43.5	41.6
Eat nutritious food during TB treatment	63.8	76.1	68.6
Disclose one's TB status to family member	23.4	39.1	29.5
Test for TB, if one has persistent cough for more than 2 weeks	27.7	50.0	36.3
Symptoms of TB	4.3	15.2	8.5
Test sputum for TB	36.2	39.1	37.3
TB can be completely cured	17.0	13.0	15.5
Adherence to TB medication is imoprtant	2.1	10.9	5.5
Alcohol consumption is a barrier to good adherence to medication	0.0	2.2	0.8
Alcohol consumption during treatment worsen the symptoms of TB	0.0	2.2	0.8
Others (specify)	0.0	2.2	0.8
Don't know/can't say	4.3	0.0	2.6
Number of cases	**59**	**37**	**96**

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

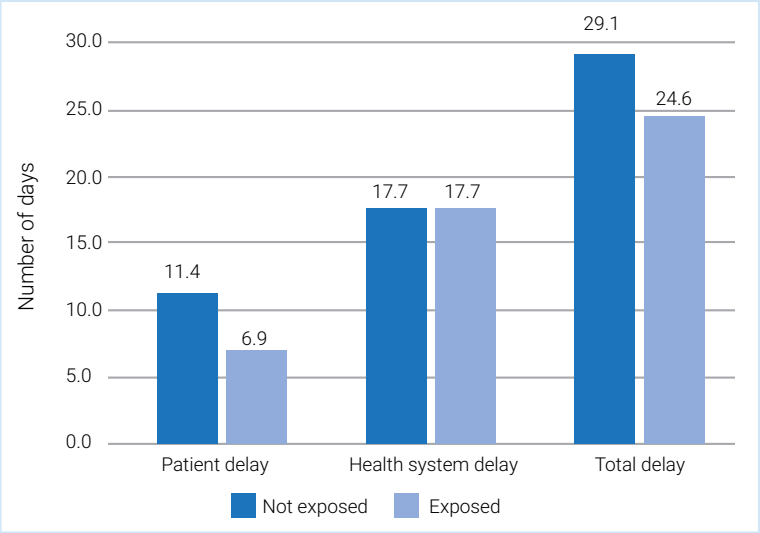
Effect of program on various delays

We noticed a significant decline in the various delays over the project period as estimated from the baseline and end-line surveys according to 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 the delays to the introduction of the program. In reality, the causal effect of any intervention program for individual "i" is the comparison of individual outcome if individual "i" is exposed to the intervention (i.e. the potential outcome in the presence of intervention), and individual "i's" outcome if individual "I" 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 is able to identify the effect of the program using non-experimental data. Matching methods are 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 while reducing bias due to confounding. We used the Euclidean distance metric to match the exposed and non-exposed individuals through nearest neighborhood matching and used characteristics such as sex of the person, age of the person and residential status of the person as matching each observation, and applied this matching method to the pooled data of the delay study conducted in 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 respondent 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 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 from the pooled data. It indicates that there is a 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 it 11 days for those who were not exposed. Similarly, the total delay was 25 days for those exposed to the program and it was 29 days for those who were not exposed to the program.

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



The results of the effect of the exposure to the intervention program from the nearest neighborhood matching method using the pooled data is 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 neighborhood 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 the program when compared to a scenario in which 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 indicated 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 when compared to a situation in which 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 provider behavior and the characteristics of the health system.

Table 29: Average intervention effect of exposure to the THALI community program on various delays from the pooled data of Hyderabad and Bengaluru

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 through the CHWs were completed when the end-line survey was undertaken, hence other program activities carried out in the slum areas of Hyderabad might have indirectly influenced the early diagnosis and treatment initiation for TB that we were not able to capture 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 health-seeking behavior between baseline and end-line surveys. We noticed an earlier shift in health-seeking to public sector health facilities between baseline and end-line surveys. By the third 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. It is important to note that even in the second visit, around 10% of the patients were visiting other informal healthcare (non-allopath) providers such as Ayurveda, Homeopath, or Unani practitioners, or chemists. However, delay was significantly reduced even among this group, indicating a good linkage of these practitioners with the public health system for TB diagnosis. We also noticed that a higher proportions of private and public sector are recommending diagnostic tests at earlier consultation visits in the end-line as compared to the baseline survey. For instance, by the second visit, the proportion of respondents receiving recommendations for diagnostic tests such as sputum tests and X-Rays increased three times during the period. This resulted in around 82% of respondents diagnosed and initiated on treatment by the third visit in the end-line, as compared to 42% diagnosed 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

The findings from the study can be used for future implementation of programs related to TB. Since about two-fifths of the patients were found to be illiterate, any of the Information, Education and Communication (IEC) activities for disseminating messages on knowledge and 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 improved over the time period and were found to be more common at public health facilities. However, more than 40% of the patients in our study prefer to visit the private sector, even for a second visit. The results indicated that the private healthcare provider was not recommending a sputum test early on and so, 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 will lead to a positive behavior change in the private provider when more and more presumptive TB cases demand an appropriate test for diagnosis. So, in the future, programs may consider either behaviour change among private healthcare providers or behaviour change amongst the community for demanding the appropriate test.

The results also indicated that although various delays were reduced, those who shopped between public and private sector had comparatively longer delays for TB diagnosis and treatment initiation. In the future, programs need to consider this element of health seeking behaviour- that is, preventing persons from shopping between the public and private sector.

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

Conclusions

In Hyderabad, major program activities of the THALI were carried out in the slum areas by CHWs in the form of community engagement activities, such as awareness creation through in-person communication and IEC materials, and referrals of individuals with TB symptoms for sputum testing to the nearest public sector labs. These program activities carried out within the community were expected to reduce the various delays in the diagnosis and TB treatment initiation among people in Hyderabad, especially among slum dwellers. We noticed that the reduction in the various delays between the baseline and end-line survey was higher among persons who reside in the slum areas versus non-slum areas. The reduction in various delays was found across almost all the socio-economic and demographic characteristics examined. However, although there was a reduction, we noticed that those persons who shopped between private and government facilities tended to have higher delays than the persons who didn't shop between health facilities. Similarly, persons who consulted the provider more visits also tended to have higher delays than those who made fewer visits. Similarly, although there was a shift in the respondent going to public health facilities for the first two consultation visits, a higher proportion of the respondents still visited private healthcare providers, amongst whom recommendations for the appropriate test was lower . Similarly, a higher proportion of the respondents went to other non-allopathic health sectors such as Unani, Ayurvedic, or Homeopathic practitioners, and pharmacists. This information is important in planning future programs. Finally, we identified that community engagement activities conducted by local trained community health workers can significantly reduce patient and total delays in TB diagnosis and treatment initiation.

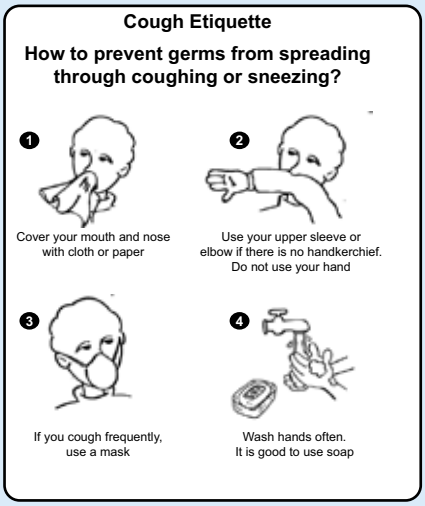
07

ANNEXURE

ANNEXURE

Communication materials used to understand respondents' exposure to the THALI program

Material	Communication Objectives	BCC Material
Nutrition (flipchart)	Consumption of nutritious food during TB treatment.	
Disclosure (flipchart)	Disclosure of one's TB status to the desired member(s) of the family to enable better support from the family, resulting in better treatment outcomes.	
One Step, the Right Step (flipchart)	Persistent cough for more than two weeks could be a symptom of tuberculosis (TB). Get tested for TB if you have this symptom.	

Bullet (Piano Folder)	Adhere strictly to the course of tuberculosis (TB) medication to improve treatment outcomes.	
Thoogi Nodi (flipchart)	Those who drink alcohol should not miss their dosages of medicines at any cost.	
Cough Hygiene Leaflet/Poster	Maintaining cough hygiene through simple methods is essential to prevent the spread of infection	

Local language versions of these materials were used during the survey

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