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

Baseline Study Report 2017

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Publisher

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ACRONYMS

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

FOREWORD

The Government of India has set ambitious targets to eliminate TB by 2025 in the country. India has managed to scale up basic TB services in the public health system treating more than 10 million TB patients under RNTCP. As per the recent National Strategic Plan the requirements for moving towards TB elimination have been integrated into the approach of "Detect-Treat-Prevent-Build".

TB can be controlled if diagnosed early and treated completely. Transmission is also thus interrupted. The challenge with TB control in India is delayed diagnosis and inadequate treatment or incomplete treatment, as a result of patient and provider behaviours, social stigma and health system related barriers. The strategies of community driven and patient centred approach adopted by the Tuberculosis Health Action Learning Initiative (THALI) undertaken by Karnataka Health Promotion Trust (KHPT), Bengaluru, and TB Alert India, Hyderabad envisaged to reduce the diagnostic and treatment delays.

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

A sample of 225 adult new sputum positive patients who had initiated treatment from the RNTCP during the three months prior to the date of survey were interviewed in each of the cities. The patients were asked about their visits to various health care providers from the onset of their TB related symptoms, until they were initiated on TB treatment. The study provides valuable information about patient preferences for health seeking, provider's practice in relation to TB diagnosis and initiation of treatment and other barriers that patient's may face during seeking health care services.

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

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Joint Director (TB), TS

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

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

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

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

Background

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

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

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

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

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

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

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

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

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

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

Objectives of baseline study

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

Study area, sample size and sample identification

The study area included all 19 Tuberculosis Units (TUs) in the Hyderabad district. The subjects were NSP adults (aged 18 years and above) diagnosed with pulmonary TB who had been initiated on TB treatment from the RNTCP, anytime during the three months prior to the survey conducted between February and May 2017. The target sample size was 225 NSP adult patients. The sample was proportionately distributed across TUs based on the number of NSP patients initiated on TB treatment within that TU, during the quarter prior to the start of the survey. A list of all the NSP adult TB patients (> 18 years of age) who had been initiated on treatment in each of the 19 TUs during the three months preceding the survey was prepared by the trained field interviewers. These interviewers then contacted the patients and obtained verbal consent for their participation in the study. The NSP adult TB patients were contacted, either at the DOTS centre or through their mobile/land-line telephone contact numbers. Those who consented to a more detailed review were interviewed in person after obtaining written consent from them, until the proportionate sample size for a TU was achieved. If in any TU, the targeted sample size was not reached, then an additional sample was drawn from another TU with new adult TB patients.

Survey tools

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

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

Training of field staff

In order to minimize the non-sampling errors, the Monitoring, Evaluation, Research, and Learning (MERL) specialist and a research coordinator trained field staff over a period of six days, to maintain standardized survey procedures. Field practice was incorporated into the training to enhance their competencies to adhere to survey procedures and to administer and fill the questionnaires. Training also included the procedures to be followed to obtain written consent and to maintain confidentiality of the respondents' information. The training, organised from February 16-21, 2017, was attended by 15 persons, of which nine field staff, two supervisors and one research coordinator were selected to constitute the field team.

Field data collection

Field data collection was carried out by the nine field investigators under supervision and support of the two field supervisors, and the field data collection procedure was organised by the research coordinator. Field data collection for the study started on February 22, 2017 and was completed on April 29, 2017. The field staff included six female and three male field investigators.

Ethics approval

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

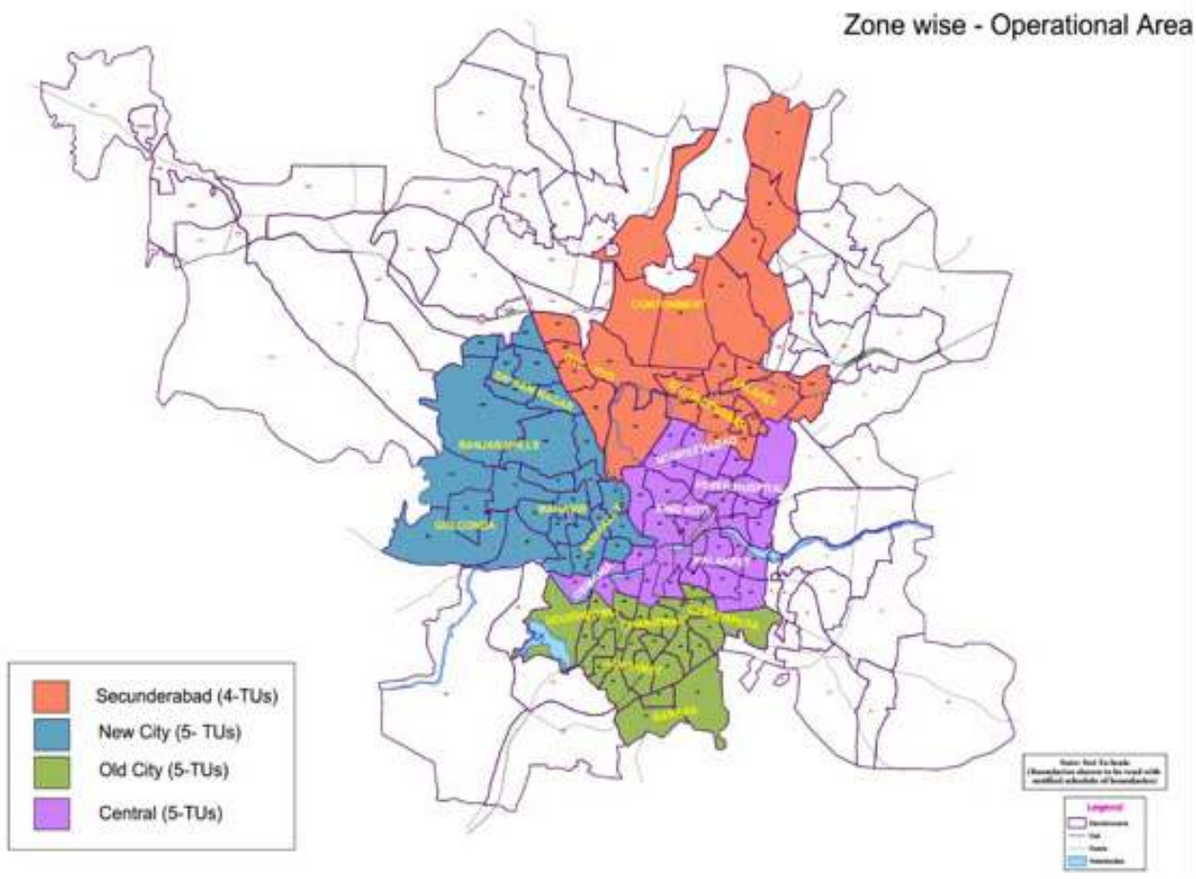
Profile of Hyderabad City

Hyderabad city is a district in the Indian state of Telangana. The city is a fully urban district with no villages, and is surrounded in its entirety by the Rangareddy district. Hyderabad is divided into two revenue divisions; Hyderabad and Secunderabad. The district has 16 urban Mandals of which Hyderabad Revenue Division has nine Mandals and Secunderabad Revenue Division, seven.

According to the 2011 Census of India, the district has a population of 3,943,323, of which 2,018,575 or 51% are males and 1,924,748 or 49% are females, with an overall sex ratio of 954 females per 1000 males. The district is the tenth most populous district in the state and its total population in the current period is estimated to be 4,002,230 of which 1,446,763 (36%) lives in 942 slum areas. Hyderabad district recorded a decadal population growth rate of 2.97% between 2001-2011. The overall population density in the district is 18,172 persons per square kilometre. Literacy rate among population aged seven and above is 83.2%, and 87.0% and 79.3% among males and females, respectively. Around 6.3% of the total population in the district belongs to the Scheduled Castes, and 1.2% to the Scheduled Tribes. According to the 2011 Census, children (0-14 years) form 27% of the district's population, adults aged 60 and over make up 7%, and the working age group (15-59 years) forms the remaining 66% of the population.

As per the RNTCP, the Hyderabad district has 19 TUs (Tuberculosis Units). For operational effectiveness of the project, district geography has been divided into four programme zones. These zones were made according to the slum area population in each TU. The Secunderabad Zone includes slum areas from Cantonment, Lalapet, Secunderabad and District Tuberculosis Centre Hyderabad TUs; the Central Zone includes slum areas in the Musheerabad, Fever Hospital, King Koti, Malakpet and Osmania TUs; the Old City Zone includes slum areas in the Dabeerpura, Barkas, Jangammet, Charminar and Doodh Bowli TUs; and New City Zone includes slum areas in the Mahaveer, Nampally, Golconda, Banjara Hills and Sriram Nagar TUs.

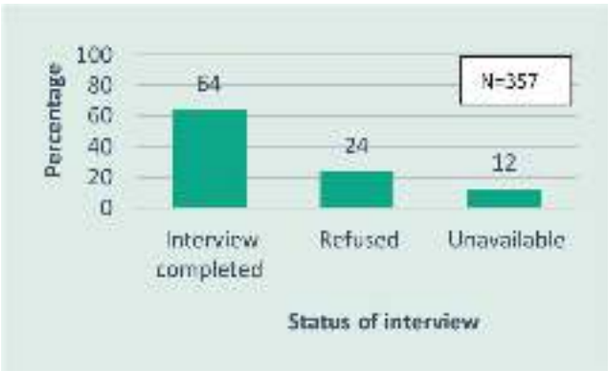
Geographical area



Zone-wise classification of the operational area in Hyderabad

Sample coverage

In total, 470 NSP adult TB patients who were started on treatment during the three months prior to the date of visit of the field interviewer, were listed by name from the 19 TUs. Of these, 357 (76%) patients were contacted, while the remaining 24% (113) patients could not be contacted due to incorrectly recorded contact information and prior achievement of the sample size for the TU. Interviews were completed with 229 (64%) of the 357 patients, 24% refused to participate in the study and another 12% of them were not available for interviews.



Profile of respondents

The background characteristics of the patients interviewed are given in Table-1. The mean age of the adult patient was 36 years. Females constituted 44% of the NSP adult patients, with a mean age of 31 years. The mean age of male patients was 40 years. 60% of the female patients and 22% of the male patients were less than 30 years in age. Overall, 65% of the respondents lived in slum areas and the remaining 35% in non-slum areas. We did not notice any sex differentials in the residential status of the patients.

Marital status data of the respondents reveals that 71% of them lived with their spouse, 23% were not married and the remaining 6% had dissolved marriages. Incidences of dissolution of marriage and never having married were comparatively higher among females than males.

27% of the respondents were illiterate and 42% had completed middle school. More females than males had completed middle school.

Comparatively more females than males were not engaged in any occupation outside the home. Nearly one-quarter of the respondents were daily wage labourers and more males (37%) than females (11%) were engaged in daily labour.

Data around religious distribution of the respondents shows that 61% of respondents were Hindu, 35% were Muslim and the remaining 4% belonged to other religions. However, more female patients (44%) than males (29%) were Muslim. Similarly, caste-wise distribution data reveals that one-quarter of the patients belonged to the Scheduled Castes and more males (31%) than females (18%) belonged to this group.

Personal monthly income data reveals that around 43% of the respondents earned between Rupees 5000 and 10,000. Reported average personal monthly income was higher for males than females. Nearly, half of the respondents reported household monthly income in the range of Rupees 10,000 to 15,000.

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

Characteristic	Male	Female	Total
Sex			
Male			55.9
Female			44.1
Age			
18-29	21.9	60.4	38.9
30-49	53.1	25.7	41.0
50+	25.0	13.9	20.1
Mean age	40.2	31.2	36.3
Place of residence			
Slum area	64.8	64.4	64.6
Non-slum area	35.2	35.6	35.4
Marital status			
Currently married	75.8	66.3	71.6
Marriage dissolved	3.9	7.9	5.7
Never married	20.3	25.7	22.7

Characteristic	Male	Female	Total
Literacy and education			
Illiterate	27.3	27.7	27.5
Literate, middle incomplete	36.7	22.8	30.6
Middle completed	35.9	49.5	41.9
Occupation			
Business	11.7	3.0	7.9
Salaried job	8.6	7.9	8.3
Daily labour	36.7	10.9	25.3
Other job	27.3	8.9	19.2
Not working	15.6	69.3	39.3
Religion			
Hindu	68.8	51.5	61.1
Muslim	28.9	43.6	35.4
Other	2.3	5.0	3.5
Caste/Tribe			
Scheduled Caste	31.3	17.8	25.3
Scheduled Tribe	3.1	5.0	3.9
Others	65.6	77.2	70.7
Personal monthly income (in rupees)			
< 5000	14.1	41.6	26.2
5000-9999	51.6	32.7	43.2
10000+	33.6	22.8	28.8
Not mentioned	0.8	3.0	1.7
Mean personal income	**8980.3**	**6408.2**	**7860.0**
Household monthly income (in rupees)			
< 10000	28.9	27.7	28.4
10000-15000	43.8	49.5	46.3
15000+	25.0	18.8	22.3
Not mentioned	2.3	4.0	3.1
Mean household income	**14322.4**	**13752.6**	**14073.4**
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**128**	**101**	**229**

Household composition data reveals that 32% of the patients did not have any children below 18 years of age. Over half of the patients had more than one child and 34% of the patients had more than five persons in their household. On an average, there were 5.1 persons per household. (Table-2)

It was found that 81% of the patients had a Below Poverty Line (BPL) card and the remaining 19% of the patients did not have a BPL card. Rented homes for habitation were being used by 69% of the patients, and 73% of the

total patients had houses with more than one room. However, 58% of the patients only used a single room for sleeping. While ownership of a landline telephone and radio was very low, a majority of the patients reported that they had mobile phones (99%) and a television set (94%) in their homes.

Of the patients interviewed, two-thirds of the respondents reported that they were permanent residents of Hyderabad (Table-3). 14% of all patients reported that they had been staying in Hyderabad for less than 10 years and 18% had been staying in Hyderabad for more than 10 years. Around 12% of the respondents had moved into Hyderabad from a town and another 21% of respondents had moved from a village. Similarly, it was reported by 13% of the respondents that they had been away from their current place of residence for more than one month in the past one year.

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

Characteristic	Percent
Number of persons aged < 18 years	
0	31.9
1	15.3
2	30.1
3+	22.7
Mean number of persons aged < 18 years	**1.60**
Number of persons aged >= 18 years	
1	0.4
2	34.5
3	21.8
4+	43.2
Mean number of persons aged >= 18 years	**3.51**
Total number of household members	
<=2	7.4
3	14
4	24.9
5	19.7
6+	34.1
Mean number of persons	**5.10**
Has BPL card	
Yes	81.2
No	18.8
Ownership of present house	
Own house	31.0
Rented house	69.0
Number of rooms	
1	26.6
2	41.9
3	20.5
4+	10.9

Characteristic	Percent
Number of rooms used for sleeping	
1	57.6
2	35.8
3	6.1
4+	0.4
Own a radio	
Yes	4.4
No	95.6
Own a telephone	
Yes	3.9
No	96.1
Own a mobile	
Yes	99.1
No	0.9
Own a television	
Yes	93.9
No	6.1
Total percent	**100.0**
Number of cases	**229**

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

Characteristic	Percent
Duration of stay in Hyderabad city	
Always	67.7
< 10 years	14.0
10+ years	18.3
Type of place from where the respondent moved in	
Not moved in	67.7
From another town	11.8
From a village	20.5
Whether the respondent had been away from the current place of residence for more than one month in the past one year	
Yes	13.1
No	86.9
Total percent	**100**
Number of cases	**229**

Knowledge of any other person having TB

All respondents were asked whether they had known anyone with TB before they were diagnosed with TB themselves, as well as the duration of knowing this person. This information was collected to determine whether the patient had come in contact with a TB patient. The results indicated that around 42% of the patients knew a TB patient before they were diagnosed with the current illness (Table-4). Among the patients who reported knowing someone with TB, the duration of having known the person was less than one year for 39% of the respondents, between one to two years for 23%, and two or more years for 38% of the study patients.

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

Characteristic	Percent
Whether the respondent knew a TB patient before themselves being diagnosed with TB	
Yes	41.9
No	58.1
Total percent	**100.0**
Number of cases	**229**
Duration of knowing this person	
< 1 month	2.1
1- 5 months	9.4
6-11 months	27.1
12-23 months	22.9
24+ months	38.5
Total percent	**100.0**
Number of cases	**96**

Presence of any other disease condition

The patients were also asked to report whether they had been diagnosed with any other disease conditions. At least one disease condition was reported by 28% of the respondents. Diabetes was reported by 21% of the respondents, more by males (27%) than by females (13%). Among patients who were 50 years or older, 44% and 22% reported having diabetes and high blood pressure (hypertension), respectively. In the 30-49 year age group, 26% had diabetes, while only 5% of the respondents in the age group of 18-29 years reported having diabetes. Around one-quarter of the patients in Central and Old City zones reported that they had diabetes. High BP and hypertension was reported by around 10% of the patients in Central and New City zones. (Table-5)

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

Name of disease	Sex of the respondent		
	Male	Female	Total
Diabetes	27.3	12.9	21.0
Asthma/Chronic respiratory disease	3.1	1.0	2.2
Heart disease	0.0	1.0	0.4
High BP/Hypertension	7.0	9.9	8.3
HIV/AIDS	3.1	1.0	2.2
Hyper/hypothyroidism	0.0	4.0	1.7
At least one disease	35.2	17.8	27.5
More than one disease	5.5	7.9	6.6
Number of cases	**128**	**101**	**229**

Name of disease	Age of the respondent		
	18-25	30-49	50+
Diabetes	4.5	25.5	43.5
Asthma/Chronic respiratory disease	1.1	2.1	4.3
Heart disease	0.0	0.0	2.2
High BP/Hypertension	1.1	8.5	21.7
HIV/AIDS	0.0	5.3	0.0
Hyper/hypothyroidism	1.1	0.0	6.5
At least one disease	7.9	34	52.2
More than one disease	0	7.4	17.4
Number of cases	**89**	**94**	**46**

Name of disease	TUs according to program zones			
	Secunderabad Zone	Central Zone	Old City Zone	New City Zone
Diabetes	13.5	24.2	25.5	20.0
Asthma/Chronic respiratory disease	7.7	0.0	0.0	1.7
Heart disease	0.0	1.5	0.0	0.0
High BP/Hypertension	5.8	10.6	5.9	10.0
HIV/AIDS	5.8	3.0	0.0	0.0
Hyper/hypothyroidism	0.0	3.0	0.0	3.3
At least one disease	30.8	28.8	25.5	25.0
More than one disease	1.9	9.1	5.9	8.3
Number of cases	**52**	**66**	**51**	**60**

Health seeking behaviour

Visit to the health care provider and diagnosis history

All patients were asked to provide details of their consultations with doctors or health care providers, made until TB diagnosis and treatment initiation. The analysis revealed that on average, patients consulted with either a Practitioner of Modern Medicine (POMM) or other health care providers at least 4.1 times before TB diagnosis and treatment initiation. A POMM alone was consulted 3.8 times before TB diagnosis and treatment initiation. The number of consultations were comparatively higher for females than males. For example, 58% of the females consulted a POMM four or more times as compared to 48% of males. Only 8% of the patients consulted the POMM once before TB diagnosis and treatment initiation. (Table-6)

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

Number of visits	Sex of the respondent		
	Male	Female	Total
Visited any health care provider			
1	3.2	4.0	3.6
2	21.0	15.0	18.3
3	22.6	16.0	19.6
4	21.0	27.0	23.7
5	16.9	17.0	17.0
6	4.8	8.0	6.3
7+	10.5	13.0	11.6
Mean number of visits	**3.9**	**4.4**	**4.1**
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**124**	**100**	**224**
Visited a qualified health care provider			
1	8.9	6.0	7.6
2	25.0	19.0	22.3
3	19.4	17.0	18.3
4	23.4	24.0	23.7
5	11.3	14.0	12.5
6	4.8	8.0	6.3
7+	7.3	12.0	9.4
Mean number of visits	**3.6**	**4.1**	**3.8**
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**124**	**100**	**224**

Note: Five HIV/AIDS patients have been excluded

Reasons for consulting a health care provider in male and female respondents were identified, and an analysis has been presented in Table-7.The most frequently reported reasons for consulting the health care provider were closeness to patient's home or easy accessibility (48%), recommendation of relatives or friends (48%) and follow-up visit (42%). In addition, around 22% of the patients reported a lack of consultation fee and 10% reported a reference by another doctor as the reason which prompted them to go to a particular provider.

Table 7: Percentage distribution of respondents according to the main reason for visiting the health care provider, by sex

Main reason for visiting the provider	Sex of the respondent		
	Male	Female	Total
Close to home/Easy to access	44.4	53.0	48.2
Friends/Relatives recommended	47.6	49.0	48.2
Follow-up visit	41.9	42.0	42.0
Good reputation	26.6	31.0	28.6
Know provider personally	28.2	28.0	28.1
Other	25.0	30.0	27.2
No consultation fee	21.0	23.0	21.9
Price is reasonable /Low cost	13.7	17.0	15.2
Doctor referred	8.1	12.0	9.8
Treats me nicely	6.5	13.0	9.4
Only provider in my area	4.8	2.0	3.6
Convenient hours	2.4	2.0	2.2
Number of visits	**124**	**100**	**224**

Note: Two HIV/AIDS patients have been excluded

Distribution of patients by the type of facility consulted (public or private) across different visits has been presented in Table-8. In the first three visits, more than half of the patients consulted private health care providers. However, after the third visit, the proportion of patients who visited a public health care facility was more than those who visited a private health care facility. A private health care provider was consulted by more female patients than male patients in the first few visits.

Table 8: Percentage distribution of respondents according to the type of health care facility visited, by visit number and sex

Type of health facility	Sex of the respondent		
	Male	Female	Total
First visit			
Public health facility	14.5	17.0	15.6
Private health facility	62.1	70.0	65.6
Other	23.4	13.0	18.8
Number of cases	**124**	**100**	**224**
Second visit			
Public health facility	39.2	35.4	37.5
Private health facility	50.8	60.4	55.1
Other	10.0	4.2	7.4
Number of cases	**120**	**96**	**216**
Third visit			
Public health facility	50.0	49.4	49.7
Private health facility	43.6	45.7	44.6
Other	6.4	4.9	5.7
Number of cases	**94**	**81**	**175**
Fourth visit			
Public health facility	59.1	55.4	57.3
Private health facility	39.4	43.1	41.2
Other	1.5	1.5	1.5
Number of cases	**66**	**65**	**131**
Fifth visit			
Public health facility	60.0	52.6	56.4
Private health facility	37.5	44.7	41.0
Other	2.5	2.6	2.6
Number of cases	**40**	**38**	**78**

Note: Five HIV/AIDS patients have been excluded

Table-9 presents the distribution of possible disease conditions reported by the provider to the patients at different consultation visits. More than one-third of the patients received no information about their disease condition during consultation visits. This was also more common with females than with males.

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

Disease condition diagnosed	Sex of the respondent		
	Male	Female	Total
First visit			
Common cough	45.2	37.0	41.5
Common cold	4.8	8.0	6.3
Cough induced due to allergy	4.0	3.0	3.6
Chest congestion	1.6	1.0	1.3
Tuberculosis	7.3	2.0	4.9
Did not tell anything	29.8	38.0	33.5
Other	7.3	11.0	8.9
Number of cases	**124**	**100**	**224**
Second visit			
Common cough	25.8	20.8	23.6
Common cold	1.7	3.1	2.3
Cough induced due to allergy	2.5	1.0	1.9
Chest congestion	4.2	1.0	2.8
Tuberculosis	19.2	17.7	18.5
Did not tell anything	36.7	44.8	40.3
Other	10.0	11.5	10.6
Number of cases	**120**	**96**	**216**
Third visit			
Common cough	14.9	14.8	14.9
Common cold	5.3	0.0	2.9
Cough induced due to allergy	2.1	1.2	1.7
Chest congestion	0.0	3.7	1.7
Tuberculosis	27.7	24.7	26.3
Did not tell anything	42.6	50.6	46.3
Other	7.4	4.9	6.3
Number of cases	**94**	**81**	**175**
Fourth visit			
Common cough	9.1	6.2	7.6
Common cold	3.0	1.5	2.3
Cough induced due to allergy	0.0	3.1	1.5
Chest congestion	4.5	7.7	6.1
Tuberculosis	30.3	26.2	28.2
Did not tell anything	43.9	47.7	45.8
Don't remember	1.5	0.0	0.8
Other	7.6	7.7	7.6
Number of cases	**66**	**65**	**131**

Disease condition diagnosed	Sex of the respondent		
	Male	Female	Total
Fifth visit			
Common cough	5.0	7.9	6.4
Common cold	5.0	2.6	3.8
Cough induced due to allergy	5.0	7.9	6.4
Tuberculosis	40.0	23.7	32.1
Did not tell anything	40.0	50.0	44.9
Don't remember	2.5	0.0	1.3
Other	2.5	7.9	5.1
Number of cases	**40**	**38**	**78**

Note: Five HIV/AIDS patients have been excluded

In the first and second consultation visits, 42% and 24% of the patients were informed by the health care provider that common cough was the disease condition. As the number of visits of the patient increased, there was a corresponding increase in the health care provider reporting TB as the possible disease condition to the patients.

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

Recommendation	Sex of the respondent		
	Male	Female	Total
First visit			
Diagnostic tests	22.6	31.0	26.3
Prescribed medicine	89.5	85.0	87.5
Referred to another doctor/hospital	1.6	0.0	0.9
Admission to hospital	1.6	1.0	1.3
Referred to place for TB treatment	1.6	0.0	0.9
Number of cases	**124**	**100**	**224**
Second visit			
Diagnostic tests	52.5	52.1	52.3
Prescribed medicine	67.5	76.0	71.3
Referred to another doctor/hospital	2.5	4.2	3.2
Admission to hospital	3.3	1.0	2.3
Referred to place for TB treatment	3.3	2.1	2.8
Number of cases	**120**	**96**	**216**

Disease condition diagnosed	Sex of the respondent		
	Male	Female	Total
Diagnostic tests	52.5	52.1	52.3
Prescribed medicine	67.5	76.0	71.3
Referred to another doctor/hospital	2.5	4.2	3.2
Admission to hospital	3.3	1.0	2.3
Referred to place for TB treatment	3.3	2.1	2.8
Number of cases	**120**	**96**	**216**
Third visit			
Diagnostic tests	63.8	63.0	63.4
Prescribed medicine	68.1	59.3	64
Referred to another doctor/hospital	1.1	3.7	2.3
Admission to hospital	2.1	1.2	1.7
Referred to place for TB treatment	1.1	0.0	0.6
Number of cases	**94**	**81**	**175**
Fourth visit			
Diagnostic tests	71.2	63.1	67.2
Prescribed medicine	53.0	49.2	51.1
Referred to another doctor/hospital	3.0	3.1	3.1
Admission to hospital	1.5	1.5	1.5
Referred to place for TB treatment	3.0	1.5	2.3
Nothing	1.5	0.0	0.8
Number of cases	**66**	**65**	**131**
Fifth visit			
Diagnostic tests	75.0	565.8	70.5
Prescribed medicine	45.0	47.4	46.2
Referred to another doctor/hospital	0.0	2.6	1.3
Admission to hospital	2.5	5.3	3.8
Referred to place for TB treatment	7.5	5.3	6.4
Number of cases	**40**	**38**	**78**

Note: Five HIV/AIDS patients have been excluded

In the first visit, around a quarter of the patients were recommended a diagnostic test and around 88% of the patients were prescribed medicines. Recommendations for diagnostic tests increased as the number of consultation visits increased. In the first visit, recommendations for a diagnostic test were reported more by females (31%) than males (23%). However, after the third visit, diagnostic tests were recommended more to male patients than female. By the fifth visit, diagnostic tests were recommended to nearly 71% of the patients and around 88% of the patients were prescribed medicines. (Table-10)

The distribution of the different diagnostic tests recommended by the heath care provider at each visit has been captured and presented in Table-11. In the first consultation, only 4% of the patients were recommended sputum tests and 12% of the patients were recommended a chest X-ray.

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

Type of test recommended	Sex of the respondent		
	Male	Female	Total
First visit			
Sputum only	3.2	5.0	4.0
X-ray only	7.3	17.0	11.6
Both X-ray and sputum	6.5	4.0	5.4
Number of cases	**124**	**100**	**224**
Second visit			
Sputum only	14.2	19.8	16.7
X-ray only	10.0	14.6	12.0
Both X-ray and sputum	20.0	8.3	14.8
Number of cases	**120**	**96**	**216**
Third visit			
Sputum only	25.5	17.3	21.7
X-ray only	8.5	18.5	13.1
Both X-ray and sputum	23.4	16.0	20.0
Number of cases	**94**	**81**	**175**
Fourth visit			
Sputum only	39.4	35.4	37.4
X-ray only	10.6	9.2	9.9
Both X-ray and sputum	16.7	12.3	14.5
Number of cases	**66**	**65**	**131**
Fifth visit			
Sputum only	40.0	28.9	34.6
X-ray only	5.0	5.3	5.1
Both X-ray and sputum	22.5	28.9	25.6
Number of cases	**40**	**38**	**78**

Note: Five HIV/AIDS patients have been excluded

As the number of consultations increased, the percentage of patients who were recommended only a chest X-Ray reduced. There was a gradual increase in the number of patients who were recommended a sputum test as the number of consultations increased. In the first three consultations, more female patients were recommended a chest X-ray than male patients.

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

Type of test recommended	Type of facility consulted		
	Government facility	Private facility	Other
First visit			
Sputum only	20.0	1.4	0.0
X-ray only	2.9	17.0	0.0
Both X-ray and sputum	14.3	4.8	0.0
Number of cases	**35**	**147**	**42**
Second visit			
Sputum only	34.6	6.7	0.0
X-ray only	8.6	16.0	0.0
Both X-ray and sputum	23.5	10.9	0.0
Number of cases	**81**	**119**	**16**
Third visit			
Sputum only	35.6	9.0	0.0
X-ray only	10.3	16.7	10.0
Both X-ray and sputum	23.0	19.2	0.0
Number of cases	**87**	**78**	**10**
Fourth visit			
Sputum only	56.0	13.0	0.0
X-ray only	5.3	16.7	0.0
Both X-ray and sputum	14.7	13.0	50.0
Number of cases	**75**	**54**	**2**
Fifth visit			
Sputum only	45.5	21.9	0.0
X-ray only	0.0	12.5	0.0
Both X-ray and sputum	27.3	25.0	0.0
Number of cases	**44**	**32**	**2**

Note: Five HIV/AIDS patients have been excluded

We also analysed the diffusion of diagnostic tests recommended to the patients at each visit, according to the type of facility consulted (see Table-12). At each visit, the percentage of patients who were recommended a sputum test was higher at a government health facility than at a private health facility. Both sputum tests and chest X-rays were also recommended more if the patient visited a government health facility. However, a recommendation for only a chest X-ray was more common if the patient visited a private health facility. It is important to note that more patients were recommended diagnostic tests if they consulted a government health facility.

Data on the type of test conducted across each visit to the health care provider was also collected and is shown in Table-13. The results indicate that very few of the patients did not follow through with the test recommended to them. Although small, this was particularly applicable to chest X-ray recommendations. More females than males underwent either sputum tests or X-rays tests in the first visit. As the number of consultations increased, more male patients than female, took either sputum tests or chest X-rays.

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

Type of test recommended	Type of facility consulted		
	Male	Female	Total
First visit			
Sputum only	2.4	6.0	4.0
X-ray only	6.5	16.0	10.7
Both X-ray and sputum	6.5	3.0	4.9
Number of cases	**124**	**100**	**224**
Second visit			
Sputum only	13.3	20.8	16.7
X-ray only	10.0	13.5	11.6
Both X-ray and sputum	20.0	6.3	13.9
Number of cases	**120**	**96**	**216**
Third visit			
Sputum only	25.5	17.3	21.7
X-ray only	8.5	17.3	12.6
Both X-ray and sputum	22.3	14.8	18.9
Number of cases	**94**	**81**	**175**
Fourth visit			
Sputum only	37.9	33.8	35.9
X-ray only	10.6	9.2	9.9
Both X-ray and sputum	15.2	12.3	13.7
Number of cases	**66**	**65**	**131**
Fifth visit			
Sputum only	40.0	28.9	34.6
X-ray only	5.0	5.3	5.1
Both X-ray and sputum	20.0	26.3	23.1
Number of cases	**40**	**38**	**78**

Note: Five HIV/AIDS patients have been excluded

Table-14 provides the distribution of tests conducted according to the type of facility consulted by the patient. Irrespective of the visit number, a larger proportion of patients underwent either sputum tests or chest X-rays if they visited a government facility. Similarly, as the number of consultations increased, the proportion of patients who underwent a sputum test also increased, irrespective of type of facility consulted.

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

Type of test conducted	Type of facility consulted		
	Government facility	Private facility	Other
First visit			
Sputum only	20.0	1.4	0.0
X-ray only	2.9	15.6	0.0
Both X-ray and sputum	11.4	4.8	0.0
Number of cases	**35**	**147**	**42**
Second visit			
Sputum only	33.3	7.6	0.0
X-ray only	7.4	16.0	0.0
Both X-ray and sputum	23.5	9.2	0.0
Number of visits	**81**	**119**	**16**
Third visit			
Sputum only	35.6	9.0	0.0
X-ray only	10.3	15.4	10.0
Both X-ray and sputum	23.0	16.7	0.0
Number of visits	**87**	**78**	**10**
Fourth visit			
Sputum only	54.7	11.1	0.0
X-ray only	5.3	16.7	0.0
Both X-ray and sputum	13.3	13.0	50.0
Number of visits	**75**	**54**	**2**
Fifth visit			
Sputum only	45.5	21.9	0.0
X-ray only	0.0	12.5	0.0
Both X-ray and sputum	27.3	18.8	0.0
Number of visits	**44**	**32**	**2**

Note: Five HIV/AIDS patients have been excluded

The diffusion of patients according to diagnostic tests sites has been shown in Table-15. The most frequently reported place for conducting tests was the Designated Microscopy Centre (DMC) (48%), followed by the municipal corporation hospital (28%) and government TB hospital (19%). More females (57%) than males (41%) reported the DMC as the place of testing. Around a quarter of the patients reported either private hospitals or private labs as the place of conducting tests.

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

Place of conducting the test	Sex of the respondent		
	Male	Female	Total
Municipal/corporation hospital	30.7	24.0	27.7
Government TB hospital	21.0	17.0	19.2
Medical college	0.8	0.0	0.5
Other government hospital	5.7	7.0	6.3
Designated Microscopy Centre	41.1	57.0	48.2
Private hospital	15.3	6.0	11.2
Private clinic	2.4	0.0	1.3
Any private lab	12.1	17.0	14.3
Other	2.4	3.0	2.7
Number of cases	**124**	**100**	**224**

The percentage distribution of patients according to the diseases condition reported to them after conducting the tests is presented in Table-16. After conducting the test, the health care provider doubted the presence of TB in 9% of the patients. No information about their disease condition was given to about 5% of the patients, and an equal number of patients reported being told that they had typhoid after conducting the diagnostic test.

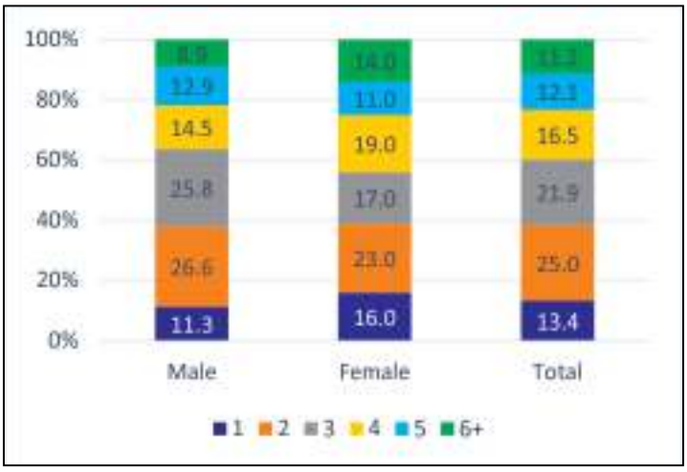
Table 16: Percentage distribution of respondents according to the information received about their disease condition after tests, by sex

Disease condition reported after test	Sex of the respondent		
	Male	Female	Total
No TB	1.6	2.0	1.8
Allergy	1.6	1.0	1.3
Chest congestion	2.4	4.0	3.1
TB	100.0	100.0	100.0
Don't know	0.8	4.0	2.2
Don't remember	0.8	0.0	0.5
Doubted TB	8.9	10.0	9.4
Did not tell any thing	4.0	7.0	5.4
Typhoid	1.6	8.0	4.5
Other	16.1	18.0	17.0
Number of cases	**124**	**100**	**224**

Note: Five HIV/AIDS patients have been excluded

The visit number by which the patient was identified to have TB was also analysed and the result is presented in Figure-2. On average, about 3.4 visits were made by the patient for them to be diagnosed with TB. Around one-quarter of the patients consulted the health care provider five or more times before they were diagnosed with TB. Overall, 60% of patients were identified as having TB by their third consultation. Further, by the third visit, more males (64%) than females (56%) were identified as having TB.

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



Patient and health system delays

Patient delay in care seeking

The patient delay in visiting a qualified health care provider was also captured and has been presented in Table-17. We performed bivariate and regression analyses to determine characteristics that significantly influence patient delay. Patient delay in this study is defined as the number of days from the start of the symptoms (cough/fever) to the time when the patient first consulted a qualified health care provider. The average patient delay was nearly 20 days from the start of the symptoms.

Geographical factors: Patients from slum areas reached a qualified health care provider earlier (19 days) than those from non-slum areas (22 days), but the difference was not considered significant. Respondents from the Secunderabad Zone had the highest delay (23 days), followed by New City Zone (19 days), Old City Zone (18 days) and Central Zone (17 days).

Individual factors: Although not significant, there was a five-day difference in the mean patient delay between males and females, with males having the longer mean patient delay of 22 days. The mean patient delay was found to be 24 days among patients aged 50 years and above, against 18 days for patients aged below 50 years.

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

Characteristic	Mean patient delay	Standard deviation of patient delay	p-value	Median patient delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Sex							
Male	21.6	31.7		15	7	20	124
Female	16.9	19.6	0.198	10	7	18	98
Age							
< 50 years	18.4	24.2		14	7	20	176
50+	23.8	36.2	0.234	10	7	20	46
Place of residence							
Slum area	18.5	25.8		10	5	18	144
Non-slum area	21.5	29.5	0.433	14	8	24	78
Marital status							
Married or previously married	21.0	29.3		15	7	20	170
Never married	14.7	17.2	0.139	10	4	18	52
Literacy and education							
Illiterate or primary completed	22.1	32.1		13	7	24	98
More than primary completed	17.5	22.3	0.208	13	7	19	124
Occupation							
Daily labourer	20.0	27.3		12	7	20	57
Business	11.2	8.1		8	4	18	18
Salaried job	17.1	11.0		15	8	25	19
Other job	27.6	36.7		15	8	30	41
Not working	17.8	26.2	0.207	10	7	15	87
Religion							
Hindu	22.1	29.8		15	7	27	134
Non-Hindu	15.6	21.9	0.079	9	5	15	88
Caste/Tribe							
Scheduled Caste/Scheduled Tribe	23.5	34.5		13	7	20	66
Others	17.9	23.2	0.156	13	7	20	156
Personal monthly income (in rupees)							
< 5000	20.1	29.1		10	5	20	61
5000+	19.4	26.4	0.861	15	7	20	161
Monthly household income (in rupees)							
< 10000	13.2	9.1		14	7	18	69
10000+	22.4	31.7	0.019	12	7	21	153
Duration of stay in the city							
< 10 years	27.6	34.4		15	10	30	30
10+ years	18.3	25.7	0.080	10	7	18	192

Characteristic	Mean patient delay	Standard deviation of patient delay	p-value	Median patient delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Personally knew someone with TB							
Yes	21.3	32.2		10	7	18	93
No	18.3	22.7	0.411	15	7	20	129
Number of household members							
< 5 members	23.4	31.5		15	8	27	101
5+ members	16.4	22.4	0.056	10	5	15	121
TU areas according to program zones							
Secunderabad Zone	23.3	28.4		15	7	30	49
Central Zone	17.8	25.6		14	7	17	63
Old City Zone	18.3	26.6		12	3	20	50
New City Zone	19.4	28.3	0.732	10	7	21	60

Note: Five HIV/AIDS patients have been excluded. Two patients whose delay was not known have also been excluded.

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

Characteristic	Mean patient delay	Standard deviation of patient delay	p-value	Median patient delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Type of facility first visited							
Government	21.2	34.5		10.0	8.0	15.0	35
Private	14.0	19.2		8.0	4.0	15.0	145
Other	37.3	35.2	<0.001	25.0	17.0	43.0	42
Distance to DOTS centre							
<2 km	21.3	30.1		14	5	22	126
2+ km	17.3	22.5	0.274	11	7	19	96
Whether respondent consumed alcohol before TB diagnosis							
No	15.8	17.5		10	6	18	135
Yes	25.4	36.8	0.0091	15	7	27	87
Whether respondent smoked before TB diagnosis							
No	16.5	19.6		10.0	7.0	17.0	150
Yes	26.0	37.7	0.014	15.0	7.0	30.0	72
Type of facility visited (based on all visits)							
Only government	31.9	41.2		15	10	33	48
Only private	10.7	8.8		10	3	15	19
Both (private and government)	16.8	21.5		10	6	18	155
Total	**19.6**	**27.1**	**0.001**	**13**	**7**	**20**	**222**

Note: Five HIV/AIDS patients have been excluded. Two patients whose delay was not known have also been excluded.

The mean patient delay was found to be smaller among patients who had never married as compared to patients who were married at the time or had once been married. Patients who had completed schooling till the primary level or more were found to have a shorter patient delay than those who were either illiterate or had not completed their primary education. Comparatively, patients who were employed as daily labourers and in other jobs (as drivers, security staff, housekeeping staff, painters and tailors) were found to have a greater patient delay than patients who were involved in businesses and salaried jobs. We identified a significant difference in patient delay according to the religion of the patient, with Hindu patients consulting a qualified health care provider later (22 days) as compared to non-Hindu patients (16 days). Similarly, on an average, patients belonging to either the Scheduled Castes or the Scheduled Tribes were also found to face a greater patient delay. We did not find any difference in patient delay according to personal monthly income. However, patients with a household income of less than Rupees 10,000 had a smaller average patient delay of 13 days compared to 22 days for those with a monthly income of more than Rupees 10,000. Patients who had been living in Hyderabad for less than 10 years were found to have a significantly longer patient delay (28 days), compared to patients who had been staying in the city for 10 or more years (18 days). Mean patient delay was slightly longer if the patient knew someone with TB prior to their own diagnosis of TB. Patients living in households with less than five members were found to experience a longer patient delay than patients from households with five or more members and this difference was found to be significant.

Health seeking and other behavioural factors: The patient delay in consulting a qualified health care provider was almost 37 days if the patient first visited a non-qualified health care provider. The results also indicate that patients were reaching a private facility earlier than a government facility. The patient delay was less if the patient consulted only a private facility. This delay was significantly greater if the patient either consumed alcohol or smoked tobacco, before being diagnosed with TB.

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

No geographical factors were found to be associated with patient delay in the bivariate analysis. Some individual, health seeking and other behavioural factors, however, were found to be associated with the patient delay. The regression results indicated a significantly longer patient delay for patients whose monthly household income was Rupees 10,000 or more as compared to patients whose monthly household income was less than Rupees 10,000 after controlling for other variables. The difference in the adjusted mean patient delay between these two group was found to be nine days. The adjusted mean patient delay was shorter for patients who had been living in the city for more than 10 years, as well as for patients living in households with five or more members, but its effect was not statistically significant. Patients who drank alcohol and smoked tobacco were found to experience a longer patient delay, but the effect of such personal habits was not found to be statistically significant. Patients who first visited a non-government or non-private health facility had a significantly greater patient delay and the adjusted mean value was 31 days. Patients who approached and continued with a public facility until treatment initiation had a longer mean patient delay. However, patients who approached and continued with a private health facility until treatment initiation from the RNTCP had a significantly shorter patient delay. Also, patients who approached both private and government health facilities prior to treatment initiation had significantly shorter adjusted mean patient delay. The long patient delay among patients who visited government facilities could be caused by many of these patients having consulted an unqualified health care provider earlier.

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

Characteristic	Adjusted mean patient delay	95% CI	
		Lower	Upper
Religion			
Hindu	20.3	15.8	24.8
Non-Hindu	18.4	12.7	24.1
Monthly household income (in rupees)			
< 10000	13.4	7.4	19.5
10000+	22.3**	18.3	26.3
Duration of stay in the city			
< 10 years	25.0	15.7	34.3
10+ years	18.7	15.1	22.3
Number of household members			
< 5 members	21.1	16.0	26.2
5+ members	18.2	13.6	22.9
Type of facility first visited			
Government	14.3	2.9	25.8
Private	17.5	12.5	22.4
Other	31.1*	22.7	39.5
Whether respondent consumed alcohol before TB diagnosis			
No	18.1	13.1	23.0
Yes	21.8	15.3	28.4
Whether respondent smoked before TB diagnosis			
No	18.4	13.9	22.9
Yes	22.0	14.8	29.2
Type of facility visited (based on all visits)			
Only government	30.5	19.9	41.0
Only private	12.1**	0.1	24.2
Both (private and government)	17.1**	12.6	21.6
Total	**19.6**	**16.2**	**22.9**

Note: Five HIV/AIDS patients have been excluded. Two patients whose delay was not known have also been excluded.
*significant at p-value < 0.01; **significant at p-value < 0.05

Delay in diagnostic and treatment initiation

Health system delay, which includes delay in both diagnosis and treatment, is defined as the number of days between the first day of consulting a qualified health provider and the day of treatment initiation from the RNTCP. The bivariate analysis of the results of mean, median and interquartile range of health system delay is shown in Table-19. The mean health system delay was found to be 34 days while the median was 21 days.

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

Characteristic	Mean health system delay	Standard deviation	p-value	Median health system delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Sex							
Male	29.7	34.1		19	10	38	124
Female	39.0	37.5	0.056	25	14	53	98
Age							
< 50 years	32.4	35.6		20	12	43	176
50+	39.3	36.6	0.245	25	11	52	46
Place of residence							
Slum area	34.7	33.7		23	11	49	144
Non-slum area	32.1	39.6	0.601	20	12	37	78
Marital status							
Married or previously married	33.6	37.4		22	12	39	170
Never married	34.4	30.2	0.881	21	12	53	52
Literacy and education							
Illiterate or primary completed	35.3	44.3		21	11	37	98
More than primary completed	32.6	27.5	0.586	22	12	49	124
Occupation							
Daily labourer	47.7	47.7		21	12	49	57
Business	25.8	25.8		20	10	47	18
Salaried job	21.1	21.1		23	7	40	19
Other job	20.2	20.2		17	11	36	41
Not working	36.5	36.5	0.312	23	13	53	87
Religion							
Hindu	34.5	39.7		21	11	42	134
Non-Hindu	32.8	29.2	0.736	23	12	49	88
Caste/Tribe							
Scheduled Caste/Scheduled Tribe	38.9	47.9		20	12	52	66
Others	31.6	29.2	0.165	22	11	44	156
Personal monthly income (in rupees)							
< 5000	37.4	39.1		25	10	52	61
5000+	32.4	34.5	0.350	21	12	39	161

Characteristic	Mean health system delay	Standard deviation	p-value	Median health system delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Monthly household income (in rupees)							
< 10000	34.8	43.5		20	9	48	69
10000+	33.3	31.9	0.782	22	13	44	153
Duration of stay in the city							
< 10 years	36.6	36.1		24.0	12.0	52.0	30
10+ years	33.4	34.4	0.649	21.0	12.0	43.0	192
Personally knew someone with TB							
Yes	36.9	41.7		22	11	49	93
No	31.6	30.8	0.279	21	12	40	129
Number of household members							
< 5 members	32.6	38.7		19	11	42	101
5+ members	34.8	33.4	0.656	25	13	46	121
TU areas according to programme zones							
Secunderabad Zone	36.3	47.9		21	13	37	49
Central Zone	30.9	26.9		20	11	47	63
Old City Zone	30.2	34.9		21	12	39	50
New City Zone	37.7	33.6	0.606	30	11	53	60

Note: Two HIV/AIDS patients have been excluded. Two patients whose delay was not known have also been excluded

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

Characteristic	Mean health system delay	Standard deviation	p-value	Median health system delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Type of facility first visited							
Government	21.1	17.7		19.0	6.0	31.0	35
Private	39.4	39.5		27.0	15.0	52.0	145
Other	25.0	29.1	0.005	15.0	6.0	35.0	42
Distance to DOTS centre							
<2 km	34.3	40.3		21	11	40	126
2+ km	33.1	29.1	0.802	25	14	48	96
Whether respondent consumed alcohol before TB diagnosis							
No	36.2	35.1		23	13	52	135
Yes	30.0	36.8	0.209	19	10	37	87

Characteristic	Mean health system delay	Standard deviation	p-value	Median health system delay	First quartile	Third quartile	Number of cases
Whether respondent smoked before TB diagnosis							
No	34.3	34.2		21.0	12.0	48.0	150
Yes	32.7	39.2	0.747	23.0	12.0	39.0	72
Type of facility visited (based on all visits)							
Only government	14.9	15.3		10	5	21	48
Only private	48.8	43.0		39	13	74	19
Both (private and government)	37.8	37.4	<0.001	27	15	49	155
Number of consultation visits							
<3	10.6	8.5		9	4	14	49
3-4	26.7	20.0		19	13	35	97
5+	57.9	47.0	0.002	48	27	70	76
Total	**33.8**	**35.8**		21	12	46	222

Note: Five HIV/AIDS patients are excluded. Two patients whose delay was not known

Geographical factors: Patients residing in slum areas had a marginally longer health system delay than patients from the non-slum areas. According to programme zones, New City Zone (38 days) and Secunderabad Zone (36 days) had longer mean health system delays than Central Zone (31 days) and Old City Zone (30 days).

Individual factors: The mean health system delay was significantly greater for females (39 days) than males (30 days). Patients who were aged 50 years or more had a longer health system delay than those who were less than 50 years old. Patients who lived in slum areas had a longer health system delay (35 days) than non-slum area residents (32 days). The health system delay was longer for patients employed as daily wage labourers (48 days), as well as for patients who were not working (37 days). Although not significant, patients belonging to either the Scheduled Castes or Scheduled Tribes had a longer health system delay (39 days) than their counterparts (32 days). The mean health system delay was greater for patients whose personal monthly income was less than Rupees 5000 when compared with those whose monthly income was Rupees 5000 or more. Similarly, patients who had been living in Hyderabad city for less than 10 years also faced a greater health system delay.

Health seeking and other behavioural factors: If the first facility visited by a patient was a private facility, then the health system delay was significantly greater at 39 days. The health system delay was smaller at 21 days, if the patient first consulted a government health facility. The health system delay was significantly longer for patients who consulted only private facilities until treatment initiation (49 days), followed by patients who visited both private and government facilities (38 days). The lowest health system delay was seen in patients who visited only government health facilities until treatment initiation (15 days). Similarly, multiple visits to health facilities increased the health system delay. For example, the health system delay was highest among patients who consulted a health care provider five or more times (58 days) as compared to patients who consulted a provider less than three times (11 days). (Table-19)

A multiple regression model was applied next to understand the risk factors for health system delay. The estimated adjusted mean health system delay from the regression model is presented in Table-20. Many of the individual and geographical characteristics were not significantly associated with health system delay in the bivariate analysis. However, most of the health seeking behaviours were significantly associated with health system delay in the bivariate analysis.

Although we noticed a difference of almost 8 days in the adjusted mean health system delay between female and male patients (with females having the longer delay), the variation was not found to be significant according to the multiple regression model. If the patient approached only government facilities until treatment initiation, then the health system delay in starting the treatment was found to be significantly shorter at 31 days after controlling for other factors. However, the health system delay was maximum for patients who consulted only private health facilities until the initiation of treatment and it was 13 days more than the delay for patients who approached only government facilities. Further, if the patient consulted both private and government health care providers until the initiation of treatment, then the health system delay was slightly greater as compared to patients who approached only government facilities. Results indicate that private health care providers took more time to recommend the appropriate test, hence, there was a longer health system delay even though the patients had consulted them earlier.

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

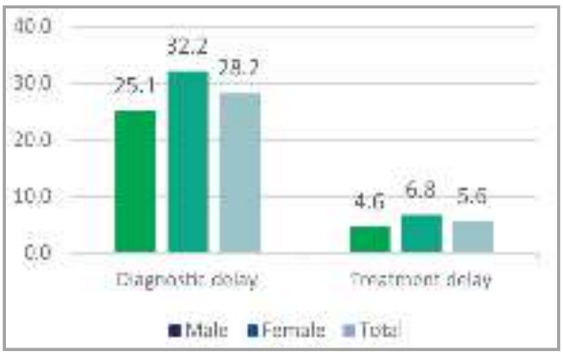
Characteristic	Adjusted mean health system delay	95% CI	
		Lower	Upper
Sex			
Male	31.4	26.1	36.8
Female	36.8	30.8	42.8
Type of facility first visited			
Government	33.4	19.6	47.1
Private	37.4	31.4	43.4
Other	21.6	11.5	31.8
Type of facility visited (based on all visits)			
Only government	30.8	17.7	43.9
Only private	44.0	29.9	58.0
Both (private and government)	33.5	28.0	38.9
Number of consultation visits			
< 3	11.9	2.7	21.0
3-4	25.8**	19.8	32.0
5+	58.0*	50.9	65.1
Constant	**33.8**	**29.8**	**37.8**

Note: Five HIV/AIDS patients have been excluded. Two patients whose delay was not known have also been excluded.
*significant at p-value < 0.01; **significant at p-value < 0.05

In addition to the type of health facility approached, the total number of visits made to various facilities also significantly influenced the health system delay even after controlling for other potential factors. The health system delay was significantly longer for patients who made five or more visits to health facilities (58 days). This delay was comparatively less (12 days) for patients who made less than three visits prior to treatment initiation. Similarly, patients who approached health facilities three to four times, had a health system delay of 26 days. (Table-20)

We also individually analysed diagnostic delay and treatment delay, under health system delay. Diagnostic delay is the number of days passed between first consulting a qualified health care provider until the patient is diagnosed with TB, and treatment delay is the number of days a patient takes to start TB treatment after their diagnosis.

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



In total, the mean diagnostic delay was about 28 days and the mean treatment delay was six days (see Figure-3). This indicates that even after the diagnosis of TB, there was a delay in initiating treatment for TB.

Individual factors: The diagnostic as well as the treatment delay was greater for females than for males. Males were, on an average, diagnosed with TB around six days earlier than females. The treatment delay for males was around five days and for females, nearly seven days.

Total delay in treatment initiation

Total delay in treatment initiation is the addition of patient delay and health system delay and is expressed in number of days. The mean total delay, and other statistics for total delay, according to selected characteristic is presented in Table- 21.

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

Characteristic	Mean health system delay	Standard deviation	p-value	Median total delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Sex							
Male	51.3	44.9		39	23	59	124
Female	55.9	39.3	0.433	44	27	72	98
Age							
< 50 years	50.8	40.8		39	25	64	176
50+	63.0	47.5	0.082	50	30	84	46
Place of residence							
Slum area	53.2	39.5		41	26	70	144
Non-slum area	53.6	47.7	0.953	42	26	64	78
Marital status							
Married or previously married	54.6	45.3		41	26	64	170
Never married	49.1	31.5	0.414	42	24	70	52
Literacy and education							
Illiterate or primary completed	57.4	51.9		41	24	77	98
More than primary completed	50.1	33.0	0.207	43	26	64	124

Characteristic	Mean health system delay	Standard deviation of health system delay	p-value	Interquartile range			
				Median total delay	First quartile	Third quartile	Number of cases
Occupation							
Daily labourer	58.4	56.6		39	24	64	57
Business	40.3	25.1		35	24	57	18
Salaried job	44.4	21.4		43	34	55	19
Other job	53.2	37.6		45	30	63	41
Not working	54.8	40.0	0.489	43	25	72	87
Religion							
Hindu	56.6	47.9		41	26	70	134
Non-Hindu	48.4	32.3	0.160	42	25	64	88
Caste/Tribe							
Scheduled Caste/Scheduled Tribe	62.4	56.4		42	26	79	66
Others	49.5	34.5	0.038	41	25	63	156
Personal monthly income (in rupees)							
< 5000	57.5	44.9		47	24	79	61
5000+	51.8	41.5	0.369	39	26	63	161
Monthly household income (in rupees)							
< 10000	48.0	45.0		38	24	52	69
10000+	55.8	41.2	0.209	43	27	70	153
Duration of stay in the city							
< 10 years	64.2	42.6		57	30	84	30
10+ years	51.6	40.5	0.133	40	26	64	192
Personally knew someone with TB							
Yes	58.2	50.0		43	26	74	93
No	49.8	35.9	0.150	39	26	63	129
Number of household members							
< 5 members	56.0	47.1		41	26	69	101
5+ members	51.1	38.2	0.401	42	25	63	121
TU areas according to programme zones							
Secunderabad Zone	59.6	55.0		42	24	77	49
Central Zone	48.8	34.1		39	26	65	63
Old City Zone	48.5	42.4		37	24	51	50
New City Zone	57.1	38.7	0.410	49	30	74	60

Note: Five HIV/AIDS patients have been excluded. Two patients whose delay was not known have also been excluded.

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

Characteristic	Mean total delay	Standard deviation	p-value	Median total delay	Interquartile range		Number of cases
					First quartile	Third quartile	
Type of facility first visited							
Government	42.3	36.6		34	23	47	35
Private	53.4	43.7		42	26	65	145
Other	62.2	41.6	0.121	50	33	79	42
Distance to DOTS centre							
<2 km	55.6	47.8		39	25	69	126
2+ km	50.4	34.4	0.363	42	26	64	96
Whether respondent consumed alcohol before TB diagnosis							
No	52.0	36.7		42	27	67	135
Yes	55.5	50.3	0.553	40	23	64	87
Whether respondent smoked before TB diagnosis							
No	50.8	37.4		41.0	24.0	66.0	150
Yes	58.7	51.4	0.196	42.0	27.0	71.0	72
Type of facility visited (based on all visits)							
Only government	46.8	42.1		34	22	60	48
Only private	59.5	42.4		54	27	80	19
Both (private and government)	54.6	42.6	0.432	43	27	68	155
Number of consultation visits							
<3	32.5	29.4		25	16	39	49
3-4	47.2	34.6		38	24	55	97
5+	74.6	49.4	0.004	62	43	90	76
Total	**53.3**	**42.5**		**41**	**26**	**66**	**222**

Note: Five HIV/AIDS patients have been excluded. Two patients whose delay was not known have also been excluded.

Overall, in Hyderabad city, it took 53 days on an average for an adult NSP patient to be initiated on TB treatment from the RNTCP, after the onset of symptoms.

Geographical factors: We did not notice any difference in the average total delay between patients residing in slum areas and non-slum areas. Patients in the Secunderabad and New City zones had longer total delays of 60 and 58 days, respectively, than patients from Old City and Central zones (49 days each).

Individual factors: Though not significant, the total delay was slightly longer for females than males. Patients who were 50 years or older experienced a total delay of 63 days which was longer than the total delay for patients below 50 years of age. Patients who were either illiterate or who had not completed primary schooling had a greater total delay (57 days) compared to those who had completed primary schooling (50 days). Total delay was longer both for patients who were engaged as daily labourers (58 days) and those who were not working

(55 days). Patients belonging to the Hindu religion had a total delay of 57 days as compared to a total delay of 48 days for patients belonging to other religions. Similarly, patients belonging to either the Scheduled Castes or the Scheduled Tribes had a longer total delay (62 days) than their those who did not (50 days). Patients whose personal monthly income was less than Rupees 5000 faced a longer total delay of 58 days, than patients whose personal monthly income was Rupees 5000 or more (52 days). The total delay was longer at 64 days, for patients who had been staying in Hyderabad city for less than 10 years, than the delay of 52 days in patients who had been staying in the city for 10 or more years. Among the patients who knew someone with TB prior to their own diagnosis, the total delay was 58 days.

Health seeking and other behavioural factors: Patients who first consulted a private or public health care provider had smaller total delays (53 and 42 days, respectively) than those who consulted a non-qualified health care provider (62 days). The mean total delay was highest for patients who visited only a private health facility (60 days) until treatment initiation and lowest for patients who visited only a public health facility (47 days) until the treatment initiation. The total delay increased as the number of consultation visits increased. To illustrate, the total delay was 33 days, 47 days and 74 days, for patients who visited a health care provider less than three times, between three to four times and more than five times, respectively. A longer total delay was noticed among patients who consumed alcohol or smoked tobacco prior to diagnosis. (Table-21)

The adjusted mean total delay in initiating TB treatment from the multiple regression model is given in Table-22. In the bivariate analysis, we identified two individual characteristics (age and caste/tribe), and one health seeking characteristic (total number of consultations) as significantly associated with the total delay at a p-value of under 10% level. The total delay in initiating TB treatment was found to be longer at 61 days for patients aged 50 years or above, as compared to 51 days for patients aged below 50 years. Similarly, patients who belonged to either the Scheduled Castes or the Scheduled Tribes had a significantly longer total delay in initiating TB treatment than non-Scheduled Caste and Tribe patients. The number of consultations made by the patient to the health care provider also significantly influenced the total delay. The mean total delay in initiating the treatment was about 49 days for the patients who had three or four consultation visits and 73 days for the patients who had 5 or more consultation visits, even after controlling for other significant factors.

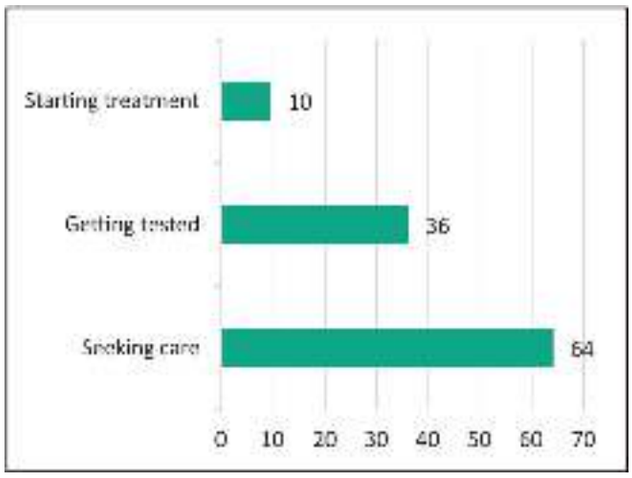
Table 22: Adjusted total delay in initiating the TB treatment using multiple regression model , by selected characteristics

Characteristic	Adjusted mean	95% CI	
		Lower	Upper
Age			
< 50 years	51.2	45.4	57.0
50+	61.4	50.0	72.8
Caste/Tribe			
Scheduled Caste or Scheduled Tribe	61.8	52.2	71.3
Others	49.8**	43.6	55.9
Number of consultation visits			
<3	31.7	20.7	42.7
3-4	48.5**	40.6	56.4
5+	73.4*	64.6	82.3
Constant	**53.3**	**48.2**	**58.5**

Note: Five HIV/AIDS patients have been excluded.
Two patients whose delay was not known have also been excluded.
*significant at p-value < 0.01; **significant at p-value < 0.05

We also asked all the patients whether they thought there was a delay in seeking care from the health care provider, a delay in getting tested for TB or a delay in starting the treatment for TB. Overall, 64%, 36% and 10% of the patients reported that they perceived a delay in seeking care, getting tested for TB, and starting treatment for TB, respectively. This indicates that more patients perceived there was patient delay, than either diagnosis or treatment delay.

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



Follow-up after treatment initiation

Table-23 provides the distribution of patients according to the number of days it took for a government grassroots health worker to visit the patient at home after their diagnosis. About one-quarter of the total patients were not visited by any government health worker at their home. Around 20% of females and 30% of males reported that they were not visited by the government health worker at their home after the diagnosis of TB. It is important to note that 21% of the patients reported that the government health worker visited their home on the day of diagnosis. The average delay in the government health worker's visit to the patient at their home was about four days.

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

Number of days between TB diagnosis and health worker's home visit	Sex of the respondent		
	Male	Female	Total
0	18.8	24.8	21.4
1-3 days	20.3	27.7	23.6
4-7 days	18.8	14.9	17.0
8+days	11.7	11.9	11.8
Not visited	30.5	20.8	26.2
Mean number of days	**4.64**	**4.17**	**4.42**
Total percent	100.0	100.0	100.0
Number of cases	128	101	229

We also captured the distance a patient had to travel from their home to the facility from where they received their TB medicine and the results are presented in Table-24. Nearly one-third of the patients lived within one kilometre of the DOTS centre while one-quarter of the patients lived three or more kilometres away from the DOTS centre. More female patients resided closer to the DOTS centre than male patients. The average distance to the DOTS centre was less than two kilometres.

56% of the patients reported that they had to pay for transportation to reach the facility. This amount, on average, was Rupees 63, for patients who had to pay for transportation. A little more than one-third of the patients reported that they had to pay less than Rupees 50 for travel to the DOTS centre. More females than males reported spending less than Rupees 50 on their travel to the DOTS centre. The expenditure for travel was slightly higher for males than females.

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

Distance and amount spent	Sex of the respondent		
	Male	Female	Total
Distance to the DOTS centre			
< 1 KM	31.3	31.7	31.4
1-2 km	21.1	28.7	24.5
2-3 km	20.3	16.8	18.8
3-4 km	9.4	12.9	10.9
4+ km	18.0	9.9	14.4
Mean distance	**2.08**	**1.56**	**1.85**
Whether pay for transportation to reach the facility			
Yes	56.3	54.5	55.5
No	43.8	45.5	44.5
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**128**	**101**	**229**
Amount spent on transportation			
<50 rupees	31.9	41.1	35.9
50-99 rupees	43.1	28.6	36.7
100+ rupees	23.6	26.8	25.0
No response	1.4	3.6	2.3
Mean amount spent	**64.59**	**60.35**	**62.76**
Total percent	**100**	**100**	**100**
Number of cases	**72**	**56**	**128**

Treatment and care-related issues

All the patients were asked if they were accompanied by anyone during their visit to the health care centre. Close to one-fifth of the patients reported that no one accompanied them before TB was diagnosed and this was reported more by males (25%) than females (11%). Spouses accompanied 27% of the patients and we did not notice any difference by sex of the respondent. Further, 21% of the patients were accompanied by their parents and this was reported more by females (29%) than males (15%). Other family members, such as children and siblings accompanied 15% and 10% of the patients, respectively (Table-25).

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

Relation with the accompanying person	Sex of the respondent		
	Male	Female	Total
No one accompanied	25.0	10.9	18.8
Wife/husband	27.3	26.7	27.1
Mother/father	14.8	28.7	21.0
Son/daughter	14.8	15.8	15.3
Sister/brother	10.9	8.9	10.0
Mother-in-law/ father-in-law	2.3	2.0	2.2
Brother-in-law/sister-in-law	0.8	1.0	0.9
Other relatives	2.3	3.0	2.6
Friend	1.6	1.0	1.3
Other	0.0	2.0	0.9
Total percent	**100**	**100**	**100**
Number of cases	**128**	**101**	**229**

The distribution of patients according to the person who informed them of their TB diagnosis as well as the patients' emotional status or reaction has been presented in Table-26. For a majority of the patients, the doctor was the person who disclosed the TB status to the patient. More males (98%) than females (90%) reported that the doctor told them about their TB status. In terms of emotional status after knowing about their TB status, 41% of the patients reported being depressed and 34% being afraid. More females (38%) than males (31%) were afraid after knowing that they had TB. About 11% of the patients did not believe that they had TB.

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

	Sex of the respondent		
	Male	Female	Total
Person who informed the respondent about their TB status			
Doctor	97.7	90.1	94.3
Government health worker	0.8	7.9	3.9
Relative	1.6	2.0	1.7

	Sex of the respondent		
	Male	Female	Total
Mood of the patient after knowing about their TB status			
Scared	30.5	37.6	433.6
Depressed	41.4	40.6	41.0
Angry	0.8	0.0	0.4
Did not believe	12.5	8.9	10.9
Other	14.8	12.9	14.0
Total percent	**100**	**100**	**100**
Number of cases	**128**	**101**	**229**

Personal habits such as alcohol consumption and tobacco usage before and after being diagnosed with TB, as well as changes in food habits, were also mapped. The results of these inquiries are given in Table-27. Both alcohol consumption and tobacco usage were reported to be negligible in females. 70% of the males reported that they consumed alcohol regularly before being diagnosed with TB and 60% reported stopping alcohol consumption after being diagnosed with TB. 55% of the males reported tobacco use before being diagnosed with TB. 42% of the males reported that they stopped tobacco use after being diagnosed with TB. This indicates that around 13% of the male patients continued to use tobacco even after knowing that they had TB.

With respect to the patient's food and eating habits after being diagnosed with TB, a quarter of the patients reported that they either did not change or reduced the quantity of food consumed. 62% of the patients reported that the quantity of food consumed was increased after being diagnosed with TB. After knowing about their TB diagnosis, around a quarter of the patients reported that they had increased the number of times food was eaten, and this was reported more by females (32%) than males (18%). Similarly, one-fifth of the patients reported that they changed the type of food consumed after being diagnosed with TB.

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

	Sex of the respondent		
	Male	Female	Total
Personal habits before being diagnosed with TB			
Drank alcohol			
Never consumed alcohol	30.5	99.0	60.7
Consumed alcohol every day	41.4	0.0	23.1
Consumed alcohol once a week	14.1	0.0	7.9
Consumed alcohol once a month	14.1	1.0	8.3
Smoked or consumed tobacco			
Never smoked/used tobacco	44.5	97.0	67.7
Smoked or used tobacco every day	53.9	3.0	31.4
Smoked or used tobacco once a week	1.6	0.0	0.9

	Sex of the respondent		
	Male	Female	Total
Personal habits after being diagnosed with TB			
Drink alcohol			
Never consume alcohol	30.5	99.0	60.7
Consume alcohol every day	2.3	0.0	1.3
Consume alcohol once a week	3.9	0.0	2.2
Consume alcohol once a month	3.1	0.0	1.7
Stopped drinking alcohol	60.2	1.0	34.1
Smoke or consume tobacco			
Never smoke/use tobacco	44.5	97.0	67.7
Smoke or use tobacco every day	5.5	1.0	3.5
Smoke or use tobacco once a week	4.7	0.0	2.6
Smoke or use tobacco once a month	3.1	0.0	1.7
Stopped smoking/tobacco use	42.2	2.0	24.5
Change in the food habit			
No change	14.1	7.9	11.4
Quantity of food reduced	16.4	9.9	13.5
Quantity of food increased	60.2	65.3	62.4
Type of food eaten changed	17.2	22.8	19.7
Number of times food is eaten reduced	11.7	15.8	13.5
Number of times food is eaten increased	18.0	31.7	24.0
Total percent	**100.0**	**100.0**	**100.0**
Number of cases	**128**	**101**	**229**

Table-28 presents the extent of disclosure of the patients' TB diagnosis and its impact on their relationships. About 34% of the respondents said that the TB patient should disclose their TB status to other people. The status of TB was disclosed to either friends or other relatives by one-third of the respondents. 22% of the patients said that their relationship with their family changed after they found out about their TB status. However, only 11% of the respondents reported a change in their relationship with friends or relatives upon disclosing their TB status.

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

	Sex of the respondent		
	Male	Female	Total
Whether people with TB should disclose their TB status			
Yes	35.9	31.7	34.1
No	64.1	68.3	65.9
Informed friends/relative that respondent had TB			
Yes	34.4	31.7	33.2
No	65.6	68.3	66.8
Relationship with family changed after knowing that the respondent had TB			
Yes	25.8	16.8	21.8
No	74.2	83.2	78.2
Relationship with friends/relatives changed after knowing that the respondent had TB			
Yes	9.4	12.9	10.9
No	90.6	87.1	89.1
Total percent	**100**	**100**	**100**
Number of cases	**128**	**101**	**229**

The patients also expressed their opinions about the kind of support needed for diagnosis or treatment of TB and their suggestions to help a person to get treatment for TB as soon as possible without delay. The frequently reported opinions about the kind of support needed for diagnosis of TB were that someone should accompany the patient to the hospital, provide information on testing centres, and provide financial support for travel and for TB testing. The most commonly expressed suggestions of the patients included, financial support for nutritious food and travel, and, family support for nutritious food and to help patients take their medicines. Suggestions to help a person initiate treatment for TB without delay and successfully complete treatment included consulting the doctor immediately, starting the treatment quickly, not being careless in seeking treatment, and taking the medicines on time and following the doctor's advice on treatment.

We also collected information on the amount spent by the patients on consultations, diagnostic tests, medicines and the total amount spent on each visit to the health care provider prior to treatment initiation. The mean and percentage distribution according to amount spent, by sex is given in Table-29. About a quarter of the patients did not spend any money on consultations. The mean consultation fee spent by the patient was Rupees 220. The consultation amount was Rupees 400 or more, for nearly 20% of patients. More females than males reported spending Rupees 400 or more on consultation fees.

A little over one-third of the patients did not spend any amount on diagnostic tests. More males (41%) than females (32%) reported not spending any money on diagnostic tests. The average expenditure for diagnostic tests was around Rupees 1350. However, 25% of the patients reported spending Rupees 2000 or more on diagnostic tests. 23% of the patients did not spend any money on medicines and 15% reported spending Rupees 2000 or more.

The average expenditure for medicine was estimated to be Rupees 970. 13% of the patients did not spend any money at all prior to treatment. The total mean amount spent prior to the TB treatment was about Rupees 2550. The total expenditure was more than Rupees 2000 for 42% of the patients. The total amount spent by the patient prior to the initiation of treatment did not differ by the sex of the patient.

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

Amount paid for (in Rupees)	Sex of the respondent		
	Male	Female	Total
Consultation			
No fee	24.2	25.0	24.6
1-199	39.5	27.0	33.9
200-399	24.2	22.0	23.2
400+	12.1	26.0	18.3
Mean consultation fee	**176.65**	**272.80**	**219.58**
Tests			
No fee	41.1	32.0	37.1
1-999	17.7	22.0	19.6
1000-1999	14.5	24.0	18.8
2000+	26.6	22.0	24.6
Mean test fee	**1416.01**	**1262.85**	**1347.63**
Medicine			
No fee	21	25.0	22.8
1-999	51.6	44.0	48.2
1000-1999	12.1	17.0	14.3
2000+	15.3	14.0	14.7
Mean expenditure on medicine	**958.75**	**978.86**	**967.73**
Total			
No fee	12.1	15.0	13.4
1-999	35.5	22.0	29.5
1000-1999	12.9	17.0	14.7
2000+	39.5	46.0	42.4
Mean total amount spent	**2551.41**	**2514.51**	**2534.94**
Number of cases	**124**	**100**	**224**

Note: Five HIV/ADIS patients have been excluded

Summary and conclusions

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

In Hyderabad district, we contacted 357 adult NSP patients, of which 229 adult NSP patients consented to be interviewed. Female patients were younger than male patients. More than a quarter of the adult NSP patients were illiterate. The result clearly indicates that visual and verbal communication strategies would be required to improve the prevention and control of TB among this strata of the population. There were more female Muslim patients than male. Females among Muslim population may require more focus in community-level intervention activities to improve their health seeking behaviour and increase demand for appropriate diagnostic tests. It is also important to note that around 13% of the patients spent one or more months away from their current place of residence. This has important ramifications for treatment access and adherence.

Nearly 42% of the adult NSP patients were in contact with a known TB patient before being diagnosed. Of these patients, 62% had been in contact with a TB patient within the last two years and 38%, longer than two years. This indicates that in order to identify more TB patients through contact screening, it should be carried out continuously for at least two years after treatment of the patient is completed and not just while the treatment is going on.

In addition to TB, around 28% of the adult NSP patients had an accompanying disease condition. Co-morbid conditions were reported more by males than females, and also by patients aged 50 and over. Special attention may be required for these patient subgroups for better TB care and management.

Almost one-third of the adult NSP patients consulted a health care provider five or more times prior to the initiation of treatment. It is apparent that multiple consultations with any health care provider may delay the initiation of TB treatment. So, it may be important to impart messages which urge patients to not shop around for qualified health care providers, especially after their TB diagnosis.

Once a person with signs and symptoms of TB has reached the health care provider, it may be important to recommend the appropriate diagnostic test to confirm the presence of TB. Invariably, recommending a sputum test was more common if the patient visited a public health facility, irrespective of the visit number. Since the number of patients consulting a private health care provider was relatively more in the first few visits, and recommending a sputum test was relatively less common, it may be important to convey the message that the person should demand the appropriate diagnostic test when they recognize the signs and symptoms of TB. Such a demand from persons symptomatic of TB may change the behaviour of the private health care providers and help them diagnose the illness early, reduce multiple consultations, as well as the delay in starting TB treatment. Missed diagnoses after diagnostic tests were also noticed. This may lead to a delay in starting the TB treatment, and also increase the number of consultation visits to the health care provider.

Nearly, one-quarter of the patients resided and travelled more than three km to reach the DOTS centre for getting treated. Slightly more males than females lived more than three km away from the DOTS centre. This may have implications on treatment completion, treatment adherence and treatment outcomes.

Out-of-pocket expenditure related to the current illness indicated that, on average, the patients spent around Rupees 2550 prior to TB treatment. Half of the total expenditure was on diagnostic tests. The total average expenditure, if the patient consulted only a government facility for the current illness, was Rupees 330 prior to TB treatment. This indicates that patients who made multiple visits, and consulted private facilities spent more out-of-pocket. In order to reduce the out-of-pocket expenditure, it may be important to educate the patients to

avoid multiple visits when having symptoms and signs of TB and also, to utilise the public sector facilities where TB services are available free of cost.

Almost 10% of the male patients continued to consume alcohol even after the diagnosis of TB. Drug side effects and toxicity were found to be more among patients who drank alcohol while taking TB medication. Around 13% of the male patients continued to smoke even after the diagnosis of TB. These patients may require interventions such as, counselling to encourage them to complete TB treatment.

Patient delay, which is understood here as the number of days taken to first consult a qualified health care provider after the start of symptoms, was an average of 20 days. Individual characteristics such as religion, monthly household income, duration of stay in the city, number of members in the household and habits such as consumption of alcohol and smoking, were found to have a significant association with patient delay in the bivariate analysis. Also, there was a high association of the facility visited first, with patient delay. For example, the mean patient delay (number of days taken to consult a qualified health care provider) was greater if the patient first neither consulted a health care provider at a public facility nor at a private health facility. Although we identified many individual characteristics associated with patient delay in the bivariate analysis, only monthly household income was identified to be influencing patient delay after controlling for other variables. Although we did not find any statistical significance in the patient delay for some individual characteristics, it may be important to focus on those subgroups of the population which have shown greater patient delay in the multivariate model with messages to consult a qualified health provider as soon as a person experiences the symptoms suggestive of TB. The subgroups of population to focus on with these messages are those who have stayed in the city for less than 10 years, whose household size is less than five members and those who consume alcohol and smoke.

Health system delay, which is the number of days taken to initiate TB treatment after consulting the first qualified health care provider (including government health facility, private health facility with allopathic doctor, referral hospitals such as Employees' State Insurance hospital, medical colleges or government TB hospital) was an average of 33 days. None of the individual characteristics showed any association with health system delay. However, the type of health facility first consulted, type of facility visited across all consultation visits, and multiple consultations, were found to be associated with health system delay. Mean health system delay was found to be shorter among patients who consulted a public health facility first, and also among patients who only visited a qualified health care provider at a government facility for all the consultations. The health system delay was 21 days and 15 days for patients who visited a public health care provider, and who visited only a public health facility, respectively. Multiple consultations are more likely to be a hindrance to diagnosis and initiating treatment for the patients.

As per the results of the multivariate regression analysis, only the number of consultation visits significantly influenced the health system delay. The result also highlights the importance of reducing multiple visits to the health facility, as well as going to the public health facility for consultation to minimise the health system delay. This also indicates the importance of behaviour change communication activities for the community members towards this aspect when they experience the symptoms and signs of TB. This is also indicative of the need for behaviour change among health care providers towards self-recommending the appropriate diagnostic test or through the patient demanding the appropriate diagnostic tests.

Health system delay was further divided into two; diagnostic delay (the number of days taken to diagnose TB through sputum test after visiting a qualified health care provider) and treatment delay (is the number of days taken to start the treatment after the diagnosis of pulmonary TB through sputum test). The results indicate that diagnostic delay was 28 days, and greater than the treatment delay of six days. These delays differed by gender of the patient, with females reporting longer delays than males. These delays were mainly influenced by both provider and individual behaviours. For example, our results for health system delay clearly indicate that multiple consultations by the individual patient was the most important factor influenced by individual behaviour. Multiple consultation visits by the patient may be due to the provider's behaviour of not recommending the appropriate diagnostic test and by extension, the appropriate treatment to help the patient.

Total delay, which is the combination of health system delay and patient delay, indicates that a major factor for a longer total delay was the number of consultation visits. Although not significant, the total delay was longer

for persons aged 50 years or more, and also for people belonging to the Scheduled Castes or Tribes. The result indicates that these subgroups of population may require more focus in order to reduce the total delay.

The results also indicate the quantum of contact screening required per index adult NSP patient, which is on average, 4.1 immediate household members, including 1.6 children under 18 years of age and 2.5 adult members. If there were 1000 sputum positive adult TB patients identified, screening may be required for 4100 household members, including 1600 children under age 18 years.

As per the RNTCP, one of the mandates of the front-line health worker is to verify the address of all diagnosed TB patients and educate them and their families on the plan of treatment. However, the results indicate that a little over 26% of the patients were not visited by the government health worker at their homes.

There are also, some limitations to the study. The various delays calculated were likely to be influenced by the recall bias of the patients. However, since we only included those adult NSP patients who initiated treatment during the three months prior to the survey, the recall bias in the number of consultation visits, type of provider visited for the consultation, duration between consultation visits, and duration between diagnosis and treatment may be minimal. Further, the study is based on the patients accessing the RNTCP services and we may not be able to generalise the delays as there could be patients accessing these services entirely in the private sector. However, results from the study do reveal that the health system delay is longer when patients consult only a private health care provider or shop around among public and private providers.

Programme implications and recommendations

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

The result also indicate that there is large patient delay in consulting a qualified provider for those TB patients who first consulted an unqualified health care provider such as an Ayurveda, homeopathy or Unani practitioner, or a pharmacist. More males also consulted an unqualified health care provider in the first three consultations. This delay may augment the incidence of TB infection in the community. The programme outreach activities by the community health worker at the city level, and obtaining information about people with symptoms suggestive of TB may change the health seeking behaviour of persons by influencing them to opt for appropriate health care facilities and qualified providers. Community-level structures envisaged under the programme, such as health information centres and engagement of key opinion leaders, may also play an important role in reducing both patient and health system delays. The trained volunteers managing the health information centres at the community level, will either refer the person identified as having presumptive TB, directly to the DMC for diagnosis or refer them to the community health worker, making the person choose the appropriate health care facility and diagnosis. Similarly, key opinion leaders at the community level should also support the programme by identifying the symptomatic patients from the community and refer them to the community health worker. This will reduce both the patient delay and health system delay, and also reduce the number of consultation visits made to various health care providers.

We also noticed a large health system delay, which mainly included a delay in diagnosis of TB. Sputum collection and transportation carried out under the programme, may reduce the health system delay by ensuring that the sputum samples reach the appropriate testing centre and obtaining the test results from the testing centre. Most frequently, the patients interviewed in the study expressed that someone should accompany the patient to the hospital, provide information on testing centres, provide financial support for travel and for TB testing, as the reasons for delay in diagnosis. In addition, the dissemination of information on testing centres and the referral of presumptive cases to the appropriate testing facility through community structures, could reduce the health system delay measured presently.

Recommendations for appropriate tests were found to be more common at public health facilities. However, most of the patients visited private providers in the first few consultations before moving to public health faculties. So, it may be important for the patient to demand the appropriate test, even when consulting a private health care provider. This will reduce the delay in diagnosis as well as reduce the number of consultations with providers. Further, this will lead to a behaviour change in the private provider when more and more presumptive TB patients demand the appropriate test for diagnosis. The community-level programme staff and the community structures established through the programme, should also make efforts to create an atmosphere among the community for demanding the appropriate diagnostic tests when they recognise the symptoms of TB.

We estimated that on an average, a patient spent around Rupees 2550 prior to the initiation of treatment from a public facility. As discussed, the dissemination of information on appropriate tests, availability of testing centres, diagnostic tests and community referrals will reduce the number of consultations. Consequently, they will be better informed about appropriate tests as well as the availability of free testing, thereby reducing the expenditure incurred prior to the initiation of treatment.

The study result emphasizes the need of screening diabetes patients for TB. In order to do this in Hyderabad, the project should collaborate with state health and non-communicable disease departments in screening diabetes patients in health camps. The presumptive TB cases identified through screening in such health camps may be referred by the project staff for testing. This will definitely reduce both the patient and health system delays.

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

Since more males visited an unqualified health care provider after the onset of symptoms suggestive of TB, the project plans to disseminate awareness on TB in labour camps and construction sites, and conduct street plays and IEC van shows in the evening hours, to help reach a larger male population. The project focuses more on counselling and soft skill training for persons who consume alcohol or smoke tobacco. Such activities may encourage them to go for diagnostic testing, thus reducing both patient and health system delays.

KEY LEARNINGS

- The mean patient and health system delays in Hyderabad among the adult NSP patient were 20 days and 34 days, respectively.
- Health system delay was mainly due to diagnostic delay, which was 28 days on average, while treatment delay was six days.
- In the first few consultations, more males consulted an unqualified health care provider.
- However, more females consulted private health care providers in the first few consultations.
- A recommendation for appropriate tests was more common among patients consulting a public health facility, irrespective of visit number.
- The average patient spent Rupees 2550 prior to TB treatment.
- About one-fifth of the NSP also had diabetes.
- Contact screening has to be carried out for at least two years in order to identify more patients of TB.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